KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

COMPLETION REPORT FOR MONITORING WELLS KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, KAFB-106247, KAFB-106V1, and KAFB-106V2 SOLID WASTE MANAGEMENT UNITS ST-106/SS-111

April 2021

377 MSG/CEI
2050 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117-5270

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Completion Report for Monitoring Wells KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, KAFB-106247, KAFB-106V1, and KAFB-106V2 Solid Waste Management Units ST-106/SS-111 Kirtland Air Force Base, New Mexico

April 2021

Prepared for
Kirtland Air Force Base
2050 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117-5270

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14. ABSTRACT

This report describes the installation of nine new nested groundwater monitoring wells (KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, and KAFB-106247) and two new nested soil vapor monitoring wells (KAFB-106V1 and KAFB-106V2) at Solid Waste Management Units ST-106/SS-111 at Kirtland Air Force Base, New Mexico.

15. SUBJECT TERMS

Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, RCRA, nested groundwater monitoring wells, nested soil vapor monitoring wells, permit, well survey, investigation-derived waste, waste disposal

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PREFACE

This Completion Report for Monitoring Wells has been prepared by EA Engineering, Science, and Technology, Inc., PBC (EA) for Kirtland Air Force Base (AFB) under the U.S. Army Corps of Engineers Contract Number W9128F-13-D-0006, Delivery Order DM02. This report describes the installation of nine nested groundwater and two nested soil vapor monitoring wells associated with Solid Waste Management Units ST-106/SS-111, Bulk Fuels Facility (BFF) at Kirtland AFB, New Mexico. This report was prepared in general accordance with the requirements of the Resource Conservation and Recovery Act permit issued to Kirtland AFB.

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
ARCH	air rotary casing hammer
BFF	Bulk Fuels Facility
bgs	below ground surface
EA	EA Engineering, Science, and Technology, Inc., PBC
ft	foot/feet
GWM	groundwater monitoring
IDW	investigation-derived waste
LNAPL	light non-aqueous phase liquid
NMED	New Mexico Environment Department
OD	outside diameter
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
SVM	soil vapor monitoring
TPH	total petroleum hydrocarbons

EXECUTIVE SUMMARY

The investigation and remediation of the Kirtland Air Force Base (AFB) Bulk Fuels Facility release (Solid Waste Management Units [SWMUs] ST-106/SS 111) are being implemented pursuant to the Resource Conservation and Recovery Act (RCRA) corrective action provisions in Part 6 of Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423 [RCRA Permit]) (New Mexico Environment Department [NMED], 2010). This completion report has been prepared to describe the installation activities associated with nine nested groundwater monitoring wells (KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, and KAFB-106247) and two nested soil vapor monitoring wells (KAFB-106V1 and KAFB-V2). The monitoring well installation, development, and surveying of the monitoring wells included in this report took place from October 5, 2018 to March 7, 2019.

The NMED requested in a letter dated December 9, 2019 that a stand-alone report containing the Data Gap Monitoring Well Installation information performed in 2018 (NMED, 2019a) be provided by October 1, 2020. This report combines the Source Area Characterization well completion information into one report. It is being provided to be consistent with the requirements of the December 9, 2019 NMED letter.

The installation and development of the monitoring wells were performed in accordance with the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling (Kirtland AFB, 2017). This Work Plan was approved with conditions by the NMED on February 23, 2018 (NMED, 2018).

The source zone characterization was performed to address data gaps in the horizontal and vertical extent of residual light non-aqueous phase liquid (LNAPL) both in the vadose zone and submerged in groundwater. The source zone characterization included sonic coring at 11 locations and collection of soil samples for chemical, physical, and biological analyses. Physical and chemical characterization was performed on residual LNAPL samples. All coring locations were completed as nested groundwater or vapor monitoring wells to augment the monitoring networks.

1. INTRODUCTION

EA Engineering, Science, and Technology, Inc., PBC installed nine nested groundwater monitoring (GWM) wells (KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, and KAFB-106247) and two soil vapor monitoring (SVM) wells (KAFB-V1 and KAFB-106V2) at Solid Waste Management Units (SWMUs) ST-106/SS-111, at Kirtland Air Force Base (AFB), New Mexico (Figures 1-1 and 1-2). The work was performed under the U.S. Army Corps of Engineers Contract Number W9128F-13-D-0006/Delivery Order DM02.

The SWMUs are known as the Bulk Fuels Facility (BFF). Environmental restoration efforts at the BFF are being performed pursuant to the corrective action provisions in Part 6 of Kirtland AFB's Resource Conservation and Recovery Act (RCRA) Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423 –"RCRA Permit") (New Mexico Environment Department [NMED], 2010). NMED is the lead regulatory agency (NMED, 2010).

The source zone characterization was performed to address data gaps in the horizontal and vertical extent of residual light non-aqueous phase liquid (LNAPL) both in the vadose zone and submerged in groundwater. The source zone characterization included sonic coring at 11 locations and collection of soil samples for chemical, physical, and biological analyses. Physical and chemical characterization was performed on residual LNAPL samples. All coring locations were completed as nested groundwater or vapor monitoring wells to augment the monitoring networks.

The installation and development of the monitoring wells were performed in accordance with the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling (Kirtland AFB, 2017). This document is listed as KAFB4543 in the NMED Facility Records. This Work Plan was approved with conditions by the NMED on February 23, 2018 and the document is listed as KAFB4656 in the NMED Facility Records (NMED, 2018). In a letter dated February 25, 2019, NMED required a report summarizing the findings (NMED, 2019). This document is listed as KAFB4780 in the NMED Facility Records. The report that was provided was the Source Zone Characterization Report (Kirtland AFB, 2019), that can be found at NMED Facility Records Identification KAFB4893.

Four Completion Reports for Monitoring Wells were prepared for these wells and were submitted as appendices to quarterly GWM reports. Well Completion Reports for KAFB-106S2, KAFB-106S4, KAFB-106S5, KAFB-106S8, KAFB-106S9, KAFB-106V1, and KAFB-106V2 were submitted with the first quarter 2019 report. Well Completion Reports for KAFB-106S1, KAFB-106S3, KAFB-106S7, and KAFB-106247 were submitted with the second quarter 2019 report. This document has been prepared to incorporate the drilling and installation of all of the wells into one report. The monitoring well installation, development, and surveying of the monitoring wells included in this report took place from October 5, 2018 to March 7, 2019.

The NMED requested, in a letter dated December 9, 2019, that a stand-alone report containing the Data Gap Monitoring Well Installation information performed in 2018 (NMED, 2019a) be provided by October 1, 2020 (listed as KAFB4915 in the NMED Facility Records). The purpose of this report is to combine the Source Zone Area Characterization well completion information into one report. It is being provided to be consistent with the requirements of the December 9, 2019 NMED letter.

2. DEVIATION

A deviation to the monitoring well installation was that KAFB-106247 was originally planned to be a background borehole located to the southeast of the source area where impacted soils were not expected to be encountered. However, conversion of this borehole to a monitoring well would also provide the opportunity to collect background groundwater samples. Based on this, it was later decided to convert the borehole into a monitoring well to assess future groundwater conditions (NMED, 2019b).

3. MONITORING WELL INSTALLATION PROGRAM

Nine nested GWM wells (KAFB-106S1, KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S5, KAFB-106S7, KAFB-106S8, KAFB-106S9, and KAFB-106247) were installed, developed, and surveyed between October 5, 2018 and March 7, 2019 (Figure 1-2). These new well locations were cored and sampled prior to well installation to address the data gaps of horizontal and vertical extent of LNAPL in the vadose zone and groundwater associated with the BFF.

Two nested SVM wells (KAFB-106V1 and KAFB-106V2) were installed and surveyed between October 18, 2018 and March 4, 2019. The purpose of the installation of the SVM wells was to assess the presence and nature of LNAPL in the subsurface and for use in a bioventing pilot test in support of the Corrective Measures Evaluation. Each of the SVM wells was installed with six nested vapor ports.

3.1 Groundwater Monitoring Well Installation

Monitoring well construction details were approved by NMED prior to the installation of each well nest. Regulatory correspondence documentation is provided in Appendix A.

The nested GWM wells were drilled using a combination of sonic coring and air rotary casing hammer (ARCH). Sonic coring was used to collect a continuous core across target depths. All cored borings were over-drilled using ARCH drilling to allow for installation of the monitoring wells. An 11.75-inch outside diameter (OD) drive casing was installed from ground surface to 200 ft below ground surface (bgs). A 9-5/8-inch OD drive casing was advanced from 160 to 200 ft bgs to the total depth of the boring. The lithologic boring logs are included in Appendix B.

Each nested well is comprised of one well screened across the water table and one vadose zone well. The vadose well was installed to function in the future with rising groundwater elevations (well construction diagrams are provided in Appendix C). Both monitoring wells were constructed using 3.5-inch OD Schedule 80 polyvinyl chloride (PVC) threaded casing. The water table wells were installed with a 40-ft screen length with approximately 15 ft of screen below the groundwater table. The vadose wells were completed with a 25-ft screen length. Each well is isolated from the other using a bentonite seal. Threaded well screens with a 0.010-inch slot screen size were used.

Following placement of the well string, a 10/20 silica sand filter pack was placed in the boring annulus from the bottom to approximately 2 ft above the well screen. A 5-ft thick bentonite chip seal was placed above the sand pack. Additional 10/20 silica sand was placed within the boring annulus from the bottom of the contingency well to approximately 2 ft above the well screen. Approximately 30 ft of bentonite chips was placed within the boring annulus above the upper silica sand filter pack. The bentonite chip seal was hydrated in lifts using a potable water source.

A high solids bentonite grout was placed in the annulus that extends from the upper bentonite chip seal to approximately 30 ft bgs (any grout settling was filled with bentonite chips to 30 ft bgs). A neat cement surface seal was installed over the grout seal and extended vertically up the well annulus to approximately 1 ft bgs.

Four of these new monitoring wells (KAFB-106S1, KAFB-106S5, KAFB-106S7, and KAFB-106S9) were completed as flush-mount wells. The flush mount wells were completed with an 18-inch diameter well vault surrounded by either a 2.5-ft × 2.5-ft × 10-inch thick concrete pad, a 3-ft × 3-ft × 4-inch thick concrete pad, or a 4-ft × 4-ft × 4-inch thick concrete pad at the ground surface. The well pad was sloped

to direct rainwater away from the well. The casings are sealed at the top with a locking well plug and vault covers have a security bolt.

Five of these wells (KAFB-106S2, KAFB-106S3, KAFB-106S4, KAFB-106S8, and KAFB-106247) were completed as aboveground wells. The aboveground well completion consisted of a 12-inch diameter steel surface casing placed to approximately 3 ft above ground surface to protect the inner well casings. The surface casing is locked with a padlock and the casings are sealed at the top with a locking well plug. The aboveground well completion was placed within a 4-ft × 4-ft × 4-inch thick concrete pad. Four protective steel bollards were installed at the corners of the pad.

Well construction details and annular volumes (theoretical and actual) for nested wells KAFB-106S1 through KAFB-106247 are listed in Tables 3-1 and 3-2, respectively.

3.2 Monitoring Well Development

After well construction was completed, the water table wells were developed in accordance with the Work Plan (Kirtland AFB, 2017) and the completion dates are listed below. Well development was initiated no sooner than 48 hours from setting well seals (Well Development Forms are included in Appendix D).

Prior to development, water levels and total depths were gauged in the wells with an electronic water level indicator. Development was accomplished by surging and bailing to remove fines in the filter pack. Wells were developed until a minimum of five casing volumes were removed and minimize development water turbidity as much as possible within the five casing volume target. Development water was contained in 55-gallon steel drums with water-tight lids and transferred to the EA investigation-derived waste (IDW) yard located on Kirtland AFB for waste characterization. Monitoring well development records are provided in Appendix D.

3.3 Soil Vapor Monitoring Well Installation

SVM well drilling, lithologic logging, and well installation were completed in accordance with the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling (Kirtland AFB, 2017). The nested SVM wells were drilled using a combination of sonic coring and ARCH methods. Sonic coring was used to collect a continuous core from ground surface to total depth. The cored borings were over-drilled using ARCH drilling to allow for installation of the SVM wells. An 11.75-inch OD drive casing was installed following coring from ground surface to the total depth of each SVM well to facilitate construction.

Each SVM well is comprised of six 0.75-inch OD Schedule 80 PVC threaded nested vapor probes with 2 ft of screen each targeting different depths of the vadose zone (well construction diagrams are provided in Appendix C). Each vapor probe is isolated from the others using a hydrated bentonite chip seal. Well screens are 0.010-inch slot screen size.

Following placement of each well string, a 10/20 silica sand filter pack was placed in the boring annulus from the bottom to approximately 1 ft above the well screen. A bentonite chip seal was placed above the sand pack to approximately 1 ft bgs. Approximately 96 ft of bentonite chips was placed within the boring annulus above the upper silica sand filter pack. The bentonite chip seal was hydrated in lifts using a potable water source.

The SVM wells were completed as flush-mount wells. The flush mount wells were completed with an 18-inch diameter well vault surrounded by a 4-ft × 4-ft × 4-inch thick concrete pad at the ground surface. The well pad was sloped to direct rainwater away from the well.

Drilling of both SVM wells began on October 18, 2018 and was completed on January 24, 2019. Well construction details and annular volumes (theoretical and actual) for KAFB-106V1 and KAFB-106V2 are listed in Table 3-2 and 3-3. Both wells were completed in the vadose zone above the water table and, therefore, well development was not required.

3.4 Monitoring Well Survey

In accordance with the Work Plan (Kirtland AFB, 2017), a registered New Mexico professional land surveyor surveyed the horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface elevation. Horizontal coordinates were measured relative to the New Mexico State Plane Coordinate System, Central Zone, North American Datum of 1983. Horizontal positions were measured to the nearest 0.1 ft, and vertical elevations were measured to the nearest 0.01 ft. The registered New Mexico professional land surveyor provided the coordinates listed in Table 3-4 and are provided in Appendix E. The locations of the monitoring wells are shown on Figure 1-2. Elevations of well construction materials are presented in Table 3-5.

4. INVESTIGATION-DERIVED WASTE MANAGEMENT

Management of IDW was performed in accordance with Section 8 of the Work Plan (Kirtland AFB, 2017) that was approved with conditions (NMED, 2018). The IDW produced during the GWM well installation consisted of soil cuttings, drilling liquids, decontamination water, and well development water. Both hazardous and non-hazardous waste was generated during well installation process. Solid and liquid IDW was segregated and placed in roll-off bins or 55-gallon steel drums pending waste characterization. Quantities of IDW are listed in Table 41.

4.1 Drill Cuttings

One, representative, five-point composite soil characterization sample was collected from each roll-off bin in accordance with the receiving waste facility requirements. The soil was tested using the Toxicity Characteristic Leaching Procedure for volatile organic compounds, semi-volatile organic compounds, pesticides, herbicides, and RCRA metals as required for acceptance by the Kirtland AFB Construction and Demolition Landfill. Additional analyses were performed for total petroleum hydrocarbons (TPH)-gasoline range organics, TPH-diesel range organics, TPH-motor oil range organics, reactivity cyanide/sulfide, ignitability, and corrosiveness (pH) using EPA-approved methods . Samples were analyzed by Hall Environmental Analysis Laboratory, Albuquerque, New Mexico. The laboratory analytical results are provided in Appendix F

The non-hazardous soil drill cuttings from the well installation that met the waste acceptance criteria were disposed of at the Kirtland AFB Construction and Demolition Landfill. Soil drill cuttings that were characterized as special waste was disposed of at the Waste Management Rio Rancho Landfill. . The roll-offs consisting of cuttings and plastic liners were transported to the Kirtland AFB Construction and Demolition Landfill.

4.2 Monitoring Well Development Water

Monitoring well development water management was performed in accordance with Section 8 of the Work Plan (Kirtland AFB, 2017). The development water was analyzed for RCRA metals; ethylene dibromide; dissolved iron and manganese; and benzene, toluene, ethylbenzene, and total xylenes. Purge water IDW samples were collected using a new disposable bailer. One composite development water sample was collected for each well. The samples were analyzed by Hall Environmental Analysis Laboratory results are provided in Appendix G. Non-hazardous, development water that met the groundwater treatment system maximum contaminant acceptance concentrations was discharged to the BFF groundwater treatment system. The GWTS maximum acceptance concentrations are discussed in Technical Memorandum Establishing Basis of Design Maximum Concentrations for the Kirtland Bulk Fuels Facility Groundwater Treatment System dated May 10, 2017. This document is listed as KAFB4523 in the NMED Facility Records. Water IDW disposal is also discussed in the Operations and Maintenance Plan for the Groundwater Treatment System (Kirtland AFB, 2016) that was approved by NMED (NMED, 2016). These documents are listed as KAFB4440 and KAFB4644 in the NMED Facility Records, respectively.

Development water generated from monitoring wells within the groundwater contamination plume can be characteristically hazardous due to benzene concentrations exceeding the 5.0 mg/l Federal standard. Hazardous, or potentially hazardous development liquids were placed in steel, 55-gallon drums and transferred to a RCRA <90-day accumulation areas designated for the BFF project. The waste was properly managed at the <90-day area until disposal could be scheduled. Kirtland AFB personnel review and approve all hazardous waste manifests for off-site disposal. All hazardous waste is disposed at a

permitted hazardous waste disposal facility and transported by a licensed hazardous waste transport company.

4.3 Decontamination Wastes

Drilling equipment was decontaminated prior to the drilling and construction of each nested well. The equipment was decontaminated in a mobile decontamination pad using a high-pressure steam cleaner. The wastewater generated by the equipment decontamination process was placed in a 20,000-gallon storage tank located at the laydown yard. Water that met groundwater treatment system acceptance criteria was treated through the groundwater treatment system and discharged to the Kirtland AFB Tijeras Arroyo Golf Course. The remaining non-hazardous high solids, water, mud, and sand were transported by Advanced Chemical Transport, Inc. to the Twin Enviro Services Penrose, Colorado disposal facility.

5. REFERENCES

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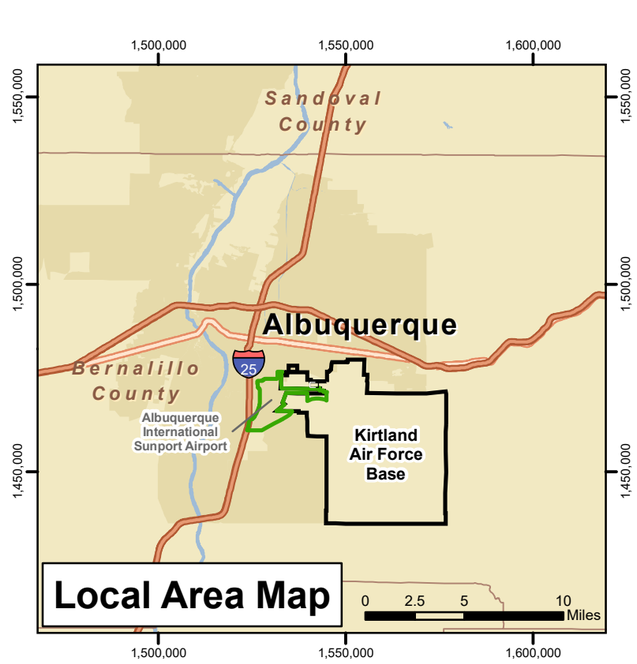
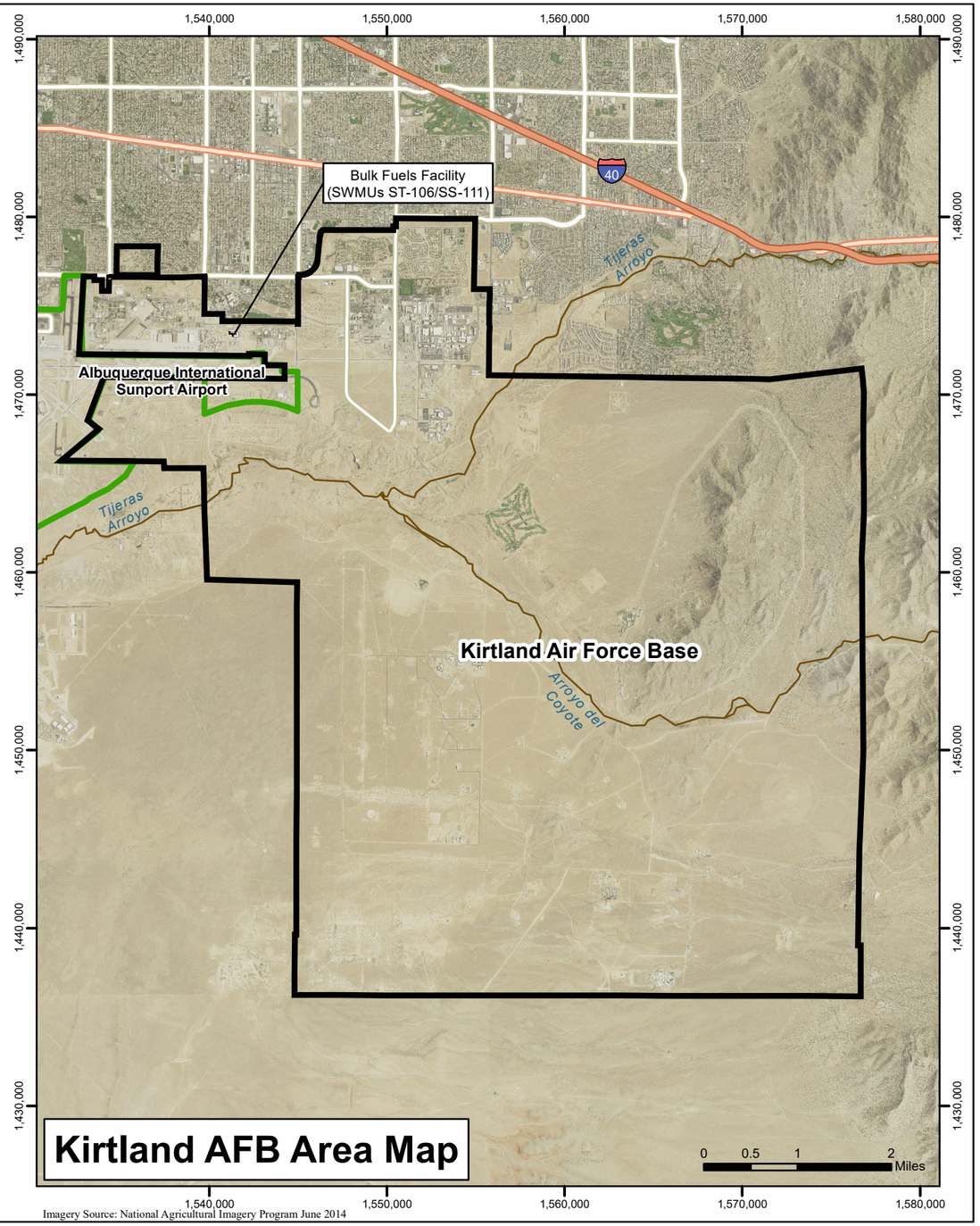
NMED. 2019a. Correspondence from Mr. Dave Cobrain, Program Manager to Colonel David S. Miller, Base Commander, 377 AB/CC, Kirtland AFB, NM and Lt. Wayne J. Acosta, Civil Engineer Office, 377 Civil Engineering Division, Kirtland AFB, NM, *re: Bulk Fuels Facility Spill, Solid Waste Management Unit ST-106/SS-11, Kirtland Air Force Base,* EPA ID# NM9570024423, HWB-KAFB-19-MISC. December 2019.

NMED. 2019b. *Approval to Not Install KAFB-106S6 and Relocate KAFB-106247* by Mr. Dennis McQuillan, Chief Scientist. January 25

FIGURES





Imagery Source: National Agricultural Imagery Program June 2014

Legend

- Kirtland Air Force Base Installation Boundary
- Albuquerque International Sunport Airport
- Major Highways
- Highways
- Major Roads
- Arroyos
- Rivers
- Source Area

Note:
SWMUs = solid waste management units

N

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

COMPLETION REPORT FOR
MONITORING WELLS
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-1

SITE LOCATION MAP

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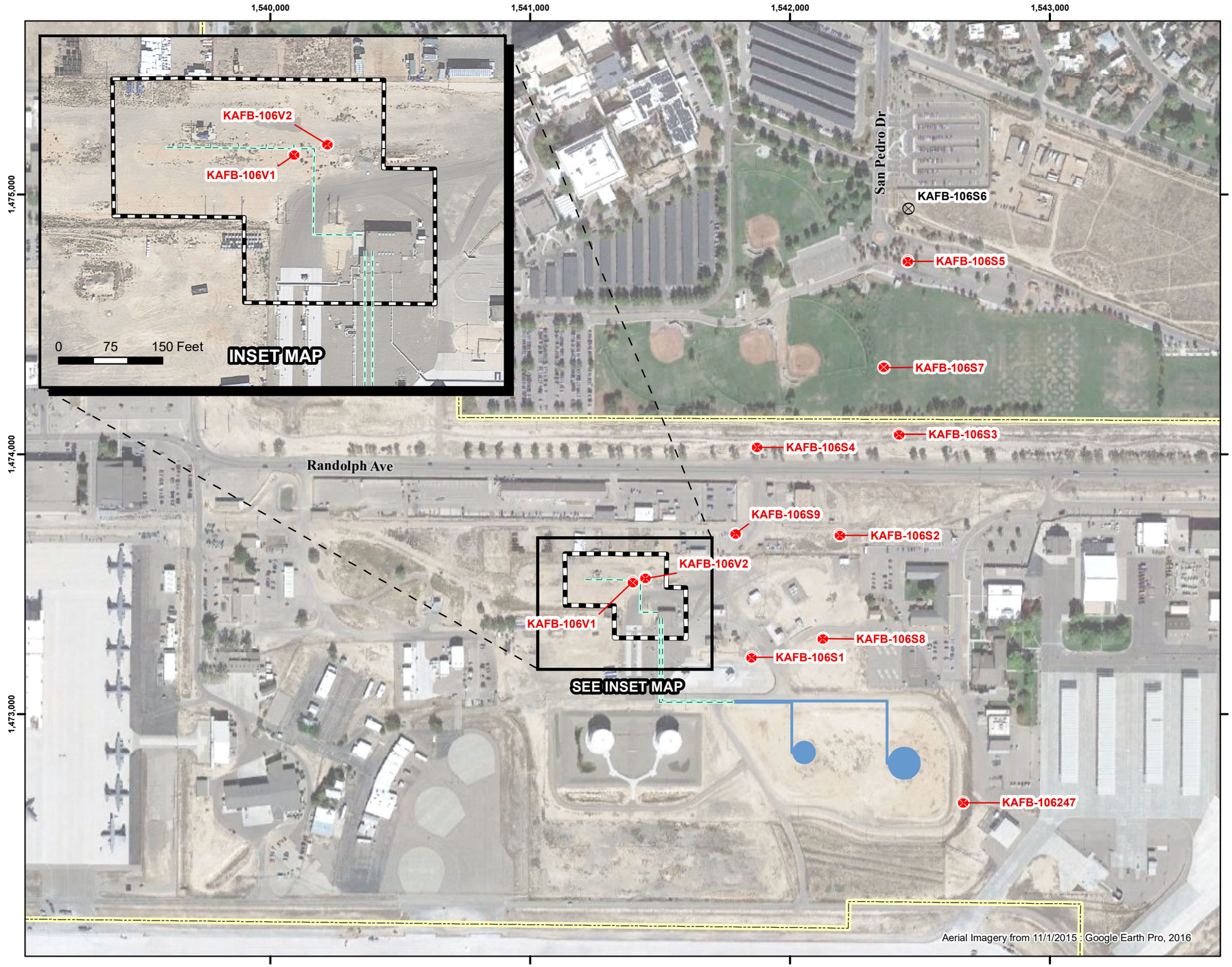
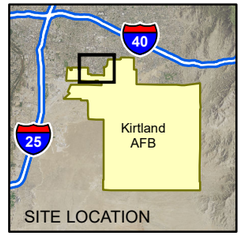


Legend

- Completed Continuous Core Location
- Optional Continuous Core Location (not drilled)
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Kirtland Air Force Base Installation Boundary
- Source Area

Notes:
KAFB-106S6 was an optional coring location that was not required based on Kirtland AFB and NMED review of field screening data from KAFB-106S5 (NMED, 2019b).
AFB = air force base
NMED = New Mexico Environment Department



N

0 200 400 800
Feet
1 inch = 400 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

COMPLETION REPORT FOR
MONITORING WELLS
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-2

LOCATION OF NESTED MONITORING WELLS

P:\Projects\Kirtland\Figures\KAFB_Coring_Program_Well_Completion\MXD\1-2_Nested_MW_Locations.mxd 3/26/2020 EA ecarpio

TABLES

Table 3-1
Well Construction Details for Nested Wells KAFB-106S1 through KAFB-106247

					3.5-inch Outside Diameter, Schedule 80 PVC					
	Bentonite Pellets		10/20 Silica Sand		Blank Casing		Screen		Sump	
Interval Designation	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
KAFB-106S1-447	440	445	445	495	0.5	447	447	487	487	489
KAFB-106S1-413	377.5	411	411	440	0.5	413	413	438	438	440
KAFB-106S2-451	444	448.8	448.8	502	-2.5	451	451	491	491	493
KAFB-106S2-417	384	415.1	415.1	444	-2.5	417	417	442	442	444
KAFB-106S3-449	441.8	447	447	512	-2.4	449	449	489	489	491
KAFB-106S3-415	380	412.5	412.5	441.8	-2.4	414.8	414.8	439.8	439.8	441.8
KAFB-106S4-446	438.9	443.3	443.3	497	-2.5	446	446	486	486	488
KAFB-106S4-412	375.9	409.9	409.9	438.9	-2.5	412	412	437	437	439
KAFB-106S5-446	438.8	444.3	444.3	500	0.5	446	446	486	486	488
KAFB-106S5-412	375.7	409.5	409.5	438.8	0.5	412	412	437	437	439
KAFB-106S7-451	443.9	449	449	505	0.3	451	451	491	491	493
KAFB-106S7-417	384.8	414.9	414.9	443.9	0.3	417	417	441.9	441.9	443.9
KAFB-106S8-451	444	449.3	449.3	496	-2.45	451	451	491	491	493
KAFB-106S8-417	384.7	414.6	414.6	444	-2.5	417	417	442	442	444
KAFB-106S9-447	440.1	444.9	444.9	496	0.8	447	447	487	487	489
KAFB-106S9-413	377	408.8	408.8	440.1	0.8	413	413	438	438	440
KAFB-106247-450	442.8	448	448	500	-2.06	450	450	490	490	492
KAFB-106247-416	378	413	413	442.8	-2	416	416	441	441	443

All measurements are in ft bgs.

Cement seal interval: 0-30 ft bgs.

Hydrated uncoated 3/8-inch bentonite chip interval: 30-46 ft bgs.

High solids bentonite grout interval: 46-377.5 ft bgs.

Screen is 0.010-inch slot.

bgs = below ground surface

ft = feet

PVC = polyvinyl chloride

Table 3-2
Annular Material Volumes for Monitoring Wells

Well Identification	Cement Seal Interval		Volumes (cubic feet)		High Solids Bentonite Grout Interval		High Solids Bentonite Grout Volumes (cubic feet)		Total Filter Pack Volumes (cubic feet)		Total Seal Volumes (cubic feet)	
			Theoretical (borehole)	Actual			Theoretical (borehole)	Actual				
	Top (ft bgs)	Bottom (ft bgs)			Top (ft bgs)	Bottom (ft bgs)			Theoretical (borehole)	Actual	Theoretical (borehole)	Actual
KAFB-106S1	1	30	17.96	16.06	46	377.5	161.35	139.98	33.10	46.43	24.55	20.71
KAFB-106S2	2	31	17.96	14.03	48	384	162.53	117.22	34.67	31.38	24.19	16.46
KAFB-106S3	2	30	17.34	14.03	41	380	157.95	119.67	40.79	39.00	21.17	14.33
KAFB-106S4	3.7	30	16.29	12.72	30	375.9	170.67	124.02	34.92	30.50	14.57	12.46
KAFB-106S5	0	28	17.34	27.4	28	375.7	171.83	354.23	38.05	56.50	14.75	14.50
KAFB-106S7	1	30	18.58	16.06	30	384.8	173.98	151.09	36.13	26.17	13.42	10.84
KAFB-106S8	1	30	17.96	16.06	40	384.7	167.75	134.28	31.60	24.68d	19.63	14.97
KAFB-106S9	0	32	19.82	27.94	31	377	170.46	334.18	41.59	57.00	13.92	16.50
KAFB-106247	0	30	18.58	15.54	40	378	165.26	132.41	34.41	32.00	21.48	15.25
KAFB-106V1	1	3	1.47	0.86	NR	NR	NR	NR	21.19	49	173.51	120
KAFB-106V2	1	3	1.47	0.86	NR	NR	NR	NR	20.87	49	186.52	120

ft bgs = feet below ground surface

NR = not recorded

Table 3-3
Well Construction Details for Nested Soil Vapor Monitoring Wells KAFB-106V1 and KAFB-106V2

					3/4-inch Outside Diameter, Schedule 80 PVC					
	Bentonite Pellets		10/20 Silica Sand		Blank Casing		Screen		Sump	
Interval Designation	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
KAFB-106V1-102	3	99	99	103.5	0.5	100.1	100.1	102.1	102.1	102.5
KAFB-106V1-113	103.5	109.5	109.5	114.6	0.5	110.6	110.6	112.6	112.6	113
KAFB-106V1-160	114.6	156.5	156.5	161.2	0.5	157.6	157.6	159.6	159.6	160
KAFB-106V1-217	161.2	214	214	218	0.5	215.1	215.1	217.1	217.1	217.5
KAFB-106V1-252	218	248.8[a]	248.8	253	0.5	250.1	250.1	252.1	252.1	252.5
KAFB-106V1-263	253	260	260	266	0.5	260.6	260.6	262.6	262.6	263
KAFB-106V2-102	3	98.5	98.5	103.5	0.5	100.2	100.2	102.2	102.2	102.6
KAFB-106V2-117	103.5	113.9	113.9	118.5	0.5	115.1	115.1	117.1	117.1	117.5
KAFB-106V2-160	118.5	156.1	156.1	161.5	0.5	157.9	157.9	159.9	159.9	160.3
KAFB-106V2-217	161.5	213.2	213.2	218.7	0.5	215.1	215.1	217.1	217.1	217.5
KAFB-106V2-252	218.7	249.5	249.5	253.5	0.5	250.2	250.2	252.2	252.2	252.6
KAFB-106V2-270	253.5	266.4	266.4	270.2	0.5	267.55	267.55	269.55	269.55	269.95

[a]There is a 4-ft section of 10/20 silica sand within the bentonite plug; from 231 to 235 ft bgs.
All measurements are in ft bgs.
Cement seal interval: 1 - 3 ft bgs.
Screen is 0.010-inch slot.
bgs = below ground surface
ft = feet
PVC = polyvinyl chloride

Table 3-4
Survey Coordinates and Elevations for Groundwater and Soil Vapor Monitoring Wells

Well Identification		State Plane Coordinate System (NAD83)		Elevations (NAVD88)	
		Northing (ft)	Easting (ft)	Top of PVC Casing (ft above mean sea level)	Top of Concrete/Ground (ft above mean sea level)
KAFB-106V1	KAFB-106V1-102	1473505.97	1541395.12	5343.26	5343.57
	KAFB-106V1-113	1473505.62	1541395.62	5343.24	
	KAFB-106V1-160	1473505.39	1541395.28	5343.26	
	KAFB-106V1-217	1473505.76	1541394.95	5343.25	
	KAFB-106V1-252	1473505.59	1541395.22	5343.25	
	KAFB-106V1-263	1473505.75	1541395.29	5343.26	
KAFB-106V2	KAFB-106V2-102	1473521.12	1541443.66	5343.47	5343.88
	KAFB-106V2-117	1473520.95	1541443.51	5343.46	
	KAFB-106V2-160	1473521.18	1541443.45	5343.5	
	KAFB-106V2-217	1473521.03	1541443.27	5343.49	
	KAFB-106V2-252	1473521.09	1541443.06	5343.51	
	KAFB-106V2-270	1473521.28	1541443.28	5343.49	
KAFB-106247	KAFB-106247-416	1472657.82	1542665.809	5350.72	5348.72
	KAFB-106247-450	1472657.798	1542666.173	5350.78	
KAFB-106S1	KAFB-106S1-413	1473216.855	1541851.285	5344.68	5345.2
	KAFB-106S1-447	1473216.755	1541850.937	5344.69	
KAFB-106S2	KAFB-106S2-417	1473687.22	1542191.37	5351.82	5349.33
	KAFB-106S2-451	1473687.54	1542191.48	5351.82	
KAFB-106S3	KAFB-106S3-415	1474075.65	1542418.47	5350.45	5348.01
	KAFB-106S3-449	1474075.66	1542418.88	5350.45	
KAFB-106S4	KAFB-106S4-412	1474026.57	1541872.34	5346.11	5343.61
	KAFB-106S4-446	1474026.65	1541872.75	5346.11	
KAFB-106S5	KAFB-106S5-412	1474742.29	1542453.71	5343.16	5343.52
	KAFB-106S5-446	1474742.59	1542453.32	5343.09	
KAFB-106S7	KAFB-106S7-417	1474334.77	1542360.92	5348.58	5348.88
	KAFB-106S7-451	1474334.55	1542361.21	5348.57	

Table 3-4
Survey Coordinates and Elevations for Groundwater and Soil Vapor Monitoring Wells

Well Identification		State Plane Coordinate System (NAD83)		Elevations (NAVD88)	
		Northing (ft)	Easting (ft)	Top of PVC Casing (ft above mean sea level)	Top of Concrete/Ground (ft above mean sea level)
KAFB-106S8	KAFB-106S8-417	1473288.63	1542125.84	5350.95	5348.45
	KAFB-106S8-451	1473288.32	1542125.67	5350.90	
KAFB-106S9	KAFB-106S9-413	1473692.91	1541782.91	5345.01	5345.79
	KAFB-106S9-447	1473692.77	1541783.29	5344.98	

ft = feet

NAD83 = North American Datum of 1983

NAVD88 = North American Vertical Datum of 1988

PVC = polyvinyl chloride

Table 3-5
Elevations for Groundwater and Soil Vapor Monitoring Well Construction Materials

Well Location ID	Northing (ft)	Easting (ft)	Top of Ground Surface Elevation	Top of Casing Elevation	Bottom of Casing Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Top of Sump Elevation	Bottom of Sump Elevation	Top of Bentonite Grout Elevation	Bottom of Bentonite Grout Elevation	Top of Bentonite Chips Elevation	Bottom of Bentonite Chips Elevation	Top of Sand Pack Elevation	Bottom of Sand Pack Elevation
KAFB-106V1-102	1473505.97	1541395.12	5343.57	5343.07	5243.47	5243.47	5241.47	5241.47	5241.07	NA	NA	5340.57	5244.57	5244.57	5240.07
KAFB-106V1-113	1473505.62	1541395.62	5343.57	5343.07	5232.97	5232.97	5230.97	5230.97	5230.57	NA	NA	5240.07	5234.07	5234.07	5228.97
KAFB-106V1-160	1473505.39	1541395.28	5343.57	5343.07	5185.97	5185.97	5183.97	5183.97	5183.57	NA	NA	5228.97	5187.07	5187.07	5182.37
KAFB-106V1-217	1473505.76	1541394.95	5343.57	5343.07	5128.47	5128.47	5126.47	5126.47	5126.07	NA	NA	5182.37	5129.57	5129.57	5125.57
KAFB-106V1-252	1473505.59	1541395.22	5343.57	5343.07	5093.47	5093.47	5091.47	5091.47	5091.07	NA	NA	5125.57	5094.77[a]	5094.77	5090.57
KAFB-106V1-263	1473505.75	1541395.29	5343.57	5343.07	5082.97	5082.97	5080.97	5080.97	5080.57	NA	NA	5090.57	5083.57	5083.57	5077.57
KAFB-106V2-102	1473521.12	1541443.66	5343.88	5343.38	5243.68	5243.68	5241.68	5241.68	5241.28	NA	NA	5340.88	5245.38	5245.38	5240.38
KAFB-106V2-117	1473520.95	1541443.51	5343.88	5343.38	5228.78	5228.78	5226.78	5226.78	5226.38	NA	NA	5240.38	5229.98	5229.98	5225.38
KAFB-106V2-160	1473521.18	1541443.45	5343.88	5343.38	5185.98	5185.98	5183.98	5183.98	5183.58	NA	NA	5225.38	5187.78	5187.78	5182.38
KAFB-106V2-217	1473521.03	1541443.27	5343.88	5343.38	5128.78	5128.78	5126.78	5126.78	5126.38	NA	NA	5182.38	5130.68	5130.68	5125.18
KAFB-106V2-252	1473521.09	1541443.06	5343.88	5343.38	5093.68	5093.68	5091.68	5091.68	5091.28	NA	NA	5125.18	5094.38	5094.38	5090.38
KAFB-106V2-270	1473521.28	1541443.28	5343.88	5343.38	5076.33	5076.33	5074.33	5074.33	5073.93	NA	NA	5090.38	5077.48	5077.48	5073.68
KAFB-106247-450	1472657.798	1542666.173	5348.72	5350.78	4898.72	4898.72	4858.72	4858.72	4856.72	5308.72	4970.72	4905.92	4900.72	4900.72	4848.72
KAFB-106247-416	1472657.82	1542665.809	5348.72	5350.72	4932.72	4932.72	4907.72	4907.72	4905.72	5308.72	4970.72	4970.72	4935.72	4935.72	4905.92
KAFB-106S1-447	1473216.855	1541851.285	5345.20	5344.70	4898.20	4898.20	4858.20	4858.20	4856.20	5299.20	4967.70	4905.20	4900.20	4900.20	4850.20
KAFB-106S1-413	1473216.755	1541850.937	5345.20	5344.70	4932.20	4932.20	4907.20	4907.20	4905.20	5299.20	4967.70	4967.70	4934.20	4934.20	4905.20
KAFB-106S2-451	1473687.54	1542191.48	5349.33	5351.83	4898.33	4898.33	4858.33	4858.33	4856.33	5301.33	4965.33	4905.33	4900.53	4900.53	4847.33
KAFB-106S2-417	1473687.22	1542191.37	5349.33	5351.83	4932.33	4932.33	4907.33	4907.33	4905.33	5301.33	4965.33	4965.33	4934.23	4934.23	4905.33
KAFB-106S3-449	1474075.66	1542418.88	5348.01	5350.41	4899.01	4899.01	4859.01	4859.01	4857.01	5301.01	4968.01	4906.21	4901.01	4901.01	4836.01
KAFB-106S3-415	1474075.65	1542418.47	5348.01	5350.41	4933.21	4933.21	4908.21	4908.21	4906.21	5301.01	4968.01	4968.01	4935.51	4935.51	4906.21
KAFB-106S4-446	1474026.65	1541872.75	5343.61	5346.11	4897.61	4897.61	4857.61	4857.61	4855.61	5313.61	4967.71	4904.71	4900.31	4900.31	4846.61
KAFB-106S4-412	1474026.57	1541872.34	5343.61	5346.11	4931.61	4931.61	4906.61	4906.61	4904.61	5313.61	4967.71	4967.71	4933.71	4933.71	4904.71
KAFB-106S5-446	1474742.59	1542453.32	5343.52	5343.02	4897.52	4897.52	4857.52	4857.52	4855.52	5315.02	4967.82	4904.72	4899.22	4899.22	4843.52
KAFB-106S5-412	1474742.29	1542453.71	5343.52	5343.02	4931.52	4931.52	4906.52	4906.52	4904.52	5315.02	4967.82	4967.82	4934.02	4934.02	4904.72
KAFB-106S7-451	1474334.55	1542361.21	5348.88	5348.58	4897.88	4897.88	4857.88	4857.88	4855.88	5318.88	4964.08	4904.98	4899.88	4899.88	4843.88
KAFB-106S7-417	1474334.77	1542360.92	5348.88	5348.58	4931.88	4931.88	4906.98	4906.98	4904.98	5318.88	4964.08	4964.08	4933.98	4933.98	4904.98
KAFB-106S8-451	1473288.32	1542125.67	5348.45	5350.90	4897.45	4897.45	4857.45	4857.45	4855.45	5308.45	4963.75	4904.45	4899.15	4899.15	4852.45
KAFB-106S8-417	1473288.63	1542125.84	5348.45	5350.95	4931.45	4931.45	4906.45	4906.45	4904.45	5308.45	4963.75	4963.75	4933.85	4933.85	4904.45
KAFB-106S9-447	1473692.77	1541783.29	5345.79	5344.99	4898.79	4898.79	4858.79	4858.79	4856.79	5281.79	4968.79	4905.69	4900.89	4900.89	4849.79
KAFB-106S9-413	1473692.91	1541782.91	5345.79	5344.99	4932.79	4932.79	4907.79	4907.79	4905.79	5281.79	4968.79	4968.79	4936.99	4936.99	4905.69

[a]There is a 4-ft section of 10/20 silica sand within the bentonite plug; from 231 to 235 ft below ground surface.
All units in feet above mean sea level.
ft = foot/feet
ID = identification
NA = not applicable

Table 4-1
Investigation-Derived Waste Quantities

Well Identification	Container	IDW Volume	IDW Type	Characterization Determination	Disposal Date	Disposal Location
KAFB-106V1 and KAFB-106V2	Roll-off no. KAFB-106V1/V2-1	12 cubic yards	Soil	Non-hazardous special waste	1/25/2019	WM
	Roll-off no. KAFB-106V1/V2-2	10 cubic yards	Soil	Non-hazardous special waste	2/20/2019	WM
	Roll-off no. KAFB-106V1/V2-3	12 cubic yards	Soil	Non-hazardous special waste	3/13/2019	WM
KAFB-106247	Roll-off no. KAFB-106247-1	13 cubic yards	Soil	Non-hazardous	3/13/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106247-2	10 cubic yards	Soil	Non-hazardous	4/10/2019	Twin Enviro
	Roll-off no. KAFB-106247-3	10 cubic yards	Soil	Non-hazardous	4/10/2019	Twin Enviro
	Roll-off no. KAFB-106247-4[a]	2 cubic yards	Mud & Water	Non-hazardous	4/10/2019	Twin Enviro
	Steel drum no. KAFB-106247-DW-1	50 gallons	Water & Sand	Non-hazardous	4/1/2019	GWTS
	Steel drum no. KAFB-106247-DW-2	50 gallons	Water & Sand	Non-hazardous	4/1/2019	GWTS
KAFB-106S1	Roll-off no. KAFB-106S1-1	14 cubic yards	Soil	Non-hazardous	1/14/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S1-2	2 cubic yards	Soil	Non-hazardous	1/23/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S1-3	13 cubic yards	Soil	Non-hazardous	3/15/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S1-4	13 cubic yards	Soil	Non-hazardous	3/15/2019	Kirtland AFB C&D
	Steel Drum no. KAFB-106S1-DW-1	50 gallons	Water & Sand	Hazardous	4/24/2019	ACT
	Steel Drum no. KAFB-106S1-DW-2	50 gallons	Water & Sand	Hazardous	4/24/2019	ACT
KAFB-106S2	Roll-off no. KAFB-106S2-1	16 cubic yards	Soil	Non-hazardous	1/8/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S2-2	3 cubic yards	Soil	Non-hazardous special waste	1/9/2019	WM
	Roll-off no. KAFB-106S2-2	20 gallons	Water	Non-hazardous	1/29/2019	GWTS
	Roll-off no. KAFB-106S2-3	12 cubic yards	Soil	Non-hazardous	1/8/2019	Kirtland AFB C&D
	Steel Drum no. KAFB-106S2-DM-1	45 gallons	Water & Sand	Hazardous	2/11/2019	ACT
	Steel Drum no. KAFB-106S2-DM-2	50 gallons	Water & Sand	Hazardous	2/11/2019	ACT
KAFB-106S3	Roll-off no. KAFB-106S3-1	18 cubic yards	Soil	Non-hazardous	12/14/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S3-2	5 cubic yards	Soil	Non-hazardous	1/8/2019	Kirtland AFB C&D
	Steel Drum no. KAFB-106S3-DM-1	53 gallons	Water & Sand	Hazardous	2/11/2019	ACT
	Steel Drum no. KAFB-106S3-DM-2	55 gallons	Water & Sand	Hazardous	2/11/2019	ACT
KAFB-106S4	Roll-off no. KAFB-106S4-1	17 cubic yards	Soil	Non-hazardous	11/16/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S4-2	5 cubic yards	Soil	Non-hazardous	1/4/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S4-3	3 cubic yards	Soil	Non-hazardous	1/8/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S4-3	20 gallons	Water	Non-hazardous	1/29/2019	GWTS
	Steel Drum no. KAFB-106S4-DM-1	50 gallons	Water & Sand	Non-hazardous	1/28/2019	GWTS
	Steel Drum KAFB-106S4-DM-2	36 gallons	Water & Sand	Non-hazardous	1/28/2019	GWTS
KAFB-106S5	Roll-off no. KAFB-106S5-1	16 cubic yards	Soil	Non-hazardous	10/31/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S5-2	10 cubic yards	Soil	Non-hazardous	11/16/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S5-3	2 cubic yards	Soil	Non-hazardous	12/13/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S5-3	20 gallons	Water	Non-hazardous	11/30/2018	GWTS

Table 4-1
Investigation-Derived Waste Quantities

Well Identification	Container	IDW Volume	IDW Type	Characterization Determination	Disposal Date	Disposal Location
	Roll-off no. KAFB-106S5-4	7 cubic yards	Mud	Non-hazardous	2/22/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S5-4	55 gallons	Water	Non-hazardous	11/30/2018	GWTS
	Steel Drum no. KAFB-106S5-DM-1	48 gallons	Water & Sand	Hazardous	2/11/2019	ACT
	Steel Drum no. KAFB-106S5-DM-2	50 gallons	Water & Sand	Hazardous	2/11/2019	ACT
KAFB-106S7	Roll-off no. KAFB-106S7-1	12 cubic yards	Soil	Non-hazardous	2/20/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S7-2	13 cubic yards	Soil	Non-hazardous	2/20/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S7-3	6 cubic yards	Soil	Non-hazardous	3/12/2019	Kirtland AFB C&D
	Steel Drum no. KAFB-106S7-DW-1	50 gallons	Water & Sand	Hazardous	4/24/2019	ACT
	Steel Drum no. KAFB-106S7-DW-2	48 gallons	Water & Sand	Hazardous	4/24/2019	ACT
KAFB-106S8	Roll-off no. KAFB-106S8-1	9 cubic yards	Soil	Non-hazardous	3/13/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S8-2	15 cubic yards	Soil	Non-hazardous	3/12/2019	Kirtland AFB C&D
	Roll-off no. KAFB-106S8-3	8 cubic yards	Soil	Non-hazardous	3/13/2019	Kirtland AFB C&D
	KAFB-106S8-DW-1	50 gallons	Water & Sand	Hazardous	4/24/2019	ACT
	KAFB-106S8-DW-2	40 gallons	Water & Sand	Hazardous	4/24/2019	ACT
KAFB-106S9	Roll-off no. KAFB-106S9-1	16 cubic yards	Soil	Non-hazardous	11/16/2018	Kirtland AFB C&D
	Roll-off no. KAFB-106S9-2	6 cubic yards	Soil	Non-hazardous	1/9/2019	WM
	Roll-off no. KAFB-106S9-2	75 gallons	Water	Non-hazardous	1/29/2019	GWTS
	Roll-off no. KAFB-106S9-3	14 cubic yards	Soil	Non-hazardous	12/13/2018	Kirtland AFB C&D
	Steel Drum no. KAFB-106S9-DM-1	40 gallons	Water & Sand	Hazardous	2/11/2019	ACT
	Steel Drum no. KAFB-106S9-DM-2	45 gallons	Water & Sand	Hazardous	2/11/2019	ACT
	Steel Drum no. KAFB-106S9-DM-3	20 gallons	Water & Sand	Hazardous	2/11/2019	ACT

ACT = Advanced Chemical Transport, Inc.
AFB = Air Force Base
C&D = construction and demolition
GWTS = groundwater treatment system
IDW = investigation-derived waste
no. = number
Twin Enviro = Twin Enviro Services in Penrose, Colorado
WM = Waste Management

Table 3-4
Survey Coordinates and Elevations for Groundwater and Soil Vapor Monitoring Wells

Well Identification		State Plane Coordinate System (NAD83)		Elevations (NAVD88)	
		Northing (ft)	Easting (ft)	Top of PVC Casing (ft above mean sea level)	Top of Concrete/Ground (ft above mean sea level)
KAFB-106S8	KAFB-106S8-417	1473288.63	1542125.84	5350.95	5348.45
	KAFB-106S8-451	1473288.32	1542125.67	5350.90	
KAFB-106S9	KAFB-106S9-413	1473692.91	1541782.91	5345.01	5345.79
	KAFB-106S9-447	1473692.77	1541783.29	5344.98	

ft = feet

NAD83 = North American Datum of 1983

NAVD88 = North American Vertical Datum of 1988

PVC = polyvinyl chloride

APPENDICES

APPENDIX A

REGULATORY CORRESPONDENCE

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, NM 87502-5469
Telephone (505) 827-2855 Fax (505) 827-2836
www.env.nm.gov

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 23, 2018

Colonel Richard W. Gibbs
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Mr. Chris Segura
Chief, Installation Support Section
AFCEC/CZOW
2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

RE: WORK PLAN FOR VADOSE ZONE CORING, VAPOR MONITORING, AND WATER SUPPLY SAMPLING, REVISION 2
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Gibbs and Mr. Segura:

The New Mexico Environment Department ("NMED") is in receipt of the Kirtland Air Force Base ("KAFB") ("Permittee") *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Revision 1* ("Work Plan"), dated December 15, 2017. The Work Plan addresses activities to be performed at the Bulk Fuels Facility ("BFF") site, including:

- Continuous coring and sample collection from up to twelve (12) boring locations;
- Installation of soil vapor monitoring ("SVM") points in three continuous coring locations;
- Installation of dual-completion soil vapor/groundwater monitoring wells in up to eight (8) boring locations;
- Vadose zone monitoring, maintenance, and reporting of existing SVM network; and
- Sampling and reporting for water supply wells.

The data collected under the Work Plan will provide critical data to address the existing data gap which is complicating efforts to define the nature and extent of light non-aqueous phase liquid ("LNAPL") at the Site along with allowing the Permittee to estimate the remaining mass of LNAPL. Further, as indicated in the Work Plan, the data will also be important for development of treatability studies at the BFF site in support of the Corrective Action process.

As stated in the Work Plan (Section 3.1.1), when the fuel leak began, the water table was likely higher than today. As the water table dropped over time due to increased demand and pumping of the aquifer, a "smear zone" was created. Therefore, the vertical extent of LNAPL is from a maximum elevation of the LNAPL layer above the highest historical water table elevation to the minimum elevation of LNAPL-water interface at the lowest water table elevation. The horizontal extent can be anticipated to be variable over time, with LNAPL migrating some distance over time, even as the water table dropped. An additional level of complexity is how the LNAPL thickness over time will be affected by the submergence of water table well screens, as the water table has rebounded since 2009. The coring locations, depths, and procedures provided in the Work Plan were scoped and designed over a series of technical working groups to most effectively and efficiently characterize the LNAPL remaining in the subsurface and understand any potential sources that remain.

An additional key component of the Work Plan is the installation of groundwater monitoring wells screened across the water table at the coring locations. With the rising water table, the majority of the water table groundwater monitoring well network has become submerged, resulting in a loss of data refinement at the water table for both dissolved-phase contaminants and measurable LNAPL thickness. A newly installed groundwater monitoring well, KAFB-106MW1, is monitored in support of the in-situ bioremediation pilot test and had measurable LNAPL in September and October 2017. This occurrence of LNAPL in a water table groundwater monitoring well, along with concentration data from 2017, indicates that LNAPL is present in sufficient quantities at the water table to enter a monitoring well in a measurable thickness.

The Work Plan is hereby approved, subject to the following conditions:

1. Photoionization detector ("PID") readings will be collected every twenty (20) feet from the ground surface to the top of the 1970 high water mark, at which point the frequency shall be increased to at least every ten (10) feet in order to capture zones of residual fuel contamination in the vadose zone.
2. Coring intervals will begin at least ten (10) feet above the 1970s high water mark, which is equivalent to the 1960s high water mark. Coring intervals may be changed based upon preceding coring and field data, and will be conveyed by the Permittee to NMED for approval prior to implementing changes in coring depths.
3. Figure 3-7 indicates that mineralogical and microbial data will only be collected from samples within the saturated and or smear zone. The Permittee shall propose, for NMED approval, unsaturated zone coring intervals for source area locations KAFB 106V1 and KARB-106V2 where these analyses also will be conducted.

4. Coring location KAFB-106S7 will remain as optional, pending the results obtained from coring locations KAFB-106S3 and KAFB-106S5.
5. Background coring ST-106 SBBG shall be the last drilling location. The Permittee and NMED shall meet to discuss observations and test results from other coring locations, and the Permittee shall propose to NMED for approval, coring intervals and analyses for ST-106 SBBG that will provide actual background data to use for screening data and informing decisions. The Permittee and NMED shall meet and agree on coring intervals and analyses for ST-106 SBBG, as expeditiously as possible, so as not to incur drilling down-time or a separate mobilization.
6. If the location of background well ST-106 SBBG becomes problematic due to its closeness to the airport runway, the Permittee shall propose, and obtain NMED approval for, a new location.
7. The Permittee shall core and install a groundwater monitoring well at location KAFB-106S5 first, so that information from this well can be used to monitor contamination conditions south of groundwater extraction well KAFB-106239.
8. During drilling, the Permittee shall provide a PDF copy of lithologic logs daily along with an update email documenting daily and planned activities. A well approval form with the proposed screen intervals for groundwater monitoring well completions must be submitted for NMED approval prior to the start of well construction. NMED understands the importance of no field delays and will return the approved well form within one working day of receipt.
9. This approval also applies to the drilling and construction of soil vapor monitoring and injection wells, injection points, and an air lift well that will be used in bioventing and air lift pilot tests. NMED is currently reviewing the full workplans for these pilot tests and will provide the Permittee with comments in the near future, but the Permittee is authorized to proceed with the drilling and construction of these wells and points.
10. Prior to drilling de-mobilization, and after the coring program has generated additional data, NMED and the Permittee shall meet to discuss feasibility of continuous coring and groundwater monitoring well installation at locations near KAFB-106MW1, where LNAPL was measured in September and October 2017, and KAFB-106018 where measurable LNAPL and high dissolved-phase hydrocarbons have been detected in the past.

If you have any questions regarding this letter, please contact NMED, Chief Scientist Dennis McQuillan at (505) 827-2140.

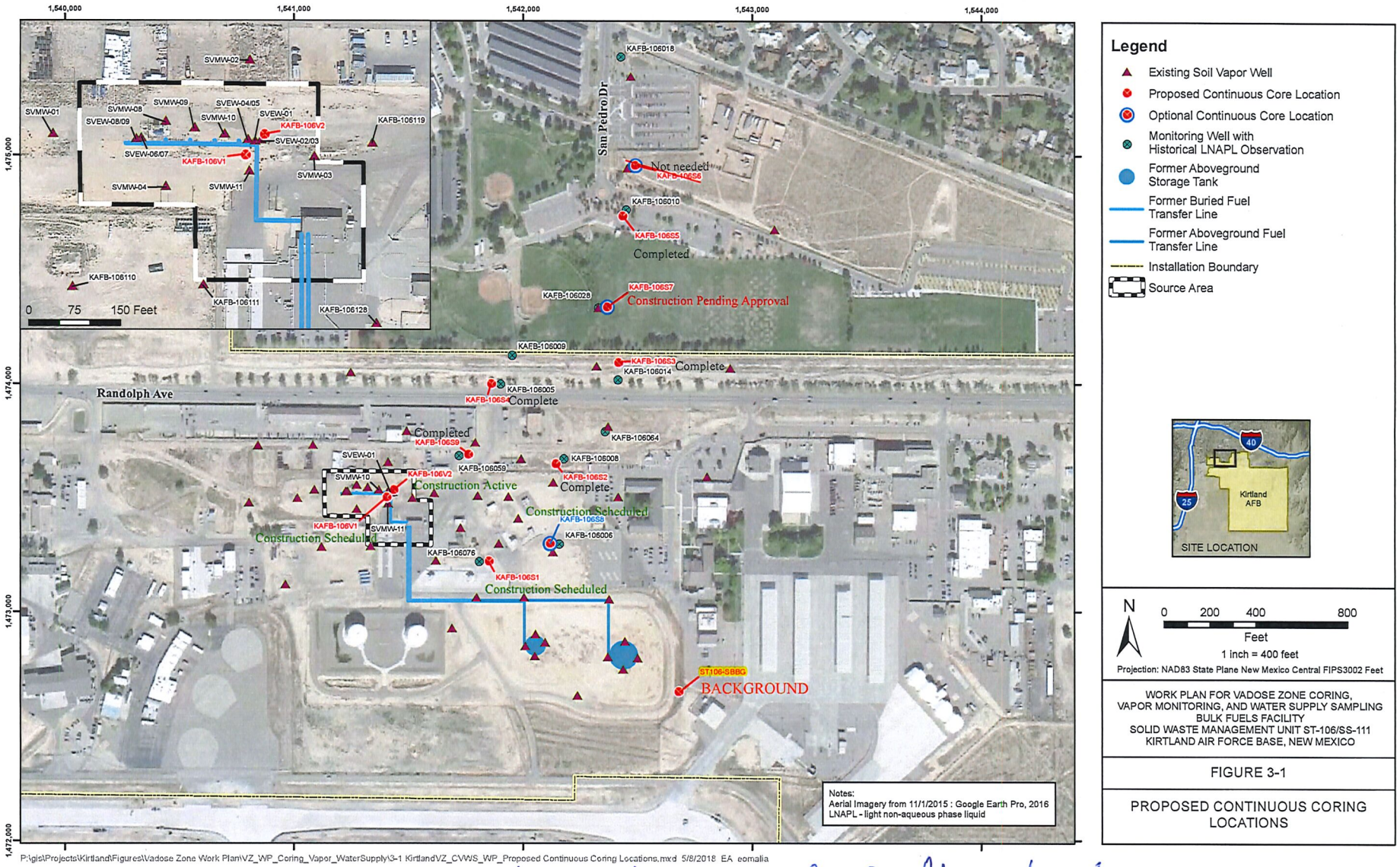
Sincerely,

JCB

Juan Carlos Borrego
Deputy Secretary
Environment Department

cc: Col. M. Harner, KAFB
K. Lynnes, KAFB
B. Renaghan, AFCEC
H. O'Grady, KAFB-AFCEC
T. Simpler, USACE
Bart Faris, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
B. Salem, NMED-HWB
S. Pullen, NMED-GWQB
M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

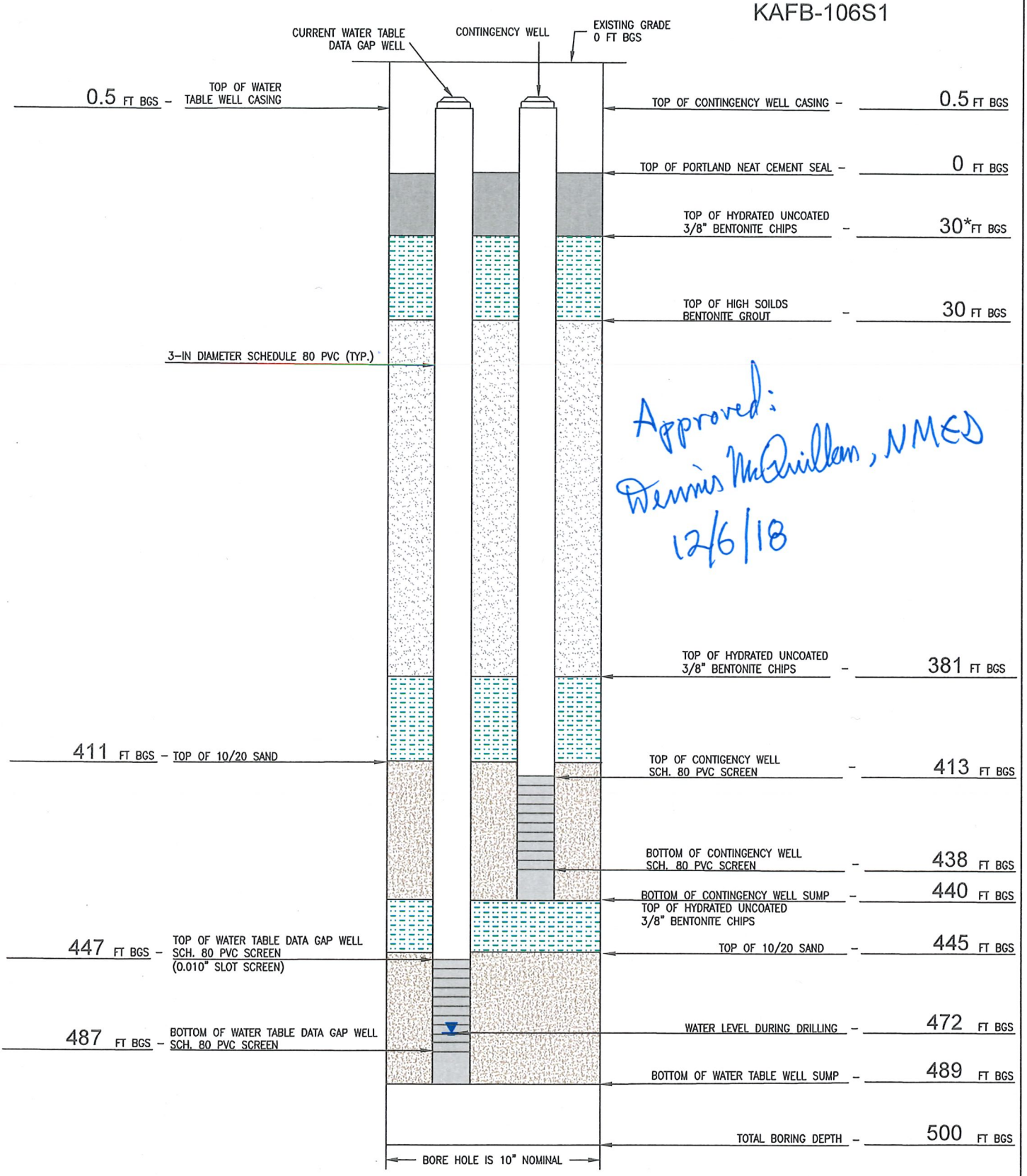
File: KAFB 2018 Bulk Fuels Facility Spill



Approved: Dennis McQuillen 1/25/19

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S1



*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

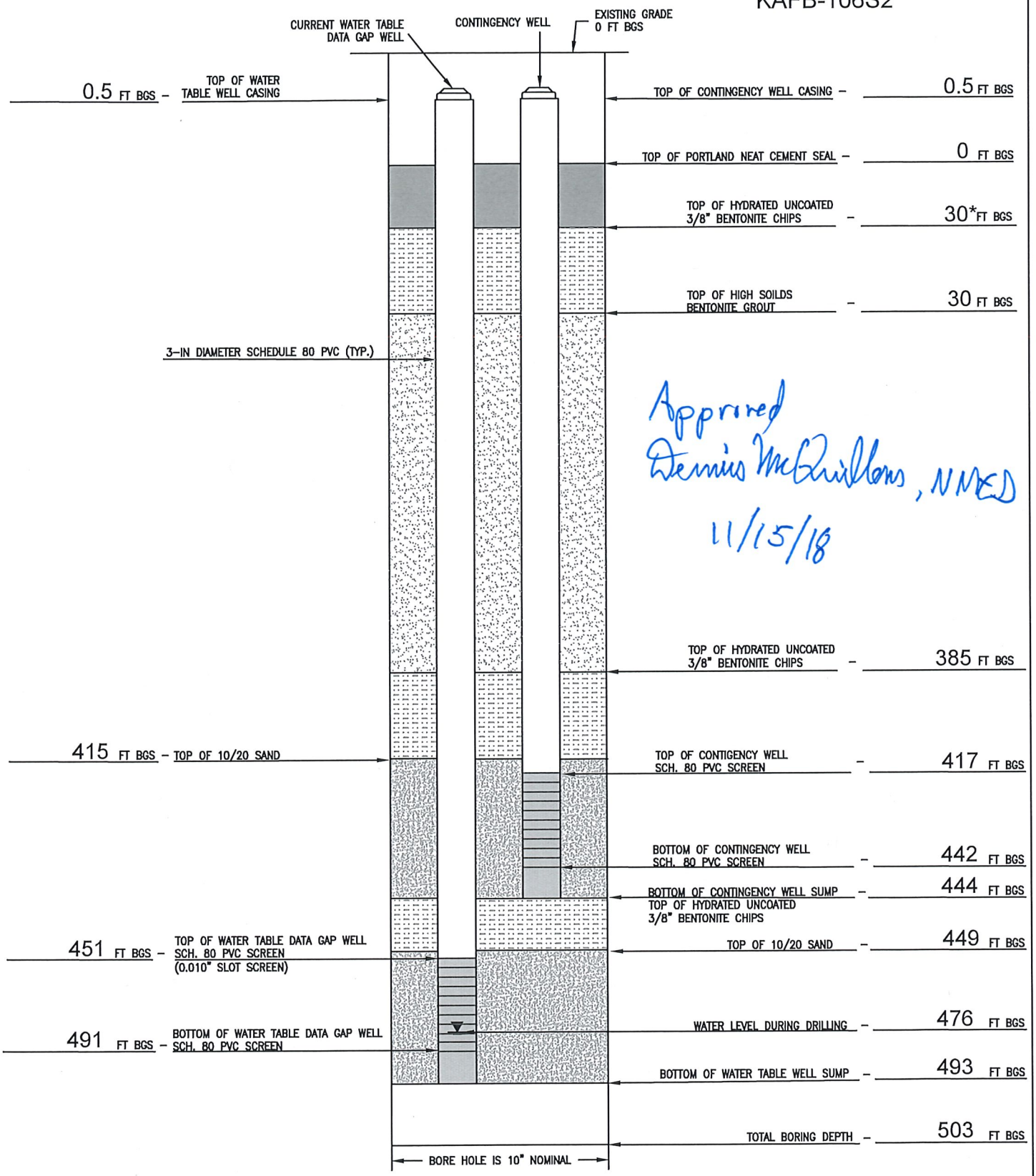
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 01JAN19/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S1	GEOLOGIST: MESSENGER	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62598DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S2



Approved
Dennis McQuillan, NMED
11/15/18

*Additional bentonite chips may be added to account for bentonite grout settlement.

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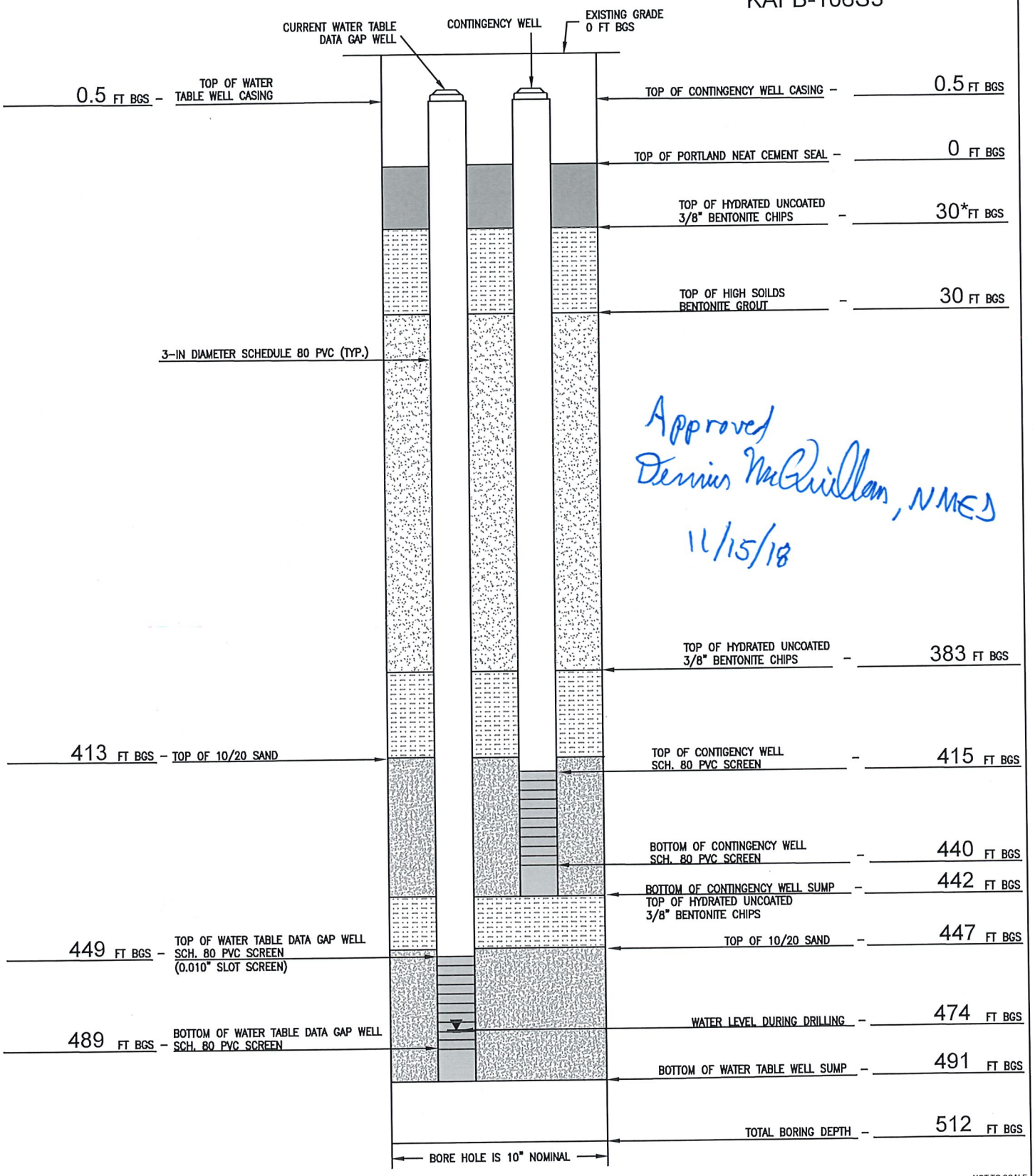
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 19OCT18/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S2	GEOLOGIST: ANDRESS	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62735DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S3



Approved
Dennis McQuillan, NMED
11/15/18

*Additional bentonite chips may be added to account for bentonite grout settlement.

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320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 27NOV18/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S3	GEOLOGIST: Messenger/Andress	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62599DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Nothven\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

Bockisch, Bernard

From: McQuillan, Dennis, NMENV <dennis.mcquillan@state.nm.us>
Sent: Tuesday, November 13, 2018 1:00 PM
To: Moayyad, Behnaum CIV USARMY CESPA (US)
Cc: Jercinovic, Devon; Bockisch, Bernard; Cordova, Amy Elizabeth CIV USARMY CESPA (USA); Dreeland, Linda E CIV USARMY CESPA (US); Kunkel, Tara S CIV USARMY CESPA (US); Phaneuf, Mark J CIV USARMY CESPA (US); RENAGHAN, BRIAN J GS-13 USAF AFMC AFCEC/CZRX; Scott C. Clark (scott.clark@us.af.mil); Kathryn D Lynnes (kathryn.lynnes@us.af.mil)
Subject: RE: Kirtland BFF- Request for KAFB-106S4 Well Construction Approval - SUSPENSE 9 NOV COB (UNCLASSIFIED)

Ben,

Our printer has been down today. This well construction is approved and I will email you a signed copy when our printers return to service.

Dennis McQuillan
Chief Scientist
New Mexico Environment Department
1190 St. Francis Dr.
PO Box 5469
Santa Fe, NM 87502
505-827-2140 desk
505-660-1592 cell
dennis.mcquillan@state.nm.us

-----Original Message-----
From: Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>
Sent: Sunday, November 11, 2018 6:42 PM
To: McQuillan, Dennis, NMENV <dennis.mcquillan@state.nm.us>
Cc: Jercinovic, Devon <djercinovic@eaest.com>; Bockisch, Bernard <bbockisch@eaest.com>; Cordova, Amy Elizabeth CIV USARMY CESPA (USA) <Amy.E.Cordova@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; RENAGHAN, BRIAN J GS-13 USAF AFMC AFCEC/CZRX <brian.renaghan@us.af.mil>; Scott C. Clark (scott.clark@us.af.mil) <scott.clark@us.af.mil>; Kathryn D Lynnes (kathryn.lynnes@us.af.mil) <kathryn.lynnes@us.af.mil>
Subject: [EXT] RE: Kirtland BFF- Request for KAFB-106S4 Well Construction Approval - SUSPENSE 9 NOV COB (UNCLASSIFIED)

Importance: High

CLASSIFICATION: UNCLASSIFIED

Hi Dennis.
Well construction is scheduled to begin Monday 12 Nov. Please review well construction request at your earliest convenience.

Thank you,
Ben Moayyad
USACE-Albuquerque
Mobile: (505) 639-3195

NOTICE: THE OFFICE IS UNDER CONSTRUCTION AND THE OFFICE PHONE LINE IS NOT AVAILABLE.

-----Original Message-----
From: Moayyad, Behnaum CIV USARMY CESPA (US)
Sent: Wednesday, November 7, 2018 4:50 PM
To: Dennis McQuillan (dennis.mcquillan@state.nm.us) <dennis.mcquillan@state.nm.us>
Cc: Jercinovic, Devon <djercinovic@eaest.com>; 'Bockisch, Bernard' <bbockisch@eaest.com>; Cordova, Amy Elizabeth CIV USARMY CESPA (USA) <Amy.E.Cordova@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; RENAGHAN, BRIAN J GS-13 USAF AFMC AFCEC/CZRX <brian.renaghan@us.af.mil>; Scott C. Clark (scott.clark@us.af.mil) <scott.clark@us.af.mil>; Kathryn D Lynnes (kathryn.lynnes@us.af.mil) <kathryn.lynnes@us.af.mil>
Subject: Kirtland BFF- Request for KAFB-106S4 Well Construction Approval - SUSPENSE 9 NOV COB (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Dennis,
On behalf of the Air Force, USACE is requesting approval for wells construction at the third core location KAFB-106S4 by the end of the work week (9 Nov COB). The proposed well design is attached (first attachment). Well construction is scheduled to begin at this location on Monday 12 Nov.

Well Screen Determination:
Information from the borehole and from nearby wells and boring was used to estimate the current water table depth at 471 ft bgs for the well screen design. Water levels were measured from nearby wells last month at depths between 470 and 472 feet bgs, with the closet well having a depth to water of 471 ft bgs (Excel second attachment). KAFB-106S4 was drilled to total depth yesterday. No representative static level was measured in the well casing. However, well core indicates saturated material somewhere below 469 feet bgs based on core moisture (third PDF attachment shows top of capillary fringe at 469). Nearby boring logs indicate similar geologic materials with good communication for hydrostatic conditions (last 3 attachments).

Coring Updates:
- KAFB-106S5 boring and well construction are complete
- KAFB-106S9 should grouted by end of shift tomorrow
- KAFB-106S2 coring has started from ground surface and will finish coring on next shift
- KAFB-106S3 drilled ARCH to target zone and will be cored to TD next (expedited this location to provide more information on optional locations)
- KAFB-106S4 cored to TD and ready to build On schedule to complete coring at S2 and S3 during next shift starting 12 NOV. Additional information to follow.

Please advise on your review of the proposed construction diagram and let us know if you have any questions or concerns. AFCEC has experienced some difficulties transmitting email with attachment recently. USACE is providing this information on their behalf.

Thank you for your time,
Ben Moayyad
USACE-Albuquerque
Mobile: (505) 639-3195

NOTICE: THE OFFICE IS UNDER CONSTRUCTION AND THE OFFICE PHONE LINE IS NOT AVAILABLE.

-----Original Message-----
From: Bockisch, Bernard [mailto:bbockisch@eaest.com]
Sent: Tuesday, November 6, 2018 4:19 PM
To: Cordova, Amy Elizabeth CIV USARMY CESPA (USA) <Amy.E.Cordova@usace.army.mil>; Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; Salazar, Carlos F CIV USARMY CESPA (US) <Carlos.F.Salazar@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>
Cc: Jercinovic, Devon <djercinovic@eaest.com>
Subject: [Non-DoD Source] Kirtland BFF- Request to NMED for KAFB-106S4 Well Construction Approval- Draft for USACE use

KAFB-106S4 is at total depth (504 ft bgs) and maybe reamed as early as Monday morning (12NOV18). We are requesting permission to construct the well per Condition 8 of the approval for the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Revision 2 (approved by NMED on February 23, 2018).

An existing monitoring well (KAFB-106005) is located approximately 60 feet from our current drilling location at KAFB-106S4. EA collected a depth to water measurement on Wednesday (10OCT18) from KAFB-106005 (471.00 ft bgs).

We anticipate that the borehole will be ready for well construction by Monday (12NOV18). We will compare the boring log data we collect from KAFB 106S4 to KAFB 106005. If any significant lithologic conditions are observed in the borehole for KAFB 106S4 from the nearby existing well, we will communicate this change prior to well construction.

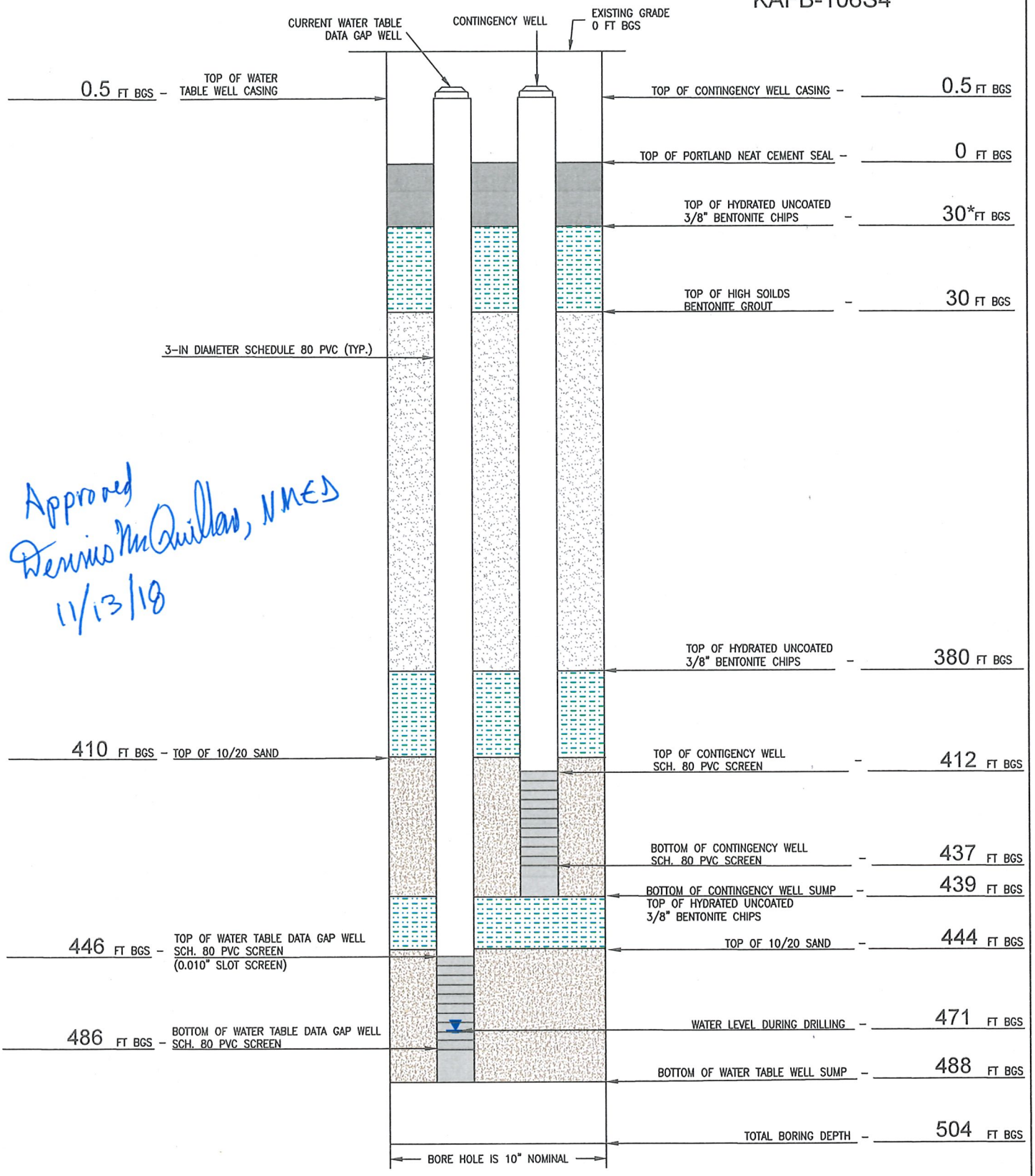
Please let us know if you have any questions.

Bernard Bockisch, PMP
EA Engineering, Science, and Technology, Inc., PBC Senior Project Manager
320 Gold Ave. SW, Suite 1300
Albuquerque, NM 87102
Cell: 505.280-0572
Office: 505.234-1105
Email: bbockisch@eaest.com <mailto:bbockisch@eaest.com> Blockedwww.eaest.com
<Blockedhttps://clicktime.symantec.com/a/1/dmYHw9VyknWlDGnU2aePr243WMQinwjiOsaWzhVE7O0=?d=nEVPqV-jmauTBWi-aqah0bqod4eBkPUnWEAOLkQwk2riCtOpNj81b5Ttkr_5Sm_N5y1E1g2ku1Rtwhns7Gn-nSHM4AA7sMVo1iJ-rQ_17SUePUZZUx9wisylzP5wbUly2z7MgfP4raguCkXuj-EjFlyDnQ2_XN-7m2n_RrFwPoSl-_HM_btOTtJDjHrtI6bA_vEsl4UjURx3RbPfFceJZdYRZGcX8ejlLcO8RMSnXWXedaCJui3XtlOkZig-bDGNmcpoRHevUuICtx1cqbbQOpmXVopphyF-LusxaYV76BsRbZZucQuKkIkNV5vzONuDB3FBHtn6WF13y2vhXbQLgHJ6SAceH2IVU-Y3MoLzOi38_aI8Ob6MhiF9L-mKb15_A3r3qfrd4HmbVdVlhSGqGz15KfAZURULtX9N-OPN6i5rNABvCPprlsteUiPjPIJ4KTYb9bq6jdFu7mnSmR5NpuYNRnIGOtELIA9fLKDEk-npSMmLlbTI8GhhzcL8wiLlrvSP&u=http%3A%2F%2Fwww.eaest.com%2F>

CLASSIFICATION: UNCLASSIFIED
CLASSIFICATION: UNCLASSIFIED

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S4



Approved
Dennis McQuillan, NMED
11/13/18

*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

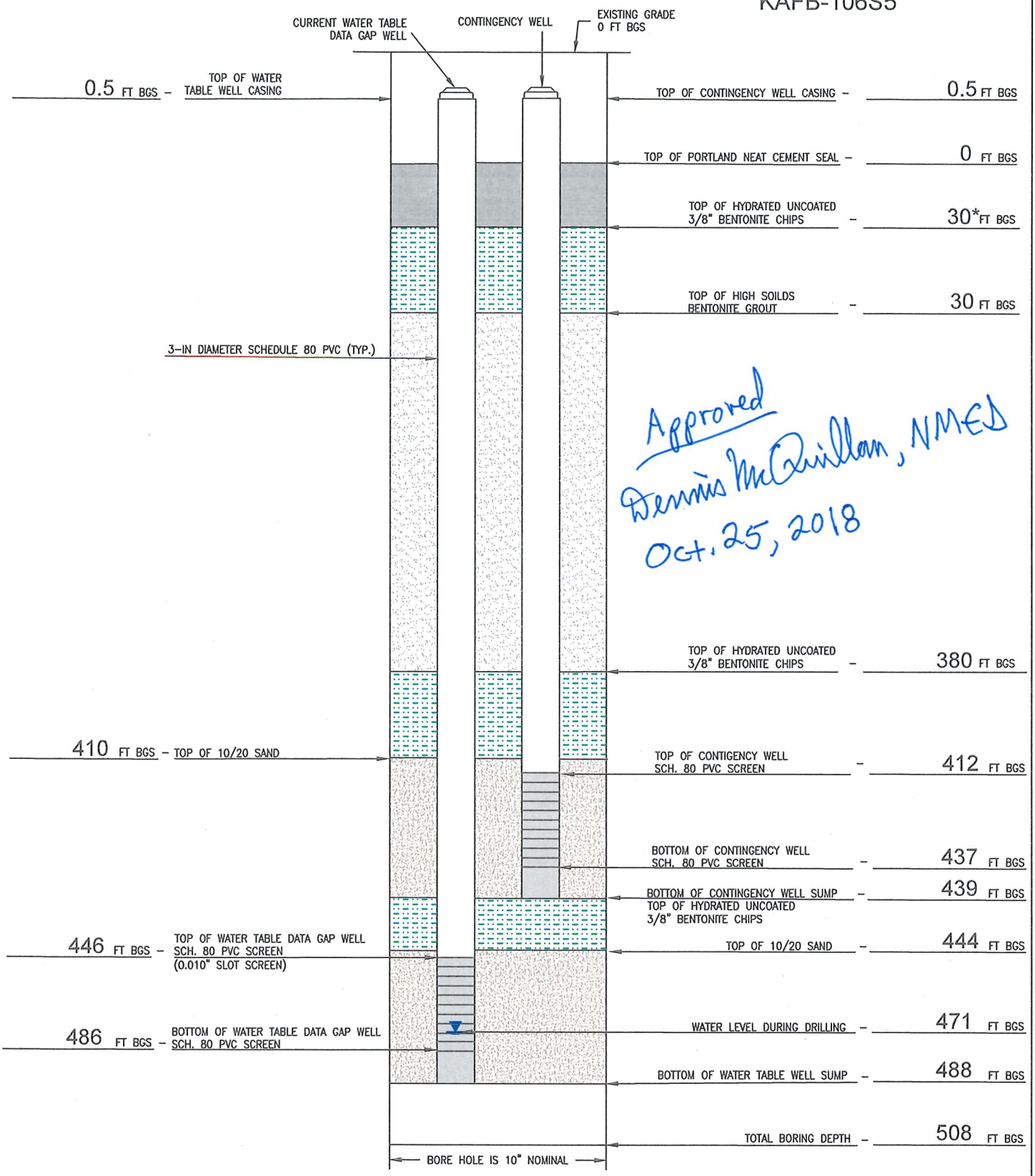
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 12NOV18/0700	INSTALLATION END DATE/TIME: 16NOV18
PROJECT NO.: 62735D472	WELL ID: KAFB 106S4	GEOLOGIST: Messenger/Montoya	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\625900M01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Nativex\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S5



Approved
Dennis McQuillan, NMED
Oct. 25, 2018

*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

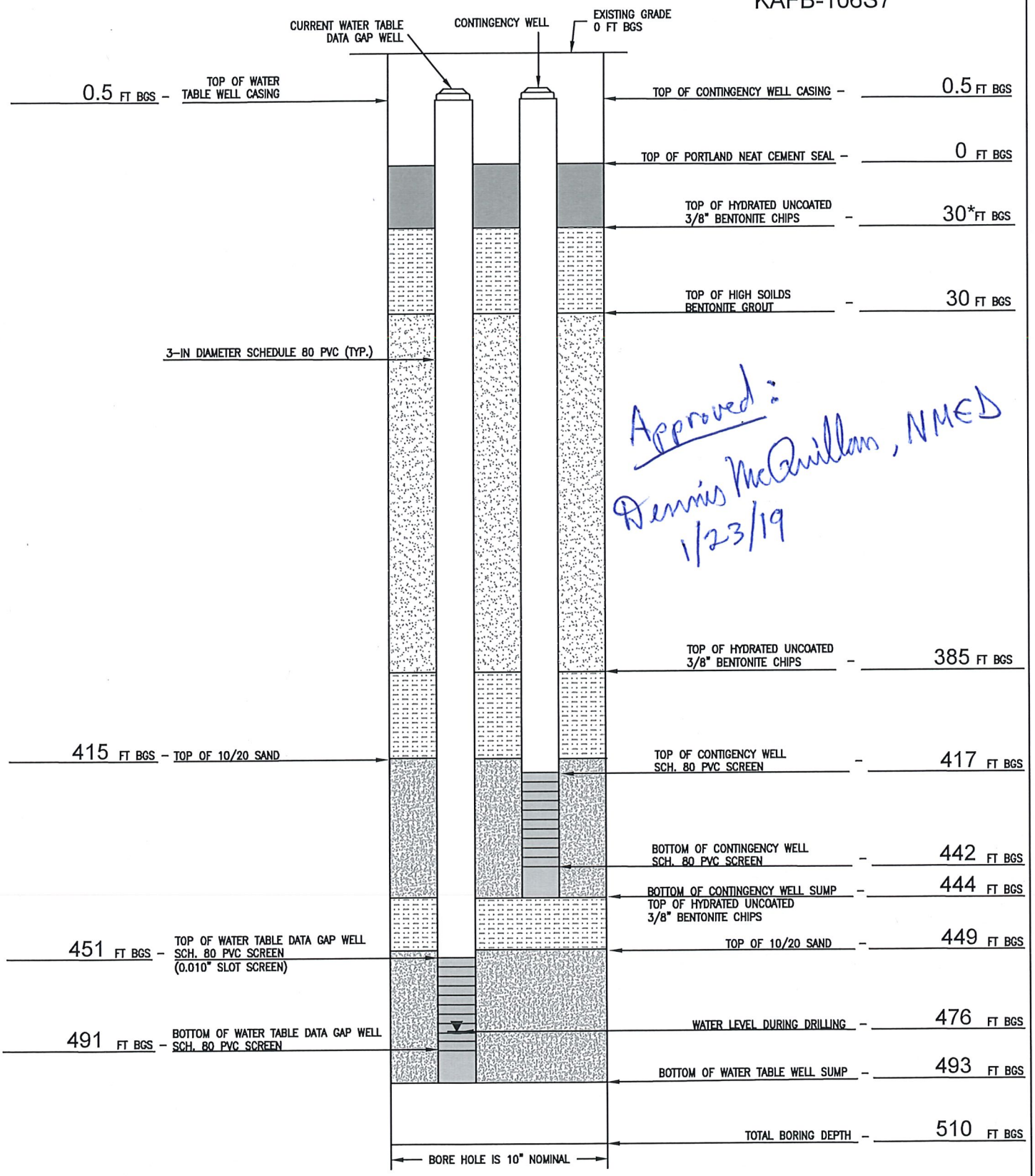
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 06OCT18/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S5	GEOLOGIST: Messenger/Montoya	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62596DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:38am

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S7



Approved:
Dennis McQuillan, NMED
1/23/19

*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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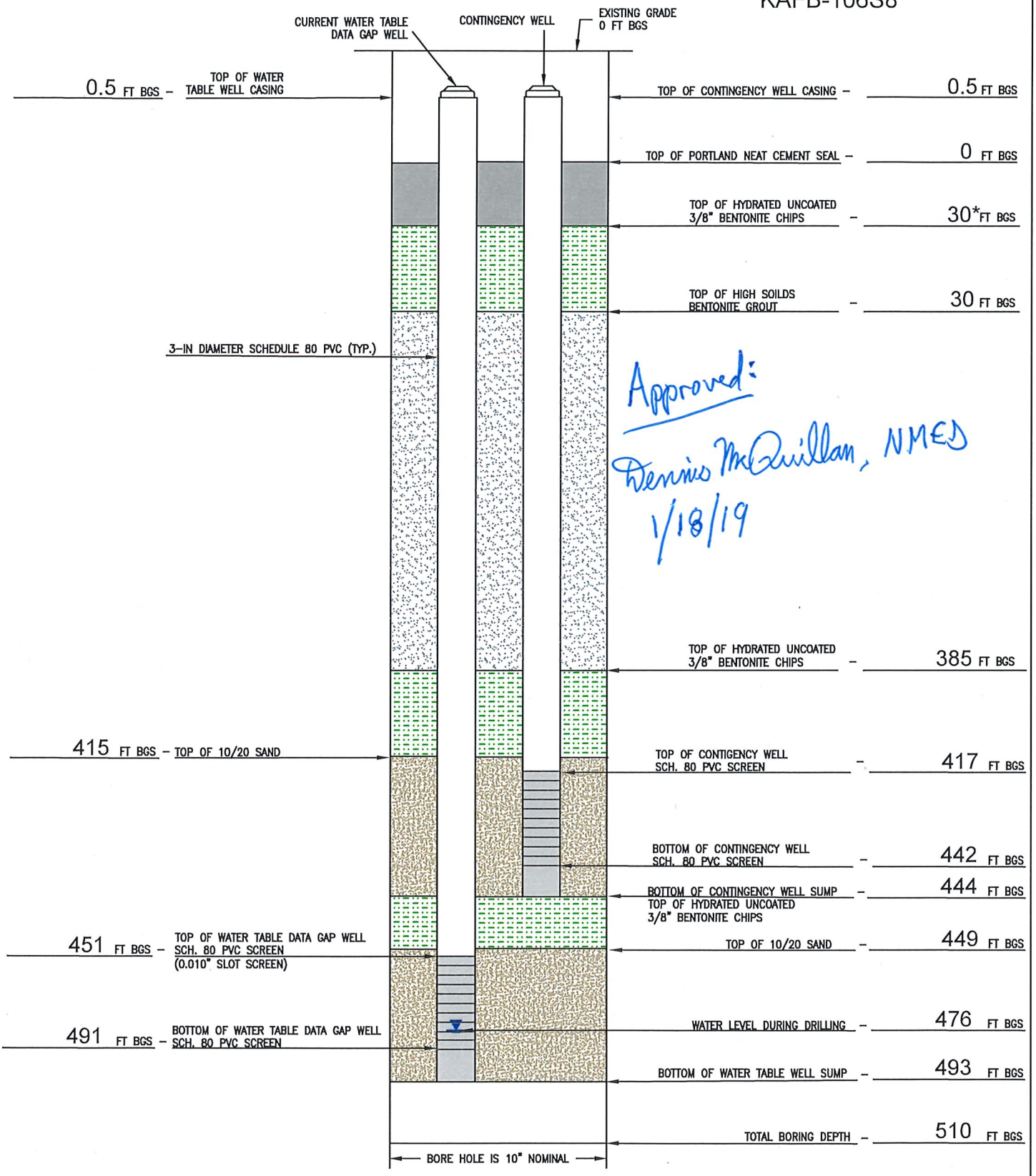
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 29JAN19/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S7	GEOLOGIST: MESSENGER	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62590DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 - 11:39am

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S8



*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
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FT=FEET

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 05FEB19/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62735DM02	WELL ID: KAFB 106S8	GEOLOGIST: MESSENGER	DRILLER: CASCADE

CAD FILE: \\ABQ\Projects\Active Projects\62735DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

Bockisch, Bernard

From: Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>
Sent: Friday, October 19, 2018 4:48 PM
To: Jercinovic, Devon; Bockisch, Bernard
Subject: FW: Request for KAFB-106S9 Well Construction Approval, SUSPENSE 20 OCT Saturday (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Good for construction at S9 this weekend.

Ben Moayyad
USACE-Albuquerque
Mobile: (505) 639-3195

NOTICE: BEGINNING 15 OCT 18 THE OFFICE WILL BE UNDER CONSTRUCTION AND THE OFFICE PHONE LINE WILL NOT BE ACCESSIBLE.

-----Original Message-----
From: McQuillan, Dennis, NMENV [mailto:dennis.mcquillan@state.nm.us]
Sent: Friday, October 19, 2018 3:37 PM
To: Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>
Cc: Scott C. Clark (scott.clark@us.af.mil) <scott.clark@us.af.mil>; RENAGHAN, BRIAN J GS-13 USAF AFMC AFCEC/CZRX <brian.renaghan@us.af.mil>; SHEEN T CTR USAF AFSOC 27 SOCES/CEIER KOTTKAMP (sheen.kottkamp.1@us.af.mil) <sheen.kottkamp.1@us.af.mil>; SEGURA, CHRISTOPHER G GS-13 USAF AFCEC/CZO <christopher.segura.2@us.af.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; CORDOVA, AMY ELIZABETH CIV USARMY CESPA (US) <Amy.E.Cordova@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>
Subject: [Non-DoD Source] RE: Request for KAFB-106S9 Well Construction Approval, SUSPENSE 20 OCT Saturday (UNCLASSIFIED)

Approved

Dennis McQuillan
Chief Scientist
New Mexico Environment Department
1190 St. Francis Dr.
PO Box 5469
Santa Fe, NM 87502
505-827-2140 desk

505-660-1592 cell
dennis.mcquillan@state.nm.us

-----Original Message-----
From: Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>
Sent: Friday, October 19, 2018 11:12 AM
To: McQuillan, Dennis, NMENV <dennis.mcquillan@state.nm.us>
Cc: Scott C. Clark (scott.clark@us.af.mil) <scott.clark@us.af.mil>; RENAGHAN, BRIAN J GS-13 USAF AFMC AFCEC/CZRX <brian.renaghan@us.af.mil>; SHEEN T CTR USAF AFSOC 27 SOCES/CEIER KOTTKAMP (sheen.kottkamp.1@us.af.mil) <sheen.kottkamp.1@us.af.mil>; SEGURA, CHRISTOPHER G GS-13 USAF AFCEC/CZO <christopher.segura.2@us.af.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; CORDOVA, AMY ELIZABETH CIV USARMY CESPA (US) <Amy.E.Cordova@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>
Subject: [EXT] Request for KAFB-106S9 Well Construction Approval, SUSPENSE 20 OCT Saturday (UNCLASSIFIED)
Importance: High

CLASSIFICATION: UNCLASSIFIED

Dennis,
Sorry for the Rush. Borehole stability at KAFB-106S9 is a concern and we would like to proceed with well construction tomorrow Saturday 20th. Boring 106S9 is located just north of the BFF, outside the fence (first figure).

On behalf of Kirtland, we request review and approval of the attached well construction specification (second attachment) for a monitoring well at borehole location KAFB-106S9. Coring will be completed today to total depth (third attachment). Water was identified in the boring at approximately 472 ft bgs. Construction is scheduled to begin Saturday, earlier than originally scheduled due to loose sands below the water table. Review and approval or comments is therefore requested by today if possible, or tomorrow if you are willing.

Backup information for screen selection:
EA performed water level measurements this month (fourth file attached) and identified 9 adjacent wells in the vicinity of KAFB-106S9 on flat ground. Based on gauging from these wells (locations on last attachments), static water is anticipated at depths between 471 and 474 feet bgs.

Information summarized by EA below. Please call for questions.

Thanks in advance for your time and prompt review,

Ben Moayyad

USACE-Albuquerque
Mobile: (505) 639-3195

NOTICE: BEGINNING 15 OCT 18 THE OFFICE WILL BE UNDER CONSTRUCTION AND THE OFFICE PHONE LINE WILL NOT BE ACCESSIBLE.

-----Original Message-----
From: Jercinovic, Devon [mailto:djercinovic@eaest.com]
Sent: Friday, October 19, 2018 8:56 AM
To: Moayyad, Behnaum CIV USARMY CESPA (US) <Behnaum.Moayyad@usace.army.mil>; Kunkel, Tara S CIV USARMY CESPA (US) <Tara.S.Kunkel@usace.army.mil>; CORDOVA, AMY ELIZABETH CIV USARMY CESPA (US) <Amy.E.Cordova@usace.army.mil>; Salazar, Carlos F CIV USARMY CESPA (US) <Carlos.F.Salazar@usace.army.mil>; Phaneuf, Mark J CIV USARMY CESPA (US) <Mark.J.Phaneuf@usace.army.mil>; Dreeland, Linda E CIV USARMY CESPA (US) <Linda.E.Dreeland@usace.army.mil>
Cc: Bockisch, Bernard <bbockisch@eaest.com>; Morse, Earl <emorse@eaest.com>; Andress, Lane <landress@eaest.com>; Bracht, Ginny <gbracht@eaest.com>
Subject: [Non-DoD Source] Kirtland BFF- Request to NMED for KAFB-106S9 Well Construction Approval- Draft for USACE use

USACE TEAM, Draft email for your use in requesting well construction approval for KAFB-106S9 from NMED

KAFB-106S9 drilling will be at total depth (508 ft bgs) today. We are requesting permission to construct the well per Condition 8 of the approval for the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Revision 2 (approved by NMED on February 23, 2018).

An existing monitoring well (KAFB-106059) is located approximately 60 feet from our current drilling location at KAFB-106S9. EA collected a depth to water measurement on Wednesday (10OCT18) from KAFB-106059 (471.83 ft bgs). Based on this measurement, the depth to water at this location should be approximately 472 ft bgs. Saturated cores were also obtained at this depth (see attached lithologic log).

Attached:

* Proposed well construction with depth to water (472 feet bgs).
* Lithologic log for KAFB-106S9 to depth of 486 bgs (depth to date)
* Lithologic logs for KAFB-106059, KAFB-106060, KAFB-106061

* Q3/Q4 2018 well gauging measurements.

* Well Map (Figure 3-1)

We are requesting to immediately ream and start well construction on this borehole in advance of KAFB-106S5 to mitigate any well construction issues in the sands below the water table. We anticipate that the borehole will be ready for well construction by Saturday (20OCT18) afternoon. KAFB-106S5 will still be completed and sampled on schedule.

Please let us know if you have any questions.

Devon E. Jercinovic, PG, PMP

EA Engineering, Science, and Technology, Inc., PBC

Program Manager II

320 Gold Ave. SW, Suite 1300

Albuquerque, NM 87102

Cell: 505.401.1181

Office: 505.715.4248

Email: djercinovic@eaest.com <mailto:djercinovic@eaest.com>

BlockedBlockedwww.eaest.com <BlockedBlockedhttps://clicktime.symantec.com/a/1/XpG8o5mentywZ6ONd5ijcpv4Mf3Kqw4yZ1aB-bE4oek=?d=i0KZHSekUOykC7R7jsq-6DgoN9rLUe8dBLvolvqNuYQMEOLEMW0Q7I490sUgcqWnBUpw76K1ISset9IX2t04URaILAXey-

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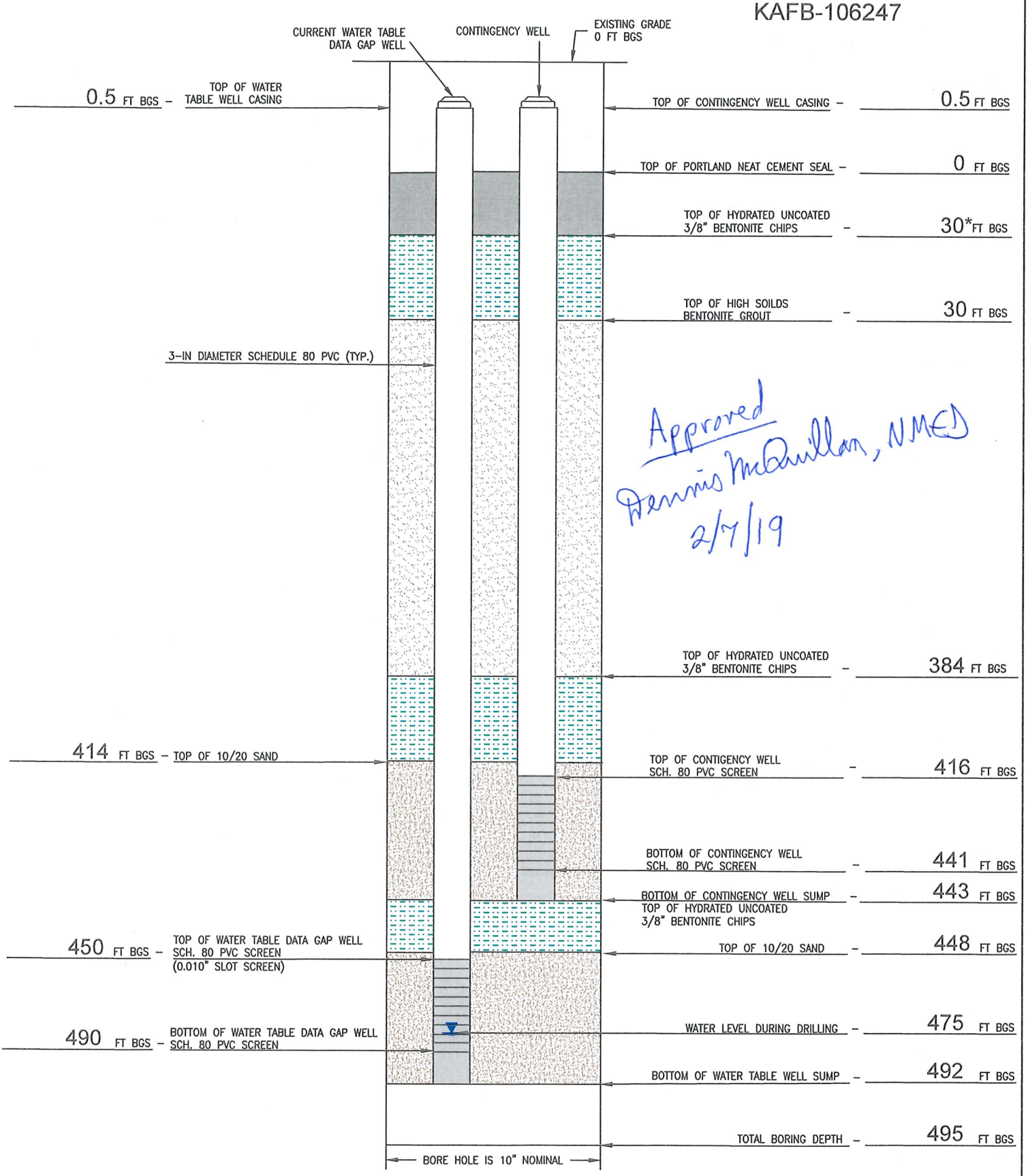
CLASSIFICATION: UNCLASSIFIED

CLASSIFICATION: UNCLASSIFIED

NESTED MONITORING WELL CONSTRUCTION

KAFB-106247



*Additional bentonite chips may be added to account for bentonite grout settlement.

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

CAD FILE: \\ABQ\Projects\Active Projects\62599DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Natives\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/8/2018 – 11:39am

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 17FEB19/0700	INSTALLATION END DATE/TIME: TBD
PROJECT NO.: 62599DM01	WELL ID: KAFB 106247	GEOLOGIST: MESSENGER	DRILLER: CASCADE

APPENDIX B

LITHOLOGIC BORING LOGS

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **1 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0							SP		Poorly graded sand: brown; slightly moist; 100% fine sand; trace gravel. Note: Hydroknife to 8 ft for utilities clearance.	3" Schedule 80 PVC Riser, 0.5 to 447 ft bgs; 3" Schedule 80 PVC Riser, 0.5 to 413 ft bgs
5	28.2						ML		Silt: 5YR 5/4, reddish brown; soft to medium stiff; slightly moist; 80% silt; 20% coarse sand and gravel to 1/4"; subangular to subrounded; gravel is caliche. Note: slightly mottled to 5YR 8/1, white. At 8.25 ft, one 4" limestone cobble, subangular, is present. At 9 ft, trace clay; low plasticity.	
10	3.1									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **2 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
10					8 - 16		ML		Silt: see description on previous page.	Neat Portland Cement, 5% Bentonite Solids, 1 to 30 ft bgs
							CL-ML		Silty clay: 5YR 5/4, reddish brown; stiff; slightly moist; medium plasticity. Note: at 12 ft, very stiff; occasional white specks less than 1/8" diameter.	
15										
					16 - 20		ML		Silt: 5YR 5/4, reddish brown; stiff; slighlty moist; nonplastic. Note: less than 5% caliche spots to 1/2". At 16 ft, medium stiff. At 18 ft, soft to medium stiff.	
20	31.3									

Notes:
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UV Fluorescence Field Test
Not Tested
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Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

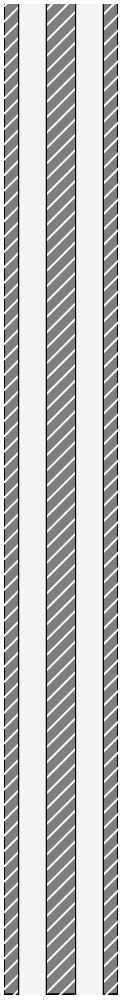
Well ID: **KAFB-106S1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
20	3.0	25.5		P	20 - 26		ML		Silt: 5YR 5/4, reddish brown; medium stiff to stiff; dry to slightly moist; nonplastic to low plasticity; trace clay. Note: less than 5% white caliche spots less than 1/8" diameter. At 25 ft, medium stiff; slightly moist; no clay.	
25		47.9					CL		Clay: 5YR 5/4, reddish brown; stiff; moist; plastic; silt present. Note: silt content increases downward.	
							ML		Silt: 5YR 6/4, light reddish brown; very stiff; dry to slightly moist; nonplastic. Note: 5% white caliche specks less than 1/8" diameter.	
30										



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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **4 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
30	2.8				26 - 36		ML		Silt: 5YR 5/6, yellowish red; medium stiff to stiff; slightly moist; nonplastic to low plasticity; trace clay. Note: 5% caliche stringers and specks less than 1/8". At 32.5 ft, soft to medium stiff; nonplastic. At 33.5 ft, 5YR 6/3, light reddish brown; medium stiff; low plasticity. At 37.5 ft, 5YR 5/4, reddish brown; soft to medium stiff; nonplastic.	Hydrated Uncoated Bentonite Chips, 3/8", 30 to 46 ft bgs
35	25.7				36 - 38					
40	28.2									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
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Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
40	2.3				38 - 46		CL		Clay: 5YR 4/4, reddish brown; stiff; slightly moist; medium plasticity; 80% clay; 20% silt. Note: at 42 ft, 7.5YR 6/3, light brown; 100% clay.	
45							ML		Silt: 5YR 5/4, reddish brown; medium stiff to stiff; dry to slightly moist; low to medium plasticity; 80% silt; 20% clay. Note: 10% white caliche spots less than 1/8" diameter. At 44.5 ft, 5YR 5/3, reddish brown; stiff; 15% of core is caliche stringers and specks to 1/8" diameter. At 45.5 ft, 5YR 6/3, light reddish brown. At 46 ft, 5YR 5/4, reddish brown; nonplastic; 100% silt; less than 5% caliche specks less than 1/8" diameter. At 48 ft, 5YR 5/4, reddish brown; nonplastic to low plasticity; trace clay; 5% white caliche specks to 1/8" diameter. At 49 ft, 5YR 5/6, yellowish red; medium stiff; trace caliche specks.	
50										

37.5

High Solids Bentonite Grout, 46 to 377.5 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **6 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
50	1.8				46 - 55		ML		Silt: 5YR 5/6, yellowish red; medium stiff to stiff; dry to slightly moist; low to medium plasticity; 80% silt; 20% clay. Note: trace white caliche spots less than 1/8" diameter.	
							CL-ML		Silty clay: 5YR 4/3, reddish brown; stiff; slightly moist to moist; medium plasticity.	
							ML		Silt: 5YR 5/3, reddish brown; medium stiff; slightly moist; low to medium plasticity; 70% silt; 30% clay. Note: 8% caliche specks less than 1/8" diameter.	
55		30.6					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (5% fine, 30% medium, 65% coarse); 20% gravel to 1"; subrounded; gravel is granite and lithic fragments. Note: at 59.5 ft, gravel to 2".	
60										

Notes:
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▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **7 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
60	1.5				55 - 66		ML		Silt: 5YR 4/3, reddish brown; medium stiff to stiff; slightly moist; 70% silt; 30% clay, low to medium plasticity. Note: at 61 ft, nonplastic to low plasticity; 90% silt; 10% clay. At 62 ft, 5YR 5/4, reddish brown; soft to medium stiff; nonplastic; 100% silt.	
65									Silt with sand: 5YR 5/4, reddish brown; soft; slightly moist; 75% silt; 25% fine to coarse sand (20% fine, 20% medium, 60% coarse); trace gravel to 1"; gravel is quartz, caliche, sandstone conglomerate, and lithic fragments. Note: at 65 ft, silt content is decreasing with depth. Lense of well-graded sand from 66 to 67 ft, 100% fine to coarse sand (15% fine, 60% medium, 25% coarse); trace caliche and lithic gravel to 1/2".	
	40.5									
70							CL-ML		Silty clay: 5YR 5/4, reddish brown; hard; dry to slightly moist; medium plasticity. Note: silt from 68 - 70 ft, 80% silt, 20% clay.	

Notes:
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **8 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
70	1.3				66 - 76		CL-ML		Silty clay: 5YR 5/4, reddish brown; hard; dry to slightly moist; medium plasticity.	
									Silt: 5YR 5/4, reddish brown; stiff; dry to slightly moist; low to medium plasticity; 70% silt; 30% clay.	
75									Silt with sand: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; sand is very fine.	
	39.4						ML		Silt: 7.5YR 5/3, brown; medium stiff; slightly moist. Note: at 76.5 ft, medium stiff to stiff; 10% pinkish white redox spots to 1/2" diameter. At 78 ft, 20% redox spots.	
80										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **9 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
80	1.3				76 - 86		CL		Clay: 5YR 5/3, reddish brown; stiff; dry to slightly moist; high plasticity. Note: 15% white caliche spots and stringers less than 1/8" diameter. At 82 ft, very stiff; medium to high plasticity; no caliche. At 86 ft, 7.5YR 4/4, brown; 20% redox spots, 7.5YR 8/1, white. From 87.5 to 88 ft, 80% redox spots.	
85										
					54.1					
90							ML		Sandy silt: 5YR 5/4, reddish brown; soft to medium stiff; slightly moist; 60% silt; 40% very fine sand.	

Notes:
(1) Current Water Table Well
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bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
90	2.0				96 - 96		ML		Sandy silt: see description on previous page.	
							SM		Silty sand: 5YR 5/4, reddish brown; loose to medium dense; slightly moist; 70% sand; 30% silt. Note: lense of silt from 92 to 93 ft, very stiff; dry to slightly moist; nonplastic. At 93 ft, 60% sand (65% fine, 35% medium); trace coarse sand; 40% silt.	
95							SP		Poorly graded sand: 5YR 5/4, reddish brown; loose to medium dense; 100% fine to medium sand (80% fine, 20% medium). Note: at 97 ft, 95% sand; 5% gravel from 1/2 to 1"; subangular; gravel is moderately cemented medium grained sandstone. At 99 ft, 1" lense of well-cemented sand; underlain by 95% sand (15% medium, 85% coarse); trace fine sand; 5% gravel to 1".	
100										

34.2

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **11 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
100	1.3				96 - 106		SP		Poorly graded sand: 5YR 5/4, reddish brown; loose to medium dense; 100% fine to medium sand (70% fine, 30% medium); trace coarse sand.	
							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (5% fine, 40% medium, 55% coarse); 5% gravel to 3/4"; subangular; gravel is quartz, feldspar, lithics, and sandstone. Note: lense of silt from 103.5 to 104 ft, 7.5YR 5/3, brown; stiff; nonplastic to low plasticity; 80% silt; 20% clay. At 104 ft, 7.5YR 6/2, pinkish gray; 100% sand (85% very fine, 10% fine, 5% medium); trace coarse sand.	
105									Well-graded sand: 7.5YR 6/2, pinkish gray; loose; slightly moist; 100% very fine to medium sand (85% very fine, 10% fine, 5% medium); trace coarse sand. Note: lense of silt from 105.5 to 106 ft, 7.5YR 4/3, brown; 80% silt; 20% clay, nonplastic to low plasticity.	
	42.2						ML		Silt: 7.5 YR 4/3, brown; stiff; slightly moist; nonplastic to low plasticity; 80% silt; 20% clay. Note: at 106 ft, 7.5YR 5/4, brown; medium stiff; 100% silt; trace very fine sand; trace clay, nonplastic. At 107 ft, soft to medium stiff. At 108 ft, medium stiff to stiff; low to medium plasticity; 70% silt; 30% clay.	
110										

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **12 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
110	1.6				106 - 116		ML		Silt: 7.5 YR 5/3, brown; soft; slightly moist; nonplastic; 100% silt.	
							SM		Silty sand: 7.5YR 5/3, brown; dense to very dense; slightly moist; 50% very fine sand; 50% silt.	
115									Silt: 7.5YR 5/4, brown; medium stiff; slightly moist; 100% silt. Note: at 115 ft, low to medium plasticity; 70% silt; 30% clay.	
	53.7						ML		Silt with sand: 7.5YR 5/4, brown; medium stiff; slightly moist; 80% silt; 20% very fine sand.	
120									Silt: 7.5YR 5/4, brown; stiff; slightly moist; nonplastic. Note: at 119 ft, very stiff to hard; dry to slightly moist; one 4" limestone cobble present.	

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **13 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
120	2.7				116 - 126		ML		Silt: 7.5YR 5/4, brown; medium stiff to stiff; slightly moist; trace clay, nonplastic to low plasticity. Note: lense of silty sand from 122 to 122.5 ft, 7.5YR 5/3, brown; loose; sand is 65% very fine, 10% fine, 25% medium, trace coarse.	
							CL-ML		Silty clay: 7.5YR 5/4, brown; very stiff; dry to slightly moist; medium plasticity.	
							ML		Silt: 7.5YR 5/4, brown; stiff; slightly moist; trace clay, nonplastic.	
125							CL		Clay: 7.5YR 5/3, brown; stiff; dry to slightly moist; medium plasticity. Note: at 126 ft, very stiff. At 126.25 ft, calcium carbonate staining present in clay fractures.	
					53.8					
130										

Notes:
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bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **14 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
130	2.2				126 - 136		CL		Clay: 7.5YR 5/3, brown; stiff; dry to slightly moist; medium plasticity. Note: at 130 ft, 2" lense of calcium carbonate staining. At 131.75 ft, 1" lense of calcium carbonate staining.	
							ML		Silt with sand: 7.5YR 5/3, brown; soft to medium stiff; 50% silt; 30% clay, medium to high plasticity; 20% very fine sand. Note: clay is present in nodules to 3". Silty sand from 133 to 134 ft, loose; slightly moist; sand is very fine.	
135							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% very fine sand. Note: at 135 ft, trace silt.	
	53.8				136 - 142		CL		Clay: 5YR 5/4, reddish brown; very stiff; slightly moist; high plasticity; 80% clay; 20% silt. Note: at 139 ft, stiff.	
140										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **15 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
140	6.6			P, V			CL		Clay: 5YR 5/4, reddish brown; very stiff; dry to slightly moist; high plasticity; 60% clay; 40% silt. Note: at 141 ft, medium stiff; slightly moist.	
	86.7				142 - 146		ML		Sandy silt: 7.5YR 7/2, pinkish gray; soft; dry; 60% silt; 40% fine to coarse sand (15% fine, 70% medium, 15% coarse).	
							SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand.	
145	39.5						CL		Clay: 7.5YR 6/3, light brown; very stiff; dry; medium plastic; 80% clay, 20% silt. Note: at 146 ft, 7.5YR 6/4, light brown; soft to stiff; low plasticity; 70% clay nodules to 3"; 30% silt. Lense of clayey sand with silt from 148 to 149 ft, 7.5YR 6/4, light brown; loose; 60% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 30% clay nodules; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
150							SM		Silty sand: 7.5YR 6/4, light brown; loose; 70% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 20% silt, nonplastic; 10% clay; sand is	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **16 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
150	1.7				146 - 156		SM		quartz, feldspar, and lithic fragments. Note: clay is present as stiff to very stiff nodules to 1 1/2".	
							SW-SM		Well-graded sand with silt: 7.5YR 6/3, light brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: At 152 ft, 85% sand; 5% gravel to 1/2'; 10% silt. From 152.8 to 153.5 ft, trace clay present in stiff to very stiff nodules to 3". From 153.5 to 154 ft, lithic gravel to 2". At 154 ft, 7.5YR 5/3, brown; 85% sand (15% fine, 60% medium, 25% coarse); 5% gravel to 2"; 10% silt; gravel includes caliche.	
155	22.3						SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 60% medium, 20% coarse); 15% gravel to 2 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with clay from 158 to 159 ft, 10YR 5/3, brown; 80% sand (10% fine, 75% medium, 15% coarse); 10% gravel to 1"; 10% clay, nonplastic; sand and gravel include caliche. Lense of clayey sand with gravel from 159 to 160 ft, 7.5YR 5/4, brown; 65% sand (45% fine, 25% medium, 30% coarse); 15% gravel to 1 1/4"; 15% clay; 5% silt; nonplastic.	
160										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **17 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
160	4.3				156 - 166		SM		Silty sand with gravel: 7.5YR 5/4, brown; loose; moist; 65% fine to coarse sand (45% fine, 25% medium, 30% coarse); 15% gravel to 1 1/4"; subangular to subrounded; 15% silt; 5% clay; nonplastic. Note: At 161 ft, 65% sand; 20% gravel; 15% silt; trace clay. At 164 ft, 70% sand (10% fine, 70% medium, 20% coarse); 15% gravel; 15% silt; no clay. At 164.5 ft, silty sand; 10YR 6/3, pale brown; 60% sand (40% very fine, 60% fine); 40% silt. At 165.5 ft, sitly sand; 7.5YR 4/4, brown; 80% sand (40% fine, 30% medium, 30% coarse); 5% gravel to 1/2"; 15% silt. Lense of well-graded sand with silt from 166 to 167 ft, 85% sand (30% fine, 50% medium, 20% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 10% silt; sand includes caliche.	
165										
	32.2						CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly moist; medium plasticity; 90% clay; 10% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
							SM		Silty sand: 7.5YR 6/4, light brown; loose; slightly moist; 70% very fine to medium sand (20% very fine, 65% fine, 15% medium,); subangular to subrounded; 20% silt, nonplastic; 10% clay, low plasticity; sand is	
170										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **18 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
170	4.2				166 - 176		SM		silt; no clay. Lense of poorly graded sand with silt from 171 to 172 ft, 90% sand (60% fine, 40% medium); 10% silt. At 171.5 ft, 90% sand (20% fine, 80% medium); trace coarse sand; 10% silt. Lense of well-graded sand with silt from 172 to 173 ft, 90% sand (50% fine, 35% medium, 15% coarse); trace lithic gravel to 1/2"; 10% silt.	
							SC		Clayey sand: 7.5YR 6/4, light brown; 60% fine to coarse sand (15% fine, 60% medium, 25% coarse); 10% gravel to 1/2"; subangular to subrounded; 30% clay, low plasticity; sand is quartz, feldspar, caliche, and lithic fragments; gravel is caliche and lithic fragments. Note: clay is present as medium stiff nodules, 7.5YR 4/4, brown. Lense of well-graded sand with silt from 174 to 174.5 ft, 7.5YR 5/1, dark gray; 90% fine to coarse sand; 10% silt, nonplastic.	
175							SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (90% fine, 10% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 178.5 ft, trace coarse sand; trace quartz and lithic gravel to 1/2". Lense of well-graded sand with silt from 179 to 180 ft, 7.5YR 6/3, light brown; 85% sand (35% fine, 45% medium, 20% coarse); 5% gravel to 1 1/2"; 10% silt.	
					27.5					
180										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **19 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
180	2.5				176 - 186		SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to coarse sand (35% fine, 45% medium, 20% coarse); 10% gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 182 ft, 80% sand; 10% gravel; 5% clay as nodules; 5% silt; nonplastic. At 183 ft, 90% sand; 5% gravel; 5% silt; no clay. From 184 to 185 ft, well-graded sand with gravel; 80% sand (15% fine, 60% medium, 25% coarse); 20% gravel to 1/2". Lense of poorly graded sand from 185 to 186 ft, 95% sand (60% fine, 40% medium); trace coarse sand; 5% gravel to 3/8". At 186 ft, 95% sand (25% fine, 60% medium, 15% coarse); 5% gravel to 3/8". Lense of clay from 186.8 to 187.2 ft, 7.5YR 5/6, strong brown; medium stiff; low plasticity.	
185										
	33.3						SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 95% fine to medium sand (60% fine, 40% medium); trace coarse sand; 5% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: At 188 ft, trace clay.	
190										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **20 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
190	2.2				186 - 196		SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 95% fine to medium sand (60% fine, 40% medium); trace coarse sand; 5% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
195							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to coarse sand (15% fine, 70% medium, 15% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 194 ft, gravel to 1/2". At 195 ft, trace clay nodules, 7.5YR 4/6, strong brown.	
					41.3					
200							CL		Clay: 7.5YR 5/3, brown; medium stiff; low plasticity.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **21 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
200	4.4				196 - 206		CL		Note: Lense of clayey sand from 200.5 to 201 ft, 7.5YR 6/4, light brown; loose; slightly moist; 85% sand (75% fine, 25% medium); 15% clay, low plasticity.	
							SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium); subangular to subrounded; trace clay; sand is quartz, feldspar, lithic fragments, and caliche.	
205							SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 30% medium, 40% coarse); 20% gravel to 2 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: black coating on some gravel. At 206 ft, gravel to 1 3/4". Lense of poorly graded sand from 209 to 210 ft, 10YR 6/2, light brownish gray; 95% sand (85% fine, 15% medium); trace gravel to 3/4"; 5% silt, nonplastic.	
	33.9									
210										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **22 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	2.1				206 - 216		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (15% fine, 60% medium, 25% coarse); 30% gravel to 1 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: black coating on some gravel. At 212 ft, 65% sand; 30% gravel; 5% silt, nonplastic. At 215.5 ft, 10YR 7/2, light gray. At 216 ft, 7.5YR 5/3, brown.	
215										
					34.6					
							SW-SM		Well-graded sand with silt: 7.5YR 6/2, pinkish gray; loose; slightly moist; 85% fine to coarse sand (60% fine, 20% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
220							SW			

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **23 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
220	2.5				216 - 226		SW		subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche.	
							SW-SM		Well-graded sand with silt: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to coarse sand (60% fine, 20% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
225							SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 75% fine to coarse sand (35% fine, 35% medium, 30% coarse); 20% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: at 226 ft, well-graded sand; 85% sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1"; 5% silt. Lense of clay as nodules from 226.5 to 227 ft, 5Y 6/3, pale olive, and 10YR 5/4, yellowish brown. At 227 ft, well-graded sand with gravel; 7.5YR 6/2, pinkish gray; 75% sand (15% fine, 60% medium, 25% coarse); 20% gravel to 1 1/2"; 5% silt.	
					45.4					
230					226				Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to coarse sand (20% fine, 70% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: Lense of well-graded sand with silt from 229 to 229.2	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **24 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
230	2.4				234		SW		ft, 80% sand; 10% gravel to 1"; 10% silt; contains caliche. Lense of silty sand from 229.2 to 230 ft, 80% sand (50% fine, 50% medium); trace coarse sand; 20% silt. At 231 ft, 85% sand (20% fine, 50% medium, 30% coarse); 10% gravel to 1/2"; 5% silt.	
	42.7						SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to medium sand (70% fine, 30% medium); 5% gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments.	
235							SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); 10% gravel to 2 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 236 ft, 7.5YR 5/3, brown; 80% sand; 20% gravel.	
240					234					

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **25 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
240	3.0				246		SW		Well-graded sand with gravel: see description on previous page.	
							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 95% fine to medium sand (65% fine, 35% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: at 242 ft, 90% sand; 5% gravel to 1 1/4"; 5% silt. Lense of silt from 242.8 to 243 ft, 10YR 6/3, pale brown; soft; nonplastic.	
							SW		Well-graded sand: 10YR 7/3, very pale brown; loose; slightly moist; 95% fine to coarse sand (30% fine, 50% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
245										
	46.4						CL		Clay: 7.5YR 4/6, strong brown; medium stiff; medium plasticity. Note: at 246 ft, clay with sand; medium stiff to stiff; 85% clay; 15% fine to coarse sand; subangular to subrounded; sand is lithic fragments and caliche.	
250										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **26 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
250	22.7				246 - 256		ML		Silt: 10YR 6/2, light brownish gray; soft; nonplastic; 80% silt; 20% clay, medium plasticity. Note: clay is medium stiff nodules, 10YR 5/3, brown.	
							CL		Clay: 7.5YR 4/6, strong brown; stiff to very stiff; medium plasticity; 90% clay; 10% fine to medium sand; subangular to subrounded; sand is lithic fragments and caliche. Note: from 254 to 255 ft, 5Y 6/3, pale olive. Lense of silty sand from 256 to 257 ft, 10YR 6/3, pale brown; 70% sand (25% very fine, 60% fine, 15% medium); 30% silt, nonplastic.	
255										
	56.2						SW-SM		Well-graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 85% very fine to coarse sand (15% very fine, 10% fine, 50% medium, 25% coarse); 5% gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: at 258 ft, 90% sand (10% fine, 70% medium, 20% coarse); trace gravel; 10% silt.	
							CL		Clay: 7.5YR 4/6, strong brown; medium stiff to stiff;	
260										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **27 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
260	25.1			P, V	256 - 266		ML		Silt: 7.5YR 5/3, brown; soft; slightly moist; low plasticity; 60% silt, nonplastic; 40% clay.	
							SM		Silty sand: 10YR 5/3, brown; loose; slightly moist; 70% very fine to medium sand (35% very fine, 55% fine, 10% medium); subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: at 262 ft, 85% sand; 15% silt. From 263.5 to 264 ft, 65% sand; 25% silt; 10% clay nodules with calcium carbonate cementation, stiff, medium plasticity, 10YR 4/3, brown. Lense of poorly graded sand with silt from 264.8 to 265.7 ft, 10YR 6/3, pale brown; 90% sand (20% very fine, 70% fine, 10% medium); trace gravel to 1/2"; 10% silt.	
265										
	48.8						SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
270										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **28 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
270	11.2				266 - 276		SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: from 272 to 274 ft, no gravel.	
275	60.1			P, V			CL		Clay: 7.5YR 5/3, brown; stiff; slightly moist; medium plasticity. Note: at 276 ft, stiff to very stiff.	
280										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **29 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
280	24.1				276 - 285		CL		Clay: 7.5YR 5/3, brown; stiff; slightly moist; medium plasticity.	
							SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to medium sand (95% fine, 5% medium); trace gravel to 3/8"; subangular to subrounded; 5% silt; 5% clay; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 285 ft, 100% sand; trace gravel to 1 1/4"; no silt; no clay. Lense of well-graded sand from 286 to 287 ft, 10YR 6/2, light brownish gray; dry; 85% sand (25% fine, 60% medium, 15% coarse); 10% gravel to 2"; 5% silt.	
285	41.3									
	41.7						SW-SM		Well-graded sand with silt: 10YR 6/2, light brownish gray; loose; dry; 80% fine to coarse sand (35% fine, 50% medium, 15% coarse); 10% gravel to 2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
290							SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (65% fine, 35% medium); trace coarse sand; trace gravel to 3/4";	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **30 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
290	2.7				286 - 296		SP		subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with gravel from 291 to 292 ft, 85% sand (50% fine, 35% medium, 15% coarse); 15% gravel to 3".	
295	37.2						SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (50% fine, 35% medium, 15% coarse); 15% gravel to 3"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 296 ft, well-graded sand; 90% sand; 10% gravel to 1". At 298.3 ft, 80% sand (35% fine, 40% medium, 25% coarse); 20% gravel to 3".	
300										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **31 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
300										
0.8					296 - 306		SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (35% fine, 40% medium, 25% coarse); 20% gravel to 3"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SP-SM		Poorly graded sand with silt: 7.5YR 6/3, light brown; loose; slightly moist; 90% fine to medium sand (50% fine, 50% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand with gravel from 303.5 to 304 ft, 80% sand (35% fine, 40% medium, 25% coarse); 20% gravel to 3"; trace lithic cobbles to 4 1/4".	
305										
39.2					306 - 310		SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 90% fine to medium sand (95% fine, 5% medium); 5% gravel to 1 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of well-graded sand from 305 to 306 ft, 90% sand (50% fine, 35% medium, 15% coarse); 10% gravel to 1 1/2". At 306 ft, 95% sand (90% fine, 10% medium); trace gravel to 3/8"; 5% silt. Lense of well-graded sand from 307 to 307.5 ft, 95% fine to coarse sand (25% fine, 60% medium, 15% coarse); 5% gravel to 1". At 307.5 ft, 90% fine to medium sand; 5% gravel to 1/2"; 5% silt.	
310							SW		Well-graded sand: 10YR 5/4, yellowish brown; loose;	

Notes:
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(2) Contingency Well
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NA = Not Applicable
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **32 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
310	1.9	44.6			310 - 316		SW		slightly moist; 85% fine to coarse sand (65% fine, 25% medium, 10% coarse); 10% gravel to 2 3/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with clay from 309.5 to 310 ft, 85% sand (45% fine, 35% medium, 20% coarse); 5% gravel to 5/8"; 10% clay.	
							SM		Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 70% very fine to fine sand (30% very fine, 70% fine); 10% gravel to 2"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of clayey sand with gravel from 313.7 to 314.2 ft, 10YR 5/2, grayish brown; 70% sand (50% fine, 20% medium, 30% coarse); 15% gravel to 1 1/2"; 15% clay nodules, medium stiff, low plasticity, 7.5YR 5/4, brown.	
315							SW-SC		@ 314.2 ft - Well-graded sand with clay and gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (65% fine, 20% medium, 15% coarse); 20% gravel to 3"; trace cobbles to 4 3/8"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments; cobbles are lithic fragments.	
		50.4					SW		@ 316 ft - Well-graded sand: 10YR 5/3, brown; loose; moist; 85% fine to coarse sand (60% fine, 30% medium, 10% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 318 ft, 5% clay; no silt.	
320										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **33 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
320	2.9				316 - 326		SW		Well-graded sand: 10YR 5/3, brown; loose; moist; 75% fine to coarse sand (20% fine, 60% medium, 20% coarse); 20% gravel to 2 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of clay from 321.8 to 322 ft; 7.5YR 5/6, strong brown; very stiff; medium plasticity. At 322 ft, gravel to 2 1/2". Lense of poorly graded sand from 324 to 325 ft, 90% sand (50% fine, 50% medium); trace coarse sand; 5% gravel to 1"; 5% silt.	
325							CL		Clay: 7.5YR 5/4, brown; stiff to very stiff; medium plasticity.	
	28.3						SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 327 ft, well-graded sand with gravel; 80% sand (20% fine, 40% medium, 40% coarse); 20% gravel to 1". At 328 ft, 75% sand; 20% gravel; trace cobbles to 4"; 5% silt.	
330							SC		Clayey sand: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 5% gravel to 5/8"; subangular to	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **34 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
330	3.6				326 - 336		SW		@ 330 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (60% fine, 30% medium, 10% coarse); 5% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 334 ft, well-graded sand with gravel; 85% sand (50% fine, 30% medium, 20% coarse); 15% gravel to 2".	
335										
	38.4						SC		Clayey sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 40% fine to coarse sand (10% fine, 60% medium, 30% coarse); 35% gravel to 1 1/4"; subangular to subrounded; 25% clay, low plasticity; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SW-SC		Well-graded sand with clay and gravel: 10YR 6/3, pale brown; loose; slightly moist; 75% fine to coarse sand (10% fine, 80% medium, 10% coarse); 15% gravel to 1 5/8"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
340										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **35 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
340	2.5				336 - 345		SM		Silty sand: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to medium sand (80% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 15% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
							SW-SM		Well-graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (70% fine, 20% medium, 10% coarse); 10% gravel to 5/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand from 343 to 343.5 ft, 85% sand (40% fine, 40% medium, 20% coarse); 10% gravel to 5/8"; 5% silt, nonplastic.	
345							SC		@ 343.5 ft - Clayey sand with gravel: 7.5YR 5/4, brown; loose; slightly moist; 50% fine to coarse sand (20% fine, 40% medium, 40% coarse); 35% gravel to 1 1/2"; subangular to subrounded; 15% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of silty sand from 345 to 346 ft, 10YR 5/3, brown; 65% sand (80% fine, 20% medium); trace coarse sand; 5% gravel to 1/2"; 20% silt, nonplastic; 10% clay nodules, 7.5YR 4/6, strong brown.	
		65.6					SP-SM		@ 346 ft - Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 85% fine to medium sand (80% fine, 20% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 10% silt, nonplastic; 5% clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
		32.0					SW-SC			
350										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **36 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
350	3.8				346 - 356		SP-SM		@ 350 ft - Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to medium sand (70% fine, 30% medium); trace coarse sand; 5% gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 351 ft, well-graded sand with silt and gravel; 50% sand (10% fine, 60% medium, 30% coarse); 40% gravel to 3"; trace cobbles to 3 1/4"; 10% silt.	
							GW		@ 352 ft - Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 60% gravel to 3"; 35% fine to coarse sand (25% fine, 50% medium, 25% coarse); trace cobbles to 4"; subangular to subrounded; 5% silt, nonplastic; gravel and cobbles are lithic fragments; sand is quartz, feldspar, and lithic fragments.	
355							SW-SM		@ 354 ft - Well-graded sand with silt and gravel: 10YR 6/3, pale brown; loose; slightly moist; 55% fine to coarse sand (10% fine, 60% medium, 30% coarse); 35% gravel to 2 1/2"; subangular to subrounded; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with clay from 355.5 to 356 ft, 85% fine to coarse sand; 5% gravel; 10% clay.	
	29.1						GW		@ 356 ft - Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 60% gravel to 3"; 35% fine to coarse sand (25% fine, 50% medium, 25% coarse); subangular to subrounded; 5% silt, nonplastic; gravel is lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand with silt and gravel from 358 to 359 ft,	
360							SW-SM			

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **37 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360	2.8				356 - 366		SW-SM		15% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 360 ft, 7.5YR 6/3, light brown.	
365							SW		@ 364 ft - Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 70% fine to coarse sand (35% fine, 40% medium, 25% coarse); 25% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 366 ft, 7.5YR 5/3, brown; trace clay. At 368 ft, 80% sand, 15% gravel to 1"; 5% silt; trace clay.	
370										

38.2

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **38 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
370	3.2				366 - 376		SW		Well-graded sand with gravel: see description on previous page.	
							SP-SM		Poorly graded sand with silt: 7.5YR 6/2, pinkish gray; loose; slightly moist; 85% fine to medium sand (70% fine, 30% medium); trace coarse sand; 5% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
375							SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 85% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: At 376 ft, 7.5YR 6/3, light brown; 80% sand (45% fine, 35% medium, 20% coarse); 10% gravel to 1 3/8"; 5% silt; 5% clay.	
					42.5					
					376 - 380		SW-SC		Well-graded sand with clay: 7.5YR 6/3, light brown; loose; slightly moist; 75% fine to coarse sand (45% fine, 35% medium, 20% coarse); 10% gravel to 1 3/8"; subangular to subrounded; 10% clay; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note:	
380										

Hydrated Uncoated Bentonite Chips, 3/8", 377.5 to 411 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **39 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
380	0.4	26.1			380 - 386		SW		@ 380 ft - Well-graded sand with gravel: 7.5YR 5/3, brown; loose; moist; 65% fine to coarse sand (25% fine, 45% medium, 30% coarse); 30% gravel to 2 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SW-SM		@ 382 ft - Well-graded sand with silt: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (65% fine, 25% medium, 10% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
385							SW		@ 384 ft - Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (50% fine, 25% medium, 25% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
		47.0			386 - 390		SC		@ 386 ft - Clayey sand: 10YR 6/1, gray; loose; slightly moist; 70% very fine to medium sand (20% very fine, 45% fine, 35% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 30% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 387 ft, 75% sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1 1/4"; 15% clay. Lense of clay from 388 to 388.2 ft, 7.5YR 4/3, brown; medium stiff to stiff; medium plasticity. At 388.2 ft, well-graded sand with clay; 10YR 6/3, pale brown; 80% sand (60% fine, 30% medium, 10% coarse); 10% gravel to 1"; 10% clay nodules, low plasticity, 7.5YR 4/3, brown.	
390										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **40 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390	0.5	37.5			390 - 396		CL		@ 390 ft - Sandy clay: 7.5YR 4/3, brown; very stiff; medium plasticity; 60% clay; 30% fine to coarse sand (50% fine, 35% medium, 15% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of silty sand from 393.8 to 394.5 ft, 10YR 5/3, brown; 85% sand (30% very fine, 40% fine, 30% medium); trace gravel to 3/8"; 15% silt, nonplastic.	
395							SW-SM		Well-graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of silty sand from 395.5 to 395.8, 10YR 5/4, yellowish brown; 70% very fine to medium sand; 30% silt, nonplastic.	
		46.1			396 - 400		SC			
							SM		@ 394.8 ft - Clayey sand: 10YR 7/2, light gray; loose; dry; 65% fine to coarse sand (50% fine, 40% medium, 10% coarse); 5% gravel to 3/8"; subangular to subrounded; 30% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 396 ft, 7.5YR 5/3, brown; slightly moist; 50% sand (70% very fine, 30% fine); 40% clay; 10% silt; nonplastic.	
400									@ 397 ft - Silty sand: 10YR 5/3, brown; loose; slightly	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **41 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
400	4.7	27.7		P, V	400 - 406		SW		@ 400 ft - Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 80% fine to coarse sand (15% fine, 55% medium, 30% coarse); 15% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SP		@ 402 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (50% fine, 45% medium, 5% coarse); 5% gravel to 2 1/2"; subangular to subrounded; 5% clay, low plasticity; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is soft nodules, 7.5YR 5/4, brown. Lense of well-graded sand from 404 to 405 ft, 7.5YR 5/2, brown; 85% sand (15% fine, 55% medium, 30% coarse); 10% gravel to 1 1/2"; 5% silt, nonplastic. Lense of well-graded sand from 406 to 407 ft, 7.5YR 5/3, brown; 90% sand (35% fine, 45% medium, 20% coarse); 10% gravel to 1 1/2"; weak product odor.	
405										
		44.7			406 -		SP-SM		@ 407 ft - Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to medium sand (90% fine, 10% medium); 5% gravel to 5/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: slight product odor. At 408.5 ft, poorly graded sand; 90% sand; 5% gravel; 5% silt. -	
410										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **42 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
410	12.2				414		SM		@ 409.8 ft - Silty sand with gravel: 7.5YR 6/2, pinkish gray; loose; slightly moist; 65% fine to coarse sand (55% fine, 35% medium, 10% coarse); 20% gravel to 1 1/2"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor. At 410 ft, 65% sand; 10% gravel to 2 1/2"; trace cobbles to 3 3/4"; 15% silt; 10% clay nodules, 7.5YR 5/4, brown.	
							SP		@ 412 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (90% fine, 10% medium); trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. gravel is lithic fragments. Note: product odor. At 413 ft, well-graded sand; 7.5YR 5/3, brown; 90% sand (35% fine, 45% medium, 20% coarse); 10% gravel to 1 1/2". Lense of clayey sand from 413.8 to 414.8 ft, 10YR 7/2, light gray; 65% sand (50% fine, 40% medium, 10% coarse); 5% gravel to 3/8"; 30% clay, nonplastic. Lense of clay from 414.8 to 415 ft, 7.5YR 4/4, brown; stiff; medium plasticity.	3" Schedule 80 PVC Screen, 0.010" slot, 413 to 438 ft bgs
415	18.5		P, V		414 - 419		SW-SM		@ 415 ft - Well-graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (50% fine, 40% medium, 10% coarse); 10% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragements; gravel is quartz and lithic fragments. Note: product odor. -	10/20 Silica Sand, 411 to 440 ft bgs
							SP		@ 416 ft - Poorly graded sand: 10YR 6/3, pale brown;	
420	54.2									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **43 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	43.5						SP		gravel from 420.5 to 420.7 and 420.9 to 421 ft, 60% fine to coarse sand; 20% gravel to 1 1/2"; 20% clay. Lense of clay from 420.7 to 420.9 ft, 5YR 5/4, reddish brown; stiff; medium plasticity.	
					419 - 426		SW-SM		@ 421 ft - Well-graded sand with silt: 7.5YR 6/3, light brown; loose; slightly moist; 75% fine to coarse sand (10% fine, 65% medium, 25% coarse); 15% gravel to 1 5/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor. Lense of sandy silt from 422.7 to 423.3 ft, 10YR 5/3, brown; 50% silt, nonplastic; 5% clay; 45% sand (40% very fine, 50% fine, 10% medium); trace coarse sand; strong product odor. Lense of poorly graded sand with silt from 423.3 to 424 ft, 10YR 6/3, pale brown; 90% sand (80% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; 10% silt. At 424 ft, 80% sand (60% fine, 30% medium, 10% coarse); 10% gravel to 5/8"; 10% silt.	
425										
	29.7				426 - 428		SP-SC		@ 426 ft - Poorly graded sand with clay: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to medium sand (80% fine, 20% medium); trace coarse sand; 5% gravel to 1 1/2"; subangular to subrounded; 10% clay, medium plasticity; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. Clay is soft to stiff nodules, 5YR 5/4, reddish brown. Lense of clay from 428.7 to 429 ft, 10YR 5/3, brown; stiff to very stiff; medium plasticity; trace cobbles to 4 1/4". At 429 ft, poorly graded sand with silt; 90% sand (80% fine, 20% medium); trace coarse sand; trace gravel to 2 1/8"; 10% silt.	
	32.9									
430										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **44 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
430	21.7				428 - 436		SP-SC		@ 430.7 ft - Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 75% fine to coarse sand (40% fine, 40% medium, 20% coarse); 20% gravel to 3"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Lense of silty sand from 435.2 to 436 ft, 7.5YR 5/3, brown; 80% sand (20% very fine, 70% fine, 10% medium); trace gravel to 1"; 20% silt. Lense of well-graded gravel with clay and sand from 436 to 437 ft, 50% gravel to 2 1/2"; 40% sand (10% fine, 50% medium, 40% coarse); trace cobbles to 3 5/8"; 10% clay.	
435							SW			
	52.1									
440							CL		@ 437 ft - Clay: 7.5YR 4/6, strong brown; stiff; medium plasticity. Note: strong product odor. At 437.5 ft, 2.5Y 5/3, light olive brown. At 438 ft, 10YR 5/3, brown. At 438.5 ft, 2.5Y 6/2, light brownish gray; soft to medium stiff; low to medium plasticity.	3" Schedule 80 PVC Sump, 438 to 440 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **45 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
440	150.0				436 - 446		CL			
							ML		Sandy silt: 10YR 6/3, pale brown; loose; slightly moist; nonplastic; 50% silt; 5% clay; 45% very fine to medium sand (50% very fine, 45% fine, 5% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. Lense of clay from 444.2 to 445 ft, 5YR 4/4, reddish brown; medium stiff; medium plasticity. Lense of clay from 446.9 to 447.1 ft, 5YR 4/6, yellowish red; very stiff; medium plasticity.	Hydrated Uncoated Bentonite Chips, 3/8", 440 to 445 ft bgs
445	53.7				446 - 449		SM		Silty sand: 10YR 5/3, brown; loose; slightly moist; 70% very fine to medium sand (40% very fine, 40% fine, 20% medium); 5% gravel to 3/8"; subangular to subrounded; 20% silt, nonplastic; 5% clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. At 448 ft, 65% sand; 5% gravel; 20% silt; 10% clay. Lense of clayey sand with gravel from 448.5 to 449 ft, 70% sand (20% very fine, 40% fine, 20% medium, 20%	10/20 Silica Sand, 445 to 495 ft bgs 3" Schedule 80 PVC Screen, 0.010" slot, 447 to 487 ft bgs
450	70.4									

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **46 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	452.8				449 - 456		SM		coarse); 15% gravel to 1 3/4"; 15% clay. At 449 ft, 10YR 6/3, pale brown; 60% sand (60% very fine, 40% fine); trace gravel to 3/8"; 40% silt. At 450 ft, 60% sand; 35% silt; 5% clay.	
							SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (35% fine, 45% medium, 20% coarse); 15% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
455							ML		Sandy silt: 10YR 6/3, pale brown; loose; slightly moist; nonplastic; 50% silt; 10% clay; 40% very fine to medium sand (50% very fine, 45% fine, 5% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. Lense of silt from 455.8 to 456.2 ft, 65% silt; 15% clay; 20% sand.	
	31.4				456 - 459		SW-SM		Well-graded sand with silt and gravel: 7.5YR 5/3, brown; loose; slightly moist; 75% fine to coarse sand (35% fine, 45% medium, 20% coarse); 15% gravel to 2 3/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Lense of well-graded sand from 457.4 to 458 ft, 85% sand (50% fine, 40% medium,	
	25.3			P, V			CL			
460										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **47 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
460	652.8	35.6		P, V	459 - 464		SM		@ 460.3 ft - Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 75% very fine to medium sand (30% very fine, 60% fine, 10% medium); trace coarse sand; subangular to subrounded; 25% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
		36.0			464 - 469		SW-SM		@ 462.4 ft - Well-graded sand with silt and gravel: 10YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (50% fine, 40% medium, 10% coarse); 20% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; 5% clay, medium plasticity; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is soft nodules, 10YR 3/4, dark yellowish brown. Strong product odor. Lense of silty sand from 463.8 to 464 ft, 7.5YR 5/3, brown; 60% very fine to coarse sand; 10% gravel to 2"; 25% silt, nonplastic; 5% clay. At 464 ft, trace cobbles to 4". Lense of silty sand from 465.5 to 466 ft, 7.5YR 5/3, brown; 65% sand; 5% gravel; 25% silt, 5% clay. At 466 ft, trace cobbles to 3 1/4". Lense of well-graded sand with gravel from 468 to 469 ft, 75% sand; 20% gravel; 5% silt; trace clay nodules.	
465										
		22.7					GW-GC		Well-graded gravel with clay and sand: 7.5YR 4/2, brown; loose; moist; 50% gravel to 2 1/4"; 40% fine to coarse sand (20% fine, 50% medium, 30% coarse);	
470										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **48 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
470	2398						GW-GC		subangular to subrounded; 10% clay, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 470 ft, trace cobbles to 5".	
					479 - 476		SW		Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 80% fine to coarse sand (45% fine, 30% medium, 25% coarse); 15% gravel to 2"; subangular to subrounded; 5% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Lense of well-graded sand from 474 to 474.5, 90% sand (20% very fine, 50% fine, 20% medium, 10% coarse); 5% gravel to 1/2"; 5% silt, nonplastic. At 474.5 ft, 80% sand (20% fine, 50% medium, 30% coarse); 15% gravel to 1"; 5% silt. Lense of well-graded sand from 475.5 to 476 ft, 90% sand (50% fine, 40% medium, 10% coarse); 10% gravel to 1".	
475			P, V							
	27.3		UV						Core bag not opened; 476 to 480 ft sent to lab for UV analysis.	
			UV							
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **49 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	2572			UV, P, V, M, B	476 - 486				Core bag not opened; 480 to 488 ft sent to lab for UV analysis	3" Schedule 80 PVC Sump, 487 to 489 ft bgs
				UV						
485				UV						
	25.6			UV						
	38.2			P, V, M, B			SM		Silty sand: 7.5YR 5/2, brown; loose; moist; 75% very fine to medium sand (20% very fine, 40% fine, 40% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; 15% silt; 5% clay; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong	
490										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**
Page: **50 of 51**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
490	1784				486 - 496		CL		@ 490 ft - Sandy clay: 2.5Y 6/3, light yellowish brown; stiff to very stiff; medium plasticity; 65% clay; 30% fine to coarse sand (60% fine, 30% medium, 10% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Lense of gravelly clay from 490.8 to 491.3 ft, 10YR 8/1, white; dry; soft; nonplastic; 70% grayish brown clay nodules; 30% gravel and cobbles, calcium carbonate cemented sandstone. Lense of clayey sand from 491.3 to 492 ft, 7.5YR 4/2, brown; 70% sand (20% very fine, 20% fine, 50% medium, 10% coarse); 10% gravel to 2 1/2"; 20% clay. At 492 ft, trace cobbles of calcium carbonate cemented sandstone. At 493 ft, clay with sand; 10YR 8/1, white; dry; soft to stiff; low plasticity; 75% clay; 20% sand (30% very fine, 60% fine, 10% medium); 5% gravel to 1". Lense of clayey sand from 494.5 to 495 ft, 7.5YR 5/2, brown; 60% fine to coarse sand; 10% gravel to 2 1/2"; 30% clay, nonplastic; weak product odor.	
495							SW-SC		@ 495 ft - Well-graded sand with clay: 7.5YR 5/2, brown; loose; moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 10% gravel to 1 1/4"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: slight product odor. Lense of clayey sand from 496.5 to 497 ft, 70% sand (20% very fine, 60% fine, 20% medium); 30% clay; no product odor.	Native Soil/ Slough, 495 to 510 ft bgs
							SP-SC		@ 497 ft - Poorly graded sand with clay: 7.5YR 5/2, brown; loose; moist; 80% very fine to medium sand	
500										

27.8

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/27/18**
Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
500	14.3						SW-SC		@ 500 ft - Well-graded sand with clay: 7.5YR 5/2, brown; loose; moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
					496 - 510		SM		@ 502.5 ft - Silty sand: 10YR 5/3, brown; loose; moist; 85% very fine to fine sand (50% very fine, 50% fine); subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand with clay from 503.6 to 504.5 ft, 85% very fine to medium sand; 5% gravel to 2"; 10% clay.	
505	28.6						SP		@ 504.5 ft - Poorly graded sand: 7.5YR 5/2, brown; loose; moist; 90% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 2"; subangular to subrounded; 5% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
									TD = 510 ft	
510	215.8			P, V						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **1 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1)	Completion Details (2)
0							SW		Sand and gravel ground cover, 0 - 3 inches.	3" Schedule 80 PVC Riser, 2.5 ft above ground surface to 451 ft bgs	3" Schedule 80 PVC Riser, 2.5 ft above ground surface to 417 ft bgs
									Sandy silt: 7.5YR 5/3, brown; soft; dry. Note: lense of large pebbles and cobbles to 6" at 5 ft. Hydroknife to 8 ft for utilities clearance.		
5							ML				
	8.6				8 - 16				Sandy silt: 5YR 5/6, yellowish red; medium stiff to stiff; slightly moist to moist. Note: approximately 5% of cuttings contain caliche staining and spots. At 12 ft: 5YR 4/4, reddish brown; 5% clay, slightly plastic.		
10											Neat Portland Cement, 5% Bentonite Solids, 0 to 31 ft bgs
15											

31.7

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **2 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
15										
									Sandy silt: 7.5YR 4/4, brown; medium stiff; slightly moist. Note: 5% of cuttings contain caliche spots and stringers; 1/4" diameter. At 20.5 ft, soft; percentage of sand increases. At 22 ft, stiff.	
	7.3				16 - 22	22.9	ML			
20										
						22.3				
					22 - 26				Sandy silt: 7.5YR 5/4, brown; stiff; dry to slightly moist. Note: approximately 5 - 10% of cuttings contain caliche spots and stringers up to 1/3" diameter. At 26 ft, cuttings include up to 10% redox areas to 2", 7.5YR 7/3, pink.	
25										
						30.6				
	6.7								Sandy silt: 7.5YR 4/3, brown; stiff; slightly moist; clay, slightly plastic to plastic.	
30										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
30					26 - 36		ML		Sandy silt: 7.5YR 4/4, brown; medium stiff to stiff; slightly moist; 5% clay, low plasticity Note: trace spots of white caliche less than 1/8". At 34 ft, 7.5 YR 4/3, brown. At 36 ft, 7.5YR 7/3, pink; clay present, slightly plastic to plastic. At 37 ft, 7.5YR 5/3, brown; 15% coarse caliche sand.	Hydrated Uncoated Bentonite Chips, 3/8", 31 to 48 ft bgs
35	1.8				36 - 44				Sandy silt: 7.5YR 5/4, brown; medium stiff; slightly moist; trace clay, nonplastic. Note: approximately 5% of cuttings have caliche spots less than 1/8". At 38 ft, dry to slightly moist. At 43.75 ft, 7.5 YR 4/3, brown; clay is present, slightly plastic	
40										
45										

24.8
26.8
21.0
44

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
45					46					
	26.8				46 - 48		ML		Sandy silt: 7.5YR 4/3, brown; stiff; dry to slightly moist; 10% coarse caliche sand. Note: at 46 ft, 10% clay, slightly plastic. At 47.5, 30% of cuttings contain caliche stringers and staining, 7.5YR 7/3, pink.	
	14.0			P					Core bag not opened, used for sampling.	High Solids Bentonite Grout, 48 to 384 ft bgs
50					48 - 56		ML		Sandy silt: 7.5YR 4/3, brown; slightly moist; 10% clay, slightly plastic.	
							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% very fine to coarse sand (80% very fine, 5% fine, 10% medium, 5% coarse); trace gravel to 1"; subrounded; gravel is lithic fragments. Note: lense of sandy clay from 53 to 53.25 ft, 70% clay, very plastic; 30% coarse sand.	
55	29.2						ML		Sandy silt: 5YR 4/4, reddish brown; medium stiff to stiff; moist. Note: approximately 8% of cuttings have white caliche spots less than 1/8".	
	2.5									
60										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
60					56 - 66		ML		Silt with sand: 7.5YR 4/3, brown; medium stiff to stiff; moist; sand is medium and coarse.	
							SW		Well-graded sand with gravel: 7.5YR 4/3, brown; loose; slightly moist; 80% fine to coarse sand (15% fine, 50% medium, 35% coarse); 20% gravel to 1/2"; gravel is quartz, feldspar, and lithic fragments.	
65	1.8	50.8					ML		Sandy silt: 5YR 4/4, reddish brown; medium stiff to stiff; slightly moist; trace clay, slightly plastic to plastic. Note: approximately 5% of cuttings contain white caliche spots less than 1/8". At 67 ft, soft to medium stiff.	
									Sandy silt: 7.5YR 5/4, brown; medium stiff; slightly moist. Note: fraction of very fine sand is increasing.	
70					66 - 76		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% very fine to coarse sand (20% very fine, 10% fine, 40% medium, 30% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							ML		Sandy silt: 7.5YR 4/4, brown; medium stiff; slightly moist. Note: approximately 5% of cuttings contain white caliche spots to 1/8". At 74.5 ft, 7.5YR 5/4, brown; fraction of very fine sand increases.	
75										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **6 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
75										
	33.1				76 - 84		ML		Sandy silt: 5YR 4/6, yellowish red; medium stiff to stiff; slightly moist.	
80							SM		Silty sand: 7.5YR 6/4, light brown; medium dense to dense; slightly moist; 70% very fine to coarse sand (80% very fine, 5% fine, 10% medium, 5% coarse); 5% gravel to 1"; 20% silt; 5% clay, slightly plastic. Note: some areas are 7.5YR 8/3, pink.	
							ML		Sandy silt: 5YR 5/4, reddish brown; soft to medium stiff; slightly moist. Note: lense of silty sand from 85.5 to 86 ft, 7.5YR 5/3, brown; sand is 20% very fine, 10% fine, 60% medium, 10% coarse; subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
85	32.8				84 - 90		SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 90% very fine to coarse sand (10% very fine, 5% fine, 30% medium, 55% coarse); 10% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
	10.1						ML		Sandy silt: 5YR 5/4, reddish brown; stiff; dry to slightly moist. Note: approximately 5% of the cuttings are 1mm lenses with white carbonate staining. At 90 ft, staining increases to 10% of cuttings.	
90										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
90	1.1	33.2			90 - 96		ML		Sandy silt: 7.5YR 5/6, strong brown; medium stiff to stiff; slightly moist. Note: approximately 5% of cuttings include caliche spots and stringers less than 1/8". At 92 ft, caliche spots are up to 1/2". At 96 ft, 7.5YR 6/4, light brown; very stiff; dry; approximatly 30% of the cuttings are 7.5YR 8/3, pink.	
95		31.6			96 - 99		SP-SM		Poorly graded sand with silt: 7.5YR 5/3, brown; loose; slightly moist; 90% fine sand; 10% silt.	
		55.4			99 - 104		SM		Silty sand: 7.5YR 5/3, brown; medium dense; slightly moist. Note: at 99.5 ft, fraction of fine sand is increasing.	
100							SP		Poorly graded sand: 7.5YR 5/3, brown; medium dense; slightly moist; 100% fine sand. Note: trace concretions to 1/2".	
							SM		Silty sand: 7.5YR 5/3, brown; loose to medium dense; slightly moist; trace gravel to 1.5"; subrounded to rounded. Note: sand is poorly graded. Gravel is concretions.	
105		58.2			104		SP		Poorly graded sand: 7.5YR 5/3, brown; loose to medium dense; slightly moist; 100% very fine sand.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **8 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
105	15.7		P		106		SP			
	34.2						SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% very fine to coarse sand (30% very fine, 10% fine, 50% medium, 10% coarse).	
							SP		Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine sand.	
110					106 - 116		ML		Sandy silt: 7.5YR 5/4, brown; medium stiff to stiff; dry to slightly moist. Note: trace carbonate staining. At 110 ft, 7.5YR 5/3, brown.	
115	2.7									
	31.4				116 - 120				Sandy silt: 7.5YR 5/4, brown; medium stiff; slightly moist. Note: at 116.25 ft, a 4" band of caliche/carbonate cemented gravel from 1" to 4" is present; subangular to subrounded. At 117 ft, no caliche present. At 119.5 ft, moist; 20% clay, plastic, present in medium stiff nodules from 1" to 2".	
120										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
120	25.9				120 - 126		ML		Silt: 7.5YR 5/4, brown; medium stiff to stiff; slightly moist; 95% silt; 5% clay, plastic. Note: trace caliche in spots and stringers less than 1/8". Clay is present in medium dense nodules from 1" to 2". At 123 to 123.5 ft, 70% silt; 30% clay. At 124.5 ft; 60% silt; 30% clay.	
125	6.2						CL-ML		Silty clay: 7.5YR 5/3, brown; stiff; slightly moist; very plastic. Note: lense of silt present from 125.5 to 126 ft; 7.5YR 5/4, brown; 95% silt, 5% clay.	
	35.9				126 - 136		CL		Clay: 7.5YR 4/3, brown; stiff; dry to slightly moist; very plastic; 100% clay; trace silt. Note: at 129.5 ft, 7.5YR 5/4, brown; slightly plastic; 70% clay; 30% silt.	
130							ML		Silt: 7.5YR 5/4, brown; medium stiff to stiff; slightly moist. Note: from 130.5 to 132 ft, , 60% silt; 40% clay, slightly plastic. At 132 ft, 7.5YR 4/3, brown; 100% silt.	
135							CL		Clay: 7.5YR 5/3, brown; very stiff to stiff; dry to slightly moist; very plastic; 80% clay; 20% silt and sand.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **10 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
135	7.7									
	28.8				136 - 142		CL		Clay with sand: 7.5YR 5/3, brown; medium stiff to stiff; slightly moist; plastic. Note: At 137 ft to 138 ft, lense with 3" well-indurated nodules with calcium carbonate cement and caliche staining. At 138 ft, 70% clay, slightly plastic; 30% silt.	
140							ML		Silt: 7.5YR 5/3, brown; medium stiff to stiff; slightly moist; nonplastic; 70% silt; 30% clay. Note: at 140 ft, 7.5YR 4/2, brown; stiff; nonplastic to slightly plastic; 90% silt; 10% clay. At 141 ft, very dense; dry to slightly moist. At 142 ft, 70% silt; 30% clay, slightly plastic to plastic.	
	66.4				142 - 146					
145							SP		Poorly graded sand: 7.5YR 4/2, brown; medium dense to dense; 95% fine sand; 5% silt and clay, very plastic. Note: silt and clay present in dense nodules up to 1". Lense of clayey sand from 145.5 to 146.25, 75% fine sand; 25% clay, very plastic; clay is present in stiff nodules to 1 1/2".	
	84.6									
	11.4				146 - 152		SW		Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% very fine to coarse sand (50% very fine, 10% fine, 30% medium, 10% coarse); trace gravel to 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is pumice. Note: at 148 ft, no pumice gravel. Lense of well-graded sand	
150										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **11 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
150							SW		with gravel from 150 to 150.5 ft, 60% fine to coarse sand; 40% gravel to 2".	
	38.7				152 - 157		ML		Silt: 7.5YR 5/4, brown; very stiff; dry to slightly moist; slightly plastic; 80% silt; 20% clay. Note: at 151.25 ft, nonplastic; 100% silt. At 152 ft, trace clay, nonplastic. At 153 ft; no clay. At 155.75 ft, 100% silt, trace very fine sand.	
155	NA								No recovery	
6.1	59.4				157 - 165		CL		Sandy clay: 7.5YR 5/3, brown; medium stiff; slightly moist; plastic; 20% silt. Note: clay content decreases with depth.	
							SC		Clayey sand: 7.5YR 5/3, brown; medium dense; slightly moist; 70% fine to medium sand (50% fine, 20% medium); trace coarse sand; 30% clay, plastic.	
160							SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (5% fine, 65% medium, 30% coarse); 20% gravel to 1 1/2"; gravel is quartz, feldspar, and lithic fragments. Note: lenses of well-graded sand from 159.5 to 160 ft and 163 to 164 ft, 95% fine to coarse sand; 5% gravel to 1/2".	
165							ML		Silt: 7.5YR 6/3, light brown; medium stiff; slightly moist; slightly plastic; 85% silt; 15% clay. Note: lense	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **12 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
165		37.3			165 - 170		ML		of clay from 165 to 165.5 ft, plastic, silt content increases downward to 80% clay, 20% silt, slightly plastic.	
	5.3						SM		Silty sand: 7.5YR 5/3, brown; medium dense to dense; slightly moist; sand is fine.	
									Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 20% medium, 40% coarse); 20% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and pumice. Note: lense of silt from 167.75 to 168 ft, 60% silt; 40% clay; slightly plastic to plastic.	
170		58.7			170 - 176		SW		Well-graded sand: 7.5YR 6/4, light brown; loose to medium dense; slightly moist; 100% fine to coarse sand (80% fine, 20% medium, 20% coarse). Note: lense of well-graded sand with gravel from 168.5 to 169 ft; 85% sand; 15% gravel to 1/2"; subrounded; gravel includes pumice. From 169.5 to 170 ft, lense of silty sand with 20% clay. At 170 ft, 100% sand (70% fine, 20% medium, 10% coarse). At 172 ft, 100% sand (10% fine, 60% medium, 30% coarse). At 174 ft, sand is fining downwards to 60% fine, 30% medium, 10% coarse.at 175.5 ft. At 177.5 ft, trace gravel to 1"; gravel is pumice and lithic fragments.	
175		74.3								
	3.4				176 - 182		SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium).	
180										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **13 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
180							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium).	
	44.4				182 - 186					
185							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (5% fine, 45% medium, 50% coarse); 10% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 184 ft, 100% sand (20% fine, 70% medium, 10% coarse); trace gravel to 1/2"; gravel includes granite. At 186 ft, 95% sand (40% fine, 40% medium, 20% coarse); 5% gravel to 3/4"; fining downwards. Lense of well-graded sand with gravel from 189 to 190 ft, 85% sand (25% fine, 35% medium, 40% coarse); 15% gravel to 3/4".	
	42.8				186 - 194					
190							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slighlty moist; 100% fine to medium sand (70% fine, 30% medium); trace coarse sand. Note: lense of well-graded sand from 191 to 191.3 ft, 7.5YR 5/3, brown; 90% fine to coarse sand; 10% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. At 191.3 ft, 100% very fine sand.	
	48.5						SW		Well-graded sand: 7.5YR 5/3, brown; loose; moist; 100% fine to coarse sand (60% fine, 35% medium,	
195										

1.3

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **14 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
195									5% coarse).	
	0.3				194 - 200		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (20% fine, 40% medium, 40% coarse); trace gravel to 1/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 197 ft, sand is 70% fine, 25% medium, 5% coarse; no gravel. At 198 ft, sand is 70% fine, 15% medium, 15% coarse; trace gravel to 1/4". No gravel at 199 ft. At 200 ft, sand is 40% fine, 50% medium, 10% coarse; trace gravel to 1/2".	
200	37.7				200 - 206		ML		Silt: 7.5YR 5/3, brown; medium stiff to stiff; slightly moist. Note: At 202 ft, trace very fine sand.	
205							SW		Well-graded sand with gravel: 7.5YR 5/3, brown; medium dense; slightly moist; 70% fine to coarse sand (40% fine, 20% medium, 40% coarse); 30% gravel to 1"; angular; trace silt; gravel is well indurated very fine sandstone. Note: lense of well-graded sand from 204 to 204.5 ft; 100% fine to coarse sand.	
	50.9						SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (85% fine, 15% medium); trace coarse sand; trace gravel to 1/3"; gravel is pumice.	
	0.7				206		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (70% fine, 20% medium, 10% coarse). Note: At 208 ft, 7.5YR 6/3, light	
210										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **15 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
210					214		SW		brown; sand is 80% fine, 15% medium, 5% coarse. At 209.5 ft, sand is coarsening downwards. At 210 ft, sand is 70% fine, 20% medium, 10% coarse.	
							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% very fine sand. Note: at 212 ft, 95% sand; 5% gravel to 1/2"; angular; gravel is moderately cemented sand.	
215	40.2				214 - 216		SW		Well-graded sand: 7.5YR 6/1, gray; loose; slightly moist; 100% fine to coarse sand (75% fine, 15% medium, 10% coarse); trace gravel to 1/2"; gravel is lithic fragments. Note: at 214.5 ft, 90% sand (15% fine, 55% medium, 30% coarse); 10% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
	67.1						CL-ML		@ 216 ft: Silty clay: 7.5YR 6/3, light brown; stiff; slightly moist; plastic; 50% clay; 50% silt	
220	1.3				216 - 226		SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 30% medium, 45% coarse); 20% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: Lenses of well-graded sand from 217 to 218 ft and 221 to 222 ft; 100% fine to coarse sand. At 220 ft, sand is 20% fine, 30% medium, 50% coarse; gravel to 1/2"; gravel includes pumic and feldspar. At 222 ft, 70% sand (15% fine, 30% medium, 55% coarse); 30% gravel to 1 1/3". At 224 ft, 70% sand (35% fine, 30% medium, 35% coarse); 30% gravel to 3/4"; gravel contains occasional pumice. At 225.5 ft, 85% sand (35% fine, 25% medium, 40% coarse); 15% gravel to 1".	
225										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **16 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
225										
		62.1					SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (70% fine, 20% medium, 10% coarse).	
	1.3				226 - 234				Well-graded sand with gravel: 7.5YR 5/3, brown; loose; well graded; 80% fine to coarse sand (25% fine, 25% medium, 50% coarse); 20% gravel to 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 229 ft, 60% sand (10% fine, 30% medium, 60% coarse); 40% gravel to 1".	
230							SW-SC		Well-graded sand with clay and gravel: 7.5YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (10% fine, 45% medium, 45% coarse); 25% gravel to 1"; subangular to subrounded; 10% clay, plastic; gravel is quartz, feldspar, and lithic fragments. Note: Clay is present as nodules to 1"; 7.5YR 6/3, light brown.	
		43.1					SW		@ 231 ft: Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (10% fine, 75% medium, 15% coarse); 5% gravel to 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: Lense of poorly graded sand from 231 to 231.3 ft; 100% fine sand. At 232 ft, gravel to 1/2"; gravel is only lithic fragments. At 223.75 ft, gravel to 1"; gravel is mostly pumice with quartz and lithic fragments.	
235					234 - 242					
	2.1						SP		@ 234 ft: Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% fine to coarse sand (10% fine, 35% medium, 55% coarse); 30% gravel to 1 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand from 235.5 to 236.5 ft, 100% fine to	
240										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **17 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
240									coarse sand; trace gravel to 1/2"; gravel includes pumice.	
		61.2			242 - 246		SP		@ 236.5 ft: Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine sand. Note: at 240 ft, approximately 20% of the sand is in medium dense pieces. At 243 ft, sand size increases slightly. Lense of well-graded sand from 244.5 to 245.25, 7.5YR 6/2, pinkish gray, 100% fine to coarse sand; coarse fraction is pumice and feldspar.	
245										
		52.9			246 - 253		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 248 ft, 95% sand (75% fine, 10% medium, 15% coarse); 5% gravel to 1"; gravel includes sandstone. At 249 ft, 90% sand (10% fine, 65% medium, 25% coarse); 10% gravel to 1/2". At 251.25 ft, 7.5YR 6/2, pinkish gray; 100% sand (80% fine, 10% medium, 10% coarse).	
	0.0									
250							CL		Clay: 7.5YR 5/3, brown; medium stiff; slightly moist; plastic; 70% clay; 30% silt	
		32.1			253 - 25		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% very fine sand.	
255							CL		Clay: 7.5YR 5/4, brown; stiff; dry to slightly moist;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **18 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
255							SM		plastic.	
									Silty sand: 7.5YR 5/4, brown; dense; dry to slightly moist; nonplastic.	
	33.8						CL		Clay: 7.5YR 6/3, light brown; medium stiff; slightly moist; plastic; clay; silt; very fine sand.	
	0.5				256 - 264		CL-ML		Silty clay: 7.5YR 6/3, light brown; stiff; dry to slightly moist; slightly plastic to plastic.	
260							ML		Silt: 7.5YR 5/3, brown; medium stiff to stiff; slightly moist; slightly plastic; trace clay.	
							CL		Clay: 2.5Y 6/3, light yellowish brown; very stiff; dry to slightly moist; plastic. Note: clay stiffness decreases to medum stiff at 263.5 ft. Clay appears pale green.	
	51.1						SP		Poorly graded sand: 7.5YR 8/1, white; loose; slightly moist; 100% fine to medium sand (10% fine, 90% medium).	
265							SP-SM		Poorly graded sand with silt: 7.5YR 5/3, brown; 90% sand; 10% silt.	
							CL		Clay: 7.5YR 5/3, brown; stiff; slightly moist; very plastic; 90% clay; 10% very fine sand and silt.	
	2.2				264 - 272		SM		Silty sand: 7.5YR 5/3, brown; medium dense; slightly moist; very fine sand; silt; 10% clay, slightly plastic. Note: approximately 30% of the cuttings are present in dense clasts.	
270							SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand; trace clay, very plastic. Note:	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **19 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
270									approximately 10% of the cuttings are pieces of sandy clay up to 1". At 270 ft, no clay. At 272 ft, sand is 80% fine, 20% medium; trace gravel. At 274 ft, 100% fine sand; approximately 5% of the cuttings are dense nodules, 1" to 3" diameter. At 275 ft, no dense nodules.	
		77.7			272 - 280		SP			
275										
	2.9			P			SW		Well-graded sand: 7.5YR 6/4, light brown; loose to medium dense; slightly moist; 100% fine to coarse sand (80% fine, 10% medium, 10% coarse); trace gravel to 1/3"; subrounded; gravel is quartz and lithic fragments.	
							SP		Poorly graded sand: 7.5YR 6/1, gray; loose; slightly moist; 100% very fine sand.	
280		69.9					SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse). Note: sand is fining downwards.	
					280 - 286				Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine sand; 5% medium to coarse sand. Note: at 282 ft, 100% fine sand; trace medium and coarse sand.	
285										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **20 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
285	56.2				286 - 290		SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand; trace medium to coarse sand.	
	0.0									
290	44.9				290 - 296				Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (10% fine, 85% medium, 5% coarse); trace gravel to 1"; subangular. Note: at 294 ft, sand is 30% fine, 50% medium, 20% coarse; no gravel.	
	0.3									
295	35.9				296 - 300		SW		Well-graded sand with gravel: 5YR 4/3, reddish brown; loose; slighlty moist to moist; 80% fine to coarse sand (15% fine, 80% medium, 5% coarse); 20% gravel to 1"; rounded.	
	0.0								Well-graded sand: 5YR 4/3, reddish brown; loose; slightly moist; 100% fine to coarse sand (10% fine, 80% medium, 10% coarse).	
300										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **21 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
300	30.5				300 - 306		SW		Well-graded sand: 5YR 4/3, reddish brown; loose; slightly moist; 100% fine to coarse sand (10% fine, 80% medium, 10% coarse).	
							SW		Well-graded sand with gravel: 5YR 3/4, dark reddish brown; loose; slightly moist; 55% fine to coarse sand (10% fine, 20% medium, 70% coarse); 45% gravel to 1 1/2"; subrounded to rounded. Note: lense of silt from 304 to 304.2 ft; 5YR 5/2, reddish gray; soft; moist; slightly plastic. At 306 ft, 80% sand (20% fine, 40% medium, 40% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
305	56.1				306 - 312		SP		Poorly graded sand: 5YR 6/2, pinkish gray; 95% fine sand; 5% coarse sand; trace fine gravel; subangular. Note: at 308 ft, dark mottling present; 10YR 2/1, black.	
0.0							SW		Well-graded sand with gravel: 5YR 5/3, reddish brown; slightly moist; 60% fine to coarse sand (20% fine, 40% medium, 40% coarse); 40% gravel to 2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments.	
310	60.4				312 - 316		SP		Poorly graded sand: 5YR 5/3, reddish brown; slightly moist; 95% fine sand; 5% fine gravel; rounded.	
315										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **22 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
315							SP			
		56.3					GW		Well-graded gravel with sand: 5YR 3/2, dark reddish brown; loose; moist; 70% gravel to 2'; subrounded; 30% fine to coarse sand (10% fine, 20% medium, 70% coarse); gravel is lithic fragments.	
	2.1				316 - 326				Well-graded sand: 5YR 5/2, reddish gray; loose; slightly moist; 100% fine to coarse sand (90% fine, 3% medium, 7% coarse); sand is lithic fragments.	
320										
							SW		Well-graded sand with gravel: 5YR 3/2, dark reddish brown; loose; slightly moist to moist; 60% fine to coarse sand (15% fine, 20% medium, 65% coarse); 40% gravel to 1"; subangular to subrounded; sand and gravel are quartz and lithic fragments	
325										
		55.4								
	2.1				326 - 332					
330										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **23 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
330									Well-graded sand with gravel: 5YR 3/2, dark reddish brown; loose; slightly moist to moist; 60% fine to coarse sand (15% fine, 20% medium, 65% coarse); 40% gravel to 1"; subangular to subrounded; sand and gravel are quartz and lithic fragments. Note: Lense of well-graded sand from 331.5 to 332 ft, 100% fine to coarse sand. At 334 ft, 80% sand (20% fine, 10% medium, 70% coarse); 20% gravel to 1 1/2".	
	68.9				332 - 334					
	68.9									
335										
					334 - 340		SW		Well-graded sand: 5YR 5/2, reddish gray; loose; slightly moist; 100% fine to coarse sand (50% fine, 20% medium, 30% coarse).	
	7.3			V, P						
340									Well-graded sand with gravel: 5YR 5/2, reddish gray; loose; slightly moist; 85% fine to coarse sand (50% fine, 20% medium, 30% coarse); 15% gravel to 1"; subrounded to rounded; gravel is lithic fragments and weakly indurated sandstone.	
	53.6				340 - 345				Well-graded sand: 5YR 5/2, reddish gray; loose; slightly moist; 95% fine to coarse sand (50% fine, 20% medium, 30% coarse); 5% gravel to 1"; subrounded to rounded; gravel is lithic fragments and weakly indurated sandstone.	
345									Well-graded sand with gravel: 5YR 5/3, reddish	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **24 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
345		67.8			345 - 348				brown; loose; moist; 75% fine to coarse sand (30% fine, 20% medium, 50% coarse); 25% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
	4.7	54.7			348 - 353		SW		Well-graded sand: 5YR 5/3, reddish brown; loose; moist; 90 - 95% fine to coarse sand (30% fine, 20% medium, 50% coarse); 5 - 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
350										
		34.1			353 - 356					
355										
		45.3							Well-graded sand with gravel: 5YR 5/3, reddish brown; loose; moist; 60% fine to coarse sand (30% fine, 20% medium, 50% coarse); 40% gravel to 1"; trace cobbles; subangular to subrounded; sand is quartz, felspar, and lithic fragments; gravel is quartz and lithic fragments.	
	3.3				356					
360										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **25 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360					364				Well-graded sand with gravel: 5YR 5/3, reddish brown; loose; moist; 60% fine to coarse sand (30% fine, 20% medium, 50% coarse); 40% gravel to 1"; trace cobbles; subangular to subrounded; sand is quartz, felspar, and lithic fragments; gravel is quartz; lithic fragments; and friable decomposing granite.	
365					364 - 366		SW			
	8.1				366 - 372					
370	55.5								Poorly graded sand: 5YR 5/3, reddish brown; loose; slightly moist to moist; 95% fine to medium sand (95% fine, 5% medium); trace coarse sand; 5% gravel to 1"; subrounded to rounded.	
	38.4				372 - 376		SP			
375										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **26 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
375							GW		Well-graded gravel with sand: 5YR 5/3, reddish brown; loose; slightly moist to moist; 60% gravel to 1 3/4"; subrounded to rounded; 40% fine to coarse sand (5% fine, 15% medium, 80% coarse); gravel is lithic fragments.	
	40.1									
	37.1				376 - 384				Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 377 ft, 100% sand (70% fine, 20% medium, 10% coarse). No odor; PID reading at 378 ft suspect.	
380									Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (20% fine, 35% medium, 45% coarse); 15% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (5% fine, 45% medium, 50% coarse); 10% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand with gravel from 383.3 to 383.75 ft, 7.5YR 6/2, pinkish gray; 60% fine to coarse sand; 40% gravel to 1 1/2". At 383.75 ft; 100% sand (70% fine, 25% medium, 5% coarse); no gravel.	
385	46.3				384 - 387					
	52.8									
	17.0								Well-graded sand with gravel: 7.5YR 4/2, brown; loose to medium dense; slightly moist; gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: black coating on some minerals. At 388 ft, 7.5YR 5/3, brown; 80% fine to	
390										

Hydrated Uncoated Bentonite Chips, 3/8", 384 to 415.1 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **27 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390					387 - 394		SW		coarse sand (15% fine, 30% medium, 55% coarse); 20% gravel to 1/2". Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (40% fine, 30% medium, 30% coarse); trace gravel to 1"; gravel is quartz, feldspar, and lithic fragments. Note: at 393 ft, sand is 75% fine, 25% medium, 5% coarse; no gravel. No odor; PID reading at 394 ft is suspect.	
395	16.9				394 - 396	51.5	SC		Clayey sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 50% fine to coarse sand (30% fine, 40% medium, 30% coarse); 20% gravel to 3/4"; subangular to subrounded; 30% clay, very plastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present as nodules up to 4". At 395.75 ft, 45% fine to coarse sand; 20% gravel; 35% clay. Lense of sandy clay from 396 to 397 ft, 80% clay as nodules; 20% sand and gravel. Lense of well-graded sand from 397 to 398 ft, 90% very fine to coarse sand; 10% gravel to 1 1/4". At 398 ft, 60% sand (30% very fine, 20% fine, 30% medium, 20% coarse); trace gravel to 1/3"; 40% clay; slightly plastic, present as stiff nodules to 4".	
400					396 - 402	75.9				
					402 - 406	49.6	SP		Poorly graded sand: 7.5YR 5/4, brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium). Note: no odor, PID reading at 404 ft suspect.	
405	38.4			V, P			SW		Well-graded sand: 7.5YR 5/4, brown; loose; slightly moist; 100% fine to coarse sand (30% fine, 45%	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **28 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
405									medium, 25% coarse); trace gravel to 5/8"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 405.5 ft, sand is 35% fine, 25% medium, 40% coarse; no gravel; trace clay, slightly plastic, in stiff nodules to 3", 5YR 4/4, reddish brown. At 406 ft, sand is 55% fine, 30% medium, 15% coarse; no gravel; no clay.	
	73.3				406 - 416		SW		Well-graded sand with gravel: 7.5YR 7/1, light gray; loose; dry to slightly moist; 85% fine to coarse sand (70% fine, 20% medium, 10% coarse); 15% gravel to 1"; subangular to subrounded; gravel is granite and lithic fragments. Note: at 412 ft, 7.5YR 6/2, pinkish gray; 80% sand (60% fine, 25% medium, 15% coarse); 20% gravel and cobbles to 4". At 413 ft; 7.5YR 5/2, brown; 85% sand (70% fine, 25% medium, 5% coarse); 15% gravel to 1 1/2"; gravel is lithic fragments. Note: no odor, PID reading at 410 ft suspect.	
410	19.5									
415									Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse). Note: at 415 ft, 7.5YR 6/2, pinkish gray, sand is 20% fine, 80% medium, 20% coarse; trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. At 416 ft, 95% sand (65% fine, 25% medium, 10% coarse); 5% gravel to 1/2". At 417.5 ft; 95% sand (5% fine, 30% medium, 65% coarse); 5% gravel to 3/4". At 418 ft, 100% sand (85% fine, 10% medium, 5% coarse); trace gravel to 3/4". Lense of clay as red nodules to 3" from 418.75 to 419.25 ft, very plastic.	
	51.7				416 - 419					
	0.3	23.3		V, P						
420										

3" Schedule 80 PVC Screen, 0.010" slot, 417 - 442 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **29 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420					419 - 424		SW		@ 419.25 ft: Well-graded sand: 7.5YR 6/1, gray; loose; slightly moist; 95% fine to coarse sand (10% fine, 65% medium, 25% coarse); 5% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 420 ft, 7.5YR 5/3, brown; 100% sand (85% fine, 10% medium, 5% coarse); trace gravel to 2"; subrounded; trace clay nodules.	
							SP		@ 421 ft - Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand; trace medium to coarse sand.	
	49.1						SW		@ 423 ft - Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (35% fine, 45% medium, 20% coarse); 5% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand with gravel from 425.3 to 426 ft, 70% sand (45% fine, 20% medium, 35% coarse); 30% gravel to 1"; angular to subrounded; trace white clay in stiff nodules to 2", coated with sand and gravel.	
425					424 - 432		SC		@ 426 ft: Clayey sand: 7.5YR 4/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 30% medium, 40% coarse); 10% gravel to 1"; subangular to subrounded; 20% clay, very plastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present as stiff red nodules.	
430	0.0						SW		@ 427 ft: Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (70% fine, 20% medium, 10% coarse). Note: at 429 ft, sand is 80% fine, 15% medium, 5% coarse.	
	42.4				432 - 436				@ 430 ft: Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (55% fine, 30% medium, 15% coarse); 30% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 431 ft; gravel is	10/20 Silica Sand, 415.1 to 444 ft bgs
435										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **30 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
435					436 - 442		SP		to 3/4". Lense of well-graded gravel from 432 to 433 ft, 55% gravel to 1 1/2"; 45% fine to coarse sand; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. At 433 ft, 85% sand (10% fine, 60% medium, 30% coarse); 15% gravel to 1 1/4"; gravel includes moderately indurated sandstone conglomerate. At 434 ft, sand is 5% fine, 60% medium, 35% coarse; gravel to 3/4".	
	45.5								@ 435 ft: Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand; trace medium sand. Note: lenses of well-graded sand with gravel from 438 to 439 ft and 440 to 441 ft, 80% fine to coarse sand; 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and granite.	
440	0.2									
	40.1				442 - 448		GW		Well-graded gravel with sand: 7.5YR 5/3, brown; loose; slightly moist; 70% gravel to 1 3/4"; 30% fine to coarse sand (15% fine, 15% medium, 70% coarse); subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments.	
445							SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (40% fine, 30% medium, 30% coarse); 30% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 445 ft, 7.5YR 6/2, pinkish gray; 60% sand (15% fine, 35% medium, 50% coarse); 40% gravel to 2"; gravel includes granite. At 448 ft, 7.5YR 5/2, brown; 60% sand (15% fine, 35% medium, 50% coarse); 40% gravel to 1/2".	
	31.6				448 - 450					
450									Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (75% fine, 15%	

3" Schedule 80 PVC Sump, 442 - 444 ft bgs

Hydrated Uncoated Bentonite Chips, 3/8", 444 to 448.8 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **31 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	0.7	42.2			450 - 456		SW		medium, 10% coarse); 5% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: slight hydrocarbon odor. At 451 ft; 100% sand (50% fine, 40% medium, 10% coarse), slight hydrocarbon odor. Lense of well-graded sand with gravel from 453 to 454 ft, 70% fine to coarse sand; 30% gravel to 1 1/2". At 454 ft; 100% sand (85% fine, 10% medium, 5% coarse). At 456 ft, 95% sand (60% fine, 30% medium, 10% coarse); 5% gravel to 1"; trace clay in 1" nodules, nonplastic to plastic. At 458 ft, 100% sand (70% fine, 20% medium, 10% coarse); approximately 20% of the cuttings are medium dense.	3" Schedule 80 PVC Screen, 0.010" slot, 451 to 491 ft bgs; 10/20 Silica Sand, 448.8 to 502 ft bgs
455		25.6			456 - 458					
		61.3			458 - 466		SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand; trace gravel to 1/2"; subrounded. Note: at 461, trace medium dense areas.	
460	22.9									
465										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **32 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
465									Poorly graded sand: see description on previous page.	
		21.5					SP			
		26.0			466 - 472		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; fine to coarse sand; gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. At 469 ft, 5% clay present as nodules to 2"; dry; stiff; slightly plastic.	
470	31.7	31.9							Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine sand; 5% medium to coarse sand. Note: hydrocarbon odor. At 472 ft; sand is 90% fine, 5% medium, 5% coarse. At 473 ft, 100% very fine sand. At 474 ft, 100% fine sand.	
		45.5					SP			
		21.6		B, M, V, P						
475	90.2	22.3			473 - 479		SW		Well-graded sand with gravel: 7.5YR 4/2, brown; loose; slightly moist; 60% fine to coarse sand (15% fine, 15% medium, 70% coarse); 40% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments. Note: hydrocarbon odor. Lense of well-graded sand from 478 to 479 ft, 95% fine to coarse sand (75% fine, 15% medium, 10% coarse); 5% gravel to 1/2".	
		22.4								
		23.2					GW		Well-graded gravel with sand: 7.5YR 5/2, brown; loose; slightly moist; 80% gravel to 2 1/4"; 20%	
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **33 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	362	23.6					GW		medium to coarse sand (50% medium, 50% coarse); trace fine sand; gravel is quartz, feldspar, and lithic fragments. Note: At 480 ft, 70% gravel; 30% sand (trace fine, 30% medium, 70% coarse).	
	1802	24.2			479 - 489		SW		Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse); trace gravel to 1"; subangular to subrounded; trace clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present as nodules to 1". At 482 ft, sand is 10% fine, 75% medium, 15% coarse, hydrocarbon odor. At 483 ft, 7.5YR 4/1, dark gray; wet; 90% sand (10% fine, 35% medium, 55% coarse); 10% gravel to 1". At 484 ft, 90% sand (80% fine, 10% medium, 10% coarse); 10% gravel to 1"; trace gravel to 2 1/2". At 485 ft, 7.5YR 5/3, brown, wet, 100% fine to coarse sand.	
485		25.0					GW			
		25.4							@ 486 ft: Well-graded gravel with sand: 7.5YR 5/3, brown; loose; wet; 60% gravel to 1"; 40% fine to coarse sand (15% fine, 35% medium, 20% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
		26.9	UV						@ 487 ft: Well-graded sand with gravel: 7.5YR 4/2, brown; loose; wet; 70% fine to coarse sand (5% fine, 35% medium, 60% coarse); 30% gravel to 1 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments.	
490	1476	25.0	UV				SW		@ 489 ft: Core bag not opened, sent to lab for UV analysis.	3" Schedule 80 PVC Sump, 491 to 493 ft bgs
		25.1			489 - 499				Well-graded sand with gravel: 7.5YR 4/3, brown; loose; wet; 80% fine to coarse sand (15% fine, 30% medium, 55% coarse); 20% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic	
495	3826									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **34 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
495		25.1		B, M, V, P	499 - 510		SW		fragments. Note: at 495 ft, trace clay coating gravel. Lense of well-graded sand from 496 to 497 ft, 90% sand (10% fine, 20% medium, 60% coarse); 10% gravel to 1". At 497 ft, 7.5YR 3/1, very dark gray; 80% sand (5% fine, 20% medium, 75% coarse); 20% gravel to 3/4"; trace clay as nodules.	
		21.8								
500		22.5							Well-graded sand: 7.5YR 5/3, brown; loose; wet; 100% fine to coarse sand (10% fine, 80% medium, 10% coarse); trace gravel to 1/2"; subrounded; gravel is lithic fragments. Note: at 499 ft, 7.5YR 4/1, dark gray; medium dense. sand is 5% fine, 90% medium, 5% coarse; no gravel.	
		24.4								
		32.8					SC		Clayey sand: 7.5YR 5/2, brown; medium dense to dense; moist; 70% fine to coarse sand (20% fine, 50% medium, 30% coarse); trace gravel to 1"; 30% clay, slightly plastic to plastic; gravel is quartz, feldspar, and lithic fragments.	Native Soil/ Slough, 502 to 510 ft bgs
505	130.1	24.0					SW		@ 503 ft: Well-graded sand: 7.5YR 5/2, brown; medium dense to dense; moist; 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 1"; angular to subangular; gravel is quartz, feldspar, granite, and lithic fragments. Note: At 504 ft, 7.5YR 4/1, dark gray; wet; sand is 5% fine, 45% medium, 50% coarse; gravel is rounded to subrounded. At 505 ft, 95% sand (10% fine, 35% medium, 55% coarse); 5% gravel to 1/2".	
		24.1								
		24.8		V, P			SC		@ 506 ft: Well-graded sand with gravel: 7.5YR 4/1, dark gray; medium dense; wet; 80% fine to coarse sand (50% fine, 15% medium, 35% coarse); 20% gravel to 2/3"; subangular to subrounded; gravel is	
510	346									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **11/6/18**
Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**
Page: **35 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **475.77**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
510									quartz, feldspar and lithic fragments. @ 508 ft: Clayey sand: 7.5YR 4/1, dark gray; medium dense; wet; 75% fine to coarse sand (10% fine, 55% medium, 35% coarse); 5% gravel; subangular to subrounded; 20% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: trace nodules of silty sand to 1" present. At 509 ft, one 3" cobble present; subrounded; lithic fragment. Total depth = 510 ft bgs	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

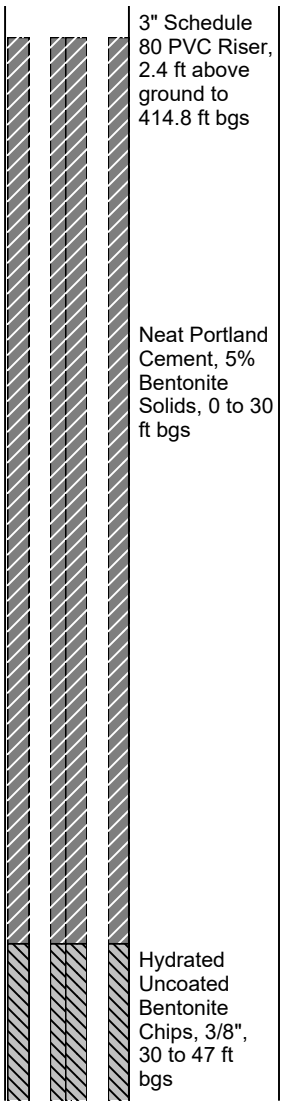
Well ID: **KAFB-106S3**
Page: **1 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
0			SP		Poorly graded sand: brown; slightly moist; trace fine gravel. Note: Hydroknife to 8 ft for utilities clearance.	3" Schedule 80 PVC Riser, 2.4 ft above ground surface to 449 ft bgs
5						
10	5.5		ML		Silt with sand: 7.5YR 5/6, strong brown; soft; dry; 90% silt, nonplastic; 10% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
15					Same as above (8 ft): 5YR 4/6, yellowish red.	
20	8.0	P				
25			SM		Silty sand: 7.5YR 5/6, strong brown; loose; moist; 80% fine to coarse sand (30% fine, 40% medium, 30% coarse); trace gravel to 3/8"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
30	4.0		ML		Silt: 10YR 6/4, light yellowish brown; soft; dry; 90% silt, nonplastic; 10% very fine to fine sand (50% very fine, 50% fine); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
35						



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **2 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
35			ML		Silt with sand: 7.5YR 6/4, light brown; soft; dry; 80% silt, nonplastic; 20% very fine to medium sand (40% very fine, 50% fine, 10% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: contains nodules of pedogenic carbonate (caliche).	
40	2.1				Same as above (35 ft): 5YR 5/4, reddish brown; no caliche.	
45					Same as above (35 ft): 10YR 6/4, light yellowish brown; no caliche; no coarse sand.	
50	1.4					High Solids Bentonite Grout, 47 to 380 ft bgs
55			SM		Silty sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 60% fine to coarse sand (30% fine, 40% medium, 30% coarse); 15% gravel to 1/2"; subangular to subrounded; 25% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 58 ft, gravel to 1 1/2" observed in hopper.	
60	2.8		SW		Well-graded sand with gravel: 7.5YR 5/4, brown; loose; moist; 85% fine to coarse sand (15% fine, 50% medium, 35% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
65			ML		Silt with sand: 7.5YR 6/6, reddish yellow; soft; moist; 85% silt, nonplastic; 15% very fine to medium sand (40% very fine, 50% fine, 10% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: drill	
70						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **3 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
70	4.5				chatter at 69 ft.	
			SW-SM		Well-graded sand with silt: 5YR 5/4, reddish brown; loose; moist; 80% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
75			SW		Well-graded sand with gravel: 5YR 5/4, reddish brown; loose; moist; 60% fine to coarse sand (10% fine, 50% medium, 40% coarse); 40% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
80	5.9		SP		Poorly graded sand: 10YR 6/4, light yellowish brown; loose; dry; 100% fine to medium sand (15% fine, 85% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
85			SM		Silty sand: 7.5YR 6/4, light brown; loose; dry; 60% very fine to medium sand (30% very fine, 60% fine, 10% medium); subangular to subrounded; 40% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
90	1.4		ML		Silt: 5YR 5/4, reddish brown; soft; moist; 75% silt, nonplastic; 15% clay, slightly plastic; 10% very fine to coarse sand (30% very fine, 50% fine, 10% medium, 10% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules.	
95					@ 95 ft: Sandy silt: 10YR 6/4, light yellowish brown; soft; moist; 65% silt, nonplastic; 35% very fine to coarse sand (15% very fine, 30% fine, 40% medium, 15% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
100	5.9		SP-SM		@ 100 ft: Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% fine to medium sand	
105						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **4 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
105			SP		(60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
					@ 105 ft: Poorly graded sand: 10YR 6/4, light yellowish brown; loose; moist; 95% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
110	5.0					
					Silt: 7.5YR 5/4, brown; soft; moist; 95% silt, nonplastic; 5% very fine to medium sand (65% very fine, 20% fine, 15% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
115						
120	5.6		ML			
125					Same as above (110 ft): 7.5YR 5/6, strong brown.	
130	4.5				Same as above (110 ft): 7.5YR 5/6, strong brown; 90% silt; 10% sand; trace gravel to 1"; gravel is lithic fragments	
135			SP		Poorly graded sand: 10YR 6/3, pale brown; loose; dry; 100% fine to medium sand (25% fine, 75% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
140						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **5 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
140	6.0		ML		Silt: 7.5YR 4/6, strong brown; soft; moist; 100% silt, nonplastic; trace fine to medium sand (95% fine, 5% medium); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
145					Same as above (140 ft): 7.5YR 5/6, strong brown; no gravel.	
150	5.6					
155						
160	10.2	P	SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (50% fine, 30% medium, 20% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
165					Same as above (160 ft): 100% fine to coarse sand; no gravel.	
170	8.3		SW-SM		Well-graded sand with silt: 10YR 5/4, yellowish brown; 90% fine to coarse sand (50% fine, 35% medium, 15% coarse); trace gravel; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche.	
175						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **6 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description
175			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments.
180	8.0		SW		Well-graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche.
185			SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments.
190	8.2		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments.
195					Poorly graded sand: 7.5YR 5/4, brown; loose; moist; 95% very fine to medium sand (15% very fine, 70% fine, 15% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.
200	5.6		SP-SM		Poorly graded sand with silt: 7.5YR 5/4, brown; loose; moist; 90% very fine to medium sand (15% very fine, 70% fine, 15% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.
205			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.
210					

Completion Details: (1) (2)

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **7 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	6.0		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (80% fine, 20% medium); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
215			SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
220	7.9				Same as above (215 ft): 10YR 4/4, dark yellowish brown.	
225			SW-SM		Well-graded sand with silt and gravel: 10YR 3/4, dark yellowish brown; loose; moist; 60% fine to coarse sand (25% fine, 60% medium, 15% coarse); 30% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
230	8.3		SW		Well-graded sand: 10YR 4/4 dark yellowish brown; loose; moist; 100% fine to coarse sand (15% fine, 70% medium, 15% coarse); trace gravel to 3/8"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
235			SW-SM		Well-graded sand with silt: 10YR 3/4, dark yellowish brown; loose; moist; 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 237 ft, gravel up to 1 1/4" observed.	
240	8.4	P	SM		Silty sand: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (30% fine, 45% medium, 25% coarse); subangular to subrounded; 15% silt, nonplastic; sand is	
245						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **8 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
245					quartz, feldspar, caliche, and lithic fragments. No cuttings returned.	
250	4.8		SM		Silty sand: 10YR 5/4, yellowish brown; loose; moist; 80% very fine to coarse sand (10% very fine, 50% fine, 25% medium, 15% coarse); trace gravel to 3/4"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
255			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% very fine to medium sand (10% very fine, 10% fine, 80% medium); trace coarse sand; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
260	3.8		SC		Clayey sand: 7.5YR 4/3, brown; loose; moist; 65% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse); trace gravel to 1"; subangular to subrounded; 35% clay, soft, slightly plastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
265						
270	4.0		SW-SC		Well-graded sand with clay: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (15% fine, 60% medium, 25% coarse); trace gravel to 1/2"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and caliche; gravel is lithic fragments.	
275			CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly plastic; 100% clay; trace very fine to fine sand (80% very fine, 20% fine); sand is quartz and feldspar.	
280						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **9 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
280	3.5		CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly plastic; 100% clay; trace very fine to fine sand (80% very fine, 20% fine); sand is quartz and feldspar.	
285			ML		Silt: 7.5YR 4/4, brown; soft; moist; nonplastic; 100% silt; trace very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz and feldspar.	
290	3.4		ML		Same as above (285 ft): 60% silt; 30% clay, 10% sand.	
295			ML		Same as above (285 ft): 60% silt; 30% clay, 10% sand. Note: drill chatter at 297 ft.	
300	5.5		SW-SC		Well-graded sand with clay: 10YR 5/3, brown; loose; dry; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); subangular to subrounded; 10% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments. Note: clay is present as soft nodules.	
305			SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; trace clay, slighlty plastic; sand is quartz, feldspar, and lithic fragments. Note: clay is present as soft nodules.	
310	5.7		SW		Well-graded sand: 10YR 5/4, yellowish brown; 90% fine to coarse sand (10% fine, 60% medium, 30% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
315						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **10 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
315						
320	5.0		SW		Well-graded sand: 10YR 5/4, yellowish brown; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
325					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 323 ft.	
330	4.7		GW		Well-graded gravel with sand: 10YR 5/4, yellowish brown; loose; moist; 65% gravel to 1"; 35% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 328 ft.	
335			SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; dry; 75% fine to coarse sand (30% fine, 40% medium, 30% coarse); 25% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 333 ft.	
340	3.6		GW		Well-graded gravel with sand: 10YR 4/3, brown; loose; moist; 70% gravel to 1"; 30% fine to coarse sand (10% fine, 60% medium, 30% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
345			SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (15% fine, 70% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
350						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **11 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
350	5.8	P	SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 65% fine to coarse sand (15% fine, 70% medium, 15% coarse); 35% gravel to 1 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
355					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to coarse sand (40% fine, 50% medium, 10% coarse); 5% gravel to 1 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
360	6.9		SP-SM		Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% very fine to medium sand (40% very fine, 55% fine, 5% medium); trace gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
365			SW-SM		@ 365 ft: Well-graded sand with silt: 10YR 4/4, dark yellowish brown; loose; moist; 80% fine to coarse sand (35% fine, 50% medium, 15% coarse); 10% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
370	6.5		SP-SM		@ 370 ft: Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% very fine to medium sand (40% very fine, 55% fine, 5% medium); trace gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
375			GW-GM		@ 375 ft: Well-graded gravel with silt and sand: 10YR 4/4, dark yellowish brown; loose; moist; 60% gravel to 1"; 30% fine to coarse sand (20% fine, 20% medium, 60% coarse); subangular to subrounded; 10% silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and	
380	6.0		SW			Hydrated Uncoated Bentonite Chips, 3/8", 380 to 412.5 ft bgs
385						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **12 of 24**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green, Forest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **512**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
385			SP		lithic fragments.	
					@ 380 ft: Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 75% fine to coarse sand (30% fine, 30% medium, 40% coarse); 25% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
390	6.4		SW		@ 385 ft: Poorly graded sand: 10YR 6/3, pale brown; loose; dry; 100% fine to medium sand (15% fine, 85% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
395					@ 390 ft: Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
400	2.3				@ 400 ft: Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (65% fine, 35% medium); trace coarse sand; 10% gravel to 1 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. End ARCH drilling at 400 ft, switch to sonic coring.	
405						
410						
415						
420						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **13 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
400	1.7	68.2			400 - 409		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (80% fine, 15% medium, 5% coarse); 5% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, limestone, and lithic fragments. Note: At 401.5 ft, 100% sand (65% fine, 15% medium, 20% coarse); no gravel.	
							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium); trace coarse sand; sand is quartz and feldspar.	
405							SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand (55% fine, 25% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 404 ft, 100% sand (60% very fine, 20% fine, 10% medium, 10% coarse); gravel is subrounded quartz. At 406 ft, 100% sand (70% fine, 20% medium, 10% coarse); no gravel. Lense of sandy clay from 407.75 to 408 ft, 60% clay, low to medium plasticity; 30% fine to coarse sand; 10% gravel to 1/2". At 408 ft; 7.5YR 6/3, light brown; dry; 100% sand (80% fine, 10% medium, 10% coarse); weakly indurated with carbonate cement. At 408.5 ft, no cementation. At 409 ft, medium dense; dry to slightly moist; 100% sand (60% fine, 30% medium, 10% coarse); weak cementation.	
		60.7								
410										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **14 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
410	6.4				409 - 416		SW		Well-graded sand: 7.5YR 5/2, brown; loose; dry to slightly moist; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 411 ft, sand is 10% fine, 35% medium, 55% coarse; trace clay in medium stiff sandy clay nodules to 2".	3" Schedule 80 PVC Screen, 0.010" slot, 414.8 to 439.8 ft bgs
									Well-graded sand with gravel: 7.5YR 5/3, brown; loose; dry to slightly moist; 80% fine to coarse sand (15% fine, 25% medium, 60% coarse); 20% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							CL		Sandy clay: 7.5YR 4/3, brown; medium stiff to stiff; slightly moist; 80% clay; 20% sand; trace gravel to 1/2".	
415									Clay: 7.5YR 5/3, brown; very stiff; moist; high plasticiity.	
	NA						SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (30% fine, 10% medium, 60% coarse); trace gravel to 1/2"; subangular; gravel is lithic fragments.	
									No recovery; core was not caught in core bag and cuttings fell into hopper.	
	78.1				416 - 423				Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 90% fine to coarse sand (5% fine, 55% medium, 40% coarse); 10% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
420							SM		Silty sand: 7.5YR 6/2, pinkish gray; loose; slightly	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **15 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	5.7			V, P	423 - 429		SM		moist; 80% fine to medium sand (65% fine, 20% medium); trace coarse sand; 20% silt. Note: at 421 ft, 70% very fine sand; 30% silt.	10/20 Silica Sand, 412.5 to 441.8 ft bgs
							SW		Well-graded sand: 7.5YR 6/2, pinkish gray; loose; slightly moist; 95% fine to coarse sand (65% fine, 25% medium, 10% coarse); 5% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							SM			
	29.1						SP		@ 422 ft: Silty sand: 7.5YR 6/2, pinkish gray; loose; slightly moist; sand is very fine.	
425	0.4								@ 423 ft: Poorly graded sand: 7.5YR 6/2, pinkish gray; loose; slightly moist; 100% very fine sand; trace medium to coarse sand. Note: at 425 ft, sand is 7.5YR 6/3, light brown; sand is 90% very fine, 5% fine, 5% medium, trace coarse.	
	32.8									
	40.6						SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 85% very fine to coarse sand (45% very fine, 15% fine, 5% medium, 35% coarse); 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% very fine to fine sand. Note: at 429 ft, 7.5YR 5/3, brown; sand is 90% fine, 10% medium, trace coarse.	
	42.9				429					
430										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **16 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
430	0.0				431		SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slighlty moist; 90% fine, 10% medium. At 431 ft, 7.5YR 5/2, brown.	
	82.8				431 - 436		SW		Well-graded sand: 7.5YR 5/2, brown; loose; dry; 100% fine to coarse sand (85% fine, 10% medium, 5% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
435	1.2						SP		Poorly graded sand: 7.5YR 6/2, pinkish gray; loose; dry; 100% very fine sand. Note: At 434 ft, 7.5YR 6/1, gray; trace silt.	
	46.6				436 - 440		SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 95% fine to coarse sand (20% fine, 40% medium, 40% coarse); 5% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 437 ft, 7.5YR 5/2, brown; 100% sand (40% fine, 30% medium, 30% coarse); trace lithic gravel to 1"; subrounded.	
440									Well-graded sand with gravel: 7.5YR 6/2, pinkish gray; loose; slightly moist; 65% fine to coarse sand (15% fine, 15% medium, 70% coarse); 35% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **17 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
440	2.7	52.3			440 - 446		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (70% fine, 20% medium, 10% coarse); 10% gravel to 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	3" Schedule 80 PVC Sump, 439.8 to 441.8 ft bgs
	1.6								Well-graded sand with gravel: 7.5YR 4/2, brown; loose; dry to slightly moist; 75% fine to coarse sand (10% fine, 35% medium, 55% coarse); 25% gravel to 1 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 444 ft, 65% sand (20% fine, 30% medium, 50% coarse); 30% gravel to 2 1/2"; 5% silt.	Hydrated Uncoated Bentonite Chips, 3/8", 441.8 to 447 ft bgs
445		45.6			446 - 448				Well-graded sand with gravel: 7.5YR 4/2, brown; loose; slightly moist; 50% medium to coarse sand (40% medium, 60% coarse); trace fine sand; 50% gravel to 2 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	10/20 Silica Sand, 447 to 512 ft bgs
		82.4					CL		Clay: 7.5YR 6/1, gray; hard; dry to slightly moist; plastic. Note: Black mottling on 30% of cuttings. At 449 ft, no mottling, specks of black, orange, and white up to 1/8" present; no odor.	3" Schedule 80 PVC Screen, 0.010" slot, 449 to 489 ft bgs
450										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **18 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	1.2				448 - 455		CL		Clay: 7.5YR 6/1, gray; hard; dry to slightly moist; plastic. Note: specks of black, orange, and white up to 3/8" present.	
							SW		Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 30% medium, 40% coarse); 30% gravel to 3"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
							SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium); trace coarse sand.	
455	15.6	66.4			455 - 459		CL		Clay: 2.5Y 6/3, light yellowish brown; very stiff; slightly moist; plastic. Note: At 455 ft, approximately 10% of cuttings contain black mottling with specks less than 1/8"; stiff. At 456 ft, 10YR 5/3, brown; contains silt. At 456.75 ft; medium stiff; medium plasticity; contains silt.	
							SM		Silty sand: 10YR 5/3, brown; loose to medium dense; slightly moist; sand is 70% very fine, 30% fine, trace medium to coarse; 10% clay, nonplastic.	
		19.6		V, P			SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (65% fine, 20% medium, 15% coarse); 5% gravel to 2 1/3";	
460										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **19 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
460	6.7	22.0			459 - 464		SW		subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: slight hydrocarbon odor. At 462 ft, 100% sand (80% fine, 15% medium, 5% coarse); no gravel. At 464 ft, 100% sand (75% fine, 20% medium, 5% coarse); no gravel.	
	15.2	26.5								
	9.4	69.9			464 - 470		GW		Well-graded gravel with sand: 7.5YR 5/2, brown; loose; slightly moist; 55% gravel to 3"; 45% fine to coarse sand (10% fine, 45% medium, 45% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
465							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (75% fine, 20% medium, 5% coarse). Note: slight hydrocarbon odor.	
							GW		Well-graded gravel with sand: 7.5YR 5/2, brown; loose; slightly moist; 55% gravel to 3"; 45% fine to coarse sand (10% fine, 45% medium, 45% coarse);	
470										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **20 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
470	7.3	50.4		B, M, V, P	470 - 474		SW		subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
									@ 470 ft: Well-graded sand: 7.5YR 5/2, brown; loose; moist; 95% fine to coarse sand (75% fine, 20% medium, 5% coarse); 5% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
		62.7					SP		@ 471 ft: Poorly graded sand: 7.5YR 5/2, brown; loose; moist; 100% fine to medium sand (95% fine, 5% medium); trace coarse sand (less than 5%).	
		23.9					GC		Clayey gravel with sand: 7.5YR 4/2, brown; loose; moist; 60% gravel to 2 1/2"; 25% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; 15% clay with silt, nonplastic to low plasticity; gravel is quartz, feldspar, and lithic fragments. Note: silt and clay form the matrix.	
475	163	24.3			474 - 480		SW		Well-graded sand: 7.5YR 4/2, brown; loose; wet; 95% fine to coarse sand (30% fine, 30% medium, 40% coarse); 5% gravel to 1"; subangular to subrounded; gravel is quartz, felspar, and lithic fragments. Note: At 476 ft, 100% sand (10% fine, 80% medium, 10% coarse); trace gravel to 3/4". At 479 ft, 95% sand (20% fine, 65% medium, 15% coarse); 5% gravel.	
		23.5								
		24.0								
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **21 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	285	27.3			480 - 484		SW		Well-graded sand with gravel: 7.5YR 4/2, brown; loose to medium dense; 75% fine to coarse sand (10% fine, 20% medium, 70% coarse); 25% gravel to 1 1/4"; subangular to subrounded; trace clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present in the matrix.	
							SC		Clayey sand with gravel: 7.5YR 4/2, brown; loose; wet; 60% medium to coarse sand (30% medium, 70% coarse); trace fine sand; 20% gravel to 1/2"; trace gravel to 1 1/2"; subangular to subrounded; 20% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present in the matrix.	
		21.7			484 - 489		SW-SC		Well-graded sand with clay: 7.5YR 4/2, brown; medium dense; wet; 95% fine to coarse sand (75% fine, 15% medium, 10% coarse); 5% gravel to 1/2"; subangular to subrounded; 10% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present in the matrix.	
485	335	22.0					SP		Poorly graded sand: 7.5YR 5/2, brown; medium dense; wet; 100% fine sand; trace medium to coarse sand.	
		24.1					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; medium dense; wet; 85% fine to coarse sand (60% fine, 15% medium, 25% coarse); 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. At 489 ft, sand is 30% fine, 50% medium, 20% coarse; gravel to 1 1/2"; hydrocarbon odor.	3" Schedule 80 PVC Sump, 489 to 491 ft bgs
	85.9	15.45		B, M, V, P						
490										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **22 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
490	468	18.5					SW		Well-graded sand with gravel: 7.5YR 5/2, brown; medium dense; wet; 85% fine to coarse sand (30% fine, 50% medium, 20% coarse); 15% gravel to 3"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
		21.0		UV, V, P	489 - 496		CL		Core bag not opened, sent to lab for UV analysis. Able to feel stiff clay through the core bag.	
495		21.1		UV, B, M						
	2569	24.0					SW		Well-graded sand: 7.5YR 5/1, gray; medium desne to dense; wet; 95% fine to coarse sand (80% fine, 15% medium, 5% coarse); 5% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: Hydrocarbon odor. At 498 ft, sand is 30% fine, 50% medium, 20% coarse; gravel to 2".	
		23.4								
500										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **23 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
500	260	24.5			496 - 512		SW		Well-graded sand: 7.5YR 4/1, dark gray; medium dense to dense; wet; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithics. Note: Hydrocarbon and organic odors.	
		24.8					SC		Clayey sand: 7.5YR 4/2, brown; dense; wet; 65% fine to coarse sand (5% fine, 55% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 30% clay, low plasticity; gravel is quartz, feldspar, and lithic fragments. Note: Hydrocarbon odor. Clay is dispersed in the matrix as orange and yellow streaks and specks up to 1/4" by 3".	
	175	24.4					SW		Well-graded sand: 7.5YR 5/2, brown; dense; wet; 85% fine to coarse sand (10% fine, 45% medium, 45% coarse); 15% gravel to 3"; trace cobbles to 3 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments. Note: Clay is present in the matrix. Lense of clayey sand with gravel from 507.75 to 508 ft, 65% fine to coarse sand; 15% gravel to 1"; 20% clay in the matrix.	
505		23.8								
		22.4					SW-SC		Well-graded sand with clay: 7.5YR 5/2, brown; dense; wet; 80% fine to coarse sand (10% fine, 50% medium, 40% coarse); 10% gravel to 1"; trace gravel to 2 1/2"; subangular to subrounded; 10% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: Clay is present in the matrix.	
510										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/18/18**
Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**
Page: **24 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
510	35.1	23.2					SP		Poorly graded sand: 7.5YR 4/2, brown; dense; wet; 100% fine to medium sand (70% fine, 30% medium).	
									Poorly graded sand with gravel: 7.5YR 4/2, brown; dense; wet; 85% medium to coarse sand (40% medium, 60% coarse); trace fine sand; 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
									Total depth = 512 ft bgs.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **1 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
0					Coarse sand and gravel to 4"	3" Schedule 80 PVC Riser, 2.5 ft above ground to 446 ft bgs
5			CL		Silty clay with sand: 7.5YR 4/3, brown; dense; plastic; medium to coarse sand. Note: Hydroknife to 8 ft for utilities clearance. Tree roots visible at 6 ft and 7 ft, 1/4" to 1/2" diameter, respectively.	
10	3.6		ML		Silt with sand: 5YR 5/4, reddish brown; loose; dry; 80% silt, nonplastic; 20% very fine to coarse sand (70% very fine, 20% fine, 5% medium, 5% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
15					Same as above (10 ft): 80% silt; 15% sand; 5% gravel to 1"; gravel is lithic fragments	
20	2.3		SM		Silty sand: 7.5YR 5/4, brown; loose; dry; 60% fine to coarse sand (20% fine, 40% medium, 40% coarse); 10% gravel to 1/2"; subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
25			ML		Silt: 7.5YR 5/4, brown; loose; dry; 90% silt, nonplastic; 10% very fine to medium sand (80% very fine, 15% fine, 5% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
30	2.5				Sandy silt: 7.5YR 5/4, brown; loose; dry; 70% silt, nonplastic; 20% fine to coarse sand (30% fine, 40% medium, 30% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	3" Schedule 80 PVC Riser, 2.5 ft above ground to 412 ft bgs Neat Portland Cement, 5% Bentonite Solids, 2 to 30 ft bgs High Solids Bentonite Grout, 30 to 375.9 ft bgs
35						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **2 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
35			ML		Sandy silt with gravel: 5YR 4/4, reddish brown; loose; dry; 65% silt, nonplastic; 20% fine to coarse sand (30% fine, 40% medium, 30% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
40	5.0	P	SM		Silty sand: 7.5YR 6/4, light brown; loose; dry; 70% fine to coarse sand (30% fine, 40% medium; 30% coarse); 10% gravel to 1/2"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
45					Same as above (40 ft): 7.5YR 5/4, brown; 60% sand; 10% gravel; 30% silt	
50	1.8				Same as above (40 ft): 60% sand; 10% gravel; 30% silt	
55			ML		Silt with sand: 5YR 4/4, reddish brown; loose; dry; 80% silt, nonplastic; 15% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
60	0.6				Same as above (55 ft): 7.5YR 5/4, brown	
65					Sandy silt: 7.5YR 5/4, brown; loose; dry; 70% silt, nonplastic; 20% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, felspar, and lithic fragments; gravel is lithic fragments	
70						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **3 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
70	3.1		ML		Silt with sand: 7.5YR 5/4, brown; loose; dry; 85% silt, nonplastic; 15% fine to coarse sand (40% fine, 40% medium, 20% coarse); trace gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
75						
80	3.8				Same as above (70 ft): 80% silt; 15% sand; 5% gravel to 1"	
85			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; dry; 100% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
90	0.2				Same as above (85 ft): trace gravel to 3/8"; gravel is lithic fragments	
95			SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
100	0.3		ML		Silt with sand: 7.5YR 4/6, strong brown; loose; dry; 85% silt, nonplastic; 15% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
105						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **4 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
105			ML		Silt with sand: 7.5YR 5/4, brown; loose; dry; 80% silt, nonplastic; 15% fine to medium sand (60% fine, 40% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
110	2.6	P			Same as above (105 ft): 7.5YR 5/6, strong brown	
115			SM		Silty sand: 7.5YR 5/6, strong brown; loose; dry; 70% fine to medium sand (80% fine, 20% medium); subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
120	0.0		ML		Silt with sand: 7.5YR 4/6, strong brown; loose; dry; 70% silt, nonplastic; 10% clay, slightly plastic; 20% fine to medium sand (80% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules	
125			CL		Clay: 7.5YR 4/4, brown; soft; 100% clay, slightly plastic. Note: clay is present in nodules	
130					No cuttings returned	
135			SP		Poorly graded sand: 10YR 5/3, brown; loose; dry; 95% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 5% clay, slightly plastic, soft; sand is quartz, feldspar, and lithic fragments. Note: clay is present as nodules.	
140						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **5 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
140	0.0		SW		Well-graded sand: 10YR 5/3, brown; loose; dry; 100% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
145			SW-SM		Well-graded sand with silt: 10YR 6/4, light yellowish brown; loose; dry; 90% fine to coarse sand (30% fine, 55% medium, 15% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
150	0.1		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; dry; 100% fine to medium sand (50% fine, 50% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
155			SW		Well-graded sand: 10YR 6/4, light yellowish brown; loose; dry; 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
160	0.0				Same as above (155 ft): gravel to 5/8"	
165					Same as above (155 ft): gravel to 1 1/4"; sand is quartz, felspar, lithic fragments, and caliche	
170	0.0		SW-SM		Well-graded sand with silt: 10YR 6/4, light yellowish brown; loose; dry; 85% fine to coarse sand (25% fine, 50% medium, 25% coarse); 5% gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic	
175						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **6 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
175					fragments	
180	0.0				Well-graded sand: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz, caliche, and lithic fragments	
185			SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; dry; 85% fine to coarse sand (25% fine, 40% medium, 35% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic fragments	
190	0.0				Same as above (180 ft): 80% sand (30% fine, 50% medium, 20% coarse); 20% gravel to 1"; no caliche in sand	
195			SP		Poorly graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 80% fine to medium sand (80% fine, 20% medium); 20% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
200	0.0		SP-SM		Poorly-graded sand with silt: 10YR 5/3, brown; loose; moist; 90% very fine to medium sand (15% very fine, 60% fine, 25% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
205			SW		Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 85% fine to coarse sand (35% fine, 45% medium, 20% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
210						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **7 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	1.8		SW		Well-graded sand: 10YR 6/4, light yellowish brown; loose; dry; 95% fine to coarse sand (15% fine, 70% medium, 15% coarse); 5% gravel to 1/2" subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
215					Same as above (210 ft): 10YR 5/4, yellowish brown; 90% sand (10% fine, 60% medium, 30% coarse); 10% gravel to 3/8"	
220	0.7				Same as above (210 ft): 10YR 5/4, yellowish brown; 90% sand (10% fine, 60% medium, 30% coarse); 10% gravel to 1/2"	
225					Same as above (210 ft): 10YR 5/4, yellowish brown; 85% sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1/2"; 5% silt, nonplastic	
230	0.8		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (20% fine, 80% medium); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche	
235					Same as above (230 ft): 7.5YR 5/4, brown; 100% sand; no gravel. Note: drill chatter at 237 ft.	
			GW		Well-graded gravel with sand: 75% gravel to 1"; 25% fine to coarse sand	
240	0.7		SP		Poorly graded sand with gravel: 10YR 6/3, pale brown; loose; dry; 80% fine to medium sand (90% fine, 10% medium); trace coarse sand; 20% gravel up to 1/2"; subangular to subrounded; sand is quartz, feldspar, and	
245			GW			

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **8 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
245					lithic fragments; gravel is quartz and lithic fragments.	
			SM		@243 ft: Well-graded gravel: 100% gravel to 1.5"	
250	0.7				Silty sand: 10YR 5/3, brown; loose; moist; 65% very fine to medium sand (20% very fine, 25% fine, 55% medium); subangular to subrounded; 35% silt, nonplastic; sand is quartz, felspar, and lithic fragments	
			ML		Silt with sand: 10YR 4/6, dark yellowish brown; soft; moist; 85% silt, nonplastic; 15% very fine to fine sand (70% very fine, 30% fine); trace gravel to 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
255			SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 85% very fine to medium sand (25% very fine, 50% fine, 25% medium, trace coarse); 5% gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments; gravel is lithic fragments and caliche	
260	0.5		ML		Silt: 10YR 4/6, dark yellowish brown; soft; moist; 90% silt, nonplastic; 10% fine to medium sand (95% fine, 5% medium); trace gravel to 3/8"; subangular to subrounded; sand is quartz and lithic fragments; gravel is lithic fragments	
265			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; dry; 100% fine sand; trace medium sand; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 269 ft.	
270	0.6					
275			SC		Clayey sand: 10YR 3/6, dark yellowish brown; soft; moist; 65% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 35% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments. Note: clay coating on sand grains.	
280						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **9 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
280	1.1	P	SC		Clayey sand: 10YR 3/6, dark yellowish brown; soft; moist; 70% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 30% clay, slighty plastic; sand is quartz, feldspar, and lithic fragments. Note: clay coating on sand grains. Drill chatter at 284 ft.	
285			SP-SM		Poorly graded sand with silt: 10YR 4/3, brown; loose; moist; 90% fine to medium sand (95% fine, 5% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
290	0.8		SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (40% fine, 40% medium, 20% coarse); 15% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
295					Same as above (290 ft): sand is 20% fine, 40% medium, 40% coarse; gravel to 1"	
300	2.1				Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 60% fine to coarse sand (10% fine, 40% medium, 50% coarse); 35% gravel to 1"; subangular to subrounded; 5% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 304 ft.	
305			GW		Well-graded gravel with sand: 10YR 6/4, light yellowish brown; loose; dry; 80% gravel to 1 1/2"; 20% fine to coarse sand (30% fine, 35% medium, 35% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments	
310	0.7				Same as above (305 ft): gravel to 2"	
315						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **10 of 27**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **Ken Claw 10 1/2"**
Milltooth Tricone 8 1/2"
Driller: **Mark Green / Forrest Chattin**
Geologist: **J. Messenger**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
315			GW		Well-graded gravel with sand: 10YR 6/4, light yellowish brown; loose; dry; 70% gravel to 2"; 30% fine to coarse sand (30% fine, 35% medium, 35% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments	
320	0.3		SW		Well-graded sand: 10YR 4/4, dark yellowish brown; loose; moist; 90% fine to coarse sand (60% fine, 25% medium, 15% coarse); 10% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
325			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (80% fine, 20% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
330	0.7		GW		Well-graded gravel with sand: 10YR 5/4, yellowish brown; loose; moist; 60% gravel to 5/8"; 40% fine to coarse sand (25% fine, 35% medium, 40% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 334 ft.	
335						
340	0.7				Same as above (330 ft): 55% gravel; 45% sand. End ARCH drilling at 340 ft, switch to sonic coring.	
345						
350						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **11 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
340	3.1	25.9			340 - 346		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (10% fine, 65% medium, 25% coarse); 10% gravel to 1 3/4"; trace cobbles to 4"; subangular to subrounded; gravel and cobbles are quartz, feldspar, granite, and lithic fragments. Note: sediments are coarsening downward.	
		27.8							Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 40% medium, 50% coarse); 20% gravel to 2"; subangular to subrounded; trace silt; gravel is quartz, feldspar, and coarse sandstone conglomerate. Note: at 343 ft, sand is 10% fine, 50% medium, 40% coarse; gravel to 1/2". At 344 ft, 75% sand (10% fine, 55% medium, 35% coarse); 25% gravel to 2 1/2"; trace silt.	
		41.6								
345										
		33.6					SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine sand	
		38.1					SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 25% medium, 50% coarse); 20% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 348 ft, 10YR 6/3, pale brown; 70% sand (15% fine, 30% medium, 55% coarse); 30% gravel to 3"; gravel is quartz, feldspar, and lithic fragments.	
350										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **12 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
350	3.8	34.4			346 - 356		SW		Well-graded sand with gravel: see description on previous pages	
		34.8					GW		Well-graded gravel with sand: 7.5YR 6/3, light brown; loose; slightly moist; 60% gravel to 3"; 20% fine to coarse sand (35% fine, 15% medium, 50% coarse); 10% cobbles to 4"; subangular to subrounded; 10% silt; gravel and cobbles are quartz, feldspar, and lithic fragments. Note: lense of silt with sand from 351.5 to 352 ft, 7.5YR 4/3, brown; dense; 70% silt, 5% clay; 25% fine sand. At 352 ft, 60% gravel; 40% sand (15% fine, 50% medium, 35% coarse); no cobbles; no silt.	
		39.7					SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to coarse sand (20% fine, 30% medium, 50% coarse); 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand from 363 to 363.5 ft, 70% medium to coarse sand (30% medium, 70% coarse); trace fine sand; 30% gravel to 2"; trace red clay nodules.	
355		20.1							Core bag not opened; saved for sampling	
		22.4					GW		Well-graded gravel with sand: 10YR 5/3, brown; loose; slightly moist; 60% gravel to 2"; 40% fine to coarse sand (15% fine, 25% medium, 60% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
360	2.1									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **13 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360	24.8			P	356 - 366		GW		Well-graded gravel with sand: 10YR 5/3, brown; loose; slightly moist; 80% gravel to 2 1/2"; 20% medium to coarse sand (25% medium, 75% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: one 6" clay nodule present.	
	30.0						SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine sand	
	31.8						SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); trace gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of well-graded gravel with sand from 364 to 364.5 ft, 60% gravel to 2"; 40% sand (25% fine, 50% medium, 25% coarse). At 364.5 ft, 90% sand (25% fine, 65% medium, 10% coarse); 10% gravel to 1". At 366 ft, 90% sand (5% fine, 50% medium, 45% coarse); 10% gravel to 1"; gravel is quartz, feldspar, and lithic fragments; trace red clay nodules to 1".	
365	50.9								Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 30% medium, 40% coarse); 30% gravel to 2 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
6.8	56.6						SP		Poorly graded sand: 7.5YR 5/3, brown; loose to medium dense; slightly moist; 100% fine sand	
370										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **14 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
370	5.7	55.4			366 - 376		SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to coarse sand (5% fine, 40% medium, 55% coarse); 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	Hydrated Uncoated Bentonite Chips, 3/8", 375.9 to 409.9 ft bgs
		48.3					SP		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand (15% fine, 70% medium, 15% coarse); trace gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
									Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine sand; trace silt	
		50.0							Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); trace silt. Note: at 374 ft, sand is 60% fine, 20% medium, 20% coarse; trace lithic gravel to 1/2"; angular to subangular; no silt.	
375										
		21.6					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 30% medium, 50% coarse); 20% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 376 ft, sand is 25% fine, 25% medium, 50% coarse; gravel to 1 1/2"; sandy clay nodules to 1" present. At 378 ft, sand is 15% fine, 25% medium, 60% coarse; gravel to 1 1/2"; sandy clay nodules to 1". At 379.5 ft, sand is 25% fine, 50% medium, 25% coarse; gravel to 1 1/4" as above.	
		21.4								
380										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **15 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
380	6.7	23.9			376 - 386		SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (45% fine, 30% medium, 25% coarse); 15% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
		23.6							Core bag not opened, saved for sampling	
385		28.0					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slighlty moist; 50% fine to coarse sand (10% fine, 30% medium, 60% coarse); 50% gravel to 1 3/4"; subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments. Note: At 385.5 ft, 90% sand (30% fine, 20% medium, 50% coarse); 10% gravel to 1". At 386 ft, 70% sand (20% fine, 30% medium, 50% coarse); 30% gravel to 2".	
		24.7								
		27.1					SP		Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 100% fine sand	
390	6.3						SW		Well-graded sand with gravel: 7.5YR 4/3, brown;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **16 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390	35.2				386 - 396		SW		loose; slightly moist; 80% fine to coarse sand (5% fine, 25% medium, 70% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and coarse grained sandstone conglomerate. Note: from 391 to 391.75, sand and gravel are well-indurated with a calcium carbonate cement.	
	39.0						SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand	
	37.8						SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 15% medium, 55% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and limestone. Note: sand is coarsening downwards.	
395							SC		Clayey sand: loose; slighty moist; 80% fine to coarse sand; 20% clay, plastic. Note: clay is present in dense reddish brown nodules containing organic material	
	NA								No recovery	
	28.4						SM		Silty sand: 7.5YR 4/2, brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 3/4"; subangular to subrounded; 20% silt; gravel is quartz, feldspar, and lithic fragments	
	46.0						SW-SC			
400							SP		@ 398.25 ft: Well-graded sand with clay and gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 35% medium, 35% coarse);	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **17 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
400		NA			396 - 406				20% gravel to 1"; subangular to subrounded; 10% silt; gravel is quartz, feldspar, and lithic fragments -	
		59.9					SW		@399 ft: Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% medium sand; trace coarse sand; trace silt	
									@400 ft: No recovery	
		NA							@401 ft: Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (10% fine, 45% medium, 45% coarse); 10% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, granite, gneiss, and lithic fragments	
	8.7	45.3					SP		No recovery Poorly graded sand: 7.5YR 5/3, brown; loose; slighlty moist; 100% fine to medium sand (95% fine, 5% medium); trace coarse sand. Note: at 465.25 ft, clay is present as nodules with organics.	
405		50.0			406 - 410		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (55% fine, 30% medium, 15% coarse); trace gravel to 1/3"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: nodules of reddish sandy clay pieces are present; dense; nonplastic.	
		56.7					GW		Well-graded gravel with sand: 7.5YR 5/3, brown; loose; slightly moist; 60% gravel to 1"; 40% medium to coarse sand (25% medium, 75% coarse); trace fine sand; subangular to subrounded. Note: lense of sandy clay from 409.75 to 410 ft; 5YR 5/4, reddish brown; dense; slightly plastic; medium sand.	
410	6.8									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **18 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
410	31.8				410 - 415		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% very fine to fine sand (40% very fine, 50% fine, 5% medium, 5% coarse)	10/20 Silica Sand, 409.9 to 438.9 ft bgs
	6.9 28.8						SP		Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine sand; trace coarse sand	3" Schedule 80 PVC Screen, 0.010" slot, 412 to 437 ft bgs
	7.8 29.4			V, P			SW		Well-graded sand with gravel: 7.5YR 5/2, loose; slightly moist; 70% fine to coarse sand (40% fine, 30% medium, 30% coarse); 30% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 414 ft, 85% sand (10% fine, 45% medium, 45% coarse); 15% gravel to 1". At 415 ft, 85% sand (15% fine, 35% medium, 50% coarse); 15% gravel to 1 1/2".	
415	24.2				415 - 420					
	26.0								Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (20% fine, 60% medium, 20% coarse). Note: at 419 ft, sand is 30% fine, 40% medium, 30% coarse. Clay lense from 421 - 421.25 ft, plastic, dense.	
	35.2									
420										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **19 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	7.7	49.6			420 - 426		SW		Well-graded sand: see previous page for description.	
		53.6							Well-graded sand with gravel: 7.5YR 6/2, pinkish gray; loose; slightly moist; 85% very fine to coarse sand (20% very fine, 10% fine, 30% medium, 40% coarse); 15% gravel; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
		60.2							Well-graded sand: 7.5YR 5/2, brown; loose; slighlty moist; 95% fine to coarse sand (10% fine, 40% medium, 50% coarse); 5% gravel; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 424 ft, 90% sand (10% very fine, 5% fine, 30% medium, 55% coarse); 10% gravel to 1 1/2". At 426 ft, 100% sand (40% very fine, 20% fine, 20% medium, 20% coarse)	
425		66.6			426 - 430		SP		Poorly graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% medium to coarse sand (30% medium, 70% coarse); 30% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
		55.6					SW		Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 75% fine to coarse sand (10% fine, 25% medium, 65% coarse); 25% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar,	
430										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **20 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
430	4.8	31.2			430 - 436		SW		granite, and lithic fragments. Note: at 430 ft, 65% sand (15% very fine, 30% fine, 30% medium, 25% coarse); 30% gravel; 5% cobbles; reddish brown sandy clay nodules to 1" present.	3" Schedule 80 PVC Sump, 437 to 439 ft bgs
		38.2								
		46.7					GW		Well-graded gravel with sand: 7.5YR 5/3, brown; loose; slightly moist; 60% gravel to 1 1/2"; 40% fine to coarse sand (15% fine, 25% medium, 60% coarse); subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and weakly cemented conglomerate. Note: clay present in nodules to 4"; plastic. At 433.5 ft, color is 7.5YR 6/1, pinkish gray; gravel is to 2"; no clay.	
435		65.2								Hydrated Uncoated Bentonite Chips, 3/8", 438.9 to 443.3 ft bgs
		46.5					CL		Clay: 10YR 6/2, light brownish gray; very dense; slightly moist; very plastic. Note: Occasional spots of red clay. Lenses of coarse sand with clay from 436 to 436.25 ft. At 439.5 ft, trace very fine sand.	
440										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **21 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
440	47.9				436 - 446		CL		Clay: 7.5YR 6/3, light brown; dense; slightly moist; plastic; trace fine sand. Note: lenses of soft clay; slightly plastic.	
	53.3						SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (15% fine, 55% medium, 30% coarse); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
	39.7						SM		Silt with sand: 7.5YR 6/3, light brown; very dense; moist; slightly plastic; very fine sand; trace clay. Note: at 444 ft, 2-3" lenses of increased clay (up to 5%) present.	
445	53.0				446 - 453		SW		Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% very fine to coarse sand (60% very fine, 20% fine, 10% medium, 10% coarse); trace gravel to 3"; trace cobbles to 3 1/2"; subangular to subrounded; gravel and cobbles are quartz, feldspar, lithic fragments, and weakly cemented sandstone. Note: at 448 ft, 90% sand (20% very fine, 40% fine, 30% medium, 10% coarse); 10% gravel; trace cobbles; trace clay.	3" Schedule 80 PVC Screen, 0.010" slot, 446 to 486 ft bgs
	46.6						SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% sand. Note: at 449.5 ft, trace silt in nodules up to 2"	
450										10/20 Silica Sand, 443.3 to 497 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **22 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	63.2						SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% sand; trace gravel to 1"; subrounded; trace silt; gravel is lithic fragments; increasing density with depth. Note: silt is in medium dense to dense nodules to 4".	
	71.3									
	26.7				453 - 460		SW		Well-graded sand: 10YR 4/2, dark grayish brown; dense; wet, water seen here; 100% very fine to coarse sand (40% very fine, 30% fine, 20% medium, 10% coarse)	
455	23.6									
	24.4						SC		Clayey sand: 10YR 6/3, pale brown; very dense; slightly plastic; 60% sand; 40% clay and silt. Note: clay and silt present in nodules up to 4" and 1" stringers. At 456, nodules include organic material to 1/4".	
	22.4						CL		Sandy clay: 10YR 5/3, brown; dense; moist; nonplastic. Note: lense of dense clay from 458 to 458.5, 7.5YR 5/3, brown; plastic.	
460										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **23 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
460	31.4			V, P	460 - 464		SP		Clayey sand: 7.5YR 5/2, brown; medium dense; moist; 80% sand; 20% clay and silt. Note: clay and silt present in dense nodules to 2".	
	35.7						SW		Well-graded sand: 7.5YR 5/2, brown; medium dense; moist; 100% very fine to coarse sand (70% very fine; 20% fine, 5% medium, 5% coarse); trace gravel to 1"; subrounded; gravel is lithic fragments	
	23.1						GW		Well-graded gravel with sand: 7.5YR 5/3, brown; loose to medium dense; moist; 60% gravel to 2"; 40% fine to coarse sand (15% fine, 25% medium, 60% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
465										
	15.6 28.5				464 - 469				Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine to coarse sand (40% fine, 30% medium, 30% coarse); trace gravel to 1"; subangular to subrounded; gravel is lithic fragments. Note: hydrocarbon odor	
	32.5						SW		Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 40% medium, 40% coarse); 30% gravel to 2 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: Hydrocarbon odor. At 468 ft, 80% sand (10% fine, 40% medium, 50% coarse); 20% gravel to 3"; trace cobbles to 4". At 469 ft, wet; 70% sand (5% fine, 35% medium, 60% coarse); 30%	
	34.7 23.9									
470										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **24 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
470	52.8	23.9					SP		gravel to 1 1/2"; no cobbles; trace clay nodules.	
									Poorly graded sand: 7.5YR 4/2, brown; loose to medium dense; wet; 100% fine sand; trace medium to coarse sand. Note: hydrocarbon odor.	
		22.8			469 - 476		SW		Well-graded sand: 7.5YR 4/2, brown; loose to medium dense; wet; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); trace clay, slightly plastic. Note: Hydrocarbon odor. Clay is present as soft nodules up to 1/3". At 472 ft, 90% sand (30% fine, 35% medium, 35% coarse); 10% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and granite.	
		26.5					GW		Well-graded gravel with sand: 7.5YR 5/2, brown; loose; wet; 60% gravel to 2"; trace cobbles to 4"; 40% fine to coarse sand (15% fine, 15% medium, 70% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor.	
475							SW		Well-graded sand with gravel: 7.5YR 5/2, brown; loose; wet; 60% fine to coarse sand (15% fine, 25% medium, 60% coarse); 40% gravel to 1 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. Clay is present as nodules.	
		21.2	UV						Core bag not opened, used for sampling.	
		21.4					GW		Well-graded gravel with sand: 7.5YR 5/2, brown; medium dense; wet; 65% gravel to 2"; 35% fine to coarse sand (15% fine, 30% medium, 55% coarse); subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments. Note: hydrocarbon odor.	
	1432	21.9			476 - 483		SW		Well-graded sand with gravel: 7.5YR 5/2, brown;	
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **25 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	74.4			B, M			SW		medium dense; wet; 60% fine to coarse sand (10% fine, 50% medium, 40% coarse); 40% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. At 480.5 ft, 70% sand (15% fine, 55% medium, 30% coarse); 30% gravel to 1". At 481 ft, 80% sand (40% fine, 20% medium, 40% coarse); 20% gravel to 1"; subrounded to rounded.	3" Schedule 80 PVC Sump, 486 to 488 ft bgs

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **26 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
490	1608	24.7					SW		Well-graded sand with gravel: 7.5YR 5/2, brown; dense; wet; 80% fine to coarse sand (20% fine, 40% medium, 40% coarse); 20% gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: strong hydrocarbon odor. At 491 ft, fraction of fine sand increases.	Native Soil/ Slough, 497 to 504 ft bgs
	2141	25.4							Core bag not opened, used for sampling.	
	1322	21.1		G, UV	493 - 496		SW		Well-graded sand: 7.5YR 4/1, dark gray; dense; wet; 100% fine to coarse sand (60% fine, 30% medium, 30% coarse). Note: hydrocarbon and an organic odor. At 498 ft, no organic odor. At 499 ft, sand is 80% fine, 15% medium, 5% coarse.	
495		23.4		B, M, V, P						
		23.1								
		23.4			496					
500										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/16/18**
Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**
Page: **27 of 27**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic core bit (nominal 7" hole)**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **504**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.98**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
500	174.2	24.4			504		SW		Well-graded sand: 7.5YR 4/2, brown; dense; wet; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 10% gravel from 2" to 3"; trace cobbles to 4"; subangular to subrounded. gravel and cobbles are quartz, feldspar, and lithic fragments. Note: hydrocarbon odor.	
	73.2	25.8							Core bag not opened, used for sampling.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **1 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
0					Asphalt, 0 - 6"	3" Schedule 80 PVC Riser, 0.5 to 446 ft bgs
5			SW		Well-graded sand with gravel: 7.5YR 5/4, brown; 80% fine to coarse sand; 20% gravel to 2"; gravel is caliche and lithics. Note: hydroknife to 8 ft for utilities clearance.	
10			SM		Silty sand: 5YR 5/4, reddish brown; loose; moist; 70% very fine to coarse sand (40% very fine, 40% fine, 10% medium, 10% coarse); subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	Neat Portland Cement, 5% Bentonite Solids, 1 to 28 ft bgs
15					Sandy silt: 5YR 5/4, reddish brown; loose; moist; 70% silt, nonplastic; 30% very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
20	8.1		ML		Silt with sand: 7.5YR 5/4, brown; loose; moist; 80% silt, nonplastic; 20% very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
25						
30	15.5				Same as above (20 ft): 5YR 5/4, reddish brown	Hydrated Uncoated Bentonite Chips, 3/8", 28 to 28.5 ft bgs
35						

(1) (2)

3" Schedule 80 PVC Riser, 0.5 to 412 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **2 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
35					Silt with sand: 5YR 5/4, reddish brown; loose; moist; 80% silt; 5% clay; slightly plastic; 10% very fine to medium sand (75% very fine, 20% fine, 5% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present in nodules.	High Solids Bentonite Grout, 28.5 to 375.7 ft bgs
40	9.5				Same as above (35 ft): gravel to 3/8"	
45			ML			
50	1.4				Same as above (35 ft): 85% silt; 10% very fine to medium sand; 5% gravel to 3/8"; no clay	
55					Sandy silt: 5YR 5/4, reddish brown; loose; moist; 75% silt, slightly plastic; 20% fine to coarse sand (60% fine, 30% medium, 10% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
60			SW		Well-graded sand with gravel: 7.5YR 5/4, brown; loose; moist; 85% fine to coarse sand (10% fine, 40% medium, 50% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
65			ML		Silt: 5YR 5/4, reddish brown; loose; moist; 90% silt, slightly plastic; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
70						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

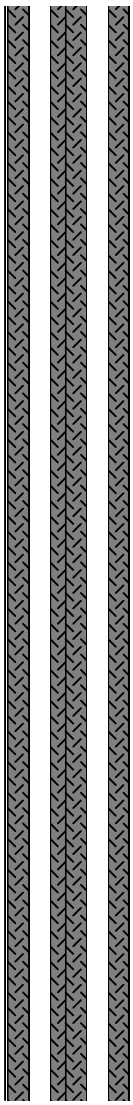
Well ID: **KAFB-106S5**
Page: **3 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
70	31.9		ML		Silt: 5YR 5/3, reddish brown; loose; moist; 85% silt; 5% clay; slightly plastic; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
75					No cuttings returned.	
80	2.0				Silt: 5YR 5/4, reddish brown; loose; moist; 85% silt; 5% clay; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
85						
90	3.0		ML		Silt with sand: 5YR 5/4, reddish brown; loose; moist; 80% silt; 5% clay; 15% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
95					Same as above (90 ft): no clay; 5% gravel to 3/8"; subangular to subrounded; gravel is quartz and lithic fragments	
100	5.0				Silt: 5YR 5/4, reddish brown; loose; moist; 90% silt, slightly plastic; 10% very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
105						



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **4 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
105			ML		Silt: 5YR 5/4, reddish brown; loose; moist; 90% silt, slightly plastic; 10% very fine to fine sand (60% very fine, 40% fine); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
110	2.9					
115						
120	1.0					
125					Same as above (105 ft): 85% silt; 5% clay; 10% sand	
130	1.0		SM		Silty sand: 5YR 5/4, reddish brown; loose; moist; 80% very fine to coarse sand (15% very fine, 25% fine, 35% medium, 25% coarse); 5% gravel to 1/2"; subangular to subrounded; 15% silt, slightly plastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
135			CL		Clay: 7.5YR 5/4, brown; slightly plastic; 90% clay; 7% very fine to medium sand (60% very fine, 30% fine, 10% medium); 3% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present in nodules up to 1".	
140						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **5 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
140	0.9		ML		Silt: 7.5YR 5/4, brown; slightly plastic; 90% silt; 10% clay	
145			ML		Same as above (140 ft): 80% silt; 20% clay. Note: clay is present in nodules up to 1".	
150	0.8		ML		Same as above (140 ft): Clay is present in nodules up to 1".	
155			SP-SM		Poorly graded sand with silt: 5YR 5/4, reddish brown; loose; moist; 90% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
160	1.6		SP		Poorly graded sand: 10YR 5/3, brown; loose; moist; 100% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
165			SW-SM		Well-graded sand with silt: 7.5YR 5/4, brown; loose; moist; 90% fine to coarse sand (10% fine, 50% medium, 40% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche	
170	2.6		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
175						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **6 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
175			SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
180	1.5				Same as above (175 ft): trace gravel to 3/8"; gravel is lithic fragments	
185					Same as above (175 ft): 95% sand; 5% gravel to 1"; gravel is quartz and lithic fragments	
190	1.3				Same as above (175 ft): 95% sand; 5% gravel to 3/8"; gravel is quartz and lithic fragments	
195						
200	0.9				Same as above (175 ft): sand is 30% fine, 40% medium, 30% coarse; trace gravel to 3/8"	
205			SW-SM		Well-graded sand with silt: 7.5YR 4/4, brown; loose; moist; 90% fine to coarse sand (30% fine, 40% medium, 30% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche	
210						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **7 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	10.7	P	SW		Well-graded sand: 7.5YR 4/4, brown; loose; moist; 100% fine to coarse sand (10% fine, 50% medium, 40% coarse); trace gravel (up to 3%) to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
215					Same as above (210 ft): 7.5YR 4/3, brown; no gravel	
220	4.6		SW-SM		Well-graded sand with silt: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (15% fine, 40% medium, 15% coarse); trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and ltihic fragments; gravel is lithic fragments	
225			GW		Well-graded gravel with sand: 10YR 5/4, yellowish brown; dry; 60% gravel to 5/8"; 40% fine to coarse sand (20% fine, 30% medium, 50% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 229 ft.	
230	1.9		SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; moist; 85% fine to coarse sand (10% fine, 50% medium, 40% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and calice; gravel is lithic fragments	
235			SP		Poorly graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to medium sand (80% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
240	4.1				Same as above (235 ft): 10YR 5/4, yellowish brown	
245						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **8 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
245			GW		Well-graded gravel with sand: 10YR 5/3, brown; loose; moist; 85% gravel to 7/8"; 15% fine to coarse sand (10% fine, 40% medium, 50% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 248 ft.	
250	6.2		SW		Well-graded sand: 10YR 5/4, brown; loose; moist; 95% fine to coarse sand (20% fine, 50% medium, 30% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
255			SP-SM		Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% fine to medium sand (90% fine, 10% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and ltihic fragments	
260	2.2		SW		Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; moist; 80% fine to coarse sand (10% fine, 50% medium, 40% coarse); 20% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and pumice	
265					Well-graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 50% medium, 30% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and pumice	
270	4.9				Same as above (265 ft): no gravel	
275			SC		Clayey sand: 10YR 5/4, yellowish brown; soft; 70% very fine to medium sand (30% very fine, 40% fine, 30% medium); subangular to subrounded; 30% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments	
280						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **9 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
280	7.0		SC		Clayey sand: 10YR 5/4, yellowish brown; soft; 80% very fine to medium sand (30% very fine, 40% fine, 30% medium); subangular to subrounded; 20% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments	
285			SP-SM		Poorly graded sand with silt; 10YR 5/4, yellowish brown; loose; moist; 90% very fine to medium sand (20% very fine, 50% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
290					No cuttings returned	
295			GW		Well-graded gravel with sand: 10YR 4/3, brown; loose; moist; 70% gravel to 3/4"; 30% fine to coarse sand (20% fine, 50% medium, 30% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments	
300	2.2		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (85% fine, 15% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
305			SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (70% fine, 30% medium); trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
310	2.3		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic	
315						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **10 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
315					fragments.	
					Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (10% fine, 50% medium, 40% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
320	2.5				Same as above (315 ft): 60% fine to coarse sand (20% fine, 65% medium, 15% coarse); 40% gravel to 1". Note: drill chatter at 324 and 329 ft.	
325						
330	2.4		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (30% fine, 45% medium, 25% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
335					Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 80% fine to coarse sand (30% fine, 45% medium, 25% coarse); 20% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
340	2.6					
345					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
350						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **11 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
350	1.7	P	SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (50% fine, 30% medium, 20% coarse); 15% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
355					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (45% fine, 40% medium, 15% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
360	4.0				Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (45% fine, 40% medium, 15% coarse); 15% gravel to 1"; subangular to suborunded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
365					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to coarse sand (35% fine, 55% medium, 10% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
370	3.3					
375					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	Hydrated Uncoated Bentonite Chips, 3/8", 375.7 to 409.5 ft bgs
380	2.9				Same as above (380 ft): 10YR 5/3, brown; sand is 20% fine, 55% medium, 25% coarse	
385						

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **12 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 5/8" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Mark Green**
Geologist: **J. Messenger**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
385					Well-graded sand: 10YR 5/3, brown; loose; moist; 95% fine to coarse sand (20% fine, 50% medium, 30% coarse); 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	(1) (2)
390	2.1		SW		Same as above (385 ft): 100% fine to coarse sand (30% fine, 60% medium, 10% coarse); trace gravel to 3/8"	
395						
400	1.1				Same as above (385 ft): 90% fine to coarse sand (20% fine, 50% medium, 30% coarse); 10% gravel to 1/2". End ARCH drilling at 400 ft, switch to sonic coring.	
405						
410						
415						
420						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **13 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
400	3.5	34.1			400 - 406		SW		Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine to coarse sand (40% fine, 30% medium, 30% coarse); trace gravel to 1/2"; subangular to subrounded. Note: from 403 to 405 ft, sand is 20% very fine, 30% fine, 30% medium, 20% coarse; no gravel.	
		43.8								
		40.5								
405	2.5	22.5			406 - 411		CL		Clay: 7.5YR 5/3, brown; very dense; very plastic; slightly moist. Note: at 406 ft, color changes to 5YR 5/4, clay is nonplastic. At 407 ft, clay is moderately dense and slightly plastic. At 408 ft, color is 5YR 5/2, reddish gray. Lense of well indurated very fine sand with calcium carbonate and cement and visible biotite from 408.5 to 408.75 ft.	
		22.0								
	4.7	22.9					SW		Well-graded sand: 7.5YR 5/3, brown; loose; moist; 100% very fine to coarse sand (80% very fine, 10% fine, 5% medium, 5% coarse); trace gravel to 1/2"; angular; gravel is very fine sandstone. Note: At 409.5	
410										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **14 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
410									ft, no coarse sand or gravel; trace clay nodules to 1/4". No recovery	10/20 Silica Sand, 409.5 to 438.8 ft bgs
	45.8				411 - 416		SP		Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine sand	3" Schedule 80 PVC Screen, 0.010" slot, 412 to 437 ft bgs
	3.7									
	62.8						SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse). Note: sand is fining downwards to 25% very fine, 50% fine, 20% medium, 5% coarse; trace gravel to 1 1/2"; gravel is fine grained sandstone concretions.	
	2.4									
415	3.2								Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% very fine to fine sand. Note: one concretion of fine grained sandstone present at 415 ft, 1/2" diameter.	
	71.7									
	21.9			V, P	416 - 421		SP			
	22.7									
420										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **15 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	3.8	27.2					SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% very fine to fine sand. Note: at 422 ft, trace gravel (up to 3%) to 3/4"; subangular to subrounded; gravel is dark lithic fragments	
		30.0			421 - 426					
		32.2					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 35% medium, 45% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand from 425.5 to 426 ft; 7.5 YR 6/3, light brown.	
425		39.2								
		22.8							Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (10% fine, 20% medium, 70% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 427 ft, 70% sand (10% fine, 45% medium, 45% coarse); 20% gravel. At 428 ft, 85% sand (10% fine, 45% medium, 45% coarse); 15% gravel to 1"; at 429 ft, 50% sand (10% fine, 10% medium, 80% coarse); 50% gravel to 1 1/2".	
		24.0								
	2.9									
430										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **16 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
430	28.9				426 - 436		SW		Well-graded sand with gravel: see description on previous page.	
	32.6						SC		Clayey sand with gravel: 5YR 4/4, reddish brown; loose; slightly moist; 50% fine to coarse sand (5% fine, 25% medium, 70% coarse); 20% gravel to 1"; subangular to subrounded; 30% clay, plastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present as nodules up to 3"; 7.5 YR 5/3, brown.	
	48.6						SW		Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: sediments are fining downwards to 70% fine, 20% medium, 10% coarse; no gravel; at 433.25. At 434 ft, color is 10YR 5/3, brown; sand is 20% very fine, 60% fine, 15% medium, 5% coarse; no gravel.	
435	49.5								Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (60% fine, 20% medium, 20% coarse); 20% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 436 ft, color is 7.5YR 5/3, brown; gravel is up to 1 1/2"; subangular to rounded.	
	40.7						SP		Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine to coarse sand. Note: 1 cobble present; 2"; subangular to subrounded; lithic fragment.	
	3.5						SW		Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% fine sand; trace medium sand	
440									Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (5% fine, 35% medium, 60% coarse); 15% gravel to 1/2";	3" Schedule 80 PVC Sump, 437 to 439 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **17 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
440	39.8				436 - 446		SW		subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 441 ft, 50% sand (10% fine, 40% medium, 50% coarse); 45% gravel to 3"; 5% cobbles to 3 1/2"; subangular to subrounded; gravel and cobbles are quartz and lithic fragments.	Hydrated Uncoated Bentonite Chips, 3/8", 438.8 to 444.3 ft bgs
	44.1						GW		Well-graded gravel with sand: 7.5YR 4/2, brown; loose; slightly moist; 70% gravel to 2 1/2"; 30% fine to coarse sand (15% fine, 15% medium, 70% coarse); subangular to subrounded; gravel is quartz, felspar, and lithic fragments. Note: nodules of red clay to 1" present.	
	60.9						SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 40% medium, 30% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 443 ft, 80% sand (60% fine, 15% medium, 25% coarse); 20% gravel. At 444 ft, 70% sand (10% fine, 60% medium, 30% coarse); 30% gravel to 1 1/2". At 445 ft, 70% sand (60% fine, 30% medium, 10% coarse); 30% gravel to 2". At 446 ft, 80% sand (5% fine, 45% medium, 50% coarse); 20% gravel to 1 1/2"; clay nodules up to 2 1/2" present.	10/20 Silica Sand, 444.3 to 500 ft bgs
445	23.1				446 - 451					3" Schedule 80 PVC Screen, 0.010" slot, 446 to 486 ft bgs
	25.9								Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (15% fine, 40% medium, 45% coarse). Note: At 448 ft, 7.5YR 6/3, light brown; 90% sand (35% fine, 45% medium, 20% coarse); 10% gravel to 3/4". At 449 ft, 7.5 YR 6/3, light brown; 100% sand (65% fine, 20% medium, 15% coarse); trace gravel to 1/2".	
	1.7									
450										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **18 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	26.8				451 - 456		SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: At 451 ft, 7.5YR 5/2, brown; 100% sand (10% very fine, 40% fine, 45% medium, 5% coarse); no gravel. At 453 ft, 7.5YR 6/3, brown. At 455.5 ft, 7.5 YR 6/3, brown; 100% sand (20% very fine, 30% fine, 30% medium, 20% coarse); trace gravel to 1".	
	41.3									
	42.8									
455	49.4									
	4.9 21.2				456 - 461				Well-graded sand: 7.5YR 4/2, brown; loose; slightly moist to moist; 100% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse); trace gravel to 1/2"; subangular; gravel is quartz and lithic fragments. Note: trace clay-rich nodules to 2" present from 456 - 456.5 ft. Slight odor starting at 456.5 ft. At 458 ft, 7.5 YR 6/3, light brown; sediment is fining downwards to 40% very fine, 50% fine, 10% medium, trace coarse at 460 ft.	
	21.9									
	3.2									
460										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **19 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
460	8.7	24.9		V, P	461 - 466		SW		Well-graded sand: 7.5YR 6/3, light brown; loose; moist; 90% very fine to coarse sand (35% very fine, 15% fine, 20% medium, 30% coarse); 10% gravel to 1"; gravel is quartz and lithic fragments. Note: Slight petroleum odor. At 461 ft, 7.5 YR 5/2, brown; 100% sand (30% very fine, 30% fine, 20% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded. 2" lense of caliche at 463 ft.	
		44.7								
		49.2					SP		Well-graded sand with gravel: 7.5YR 6/2, pinkish gray; loose; moist; 70% very fine to coarse sand (45% very fine, 15% fine, 20% medium, 20% coarse); 30% gravel to 1 1/2"; gravel is lithic fragements with carbonate cement. Note: slight petroleum odor.	
465		36.6							Poorly graded sand: 7.5YR 6/3, light brown; loose; moist; 100% fine sand; trace medium sand. Note: slight petroleum odor.	
		20.7					SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; moist; 70% fine to coarse sand (15% fine, 55% medium, 30% coarse); 30% gravel to 3"; subangular to subrounded; gravel is lithic fragments. Note: nodules of greenish sandy clay present. At 466 ft, 90% sand (5% very fine, 40% fine, 35% medium, 20% coarse); 10% gravel to 1.5"; no clay nodules.	
	27.8				466 - 471		SP		Poorly graded sand: 7.5YR 5/2, brown; loose; slightly moist; 100% very fine to fine sand; trace medium sand.	
		22.2								
	20.3						SW		Well-graded sand: 10YR 5/3, brown; medium dense; moist; 100% very fine to coarse sand (75% very fine, 15% fine, 5% medium, 5% coarse). Note: Slight petroleum odor. At 468 ft, sand is wet; trace sandstone cobbles; trace clay, plastic. Note: at 470 ft,	
470										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **20 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
470	44.2	23.0			471 - 476		SC		color is 10YR 4/2, dark grayish brown; wet; 100% sand (40% very fine, 45% fine, 10% medium, 5% coarse); trace gravel to 1/2".	
		19.9							@ 470 ft: Clayey sand: 10YR 4/2, dark grayish brown; medium dense; wet; very fine to coarse sand; clay; silt, non-plastic to slightly plastic. Note: slight petroleum odor.	
	91.0	20.7					SW		Well-graded sand: 10YR 4/3, brown; medium dense; wet; 100% very fine to coarse sand (60% very fine, 20% fine, 15% medium, 5% coarse); trace gravel to 1/3"; subangular; gravel is granite and lithic fragments. Note: slight odor. No gravel at 472 ft, 10YR 4/2, dark grayish brown. At 473 ft, 95% sand (75% very fine to fine, 25% medium to coarse).	
475	77.3	19.5					SC		Clayey sand: 10YR 4/2, dark grayish brown; medium dense; wet; 50% very fine to coarse sand; 20% cobbles to 4 1/2"; 30% clay; nonplastic to slightly plastic; cobbles are medium to coarse sandstone. Note: clay is present as red nodules up to 3". Slight odor.	
		20.5							Well-graded sand with gravel: 10YR 4/3, brown; loose to medium dense ; wet; 80% fine to coarse sand (15% fine, 70% medium, 15% coarse); 20% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: slight odor. At 477 ft, 90% sand (20% fine, 35% medium, 45% coarse); 10% gravel to 1 1/2". At 478 ft, 70% sand (5% fine, 30% medium, 65% coarse); 30% gravel to 2". Lense of trace clay nodules to 1 1/4" at 480 ft.	
		20.7					SW			
	27.7									
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **21 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	21.3				476 - 486		SP		Poorly graded sand with gravel: 7.5YR 5/2, brown; loose to medium dense; wet; 60% medium to coarse sand (35% medium, 65% coarse); trace fine sand; 40% gravel to 2 1/2"; subangular to subrounded; gravel is lithic fragments.	
							GW		Well graded gravel with sand: 7.5YR 5/2, brown; loose to medium dense; wet; 65% gravel; 35% medium to coarse sand (60% medium, 40% coarse); trace fine sand; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
	22.4									
21.8									@ 482 ft: Well-graded sand: 10YR 4/2, dark grayish brown; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments; trace clay. Note: slight odor, decreasing in intensity. At 483.5 ft, gravel up to 1 1/2 ". Clay is present as nodules.	
	25.7						SW			
485										
14.7									Well-graded sand with gravel: 10YR 4/2, dark grayish brown; medium dense; wet; 75% fine to coarse sand (15% fine, 20% medium, 65% coarse); 25% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: slight petroleum odor, increasing in intensity to 488 ft.	3" Schedule 80 PVC Sump, 486 to 488 ft bgs
	21.3									
1942										
	21.6			G, UV					Core bag not opened; sent to laboratory for UV analysis.	
490										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **22 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
490	1957	22.0		W, T V, P, B, M	486 - 496		SW		Well-graded sand with gravel: 10YR 4/2, dark grayish brown; medium dense; wet; 70% fine to coarse sand (15% fine, 30% medium, 55% coarse); 30% gravel to 2"; gravel is quartz, feldspar, and lithic fragments	
	557	25.0					SP		Poorly graded sand: 10YR 4/1, dark gray; dense; wet; 90% fine sand; 10% silt, nonplastic. Note: from 494 to 495 ft, sand is very fine.	
495	62.7	26.3								
	21.0	20.8					SW		Well-graded sand: 10YR 4/1, dark gray; medium dense; wet; 95% fine to coarse sand (10% fine, 70% medium, 20% coarse); 5% gravel to 1"; gravel is quartz and sandstone fragments	
500		20.8							Well-graded sand: 7.5YR 4/1, dark gray; medium dense; wet; 90% fine to coarse sand (10% fine, 35% medium, 55% coarse); 10% gravel to 1 1/2"; subangular to subrounded; trace clay, slightly plastic; gravel is quartz, feldspar, and lithic fragments. Note: clay is present as 1/2" to 2" nodules of green dense sandy clay.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/08/18**
Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**
Page: **23 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
500		21.3			496 - 506		SW		Well-graded sand with gravel: 7.5YR 5/1, gray; medium dense; wet; 85% fine to coarse sand (10% fine, 40% medium, 50% coarse); 10% gravel to 1"; subangular to subrounded; 5% cobbles; angular to rounded; gravel and cobbles are quartz, sandstone, and lithic fragments. Note: 2" of well-indurated sand and gravel with carbonate cement at 502 ft.	Native Soil/ Slough, 500 to 506 ft bgs
7.5		22.5								
12		24.6		V, P, B, M					Well-graded sand with gravel: 10YR 4/2, dark grayish brown; medium dense; wet; 80% fine to coarse sand (40% fine, 30% medium, 30% coarse); 20% gravel to 3/4"; subrounded to rounded; gravel is quartz, feldspar, and sandstone fragments. Note: sand is well-indurated with a carbonate cement at 505.75 ft.	
505										
16.9									TD = 506 ft	
510										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **1 of 23**

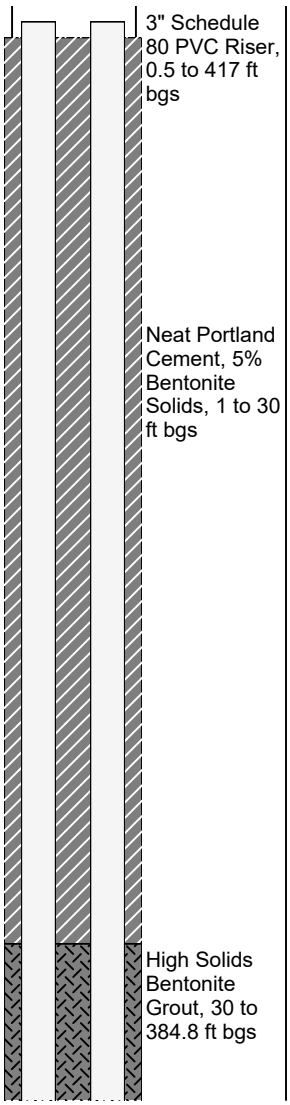
Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
0					Hydrovac to 10 ft for utilities clearance; lithology not recorded.	3" Schedule 80 PVC Riser, 0.5 to 451 ft bgs
10	25.4		ML		Sandy silt: 7.5YR 5/6, strong brown; loose; dry; nonplastic; 50% silt; 50% very fine sand.	Neat Portland Cement, 5% Bentonite Solids, 1 to 30 ft bgs
15			SM		Silty sand: 5YR 5/6, yellowish red; loose; 60% fine sand; 40% silt, nonplastic.	
20	3.9		SM		Same as above (15 ft): 70% fine sand; 30% silt.	
25			CL		Clay with sand: 5YR 5/6, yellowish red; soft; dry; 80% clay; 20% fine sand; subrounded to rounded; clay is low plasticity; sand is quartz and lithic fragments.	
30	6.8		ML		Sandy silt: 5YR 4/6, yellowish red; 60% silt; trace clay; 40% fine sand.	High Solids Bentonite Grout, 30 to 384.8 ft bgs
35						3" Schedule 80 PVC Riser, 0.5 to 417 ft bgs

(1) (2)



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **2 of 23**

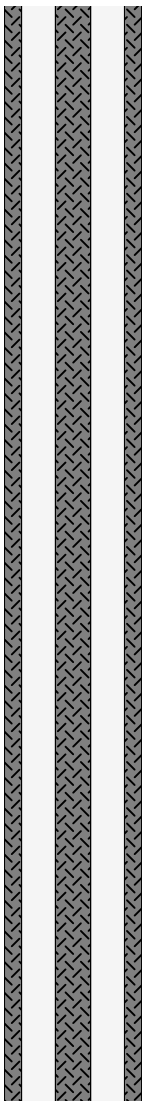
Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description
40	4.9		ML		Sandy silt: 5YR 4/6, yellowish red; trace clay; 50% silt; 50% fine sand.
			CL		Sandy clay: 5YR 6/4, light reddish brown; soft; dry; slightly plastic; 60% clay; 40% fine to medium sand (75% fine, 25% medium); subrounded; sand is quartz, feldspar, and lithic fragments.
45			SC		Clayey sand: 5YR 5/6, yellowish brown; very loose; dry; 80% fine sand; subrounded; 20% clay and silt, nonplastic; sand is quartz, feldspar, and lithic fragments.
50	4.0		CL		Clay: 5YR 5/6, yellowish red; very soft; dry; nonplastic; 90% clay; 10% fine sand; subrounded; sand is quartz, feldspar, and lithic fragments.
55			SC		Clayey sand: 5YR 5/6, yellowish red; very loose; 70% fine to coarse sand (55% fine, 15% medium, 30% coarse); 30% clay.
60	3.5				Same as above (60 ft): sand is 60% fine, 15% medium, 25% coarse; trace gravel, subrounded; gravel is quartz, feldspar, and lithic fragments.
65					Same as above (60 ft): 60% clay; 40% fine to medium sand (80% fine, 10% medium); trace gravel, subrounded; gravel is quartz, feldspar, and lithic fragments.
70					

Completion Details: (1) (2)



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **3 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
	4.0		SW-SM		Well-graded sand with silt: 5YR 5/6, yellowish red; very loose; 90% fine to coarse sand (45% fine, 45% medium, 10% coarse); angular to subangular; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	(1) (2)
75			SP-SM		Poorly graded sand with silt: 5YR 4/6, yellowish red; very loose; 90% fine to medium sand (60% fine, 40% medium); angular to subangular; 10% silt; sand is quartz, feldspar, and lithic fragments.	
80	3.8					
85					Same as above (75 ft): 5YR 5/6, yellowish red; sand is 60% fine, 40% medium.	
90	3.3		SP-SC		Poorly graded sand with clay: 5YR 5/8, yellowish red; 90% very fine to fine sand (60% very fine, 40% fine); rounded; 10% clay; sand is quartz, feldspar, and lithic fragments.	
95					Same as above (90 ft): sand is 55% very fine, 45% fine.	
100	1.6		SP-SM		Poorly graded sand with silt: 7.5YR 6/4, light brown; very loose; dry; 90% fine sand; subrounded; 10% silt; sand is quartz, feldspar, and lithic fragments.	
105						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **4 of 23**

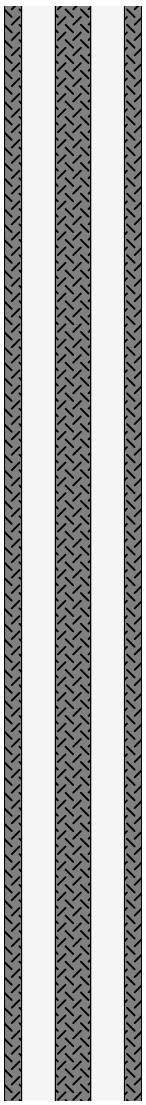
Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description
110	3.2		SP-SM		Same as above (100 ft): trace gravel; gravel is sandstone concretions.
			SM		Silty sand: 5YR 5/8, yellowish red; very loose; dry; 75% fine sand; rounded to subrounded; 25% silt; sand is quartz, feldspar, and lithic fragments.
115					Same as above (110 ft): 65% fine sand; 35% silt.
120	2.3				Same as above (110 ft): 50% fine sand; 50% silt.
125			CL		Sandy clay: 7.5YR 5/6, strong brown; very soft; moist; low plasticity; 70% clay; 30% fine sand; sand is quartz, feldspar, and lithic fragments.
130	3.3				Same as above (125 ft): 60% clay; 40% fine sand.
135			SM		Silty sand: 7.5YR 5/6, strong brown; loose; 70% fine to medium sand (85% fine, 15% medium); subrounded; 30% silt; sand is quartz, feldspar, and lithic fragments.
140					

Completion Details (1) (2)



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **5 of 23**

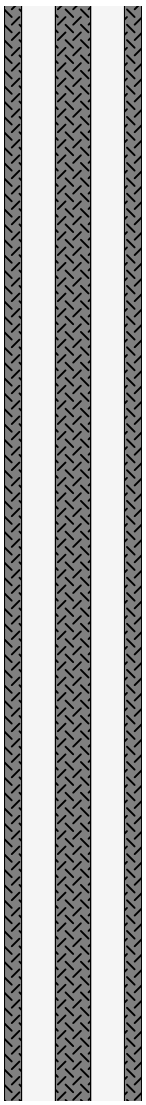
Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description
	3.0		SC		Clayey sand: 7.5YR 5/6, strong brown; loose; moist; 60% fine and coarse sand (80% fine, 20% coarse); subrounded to rounded; 40% clay; medium plasticity; sand is quartz, feldspar, and lithic fragments.
145					Sandy clay: 7.5YR 5/6, strong brown; soft; moist; medium plasticity; 70% clay; 30% fine and coarse sand (80% fine, 20% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.
150	3.8		CL		Same as above (145 ft): 50% clay; 50% sand.
155					Sandy silt: 7.5YR 5/6, strong brown; soft; 70% silt; 30% fine to medium sand (65% fine, 35% medium); rounded; sand is quartz, feldspar, and lithic fragments.
160	4.1				Sandy silt: 7.5YR 6/8, reddish yellow; soft; dry; 50% silt; 50% fine sand; rounded; sand is quartz, feldspar, and lithic fragments. Note: trace silt is present as concretions.
165			ML		Same as above (160 ft): 50% silt; 40% fine sand; 10% gravel to 1/8", subrounded; gravel is quartz, feldspar, and lithic fragments.
170	19.8				Same as above (160 ft): 50% silt; 50% sand (60% fine, 30% medium, 10% coarse).
175					

Completion Details (1) (2)



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **6 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
180	11.0		SM		Silty sand: 7.5YR 6/6, reddish yellow; loose; dry; sand is fine to coarse (60% fine, 25% medium, 15% coarse); rounded to subrounded; sand is quartz, feldspar, and lithic fragments.	
					Same as above (175 ft): sand is 55% fine, 20% medium, 25% coarse.	
185			SW		Well-graded sand: 7.5YR 7/4, pink; loose; dry; 100% fine to coarse sand (30% fine, 60% medium, 10% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.	
190	13.8					
195					Same as above (185 ft); sand is 25% fine, 60% medium, 15% coarse.	
200	13.3				Well-graded sand: 7.5YR 6/4, light brown; 100% very fine to coarse sand (45% very fine, 40% fine, 10% medium, 5% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.	
205			SM		Silty sand: 7.5YR 6/6, reddish yellow; loose; dry; sand is very fine to medium (15% very fine, 20% fine, 60% medium), rounded; 5% gravel, subrounded to rounded; sand and gravel are quartz, feldspar, and lithic fragments.	
210						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **7 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
215	1.7		SW-SM		Well-graded sand with silt and gravel: 7.5YR 6/6, reddish yellow; loose; dry; 75% fine to coarse sand (15% fine, 65% medium, 20% coarse); rounded; 15% gravel; subrounded to rounded; 10% silt; sand and gravel are quartz, feldspar, and lithic fragments.	
					Same as above (210 ft): sand is 10% fine, 65% medium, 25% coarse.	
220	2.1		SW		Well-graded sand: 7.5YR 6/4, light brown; loose; dry; 95% fine to coarse sand (20% fine, 45% medium, 35% coarse); subrounded to rounded; 5% silt; sand is quartz, feldspar, and lithic fragments.	
225					Well-graded sand with gravel: 7.5YR 6/6, reddish yellow; loose; dry; 80% fine to coarse sand (20% fine, 45% medium, 35% coarse); 15% gravel to 1 1/2"; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
230	2.4		SW-SM		Well-graded sand with silt and gravel: 7.5YR 6/6, reddish yellow; loose; dry; 50% fine to coarse sand (20% fine, 40% medium, 40% coarse); 40% gravel to 1 1/2"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
235			SW		Well-graded sand: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (15% fine, 60% medium, 25% coarse); 5% gravel to 1 1/2"; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
240	2.4		SW-SM		Well-graded sand with silt: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (10% fine, 80% medium, 10% coarse); 10% silt; sand is quartz, feldspar, and lithic fragments.	
245						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

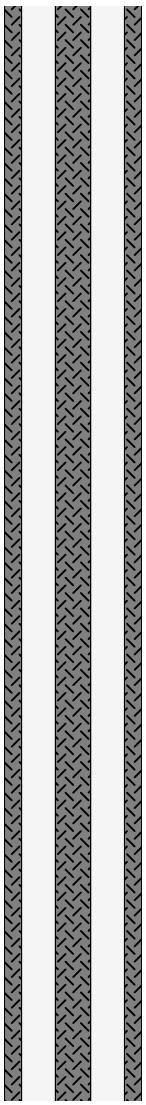
Well ID: **KAFB-106S7**
Page: **8 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
250	2.5		SW-SM		Well-graded sand with silt: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (10% fine, 80% medium, 10% coarse); 10% silt; sand is quartz, feldspar, and lithic fragments.	
			GP		Poorly graded gravel with sand: 7.5YR 6/4, light brown; loose; dry; 80% gravel to 3/4"; 20% medium to coarse sand (50% medium, 50% coarse); subrounded to rounded; gravel is quartz, feldspar, limestone, and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
255			SM		Silty sand: 7.5YR 6/4, light brown; loose; dry; sand is fine to coarse (25% fine, 60% medium, 10% coarse); 5% gravel to 3/4"; subrounded to rounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
260	1.7		CL		Clay: 7.5YR 7/4, pink; soft; medium plasticity.	
265						
270	1.6				Clay: 7.5YR 4/3, brown; soft; medium plasticity.	
275						
280						



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **9 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
	1.2		CL		Gravelly clay: 7.5YR 6/4, light brown; soft; low plasticity; 65% clay; 35% gravel to 1/4"; angular; gravel is limestone.	
285			SP		Poorly graded sand: 7.5YR 5/4, brown; loose; dry; 95% fine to medium sand (35% fine, 65% medium); 5% silt; sand is quartz, feldspar, and lithic fragments.	
290	1.7		SM		Silty sand: 7.5YR 4/3, brown; loose; 70% sand (65% fine, 30% medium, 5% coarse); subrounded to rounded; 30% silt; sand is quartz, feldspar, and lithic fragments.	
295			SM		Same as above (290 ft): 80% sand (55% fine, 30% medium, 15% coarse); 20% silt.	
300	1.2		SM		Same as above (290 ft): 85% sand (45% fine, 35% medium, 20% coarse); 15% silt.	
305			SP		Poorly graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% medium to coarse sand (35% medium, 65% coarse); 30% gravel to 1/2"; subrounded to rounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, lithic fragments, and limestone.	
310	1.4		SP			
315						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **10 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
320	0.9		SP		Poorly graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% medium sand; 30% gravel to 1/2"; subrounded to rounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, lithic fragments, and limestone.	
325			SP		Poorly graded sand: 7.5YR 5/3, brown; loose; dry; 100% fine to medium sand (95% fine, 5% medium); sand is quartz, feldspar, and lithic fragments.	
330	1.3					
335			SW		Well-graded sand: 7.5YR 6/4, light brown; loose; dry; 95% fine to coarse sand (5% fine, 95% medium, 10% coarse); 5% silt.	
340	1.0		SM		Silty sand: 7.5YR 6/4, light brown; loose; dry; 80% fine to coarse sand (65% fine, 25% medium, 10% coarse); subrounded to rounded; 20% silt; sand is quartz, feldspar, and lithic fragments.	
345			SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% fine to coarse sand (15% fine, 55% medium, 30% coarse); 30% gravel to 1/4"; angular to subangular; sand is quartz, feldspar, and lithic fragments; gravel is quartz, limestone, and feldspar.	
350						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **11 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
355	69.0		SW-SM		Well-graded sand with silt: 7.5YR 4/4, brown; loose; dry; 85% fine to coarse sand (70% fine, 10% medium, 20% coarse); 5% gravel to 1/4"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is feldspar and lithic fragments.	
360	2.6				Well-graded sand with silt and gravel: 7.5YR 4/4, brown; loose; dry; 75% fine to coarse sand (65% fine, 15% medium, 20% coarse); 15% gravel to 1/4"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is feldspar and lithic fragments.	
365			SW		Well-graded sand with gravel: 7.5YR 4/3, brown; loose; dry; 50% fine to coarse sand (10% fine, 20% medium, 70% coarse); 45% gravel to 1/2"; subrounded to rounded; 5% silt; sand and gravel are quartz, feldspar, and lithic fragments.	
370	5.1					
375						
380	3.8		SM		Silty sand: 7.5YR 6/4, light brown; 85% fine to medium sand (95% fine, 5% medium); rounded; 15% silt; sand is quartz, feldspar, and lithic fragments.	
385						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/16/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **12 of 23**

Drilling Company: **Cascade**
Drilling Method: **Air Rotary Casing Hammer**
Drill Bit: **10 1/2" Ken Claw**
8 1/2" Milltooth Tricone
Driller: **Forrest Chattin**
Geologist: **C. Montoya**

Boring Depth (ft): **506**
Boring Diameter (in): **9 5/8", 11 3/4"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details (1) (2)
390	9.8		SM		Silty sand: 7.5YR 6/4, light brown; 85% fine to medium sand (95% fine, 5% medium); rounded; 15% silt; sand is quartz, feldspar, and lithic fragments.	Hydrated Uncoated Bentonite Chips, 3/8", 384.8 to 414.9 ft bgs
395			SP-SM		Poorly graded sand with silt: 7.5YR 6/4, light brown; 90% fine to medium sand (90% fine, 10% medium); rounded; 10% silt; sand is quartz, feldspar, and lithic fragments.	
400	5.1		SW		Well-graded sand with clay and gravel: 7.5YR 6/6, reddish yellow; 70% fine to coarse sand (25% fine, 25% medium, 50% coarse); 20% gravel; subangular to subrounded; 10% clay; sand and gravel are quartz, feldspar, and lithic fragments.	
405					End ARCH drilling at 401 ft, begin sonic coring. Core log begins on the following page.	
410						
415						
420						

Notes: (1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **13 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
									No Recovery	
39.0							SW		Well-graded sand with gravel: 7.5YR 5/6, strong brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 65% medium, 15% coarse); 30% gravel to 2 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SP		Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1 1/2"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown.	
405					401 - 411		SW		Well-graded sand with gravel: 7.5YR 5/6, strong brown; loose; slightly moist; 85% fine to coarse sand (25% fine, 65% medium, 10% coarse); 15% gravel to 1 1/4"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown. Lense of clay from 406.5 to 406.7 ft, 7.5YR 5/4, brown.	
							CL			
410							SW		Clay with sand: 2.5YR 4/4, reddish brown and 7.5YR 5/4, brown; stiff to very stiff; medium plasticitiy; 80% clay; 15% fine to coarse sand (20% fine, 70% medium, 10% clay); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is mottled to 7.5YR 5/4, brown; and 7.5YR 8/1,	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **14 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0.3									white; secondary calicum carbonate present.	
	26.9				411 - 416		SW		@ 408 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (25% fine, 65% medium, 10% coarse); 10% gravel to 1 1/4"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown. Lense of clay with sand from 411.4 to 411.6 ft, 7.5YR 5/4, brown; stiff to very stiff; medium plasticity; 80% clay; 15% sand; 5% gravel.	
							SW-SC			
415									@ 412 ft - Well-graded sand with clay and gravel: 10YR 6/3, pale brown; loose; slightly moist; 65% fine to coarse sand (25% fine, 65% medium, 10% coarse); 25% gravel to 1 1/4"; subangular to subrounded; 10% clay, low to medium plasticity; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown.	
	32.7				416 - 418		SP		@ 414 ft - Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to medium sand (40% fine, 60% medium); trace coarse sand; 10% gravel to 1"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown. At 416 ft, 7.5YR 5/2, brown; 95% sand; 5% gravel; trace clay.	
	33.0									
1.3							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (25% fine, 65% medium, 10% coarse); 10% gravel to 1 1/8"; subangular to subrounded; trace silt, nonplastic; sand	
420										

3" Schedule 80 PVC Screen, 0.010" slot, 417 to 441.9 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **15 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
				P, V	418 - 423		SP-SM		is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: At 419 ft, sand is 20% fine, 65% medium, 15% coarse. Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); trace coarse sand; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 422 ft, trace lithic gravel to 1/2"; trace clay nodules, 2.5Y 5/4, light olive brown.	
	30.4				423 - 430		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); trace coarse sand; 5% gravel to 1/2"; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. At 424 ft, 90% sand; trace gravel to 1/2"; 5% silt; 5% clay nodules. At 426 ft, 10YR 6/2, light brownish gray; 95% sand; trace gravel to 5/8"; 5% silt; trace clay nodules. At 427 ft, 85% sand; 10% gravel to 1"; 5% silt.	
425							SW		Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (25% fine, 65% medium, 10% coarse); 10% gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	10/20 Silica Sand, 414.9 to 443.9 ft bgs
430							SP-SM			

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **16 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
435	2.1	68.9			430 - 432		SW		@ 429 ft - Poorly graded sand with silt: 10YR 7/2, light gray; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
		58.6			432 - 436		SP		@ 430.25 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 55% medium, 15% coarse); 25% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
		67.5					SW		@ 432 ft - Poorly graded sand: 10YR 7/2, light gray; loose; slightly moist; 85% fine to medium sand (45% fine, 55% medium); trace coarse sand; 10% gravel to 1"; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. At 434 ft, 10YR 6/2, light brownish gray; 90% sand; 5% gravel; 5% silt.	
							SW-SM		@ 436 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 55% medium, 15% coarse); 25% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
440							SW		@ 437 ft - Well-graded sand with silt: 2.5Y 6/1, gray; loose; slightly moist; 85% fine to coarse sand (35% fine, 55% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **17 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
									quartz and lithic fragments.	
	1.6				436 - 446		SW		@ 438 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 55% medium, 15% coarse); 15% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							SP-SM		Poorly graded sand with silt: 10YR 7/2, light gray; loose; slightly moist; 85% fine to medium sand (45% fine, 55% medium); trace coarse sand; 5% gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; gravel is lithic fragments.	3" Schedule 80 PVC Sump, 441.9 to 443.9 ft bgs
445							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
	34.3						SW		Well-graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 80% fine to coarse sand (30% fine, 60% medium, 10% coarse); 20% gravel to 2 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of clay from 447.4 to 447.6 ft, 7.5YR 4/6, strong brown to 7.5YR 5/4, brown; very stiff; low plasticity.	Hydrated Uncoated Bentonite Chips, 3/8", 443.9 to 449 ft bgs
							SP			
450							CL		@ 448 ft - Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; sand is quartz,	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **18 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0.1					446 - 456		CL		feldspar, and lithic fragments; gravel is quartz and lithic fragments. - @ 448.75 ft - Clay: 5YR 5/4, olive, very stiff; dry; low to medium plasticity. Note: clay is mottled to 2.5Y 8/1, white, and 2.5Y 2.5/1, black; contains secondary calcium carbonate. At 450 ft, slightly moist; no white mottling; includes mottling to 7.5YR 5/6, strong brown. At 452 ft, 7.5YR 5/3, brown; very stiff; medium plasticity; weakly mottled to 7.5YR 8/1, white; weak product odor. Lense of well-graded sand with gravel from 455.8 to 456 ft, 80% fine to coarse sand; 20% gravel to 2 1/4".	3" Schedule 80 PVC Screen, 0.010" slot, 451 to 491 ft bgs; 10/20 Silica Sand, 449 to 505 ft bgs
455										
45.4					456 - 460		ML		Silt: 10YR 6/3, pale brown; soft; nonplastic; 80% silt, 20% clay, stiff. Note: product odor. At 458 ft, 100% silt, trace clay.	
460										

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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **19 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
465	6.8	46.9			460 - 466		SM		Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 85% very fine to medium sand (30% very fine, 40% fine, 30% medium); subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: product odor. At 461 ft, trace coarse sand; trace lithic gravel to 1".	
							SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor.	
		31.1			466 - 468					
							SW		Well-graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 90% fine to coarse sand; 25% fine, 65% medium, 10% coarse); 10% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor. At 468 ft, well-graded sand with gravel; 80% sand, 20% gravel.	
470		23.6		P, V, M, B			SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand	

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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **20 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
6.3					468 - 473		SP		(30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor.	
									@ 470 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (25% very fine, 65% fine, 10% medium); trace gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor.	
27.7							SW		@ 473 ft - Well-graded sand with gravel: 10YR 5/3, brown; loose; moist; 70% fine to coarse sand (25% fine, 65% medium, 10% coarse); 30% gravel to 2"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: weak product odor. Clay is present as nodules.	
475					473 - 480		SP		@ 474 ft - Poorly graded sand: 10YR 5/3, brown; loose; moist; 100% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: weak product odor. At 476 ft, sand is 30% very fine, 65% fine, 5% medium; no gravel; trace silt. At 479 ft, 95% sand; 5% gravel. Lense of well-graded sand with gravel from 480 to 480.5 ft, 85% fine to coarse sand; 15% gravel to 1 5/8"; trace clay nodules. Lense of clayey sand with gravel from 480.5 to 481 ft, 65% fine to coarse sand; 20% gravel to 1 5/8"; 15% clay as	
480										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **21 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
485	46.3	30.6		P, V, M, B	480 - 481				nodules, low plasticity, 7.5YR 5/3, brown, and 5Y 6/3, pale olive.	
		39.9			481 - 486		SP		Poorly graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 85% fine to medium sand (40% fine, 60% medium); trace coarse sand; 15% gravel to 1 3/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor.	
							GW		Well-graded gravel with sand: 7.5YR 4/2, brown; loose; moist; 65% gravel to 3"; 35% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; trace silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: product odor.	
		31.1					SW		Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 65% fine to coarse sand (20% fine, 70% medium, 10% coarse); 35% gravel to 3"; trace cobbles to 3 1/2"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel and cobbles are lithic fragments. Note: product odor. At 487 ft, well-graded sand, 90% sand; 10% gravel to 1 1/2"; trace silt.	
490							SP		Poorly graded sand: 7.5YR 4/2, brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and	

Notes:
(1) Current Water Table Well
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UV = ultraviolet fluorescence
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bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **22 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
1499				UV	486 - 506		SW		lithic fragments; gravel is quartz and lithic fragments. Note: product odor.	3" Schedule 80 PVC Sump, 491 to 493 ft bgs
							SP		@ 490 ft - Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 70% fine to coarse sand (20% fine, 70% medium, 10% coarse); 30% gravel to 3"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor.	
									@ 491 ft - Poorly graded sand: 7.5YR 4/2, brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor.	
							SP		@ 492 ft - Core bag not opened, 492 to 494 ft sent to lab for UV analysis.	
495				P, V, M, B			SW		@ 494 ft - Poorly graded sand: 7.5YR 4/2, brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; trace silt; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Clay is nodules, 10YR 6/2, light brownish gray.	
							SP		@ 495 ft - Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 70% fine to coarse sand (20% fine, 70% medium, 10% coarse); 30% gravel to 3"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
500									@ 496 ft - Poorly graded sand: 7.5YR 4/2, brown;	

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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1018**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/10/19**
Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**
Page: **23 of 23**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **506 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.44**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
418.3							SP		loose; moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor. At 500 ft, 100% sand; trace gravel to 1 1/4"; trace silt. At 502 ft, 95% sand; 5% gravel; trace silt.	
505				P, V			SW		Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 85% fine to coarse sand (20% fine, 70% medium, 10% coarse); 15% gravel to 3"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: weak product odor.	Native Soil/ Slough, 505 to 506 ft bgs
8.6									TD = 506 ft	

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **1 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0							SP-SM		Poorly graded sand with silt: brown; slightly moist; trace fine gravel; gravel is quartz, feldspar, and lithic fragments. Note: hydroknife to 8 ft for utilities clearance.	3" Schedule 80 PVC Riser, 2.45 ft above ground surface to 451 ft bgs; 3" Schedule 80 PVC Riser, 2.5 ft above ground surface to 417 ft bgs
5									No cuttings returned	Neat Portland Cement, 5% Bentonite Solids, 1.85 ft above ground surface to 30 ft bgs
10	3.4	19.2			10 - 16		ML		Silt: 5YR 5/4, reddish brown; soft; slightly moist; nonplastic; 80% silt; 10% clay; 10% fine to coarse sand (60% fine, 30% medium, 10% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche. Note: at 12 ft, silt is mottled to 5YR 7/2, pinkish gray, by secondary calcium carbonate. At 14 ft, 70% silt; 25% clay; 5% sand.	
15										

Notes:
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USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **2 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
15										
	19.7				16 - 21		ML		Silt: 7.5YR 4/3, brown; soft; slightly moist; nonplastic; 70% silt; 25% clay; 5% fine to coarse sand (60% fine, 30% medium, 10% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: mottled to 5YR 7/2, pinkish gray. At 18 ft, 5YR 5/6, yellowish red; 60% silt; 30% clay; 10% sand. At 21 ft, 7.5YR 5/6, strong brown; 80% silt; 10% clay; 10% sand; no mottling. At 24 ft, 7.5YR 5/4, brown.	
20	2.4									
	19.3				21 - 26					
25										
	33.0						CL		Clay: 5YR 5/3, reddish brown; medium stiff; medium plasticity.	
30							ML		Silt: 7.5YR 5/6, strong brown; soft; slightly moist; nonplastic; 80% silt; 10% clay; 10% fine to coarse	

Notes:
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(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
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DTW = depth to water
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ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **3 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
30	1.9				26 - 36		ML		sand.	Hydrated Uncoated Bentonite Chips, 3/8"; 30 to 40 ft bgs
									Silt: 7.5YR 5/6, strong brown; soft; slightly moist; nonplastic; 80% silt; 10% clay; 10% fine to coarse sand.	
							CL		Clay: 5YR 5/3, reddish brown; medium stiff; medium plasticity.	
35	31.3				36 - 40		ML		Silt: 7.5YR 5/6, strong brown; soft; slightly moist; nonplastic; 80% silt; 10% clay; 10% fine to coarse sand. Note: mottled to 5YR 7/2, pinkish gray. At 36 ft, highly mottled. At 40 ft, 5YR 5/4, reddish brown; lightly mottled; 85% silt; 10% clay; 5% sand. Lense of silt with sand from 42.5 to 43 ft, 75% silt; 10% clay; 15% fine to coarse sand (50% fine, 30% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. At 44 ft, 5YR 4/4, reddish brown; 70% silt; 20% clay; 10% sand.	
40	0.4	19.4			40 - 46					High Solids Bentonite Grout, 40 to 384.7 ft bgs
45										

Notes:
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **4 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
45										
	26.6				46 - 50		ML		Silt: 5YR 4/4, reddish brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: at 47 ft, highly mottled to 5YR 8/2, pinkish white, with secondary calicum carbonate alteration throughout. Amount of alteration decreases from 49 to 50 ft. At 50 ft, 7.5YR 5/4, brown.	
50	1.6									
	26.4				50 - 56					
							CL		Clay: 7.5YR 5/3, brown; medium stiff; medium plasticity. Note: clay is lightly mottled to 7.5YR 7/2, pinkish gray.	
55	43.2						ML		Silt: 5YR 4/4, reddish brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: lightly mottled to 5YR 8/2, pinkish white, with some secondary calicum carbonate alteration.	
	28.6									
							SM		Silt with sand: 5YR 5/4, reddish brown; soft; slightly moist; nonplastic; 80% silt; 5% clay; 15% fine to medium sand (40% fine, 60% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche.	
60									@ 58 ft - Silty sand: 7.5YR 5/4, brown; loose; slightly	

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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **5 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
60	5.3				56 - 66		ML		moist; 60% fine to coarse sand (40% fine, 50% medium, 10% coarse); trace gravel to 1/2"; subangular to subrounded; 40% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche.	
									@ 60 ft - Silt: 5YR 4/4, reddish brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: lightly mottled to 5YR 8/2, pinkish white, with some secondary calicum carbonate alteration throughout. At 66 ft, 7.5YR 6/4, light brown.	
65	29.2									
70	2.5				66 - 76		SW		Well-graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 90% fine to coarse sand (15% fine, 70% medium, 15% coarse); 10% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							ML		Silt: 7.5YR 6/4, light brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: lightly mottled to 5YR 8/2, pinkish white, with some secondary calicum carbonate alteration. Mottling increases to highly mottled to 10YR 7/2, light gray, at 74 ft. At 76 ft, medium stiff to very stiff.	
75										

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ppmv = parts per million by volume
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **6 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
75										
									Silt: 7.5YR 6/4, light brown; medium stiff to very stiff; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: highly mottled to 10YR 7/2, light gray, some secondary calicum carbonate alteration.	
	46.8								Silt with sand: 7.5YR 6/4, light brown; soft; slightly moist; nonplastic; 70% silt; 5% clay; 20% sand. Note: highly mottled to 10YR 7/2, light gray.	
80	3.9				76 - 86		ML		Silt: 7.5YR 6/4, light brown; medium stiff to very stiff; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: highly mottled to 10YR 7/2, light gray. At 86 ft, very stiff; low plasticity; 80% silt; 10% clay; 10% sand.	
85	77.9				86 - 93					
90										

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ft = feet
ID = inner diameter
ppmv = parts per million by volume
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **7 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
90	1.7								Silt: 7.5YR 6/4, light brown; very stiff; slightly moist; low plasticity; 80% silt; 10% clay; 10% fine to coarse sand. Note: highly mottled to 10YR 7/2, light gray. At 91 ft, 5YR 6/4, light reddish brown.	
	33.7				93 - 100		ML			
95										
100	2.1								Poorly graded sand with silt: 7.5YR 6/3, light brown; loose; slightly moist; 90% fine to medium sand (60% fine, 40% medium); trace coarse sand; trace gravel to 3/8"; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of silt from 103 to 103.4 ft, 5YR 6/4, light reddish brown; very stiff; low plasticity; 80% silt; 10% clay; 10% sand; highly mottled to 10YR 7/2, light gray. At 103.4 ft, trace gravel to 3/8". From 104.8 to 105 ft, trace gravel to 1 1/4". Lense of poorly graded sand from 106.5 to 107 ft, 10YR 6/3, pale brown; 100%	
	23.3				100 - 106		SP-SM			
105										

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ID = inner diameter
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **8 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
105							SP-SM		very fine to medium sand (20% very fine, 70% fine, 10% medium); contains caliche.	
	33.9				106 - 116		SW-SM		Well-graded sand with silt and gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (35% fine, 45% medium, 20% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: alternating with poorly graded sand with silt; 90% fine to medium sand (60% fine, 40% medium); trace coarse sand; trace gravel to 3/8"; 10% silt, nonplastic.	
110	2.6						CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; medium plasticity. Note: slightly mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
							ML		Silt: 7.5YR 6/3, light brown; soft; slightly moist; 80% silt, nonplastic; 20% clay, low plasticity; trace sand; trace gravel to 3/8".	
							CL		@ 114 ft - Clay: 7.5YR 5/3, brown; very stiff; slightly moist; medium plasticity. Note: slightly mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
115	42.6				116 - 120		ML		@ 115 ft - Silt: 7.5YR 6/3, light brown; soft; slightly moist; 80% silt, nonplastic; 20% clay, low plasticity; trace sand; trace gravel to 3/8". Note: lense of well-graded sand from 116.5 to 117 ft, 10YR 6/3, pale brown; 90% fine to coarse sand (35% fine, 45% medium, 20% coarse); 5% gravel to 1 1/2"; subangular to subrounded; 5% silt. Lense of	
120										

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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

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EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
120	2.0	51.1			120 - 126		ML		well-graded sand from 121 to 122 ft, 90% sand (20% fine, 60% medium, 20% coarse); trace gravel to 3/8"; 5% silt; 5% clay.	
							CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; medium plasticity. Note: at 125 ft, 95% clay; 5% fine to medium sand. At 126 ft, slightly mottled to 10YR 7/2, light gray; secondary calcium carbonate present; trace fine to medium sand.	
125		37.9			126 - 136		ML		Silt: 7.5YR 6/3, light brown; soft; slightly moist; 80% silt, nonplastic; 20% clay, low plasticity; trace sand; trace gravel to 3/8".	
							CL		Clay: 7.5YR 5/3, brown; very stiff; dry; medium plasticity. Note: slight product odor. Highly mottled to 7.5YR 7/2, pinkish gray. Secondary calcium carbonate present. At 129 ft, 10YR 5/6, yellowish brown; slightly moist; low plasticity; 75% clay; 25% silt, nonplastic. At 130 ft, dry; slightly mottled to 10YR 7/2, light gray. At 131 ft, slightly moist; slightly mottled to 7.5YR 7/2, pinkish gray; mottling decreases at 133 ft. At 135 ft, mottling increases.	
130	0.2									
135										

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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

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Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **10 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
135										
							CL		Clay: 7.5YR 5/3, brown; very stiff; dry; medium plasticity. Note: slightly mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present. Note: lense of silty sand from 136 to 137 ft, slightly moist; 10YR 6/4, light yellowish brown; 60% sand (15% very fine, 70% fine, 15% medium); trace coarse sand; 30% silt, nonplastic; 10% stiff to very stiff clay nodules, medium plasticity, 7.5YR 4/4, brown.	
	40.5				136 - 145	3.9	SM		Silty sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 60% very fine to medium sand (15% very fine, 70% fine, 15% medium); trace coarse sand; subangular to subrounded; 30% silt, nonplastic; 10% clay, medium plasticity; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as stiff to very stiff nodules, 7.5YR 4/4, brown. Lense of poorly graded sand with silt from 140.2 to 141 ft, 90% sand; 10% silt.	
140							SP		@ 141 ft - Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 95% very fine to medium sand (15% very fine, 70% fine, 15% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: lense of well-graded sand with gravel from 144 to 145 ft, 75% sand (10% fine, 60% medium, 30% coarse); 20% quartz and lithic gravel to 1 1/2"; 5% silt, no caliche.	
145	51.8				145 - 150		SW-SM			
							SP		@ 145 ft - Well-graded sand with silt: 10YR 6/4, light yellowish brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 60% medium, 10% coarse); 5% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic	
150							CL			

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **11 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
150	2.3	40.0			150 - 156		CL		fragments; gravel is quartz and lithic fragments. Note: at 146 ft, 90% sand; 10% silt; trace gravel to 3/8"; caliche present.	
							ML		@ 147 ft - Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 95% very fine to medium sand (15% very fine, 70% fine, 15% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: lense of poorly graded sand with clay from 148 to 149 ft, 85% sand; trace gravel to 1/2"; 10% clay; 5% silt.	
155							SM			
		41.4					SP-SM		@ 149 ft - Clay: 10YR 5/4, yellowish brown; stiff to very stiff; slightly moist; low to medium plasticity; trace fine to medium sand. Note: at 150 ft, 7.5YR 5/3, brown; mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
									@ 151 ft - Silt: 7.5YR 5/6, strong brown; soft; slightly moist; nonplastic; trace fine to medium sand. Note: at 152 ft, sandy silt; 60% silt; 5% clay; 35% sand (30% very fine, 50% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
160	1.6				156 - 166		SW		@ 154 ft - Silty sand: 7.5YR 5/4, brown; loose; slightly moist; 60% very fine to coarse sand (20% very fine, 70% fine, 10% coarse); subangular to subrounded; 40% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
							SC		@ 155.5 ft - Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slighlty moist; 90% fine to medium	
165										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **12 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
165										
	29.1						SW		sand (60% fine, 40% medium); trace coarse sand; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lens of sandy silt from 156 to 157 ft, 10YR 5/4, yellowish brown; soft; slightly moist; 75% silt, nonplastic; 5% clay nodules, low plasticity; 20% very fine to medium sand (20% very fine, 70% fine, 10% medium). At 157 ft, trace lithic gravel to 1/2". Lense of well-graded sand from 158 to 159 ft, 90% fine to coarse sand; 5% gravel to 1 1/2"; 5% silt, nonplastic; sand and gravel include caliche. At 159 ft, 10YR 5/2, grayish brown.	
							SP			
170	0.9				166 - 176		SP-SM		@ 161 ft - Well-graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 60% medium, 10% coarse); 5% gravel to 1 1/2"; subangular to subrounded; 5% silt; sand is quartz, feldspar, caliche, and lithic fragments; gravel is caliche and lithic fragments. Note: at 162 ft, well-graded sand with gravel; 80% sand; 15% gravel; 5% silt.	
175									@ 163.5 ft - Clayey sand with gravel: 7.5YR 5/4, brown; slightly moist; 50% very fine to medium sand (20% very fine, 70% fine, 10% medium); 20% gravel to 1"; subangular to subrounded; 30% clay, low plasticity; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: well-graded sand with clay and gravel from 164.2 to 165 ft, 60% sand (30% fine, 50% medium, 20% coarse); 30% gravel to 1 1/2"; 10% clay as coating on gravel, low plasticity. Lense of clay from 165 to 165.5 ft, 7.5YR 5/3, brown; medium stiff; medium plasticity.	
	33.2						SW			
180										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **13 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
180	3.7				176 - 186		SM		@ 165.5 ft - Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; slightly moist; 75% fine to coarse sand (30% fine, 60% medium, 10% coarse); 15% gravel to 1 1/2"; subangular to subrounded; 5% silt; 5% clay; sand is quartz, feldspar, caliche, and lithic fragments; gravel is caliche and lithic fragments. Note: clay is present as nodules.	
									@ 167 ft - Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 100% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; trace silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments.	
185	35.5						SW-SM			
	30.3								@ 170 ft - Poorly graded sand with silt: 10YR 6/2, light brownish gray; loose; slightly moist; 90% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: lense of clay from 171.8 to 172 ft, 7.5YR 6/4, light brown; very stiff; low plasticity.	
190	2.6				186 - 196		SW		@ 173 ft - Well-graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 1 1/8"; subangular to subrounded; trace silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: at 174 ft, 90% sand; 5% gravel; 5% silt. At 176.5 ft, 7.5YR 4/1, dark gray. At 176.8 ft, 7.5YR 5/1, gray. Lense of poorly graded sand from 177.5 to 178 ft, 100% (20% very	
	33.4						SP			
195										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **14 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
195									fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; trace silt. At 178 ft, 95% fine to coarse sand; 5% gravel; trace silt.	
	23.1						SM		@ 181.8 ft - Silty sand: 10YR 6/2, light brownish gray; loose; slightly moist; 80% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: at 183 ft, poorly graded sand with silt; 90% sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; 10% silt; trace clay nodules, 7.5YR 5/4, brown.	
200					196 - 206		SP		@ 184 ft - Well-graded sand with silt: 10YR 7/3, very pale brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: lense of silty sand from 185 to 186 ft: 10YR 6/2, light brownish gray; 75% very fine to medium sand (20% very fine, 70% fine, 10% medium); 5% gravel to 1 1/4"; 20% silt. At 186 ft, gravel includes caliche.	
205	25.6						SW		@ 187 ft - Well-graded sand: 10YR 7/3, very pale brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments; gravel is caliche and lithic fragments. Note: at 189 ft, 10YR 6/3, pale brown. Lense of poorly graded sand with silt from 192 to 193 ft, 10YR 6/2, light brownish gray; 90% sand (20% very fine, 60% fine, 20%	
210										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **15 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
210									medium); trace coarse sand; 10% silt.	
0.7					206 - 216		SP		@ 193 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: clay is present as nodules.	
215									@ 195 ft - Silty sand: 10YR 6/2, light brownish gray; loose; slightly moist; 80% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 20% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: clay is present as nodules.	
					24.0		SW		@ 197 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: lense of well-graded sand from 198.5 to 199 ft, 85% sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/2"; 5% silt, nonplastic.	
220									@ 201 ft - Well-graded sand: 10YR 7/3, very pale brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: at 201.5 ft, well-graded sand with gravel; 85% sand; 15% gravel; trace silt. Lense of poorly graded sand from 203 to	
0.0					216 - 226		SP			
225										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **16 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
225									204 ft, 10YR 5/3, brown; 100% sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1". At 204 ft, 90% fine to coarse sand; 10% gravel; trace silt. At 207 ft, 10YR 5/3, brown. At 208 ft, 80% fine to coarse sand; 20% gravel; trace silt. At 209 ft, 90% sand (35% fine, 55% medium, 10% coarse); 5% gravel; 5% silt.	
	27.4				226 - 230		SW		@ 210.5 ft - Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 211.5 ft, 90% sand; 10% gravel, no silt.	
230	41.1			2.5	230 - 236		SP		@ 212 ft - Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (30% fine, 55% medium, 15% coarse); 35% gravel to 2"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: at 213 ft, 10YR 7/2, light gray; 70% sand; 25% gravel; 5% silt. At 214.2 ft, 10YR 6/3, pale brown; 85% sand (30% fine, 60% medium, 10% coarse); 15% gravel to 1 3/4". From 216 to 217 ft, well-graded sand; 95% sand (35% fine, 55% medium, 10% coarse); 5% gravel; trace silt. At 217 ft, 10YR 6/3, pale brown; 85% sand; 15% gravel; trace silt; coarsening downward to 75% sand; 25% gravel. Lense of well-graded gravel from 218.5 to 219 ft, 60% gravel to 2"; 40% sand (30% fine, 50% medium, 20% coarse). At 219 ft, 90% sand; 10% gravel; trace silt. At 220 ft, 80% sand; 20% gravel. At 221 ft, 90% sand; 5% gravel; 5% silt.	
235							SW			
	31.0				236 - 238		SP-SM			
	34.5				238 - 24		SW			
240									@ 222 ft - Poorly graded sand: 10YR 6/3, pale brown;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **17 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
240	2.4				1				loose; slightly moist; 85% fine to medium sand (40% fine, 60% medium); trace coarse sand; 10% gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of poorly graded sand with silt from 223.75 to 224 ft, 90% fine to medium sand; trace gravel; 10% silt.	
		26.4			241 - 246		SW		@ 225 ft - Well-graded sand with gravel: 10YR 5/3, brown; loose; slighlty moist; 80% fine to coarse sand (35% fine, 55% medium, 10% coarse); 20% gravel to 1 3/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: at 226 ft, 80% sand; 15% gravel; 5% silt. At 227 ft, well-graded sand, 95% sand; 5% gravel. At 228 ft, 85% sand; 15% gravel. Lense of well-graded sand with silt from 229 to 230 ft, 10YR 7/2, light gray; 85% sand (25% fine, 65% medium, 10% coarse); 5% gravel to 1"; 10% silt, nonplastic. From 230.8 to 231.2 ft, 95% sand; 5% gravel to 3/4".	
245		31.5					SP			
							GW			
250					246 - 256		SP		@ 233 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic fragments.	
							CL		@ 234.5 ft - Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 70% medium, 10% coarse); 15% gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic	
255										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **18 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
255									fragments; gravel is quartz and lithic fragments.	
							CL		@ 236 ft - Poorly graded sand with silt: 10YR 6/2, light brownish gray; loose; slightly moist; 90% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of poorly graded sand from 237.5 to 238 ft, 95% sand (20% very fine, 70% fine, 10% medium); 5% silt.	
	41.2						ML			
260	5.2				256 - 266		CL		@ 238 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: lense of poorly graded sand from 239 to 240, 10YR 6/3, pale brown; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 3/8". At 241 ft, well-graded sand with gravel, 75% sand; 25% gravel; trace silt. At 242 ft, 70% sand; 30% gravel; trace silt. At 244.5 ft, 10YR 6/2, light brownish gray; 85% sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/4"; 5% silt.	
265							SP			
	58.2						ML		@ 245.5 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (30% fine, 70% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of poorly graded sand with silt from 245.5 to 246 ft, 10YR 7/3, very pale brown; 90%	
270										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **19 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
270	3.1				266 - 276		ML		fine to medium sand; trace coarse sand; trace gravel to 3/8"; 10% silt, nonplastic. At 247 ft, 100% sand (45% fine, 55% medium); no coarse sand; no gravel. At 248 ft, 10YR 5/2, grayish brown.	
									@ 248.8 ft - Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 70% gravel to 1 3/4"; 30% fine to coarse sand (35% fine, 55% medium, 10% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
275							SP		@ 250 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (30% fine, 70% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of well-graded sand from 251.8 to 252 ft, 85% fine to coarse sand; 10% gravel to 1 1/4"; 5% silt.	
	31.2									
280	1.0				276 - 286		SW		@ 253 ft - Clay: 7.5YR 6/3, light brown; hard; slightly moist; low to medium plasticity. Note: lense of well-graded sand with gravel from 253.5 to 254, 10YR 6/2, light brownish gray; 75% fine to coarse sand; 25% gravel to 1 1/4"; trace silt. Lense of silt from 254 to 254.25, 10YR 6/3, pale brown; soft; nonplastic. At 256 ft, 7.5YR 5/3, brown.	
							CL		@ 257 ft - Silt: 10YR 6/3, pale brown; soft; slightly moist; nonplastic; 80% silt; 20% clay, low to medium plasticity.	
285									@ 258 ft - Clay: 7.5YR 5/3, brown; hard; slightly moist; low to medium plasticity. Note: from 258.5 to 258.8 ft,	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **20 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
285									altered to 10YR 5/1, gray. From 258.8 to 260 ft, 10YR 7/2, light gray. At 261 ft, 10YR 7/2, light gray and 7.5YR 6/3, light brown. Lense of silt from 262.75 to 263.25, 7.5YR 6/3, light brown; soft; nonplastic; trace fine sand. Lense of well-graded sand from 263.25 to 264 ft, 7.5YR 6/3, light brown; 90% sand (20% very fine, 50% fine, 20% medium, 10% coarse); 5% silt; 5% clay. -	
	66.7				286 - 293		CL		@ 264 ft - Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: lense of clay from 265.25 to 266 ft, hard; low to medium plasticity. At 266 ft, 10YR 4/4, dark yellowish brown; sand is 50% fine, 50% medium, trace coarse.	
290							SW			
							CL			
	55.0				293 - 296		SP		@ 267 ft - Silt: 7.5YR 5/2, brown; soft; slightly moist; nonplastic; 85% silt; 15% clay, low plasticity. Note: lense of clay from 273 to 273.25 ft, dry; hard; low plasticity; altered to 7.5YR 3/1, very dark gray and 7.5YR 7/2, pinkish gray; contains secondary calcium carbonate. Lense of silty sand from 273.25 to 274 ft, 10YR 6/4, light yellowish brown; 85% sand (20% very fine, 70% fine, 10% medium); 15% silt.	
295										
					296 - 300				@ 274 ft - Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 100% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel to 1/2"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic	
300										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **21 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
300					300 - 304				fragments. Note: at 275 ft, 10YR 6/3, pale brown; 90% sand; 5% silt; 5% clay as nodules; no gravel. At 276 ft; 100% sand; trace silt; no gravel; no clay. At 277 ft, 100% sand (15% very fine, 65% fine, 20% medium); trace coarse sand; trace silt.	
									@ 280 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 50% medium, 20% coarse); 20% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of poorly graded sand from 282 to 282.25 ft, 100% very fine to medium sand; trace coarse sand; trace silt.	
305	41.6						SP		@ 282.25 ft - Clay: 7.5YR 5/3, brown; hard; slightly moist; low to medium plasticity. Note: lense of poorly graded sand from 286 to 287 ft, 10YR 6/3, pale brown; 100% sand (15% very fine, 65% fine, 20% medium).	
					304 - 313		SW			
310	0.7						SM		@ 287 ft - Well-graded sand: 10YR 5/2, grayish brown; loose; moist; 90% fine to coarse sand (60% fine, 20% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: 1/2" lenses of clay at 288.6, 288.8, and 289.2 ft, 7.5YR 5/3, brown; hard; low to medium plasticity.	
							SP			
	42.3						SW		@ 290 ft - Clay: 7.5YR 5/4, brown; hard; dry; low to medium plasticity. Note: slightly mottled to 7.5YR 8/2, pinkish white; mottling increases at 291 ft. Secondary calcium carbonate present.	
315										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **22 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
315					313 - 319				@ 292.8 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; moist; 100% very fine to medium sand (15% very fine, 65% fine, 20% medium); trace gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Noe: at 293 ft, 95% sand; trace gravel to 3/4"; 5% silt, nonplastic.	
									@ 296 ft - No cuttings returned.	
320	34.7				319 - 326		SW		@ 304 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; wet; 95% very fine to medium sand (15% very fine, 65% fine, 20% medium); trace gravel to 3/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of silty sand with gravel from 305 to 306 ft, 10YR 7/1, light gray; loose; dry; 45% sand (20% very fine, 70% fine, 10% medium); trace coarse sand; 40% gravel to 2 1/4"; 15% silt. At 306 ft, 90% sand; 5% gravel to 1/2"; 5% silt.	
0.4									@ 307.25 ft - Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 75% fine to coarse sand (30% fine, 50% medium, 20% coarse); 25% gravel to 1 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
325	58.1						SP		@ 309 ft - Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 85% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 310 ft, poorly graded sand with silt, 90% sand; trace gravel to	
330										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **23 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
330	0.2				326 - 336		SW		1/2"; 10% silt. @ 311 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (15% very fine, 65% fine, 20% medium); trace coarse sand; 5% gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
335									@ 313 ft - Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 65% fine to coarse sand (30% fine, 50% medium, 20% coarse); 35% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 314 ft, 75% sand (35% fine, 55% medium, 10% coarse); 20% gravel; 5% silt, nonplastic. At 315.8 ft, 10YR 6/3, pale brown; 65% sand; 35% gravel; trace silt. At 317 ft, 75% sand (25% fine, 55% medium, 20% coarse); 20% gravel; 5% silt, nonplastic. At 319 ft, 10YR 6/3, pale brown; 60% sand; 35% gravel to 2"; 5% silt; secondary calcium carbonate throughout. At 320 ft, 10YR 5/3, brown. At 321 ft, 10YR 7/2, light gray. Lense of poorly graded sand from 323.75 to 324.25 ft, 10YR 6/4, light yellowish brown; 95% sand (20% very fine, 70% fine, 10% medium); 5% silt. At 324.25 ft, 10YR 6/3, pale brown; 90% sand (20% fine, 70% medium, 10% coarse); 10% gravel to 1 1/2".	
	36.5						SP			
340	0.6				336 - 346					
							CL		@ 326.5 ft - Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 95% fine to medium sand (45% fine, 55% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic	
345										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

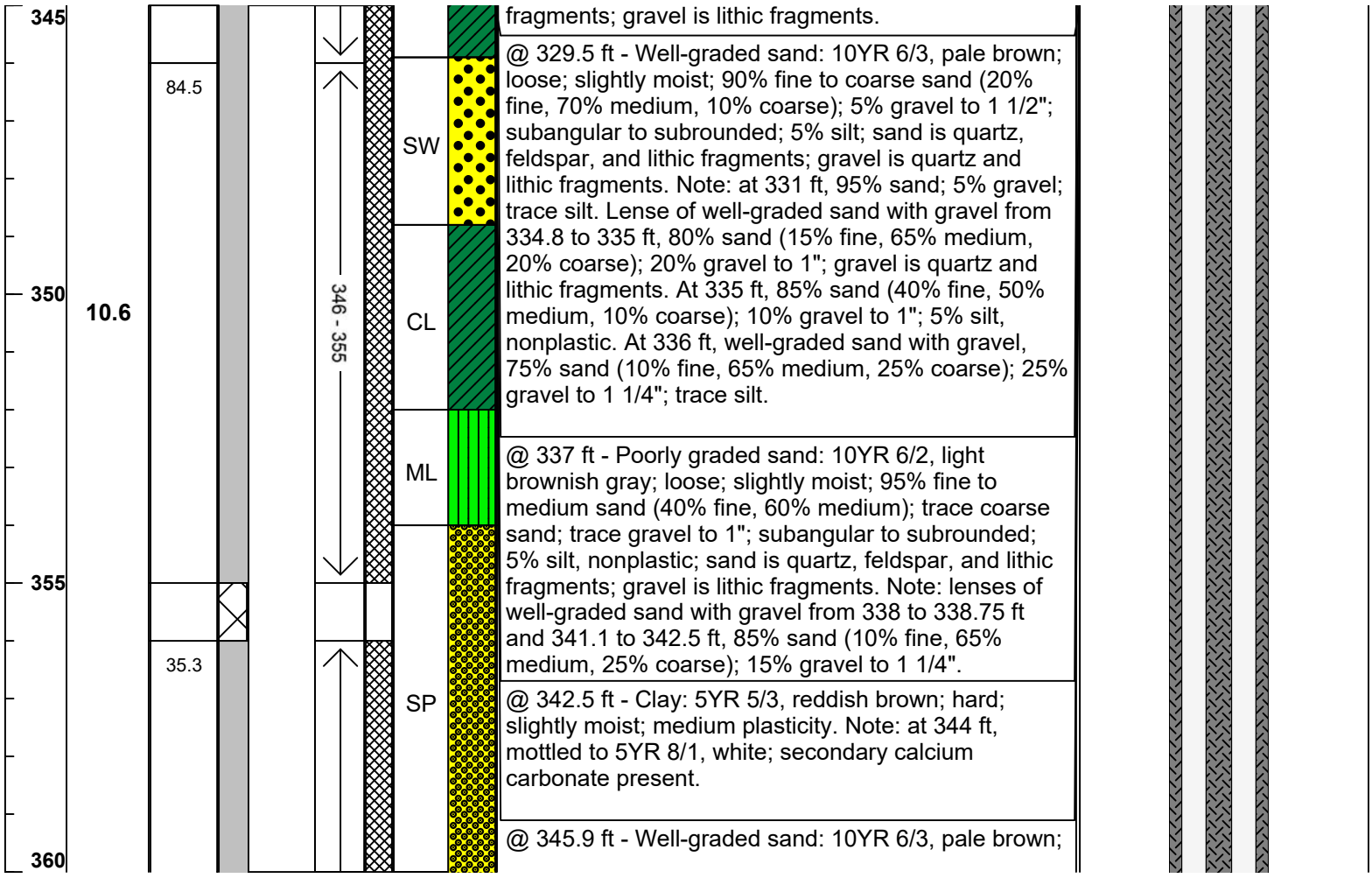
Well ID: **KAFB-106S8**
Page: **24 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
345									fragments; gravel is lithic fragments.	
									@ 329.5 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 5% gravel to 1 1/2"; subangular to subrounded; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 331 ft, 95% sand; 5% gravel; trace silt. Lense of well-graded sand with gravel from 334.8 to 335 ft, 80% sand (15% fine, 65% medium, 20% coarse); 20% gravel to 1"; gravel is quartz and lithic fragments. At 335 ft, 85% sand (40% fine, 50% medium, 10% coarse); 10% gravel to 1"; 5% silt, nonplastic. At 336 ft, well-graded sand with gravel, 75% sand (10% fine, 65% medium, 25% coarse); 25% gravel to 1 1/4"; trace silt.	
									@ 337 ft - Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lenses of well-graded sand with gravel from 338 to 338.75 ft and 341.1 to 342.5 ft, 85% sand (10% fine, 65% medium, 25% coarse); 15% gravel to 1 1/4".	
									@ 342.5 ft - Clay: 5YR 5/3, reddish brown; hard; slightly moist; medium plasticity. Note: at 344 ft, mottled to 5YR 8/1, white; secondary calcium carbonate present.	
									@ 345.9 ft - Well-graded sand: 10YR 6/3, pale brown;	



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **25 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360	0.4				356 - 366		SP		loose; slightly moist; 95% fine to coarse sand (10% fine, 65% medium, 25% coarse); 5% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 346 ft, 10YR 5/3, brown. At 346.5 ft, 10YR 6/2, light brownish gray. At 347 ft, 90% sand; 5% gravel; 5% clay as nodules, 7.5YR 4/4, brown.	
							GW			
									@ 348.8 ft - Clay: 7.5YR 5/3, brown; very stiff; low to medium plasticity. Note: weak product odor. At 349 ft, highly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 350 ft, 7.5YR 5/4, brown; slightly moist; medium stiff to stiff; low plasticity; 60% clay; 40% silt; no mottling.	
365										
	36.4						SW		@ 352 ft - Silt: 7.5YR 6/4, light brown; soft; slightly moist; low plasticity; 80% silt; 20% clay. Note: no product odor. At 353 ft, 90% silt; 10% clay.	
									@ 354 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (50% fine, 50% medium); trace coarse sand; trace gravel to 3/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: from 355 to 356 ft, cuttings highly disturbed, accurate description not possible, but generally observed to be sand. Lense of well-graded sand with gravel from 356 to 357 ft, 80% sand (30% fine, 55% medium, 15% coarse); 20% gravel to 1 3/4". At 357 ft, 95% sand (60% fine, 40% medium); no gravel; 5% silt. At 358 ft, trace lithic gravel to 1/2". From 358.6 to 358.8 ft, 85% sand; 10% lithic gravel to 1 1/2"; 5% silt. At 359 ft, trace coarse sand.	
370	0.1				366 - 376		SP			
							SW			
375										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **26 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
375										
							SW		@ 362.5 ft - Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 65% gravel to 1 3/4"; 35% fine to coarse sand (30% fine, 60% medium, 10% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
	38.6				376 - 386					
380	0.6						SW-SM		@ 364 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 65% fine to coarse sand (25% fine, 55% medium, 20% coarse); 35% gravel to 1 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 366 ft, 7.5YR 5/2, brown; 75% sand (35% fine, 55% medium, 10% coarse); 25% gravel. Lense of well-graded gravel with sand from 366.8 to 367.2 ft, 75% gravel to 2"; 25% sand (20% fine, 65% medium, 15% coarse). At 367.2 ft, 10YR 6/2, light brownish gray.	
							SW		@ 369 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
385	54.0						SP		@ 371 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 65% fine to coarse sand (25% fine, 55% medium, 20% coarse); 35% gravel to 1 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 375 ft, 10YR 5/2, grayish brown. At 376 ft, 10YR 5/3, brown; moist. At 377 ft, 80% sand (30% fine, 60% medium, 10% coarse); 15%	Hydrated Uncoated Bentonite Chips, 3/8"; 384.7 to 414.6 ft bgs
390										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **27 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390									gravel to 1"; 5% silt, nonplastic.	
0.5									@ 379.8 ft - Well-graded sand with silt and gravel: 7.5YR 5/3, brown; loose; slightly moist; 75% fine to coarse sand (25% fine, 60% medium, 15% coarse); 15% gravel to 1 1/4"; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Lense of poorly graded sand with silt from 379.8 to 380.25 ft, 7.5YR 5/3, brown; 90% sand (40% fine, 60% medium); trace coarse sand; trace gravel to 3/4"; 10% silt, nonplastic.	
395					386 - 396		SW		@ 382 ft - Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 60% medium, 15% coarse); 15% gravel to 1 1/4"; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 384 ft, 70% sand; 25% gravel, 5% silt.	
		60.4					SP-SM		@ 386 ft - Poorly graded sand: 10YR 7/2, light gray; loose; slightly moist; 100% fine to medium sand (35% fine, 65% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
400							CL			
0.4					396 - 406		SW		@ 389.75 ft - Well-graded sand with gravel: 10YR 5/2, grayish brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 60% medium, 10% coarse); 15% gravel to 1 1/2"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 391 ft, 75% sand (25% fine, 50% medium, 25% coarse); 25% gravel to 1 3/4"; trace silt. Lense of clay from 395.75 to 396.25	
405							SP-SC			

Notes:
(1) Current Water Table Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **28 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
405							SC		ft, 7.5YR 5/4, brown; very stiff; low plasticity; 90% clay; 10% lithic gravel to 1"; trace fine to medium sand. At 396.25 ft, well-graded sand, 85% sand; 10% gravel; 5% silt.	
	64.0				406 - 416		SP-SC		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
410	0.1								@ 399.5 ft - Clay: 7.5YR 5/3, brown; very stiff; slightly moist; low plasticity. Note: lense of poorly graded sand with clay from 400.5 to 401 ft, 10YR 6/1, gray; 90% sand (50% fine, 50% medium); 10% clay, nonplastic.	
							SW		@ 401 ft - Well-graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 60% medium, 10% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 403 ft, well-graded sand with gravel; 70% sand; 25% gravel; 5% silt. Lense of poorly graded sand from 403.8 to 404 ft, 95% sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1/2"; 5% silt, nonplastic.	
415	41.3				416 - 419		CL		@ 404 ft - Poorly graded sand with clay: 10YR 6/1, gray; loose; slightly moist; 90% fine to medium sand (50% fine, 50% medium); subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of clay from 404.75 to 405.1 ft, 7.5YR 5/3, brown; very stiff; low plasticity. Lense of poorly graded sand from 405.1 to 406 ft; 95% sand (40% fine, 60% medium); trace coarse	3" Schedule 80 PVC Screen, 0.010" slot, 417 to 442 ft bgs
							SP			
420	1.5	40.5		P, V			SW			

Notes:
(1) Current Water Table Well
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▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **29 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	1.1				419 - 424		SW		sand; trace gravel to 1/2"; 5% silt. At 406 ft, trace coarse sand; trace lithic gravel to 3/8". At 408 ft, trace gravel to 3/4".	10/20 Silica Sand, 414.6 to 444 ft bgs
	2.1						SP		@ 411 ft - Well-graded sand: 10YR 6/1, gray; loose; slightly moist; 85% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 412 ft, 80% sand; 15% gravel; 5% silt. At 414 ft, 10YR 6/2, light brownish gray.	
	26.2				424 - 430				@ 416 ft - Clay: 5Y5/3, olive; hard; slightly moist; medium plasticity. Note: include clumps of secondary calcium carbonate. Lense of poorly graded sand with clay from 416.25 to 416.75 ft, 10YR 6/1, gray; 90% sand (50% fine, 50% medium); 10% clay, nonplastic.	
425									@ 417.25 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (45% fine, 55% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of clay from 417.8 to 418 ft, 7.5YR 5/3, brown to 7.5YR 4/6, strong brown; very stiff; medium plasticity. At 418 ft, 90% sand; 5% gravel to 1 1/2"; 5% silt; trace clay as nodules, 7.5YR 5/3, brown.	
430	1.2	37.8			430 - 436		SW		@ 419 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (20% fine, 70% medium, 10% coarse); 15% gravel to 2 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz	
435										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **30 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
435									and lithic fragments.	
									@ 421.8 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (15% very fine, 40% fine, 45% medium; trace gravel to 3/8"); subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/4, brown. At 424 ft, 95% sand; trace coarse sand; 5% gravel to 2 1/2"; trace silt.	
									@ 425 ft - Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (20% fine, 60% medium, 20% coarse); 35% gravel to 1 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: weak product odor. At 426 ft, 70% sand; 30% gravel. At 427 ft, 75% sand; 25% gravel. At 428 ft, 85% sand; 15% gravel to 1". Lense of clay from 429.8 to 430 ft, 7.5YR 4/6, strong brown; stiff to very stiff; low to medium plasticity. Starting at 431 ft, well-graded sand, 95% sand; 5% gravel. At 432 ft, 90% sand; 10% gravel. At 433 ft, 10YR 6/3, pale brown; 95% sand; 5% gravel. At 434 ft, 90% sand; 10% gravel. At 436 ft, 95% sand (40% fine, 50% medium, 10% coarse); 5% gravel to 1 1/8". At 438 ft, 90% sand; 10% gravel to 1 1/2". From 440 to 441.75 ft, well-graded sand with gravel, 85% sand (25% fine, 60% medium, 15% coarse); 15% gravel.	
440	1.4								Alternating poorly graded sand and well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; sand is	
445										
450										

28.3 | 436 - 440 | SW
26.6 | 440 - 446 | SP
27.2 | 446 - 450 | CL / SP

3" Schedule 80 PVC Sump, 442 to 444 ft bgs

Hydrated Uncoated Bentonite Chips, 3/8"; 444 to 449.3 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **31 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	70.4	34.2			450 - 456		CL		quartz, feldspar; and lithic fragments; gravel is quartz and lithic fragments. Poorly graded sand from 441.75 to 442.2 ft, 443 to 444 ft, and 445 to 446 ft, 95% sand (45% fine, 55% medium); trace gravel to 3/8"; 5% silt, nonplastic. At 445 ft, 90% sand; 5% gravel to 1"; 5% silt. Well-graded sand from 442.2 to 443, 444 to 445, and 446 to 447 ft, 95% sand (40% fine, 50% medium, 10% coarse); 5% gravel to 1 1/8". At 444 ft, well-graded sand with gravel, 75% sand; 25% gravel. At 446 ft, 90% sand (30% fine, 60% medium, 10% coarse); 10% gravel to 1 1/2". At 446.75 ft, well-graded sand with gravel, 55% sand; 45% gravel to 2 1/2".	3" Schedule 80 PVC Screen, 0.010" slot, 451 to 491 ft bgs; 10/20 Silica Sand, 449.3 to 496 ft bgs
455		36.6			456 - 460		SM		@ 447 ft - Clay: 7.5YR 5/3, brown; stiff to very stiff; medium plasticity.	
460	124.6	51.8			460 - 466		SP		@ 448 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: well-graded sand with gravel from 449 to 450 ft, 85% sand (25% fine, 60% medium, 15% coarse); 15% gravel to 1 1/2".	
									@ 450 ft - Clay: 5YR 5/4, reddish brown; very stiff; slightly moist; low to medium plasticity. Note: product odor. At 451 ft, 7.5YR 5/3, brown.	
465									@ 451.25 ft - Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 75% very fine to medium sand (15% very fine, 60% fine, 25% medium); subangular to subrounded; 25% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: product odor. At	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **32 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
465									452 ft, poorly graded sand with silt; 90% sand; 10% silt. Lense of well-graded sand from 453 to 454 ft, 80% sand (40% fine, 50% medium, 10% coarse); 10% gravel to 1 1/4"; 5% clay nodules, 7.5YR 5/3, brown; 5% silt.	
		40.6			466 - 468				@ 454 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace gravel to 1"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor. At 457 ft, trace coarse sand. At 458 ft, 90% sand; 5% gravel to 1 1/2"; 5% silt. At 460 ft, trace coarse sand. At 462 ft, trace clay as nodules, 7.5YR 5/3, brown.	
		31.9			468 - 474		SP			
470	54.1									
		21.8		P, V, M, B	474 - 478				@ 466 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace coarse sand; 5% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor. At 474 ft, moist. At 476 ft, 95% sand; trace gravel to 3/8"; 5% silt; no clay. At 478 ft, 95% sand; 5% gravel to 2 1/2"; trace silt.	
475										
		27.3								
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **33 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	844				478 - 488		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace coarse sand; trace gravel to 2"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: product odor. At 482 ft, no coarse sand; no gravel.	
485										
490	25.9				488 - 498		GW		Well-graded gravel with sand: 7.5YR 4/3, brown; loose; wet; 65% gravel to 2"; 35% fine to coarse sand (25% fine, 55% medium, 20% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: product odor. Lense of well-graded sand from 489 to 490 ft, 90% sand (20% fine, 70% medium, 10% coarse); 10% gravel to 3/4". At 490 ft, 55% gravel to 2"; 45% sand.	3" Schedule 80 PVC Sump, 491 to 493 ft bgs
	1498						SP		Poorly graded sand: 7.5YR 4/3, brown; loose; wet; 100% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace gravel to 2"; subangular to subrounded; trace silt, nonplastic; sand is quartz,	
495										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **34 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
495							SP		feldspar, and ltihic fragments; gravel is lithic fragments. Note: product odor. At 494 ft, trace gravel to 1 1/2".	Native Soil/ Slough, 496 to 514 ft bgs
	22.1			P, V, M, B	498 - 506		SW		Well-graded sand: 7.5YR 4/3, brown; loose; wet; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 10% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: weak product odor. At 503 ft, 95% sand; 5% gravel. At 504 ft, 100% sand; trace gravel. At 504.5 ft, 95% sand; 5% gravel. At 505 ft, 90% sand; 10% gravel.	
500	8.1									
505	20.4						SP		Poorly graded sand: 10YR 6/3, pale brown; loose; wet; 100% very fine to medium sand (15% very fine, 60% fine, 25% medium); trace coarse sand; trace gravel to 2 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: weak product odor.	
					506		SW		Well-graded sand: 7.5YR 4/3, brown; loose; wet; 95% fine to coarse sand (20% fine, 70% medium, 10%	
510										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/2019**
Completion Date: **3/1/2019**

WELL LOG

Well ID: **KAFB-106S8**
Page: **35 of 35**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
510	3.7				514		SW		coarse); 5% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: weak product odor. At 510 ft, 90% sand; 10% gravel.	
	6.7			P, V					TD = 514 ft	
515										
520										
525										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **1 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0	NA				NA		SM		Silty sand: 7.5 YR 5/3, brown. Note: Hydroknife to 8 ft for utilities clearance. Lense of well-graded sand with gravel from 0 - 3". Lense of trace large pebbles and cobbles to 6" encountered at 5 ft.	3" Schedule 80 PVC Riser, 0.8 to 447 ft bgs; 3" Schedule 80 PVC Riser, 0.8 to 413 ft bgs
0.0	24.6				8 - 10		ML		Sandy silt: 7.5 YR 4/6, strong brown; medium dense; 60% silt; trace clay; slightly plastic; 40% fine to coarse sand; trace gravel to 1/2"; sand and gravel are quartz, feldspar, caliche, and lithic fragments	
10	23.6				10 - 16		CL		Clay with sand: 7.5 YR 4/6, strong brown; plastic; medium dense; slightly moist; 80% clay; 20% sand; trace gravel to 1"; gravel is caliche	Neat Portland Cement, 5% Bentonite Solids, 1.4 to 32 ft bgs
	23.6						SW		Well-graded sand: 7.5 YR 4/4, brown; loose; moist; 90% fine to coarse sand; 10% gravel to 1"; trace silt; gravel is granite, limestone, and caliche	
15	23.3						CL		Clay: 7.5 YR 4/4, brown; medium dense; very plastic; moist; 100% clay; trace coarse caliche sand. Note: silt	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **2 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
15	23.3								content increases from 16 - 16.5 ft.	
	26.1				16 - 20		CL			
	23.9								Silt: 7.5 YR 4/4, brown; medium dense to dense; moist; 100% silt; trace fine to very fine sand	
	0.0									
20	23.1				20 - 26		ML		Sandy silt: 7.5 YR 4/4, brown; loose; dry to moist; 30% fine to coarse sand, subangular; 70% silt; sand is caliche and lithic fragments. Note: lenses of clay and clayey silt at 24.9 and 25.2 ft; 5% clay is present in nodules.	
25	20.2				26 - 30		SM		Silty sand: 7.5 YR 5/6, strong brown; loose; moist; fine sand; silt	
	0.0								Silty sand: 7.5 YR 5/4, brown; loose; moist; very fine to fine sand; silt	
30										

Notes:
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NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **3 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
30					30 - 36		CL		Clay: 7.5 YR 4/6, strong brown; slightly moist; grading from slightly plastic to dense and very plastic; trace coarse caliche sand	
	29.4								Clay: 7.5 YR 6/4, light brown; dense; slightly moist; very plastic; 100% clay; trace sand; trace gravel to 1/2"; subrounded; sand and gravel are caliche	
35									Same as above (32 ft): mottled with silty sand: 7.5 YR 4/6, strong brown; medium dense; nonplastic; trace medium caliche sand	
	20.2				36 - 40		SM		Silty sand: 7.5 YR 4/6, strong brown; medium dense; slightly moist; sand is very fine; trace medium to coarse sand; trace limestone gravel to 1/2"	
	20.2								Clay: 7.5 YR 4/6, strong brown; dense; nonplastic; slightly moist; clay is intermixed with silty sand	
0.0										
40	19.4				40 - 46		CL		Clay: 7.5 YR 5/6, strong brown; dense; slightly moist; trace sand; trace gravel to 1/2"; subangular; sand and gravel are caliche	
45										Hydrated Uncoated Bentonite Chips, 3/8", 32 to 64 ft bgs

Notes:
(1) Current Water Table Well
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NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **4 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
45										
	20.8				46 - 50		CL		Clay: 7.5 YR 5/6, strong brown; dense; slightly moist; trace sand; trace gravel to 1/2"; subangular; sand and gravel are caliche	
	20.8						SW		Well-graded sand: 7.5 YR 4/4, brown; loose; slightly moist; 95% very fine to coarse sand; 5% gravel to 1"; subangular to subrounded; sand and gravel are lithic fragments; cohesive nodules of silty sand up to 2.5" are present	
0.0										
50	23.7				50 - 56		SM		Silty sand: 7.5 YR 4/6, strong brown; loose to medium dense; slightly moist; trace clay starting at 50.5 ft; trace coarse caliche sand	
									Same as above (50 ft); trace clay; trace gravel to 1/4", subangular to subrounded; gravel is caliche. Note: lense of well-graded sand from 55 to 55.5 ft; 7.5 YR 5/4, brown; loose; moist; very fine to medium sand	
55										
0.0									No recovery	
	20.6				56 - 60		SM		Same as above (50 ft). Note: lenses of well-graded sand from 56.5 to 57.5 ft and 58.5 to 59 ft; 7.5 YR 5/3, brown; 95% fine to coarse sand; 5% gravel to 1/3"; gravel is lithic fragments.	
0.0										
60										

Notes:
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(2) Contingency Well
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NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **5 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
60	20.7				60 - 66		SM		Silty sand: 7.5 YR 5/6, strong brown; loose; slightly moist; sand is very fine. Note: lense of silt with sand from 61.5 - 61.75 ft: fine to coarse sand. At 62 ft, color changes to 7.5 YR 5/4, brown.	High Solids Bentonite Grout, 64 to 377 ft bgs
65							SW		Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; 85% very fine to coarse sand; 15% gravel to 1 1/2"; gravel is lithic fragments. Note: From 63 - 63.5 ft, trace gravel to 1/3". Well-graded sand is interbedded with silty sand; 7.5 YR 5/3, brown; loose; slightly moist; very fine to coarse sand	
	20.4				66 - 70		ML		Silt: 5 YR 4/6, yellowish red; soft; slightly moist; trace very fine sand. Note: lense of dense clay from 68 - 68.25 ft, 7.5 YR 4/6, strong brown.	
0.0										
70	20.3						CL-ML		Silty clay: 7.5 YR 4/4, brown; medium dense; slightly plastic	
	20.3				70 - 76		ML		Silt: 7.5 YR 5/4, brown; 100% silt; trace coarse caliche sand. Note: from 71.5 - 74 ft, lenses of well-graded sand are present. Well-graded sand is 7.5 YR 4/6, strong brown; loose; slightly moist; 95% very fine to coarse sand; 5% gravel to 1"; subangular to subrounded; gravel is lithic fragments.	
75	20.3						CL-ML		Alternating silt and silty clay: 7.5 YR 4/4, brown; medium dense to loose; slightly moist; slightly plastic	

Notes:
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NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **6 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
75							ML CL-ML			
	19.7				76 - 80		ML		Silt: 7.5 YR 5/6, strong brown	
							CL-ML		Silty clay: 7.5 YR 6/4, light brown; medium dense; nonplastic; slightly moist	
	19.7						ML		Silt: 7.5 YR 5/6, strong brown; loose; slightly moist; trace sand; trace gravel to 1". Note: no sand or gravel from 78.5 to 80 ft.	
0.0										
80	20.6				80 - 86		ML		Silt: 7.5 YR 4/6, strong brown; medium dense; slightly moist. Note: silt breaks into platy pieces approximately 1" thick. Clay content increases at 82 ft.	
							CL		Clay: plastic; dry to slightly moist. Note: clay content decreases and silt increases to 84 ft.	
85							CL-ML		Silty clay: 7.5 YR 4/6, strong brown	
	21.0				86 - 90		ML		Silt: 7.5 YR 5/4, brown; loose; dry to slightly moist. Note: silt is dense from 86.5 to 88 ft.	
	21.0									
0.0									Silt: 7.5 YR 6/4, light brown; medium dense; slightly moist; slightly plastic; trace clay	
90										

Notes:
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **7 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
90	20.8				90 - 96		ML		Silt: 7.5 YR 6/4, light brown; medium dense; slightly moist; slightly plastic; trace clay	
							SW		Well-graded sand: 7.5 YR 5/4, brown; loose; slightly moist; very fine to coarse sand	
									Poorly graded sand: slightly moist; loose; 100% fine to medium sand. Note: sand is fining downwards	
95	25.3				96 - 100		SP		Poorly graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine sand. Note: Sand is 100% medium from 95.5 - 96 ft and 97.5 to 98 ft. Color changes to 7.5 YR 6/3, light brown, at 104 ft.	
0.0	25.3									
100	37.6			P	100 - 106					
	37.6									
105	37.6									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **8 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
105							SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% fine sand	
	21.3				106 - 110		SW		Well-graded sand with gravel: 7.5 YR 5/3, brown; sand is fine to coarse; gravel to 1"; gravel is lithic fragments, quartz, and feldspar. Note: at 108 ft, gravel to 2". Gravel lithology includes conglomerate and sandstone.	
	21.3									
	0.0									
110	37.2				110 - 116		CL-ML		Silty clay: medium dense to dense; slightly moist; very plastic. Note: at 112 ft, trace gravel to 1"; gravel is limestone with crinoid fossils. Silt lense present at 113.5 ft.	
							ML		Silt: 7.5 YR 5/4, brown; loose. Note: caliche or ash lense at 114.5 ft. Silt is medium dense beginning at 115 ft. 4" lense of caliche-indurated silt at 119 ft; 7.5 YR 7.3, pink.	
115	21.8				116 - 120					
	21.8									
	0.0								Silt with clay: 7.5 YR 5/4, brown; medium dense; nonplastic; slightly moist. Note: caliche is present	
120										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **9 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
120									beginning at 121.5 ft	
	22.7				120 - 126		ML			
							CL		Clay: 7.5 YR 5/4, brown; medium dense; slightly moist; plastic. Note: at 122 ft, clay becomes dense and plastic. Silt content increases from 124.5 to 125.5 ft.	
125										
	20.9				126 - 130		CL-ML		Silty clay: 7.5 YR 4/3, brown; medium dense; slightly moist; trace coarse sand; trace gravel to 1"	
							CL		Clay: 7.5 YR 5/3, brown; dense; slightly moist; very plastic. Note: a 2 - 3" band of indurated caliche is present at 130.75 ft. A 1" lense of well-inducrated caliche is present at 131.75.	
	0.0									
130	25.8				130 - 136		CL-ML		Silty clay: 7.5 YR 4/3, brown; dense; plastic to very plastic; trace coarse caliche sand. Note: stringers of caliche staining (5%) present. Lense of silty sand from 134 - 134.5 ft: 7.5 YR 5/3, brown; loose; slightly moist.	
135										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **10 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
135							CL-ML		Silty clay: see description on previous page	
	24.9				136 - 140		SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% fine sand; trace medium sand; sand is caliche and lithic fragments. Note: lense of well-graded sand from 138.5 to 139 ft: 100% fine to coarse sand; sand is quartz, feldspar, and lithic fragments.	
0.0										
140	23.4				140 - 144		SW		Well-graded sand: 7.5 YR 6/3, light brown; loose; dry; 100% fine to coarse sand; trace gravel to 1".	
	23.4						GW		Well-graded gravel with sand: 7.5 YR 7/3, pink; loose; dry; 60% gravel to 2"; 40% medium to coarse sand	
	25.9				144 - 150		CL-ML		Silty clay: 7.5 YR 4/4, brown; dense; very plastic	
145									Silt with clay: 7.5 YR 5/4, brown; medium dense; slightly moist; nonplastic. Note: clay content decreases from 147 to 147.25 ft.	
							ML		Silt: 7.5 YR 5/4, brown; loose; slightly moist. Note: 2 - 3" band of well-indurated silt at 149.5 ft.	
150										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
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NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **11 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
150	1.5	21.7			150 - 156		SW		Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand; 5% gravel to 1"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragements. Note: no gravel from 151.5 - 153 ft.	
155							SW-SM		Well-graded sand with silt and gravel: 7.5 YR 7/2, pinkish gray; sand is very fine to coarse; gravel to 1"; gravel is coarse sand conglomerate	
		26.0			156 - 160		SW		Well-graded sand: 7.5 YR 6/2, pinkish gray; loose; slightly moist; 90% very fine to coarse sand; 10% gravel to 1 3/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
	0.0								Well-graded sand with gravel: 7.5 YR 6/2, pinkish gray; 70% very fine to coarse sand; 30% gravel	
160		22.3			160 - 164				Well-graded sand: 7.5 YR 6/2, pinkish gray; dry to slightly moist; sand is fining downwards to 80% fine, 20% medium to coarse sand	
							SP		Poorly graded sand: 7.5 YR 6/3, light brown; slightly moist; 100% fine sand	
		25.0								
165							SW		Well-graded sand: 7.5 YR 6/3, light brown; dry to	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **12 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
165					164 - 170		SW		slightly moist; 90% very fine to coarse sand; 10% gravel to 1/2"; subangular to subrounded; gravel is medium grained sandstone and lithic fragments. Note: at 167 ft, gravel is also quartz and limestone.	
	0.0						SP		Poorly graded sand: 7.5 YR 6/2, pinkish gray; loose; dry; 100% fine sand. Note: from 169.5 to 170 ft, sand is fine to medium.	
170	19.3			P	170 - 176		SW		Well-graded sand: 7.5 YR 6/3, light brown; slightly moist; 95% fine to coarse sand; 5% gravel to 1 1/2"; sand is quartz, feldspar, and lithic fragements; gravel is lithic fragments. Note: Pieces of clay present beginning at 171 ft. Clay becomes dominant at 173.5 ft.	
							CL		Clay: 7.5 YR 6/3, light brown; dense; very plastic. Note: orange staining in stringers. At 175.5 ft, limonate and orange stained clay is dominant.	
175	1.8						SW		Well-graded sand: 7.5 YR 6/3, light brown; slightly moist; 90% fine to coarse sand; 10% gravel to 1"; subangular to subrounded	
	23.8				176 - 180		SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 100% fine sand	
	0.0									
180							SW		Well-graded sand: 7.5 YR 6/3, light brown; loose;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **13 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
180	23.2				180 - 184				slightly moist; 95% very fine to coarse sand; 5% gravel to 1"; subangular to subrounded; gravel is lithic fragments. Note: at 180 ft, sand increases to 100%; trace gravel to 1/3" to 182 ft, and trace gravel to 1/2" from 182 to 184 ft.	
185	78.3				184 - 190		SW		Well-graded sand: 7.5 YR 6/3, light brown; 90 - 95% fine to coarse sand; 5 - 10% gravel to 3/4"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Lense of poorly graded sand from approximately 188 - 188.5 ft bgs. Note: poor recovery from 184 - 190 ft. Depths associated with lithologic descriptions from 184 - 190 are not precise.	
190	0.0	49.3			190 - 196				Well-graded sand: 7.5 YR 6/3, light brown; moist; 100% fine to coarse sand; trace gravel to 1/2"; gravel and coarse sand are quartz, feldspar, and lithic fragements. Note: lense of silty clay at 192 ft.	
195									Well-graded sand: 7.5 YR 6/1, gray; slightly moist; 100% very fine to coarse sand; trace gravel; coarse sand is quartz, feldspar, and lithic fragments. Note: coarsening downwards. At 194 ft, sand is 45% fine, 40% medium, 15% coarse; gravel is lithic fragments.	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **14 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
195					196 - 200				Well-graded sand: see description on previous page.	
	27.4								Well-graded sand with gravel: 7.5 YR 6/1, gray; slightly moist; 75% fine to coarse sand (5% fine, 40% medium, 55% coarse); 25% gravel; sand and gravel are quartz, feldspar, and lithic fragments	
	0.0									
200	36.7				200 - 206		SW		Well-graded sand: 7.5 YR 6/3, light brown; loose; moist; 90% fine to coarse sand (20% fine, 35% medium, 45% coarse); 10% gravel to 1/2"; subrounded; gravel is quartz, feldspar, pumice, and lithic fragments. Note: sand is fining downward to 60% fine, 35% medium, 5% coarse at 206 ft. 100% fine to coarse sand from 200 - 203.75 ft and 205 - 206 ft; gravel up to 5% present from 203.75 - 205.	
	36.7									
	36.7									
205	26.9				206 - 210				Well-graded sand with gravel: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 70% fine to coarse sand (30% fine, 20% medium, 50% coarse); 30% gravel to 2.5"; gravel is quartz, feldspar, and lithic fragments	
							GW		Well-graded gravel with sand: 7.5 YR 6/2, pinkish gray; loose; dry to slightly moist; 55% gravel to 1"; 45% fine to coarse sand (25% fine, 25% medium, 50% coarse); angular to subrounded; gravel is quartz and lithic fragments	
	0.0						SW			
210										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **15 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	25.9				210 - 216		SW		@ 209 ft: Well-graded sand with gravel: 7.5 YR 6/2, pinkish gray; 70% fine to coarse sand (20% fine, 35% medium, 45% coarse); 30% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 211 ft, 50% sand (10% fine, 20% medium, 70% coarse); 50% gravel to 3"; gravel includes limestone; angular to subrounded. At 213 ft, sand is 15% fine, 30% medium, 55% coarse; 30% gravel to 2.1/2". Trace clay at 213.5 ft.	
215	82.9				216 - 220		SM		Silty sand: 7.5 YR 7/2, pinkish gray; loose; slightly moist; 95% fine to coarse sand (85% fine, 10% medium, 5% coarse); 5% gravel to 1/2"; subangular to subrounded	
							SW		Well-graded sand: 7.5 YR 4/2, brown; loose; slightly moist; 100% fine to coarse sand (60% fine, 20% medium, 20% coarse); trace gravel to 1/2"; sand and gravel are quartz, feldspar, and lithic fragments. Note: at 218 ft, color changes to 7.5 YR 6/2, pinkish gray.	
220	39.5						GW		Well-graded gravel with sand: 7.5 YR 6/2, pinkish gray; loose; dry; 60% gravel to 1 3/4"; 40% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded	
0.5					220 - 226		SW		Well-graded sand: 7.5 YR 6/2, pinkish gray, loose; dry; 90% fine to coarse sand (5% fine; 30% medium, 65% coarse); 10% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 223 ft, sand is 100% very fine to coarse sand (60% very fine, 30% fine, 5% medium, 5% coarse); no gravel. At 224 ft, sand is 100% very fine to coarse (20% very fine, 20% fine, 40% medium, 20% coarse); trace gravel to 1".	
225										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **16 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
225									Well-graded sand: 7.5 YR 6/2, pinkish gray; loose; dry; 100% very fine to coarse sand (30% very fine, 40% fine, 10% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 227 ft, sand is 50% very fine, 30% fine, 5% medium, 15% coarse; trace gravel to 4".	
	34.8				226 - 230					
	34.8									
	5.8								Same as above (225 ft): sand is 20% very fine, 20% fine, 50% medium, 10% coarse); subrounded; sand is quartz and pumice. Note: at 228.5 ft, sand lithology includes feldspar and lithic fragments. Trace gravel to 1" from 230.25 - 232; gravel is pumice to 230.5 and angular to subangular quartz, feldspar, and lithic fragments to 232.	
230	36.4				230 - 232		SW			
	24.2				232 - 236				Well-graded sand: 7.5 YR 5/2, brown; loose; dry to slightly moist; 100% very fine to coarse sand (10% very fine; 30% fine; 50% medium, 10% coarse); trace gravel to 3/4"; subrounded to rounded. Note: sand is fining downwards to 235.5 ft. Lense of poorly graded sand from 235.5 to 236 ft; 7.5 YR 6/4, light brown; 100% fine sand.	
235	19.2				236 - 240		SW		Well-graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% very fine to coarse sand (20% very fine, 20% fine, 40% medium, 20% coarse); trace gravel to 1"; subrounded; gravel is quartz, feldspar, and lithic fragments. Note: core is wet at 236.8 ft due to ice added to core barrel. At 238 ft, sand is 20% very fine, 10% fine, 60% medium, 10% coarse.	
	19.2									
	0.0									
240										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **17 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
240	25.9				240 - 246		CL		Clay with silt: 7.5 YR 5/3, brown; medium dense to dense; slightly moist; nonplastic. Note: grading downward to dense and weakly plastic at 241.5 ft. From 241.75 to 242 ft, clay is present in nodules, 7.5 YR 7/2, pinkish gray.	
	1.6									
	8.9								Clay: 7.5 YR 7/4, pink; dense; dry to slightly moist. Note: Clay is present in broken pieces approximatley 1 to 3" wide and 1/4 to 1/2" thick. Caliche staining and dark green to brown spots to 1/2" present. Petroluem odor.	
245							SM			
	21.3				246 - 249		CL-ML		Silty sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 80% very fine to fine sand (95% very fine, 5% fine); 20% silt	
	1.4						ML		@ 246 ft: Silty clay: 10YR 5/2, grayish brown; dense; dry; nonplastic. Note: clay is breaking into small pieces.	
	1.5								Silt: 10YR 5/4, yellowish brown; medium dense; slightly plastic. Note: Petroleum odor. Lense of silty sand from 249 - 250, 7.5 YR 6/3, light brown.	
250	22.7				249 - 256		CL		Clay: 10YR 5/3, brown; medium dense; slightly moist; slightly plastic to plastic; trace silt	
	6.0			V, P			CL-ML		Silty clay: 10YR 5/3, brown; soft; slightly moist; medium stiff; nonplastic to slightly plastic. Note: petroleum odor. Occasional caliche stringers. At 252 ft, color changes to 10YR 6/2, pale brown; Lense of clay from 254 - 254.5 ft, 7.5 YR 5/2, brown; dry; dense.	
255							SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **18 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
255					256 - 261		SP		dry; 100% fine sand	
	29.0						SC		Clayey sand: 7.5 YR 5/3, brown; loose to medium dense; sand is very fine to coarse (80% very fine, 10% fine, 8% medium, 2% coarse); clay is nonplastic	
							SW		@ 257 ft: Well-graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% very fine to coarse sand (30% very fine, 10% fine, 40% medium, 20% coarse); trace gravel to 3/4"; sand and gravel are quartz, lithic fragments, and pumice	
	4.6						ML		@ 259 ft: Sandy silt: 7.5 YR 5/3, brown; loose to medium dense; nonplastic; moist; 60% silt; 10% clay; 30% very fine sand. Note: slight petroleum odor.	
260									@ 260 ft: No recovery	
	27.3				261 - 266		SW		@261 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 95% sand; 5% gravel to 1"; sand and gravel are quartz, feldspar, and lithic fragments. Note: sand is fining downwards. At 262 ft, 100% sand (30% fine, 70% medium, 10% coarse); no gravel. At 263 ft, 100% sand (50% fine, 30% medium, 20% coarse); trace gravel to 2"; gravel includes mica; slight petroleum odor. At 266 ft, 100% sand (15% fine, 65% medium, 20% coarse); fraction of coarse sand decreases at 269 ft.	
265										
	24.8				266 - 270					
	7.7									
270										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **19 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
270	24.7				270 - 276		CL-ML		Silty clay: 7.5 YR 5/3, brown; medium dense to dense; slightly moist to moist. Note: Caliche nodules up to 1" present. Slight petroleum odor.	
275									Clay: 7.5 YR 4/3, brown; dense; slightly plastic to plastic; 70% clay; 30% silt	
	35.4				276 - 286		CL		Clay: 10YR 3/4, dark yellowish brown; dense; slightly moist to moist; very plastic. Note: soft, sandy caliche spots of up to 1/2" present in approximately 8% of the cuttings. Caliche spots increase to 15% at 279 ft, and 20% at 280 ft. From 280 to 281 ft, thin stringers of silt less than 1/8" thick present. Lense of well-graded sand with caliche gravel from 282 - 282.5 ft, 7.5 YR 6/3, light brown. 2" thick lenses of caliche present at 282 and 282.5 ft, well indurated, 7.5 YR 7/2, pinkish gray.	
	37.9									
280	3.4									
	29.4									
	34.4						SP		Poorly graded sand: 7.5 YR 5/3, brown; slightly moist; 100% very fine to fine sand; trace silt. Note: lense of well-graded sand from 283.5 - 284 ft; 100% very fine to medium sand. At 284 ft, color changes to 10YR 5/4, yellowish brown; trace silt.	
285	43.6									

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **20 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
285					286 - 288		SW		Well-graded sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 100% fine to coarse sand (30% fine, 60% medium, 10% coarse); trace gravel to 1/2"; gravel is quartz, feldspar, partially indurated sand; and lithic fragments. Note: Lense of silty sand from 285 to 285.5 ft, 10YR 5/4, yellowish brown. Lense of poorly graded sand from 285.5 - 286 ft, 10YR 6/3, pale brown; 100% fine sand. From 287 - 288 ft, well-graded sand with gravel; 70% fine to coarse sand; 30% gravel to 1/2".	
	28.6									
	20.2						SP			
	1.1									
290	19.8				288 - 296				@ 288 ft: Poorly graded sand: 10YR 5/3, brown; loose; dry; 100% fine sand	
	19.8								@ 289.5 ft: Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; dry; 80% fine to coarse sand (20% fine, 35% medium, 35% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, granite, and lithic fragments. Note: At 291 ft, fining downwards; gravel to 1/2".	
	23.3						SW		@ 293 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; dry; 100% very fine to coarse sand (20% very fine, 20% fine, 10% medium, 50% coarse); trace gravel to 3/4"; gravel is quartz, granite, feldspar, and lithic fragments. Note: at 294 ft, sand is 20% fine, 70% medium, 10% coarse. At 295 ft, sand is 30% fine, 65% medium, 5% coarse.	
295	24.5								@ 296 ft: Well-graded sand with gravel (7.5 YR 5/3, loose; dry to slightly moist; 80% fine to coarse sand (5% fine, 50% medium, 45% coarse); 20% gravel to 1 3/4"; gravel is quartz, feldspar, and lithic fragments	
	22.7									
300							SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 100% fine sand	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **21 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
300	0.8	24.3			296 - 306		SP		Well-graded sand with gravel: 7.5 YR 6/2, pinkish gray; slightly moist; 70% fine to coarse sand (50% fine, 25% medium, 25% coarse); 30% gravel to 1 1/2"; subangular to rounded; gravel is quartz, feldspar, and lithic fragments. Note: From 300.5 to 301.5, color is 7.5 YR 5/3, brown. Lense of well-graded gravel with sand from 301.5 to 302.3; 7.5 YR 4/3, brown; 60% gravel to 4"; 40% fine to coarse sand (15% fine, 15% medium, 70% coarse). From 305 - 305.5 ft, 7.5 YR 7/1, light gray; sand content is 5% fine, 20% medium, 75% coarse; trace gravel to 1".	
		25.9					SW			
305		42.4								
		29.2			306 - 310				Same as above (300.5): loose; dry; 80% fine to coarse sand (10% fine, 30% medium, 60% coarse); 20% gravel to 1"; subrounded. Note: at 307 ft, sand is 60% fine to coarse (35% fine, 30% medium, 35% coarse); gravel is 40% to 1 1/2". At 308 ft, sand is 60% fine to coarse (15% fine, 35% medium, 50% coarse); gravel is 40% to 2 1/2".	
	0.6	24.2							Well-graded gravel with sand: 10YR 5/3, brown; loose; dry; 65% gravel to 1"; 35% medium to coarse sand (30% medium, 70% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
310		24.2					GW			
		25.9			310 - 316					
315		30.4					SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 55% fine to coarse sand (10%	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **22 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
315									fine, 30% medium, 60% coarse); 45% gravel to 2"; gravel is quartz, feldspar, granite, and lithic fragments	
	20.9				316 - 324		SW		Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (20% fine, 75% medium, 5% coarse); trace gravel to 1/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 318 ft, sand is 60% fine, 20% medium, 20% coarse; trace gravel to 1/2".	
	25.9									
0.7										
320	23.7								Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 50% medium, 25% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 322 ft, color changes to 10YR 5/3, brown.	
	43.1									
	39.8				324 - 326		CL		Clay: 10YR 5/3, brown; dense; slightly moist; very plastic. Note: clay has iron staining/inclusions. Orange spots/nodules are approximately 1" long and less than 1/8" wide. Some black organic specks and streaks are present.	
325										
	23.3				326 - 330		SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 100% fine sand. Note: at 327.5 ft, 90% fine sand; 10% gravel to 2"; subangular to subrounded; gravel is lithic fragments. Lense of silty sand from 328 to 328.5 ft; very fine sand; 10% gravel to 1".	
	25.1									
1.4							SW		Well-graded sand: 10YR 5/3, brown; loose; dry; 95% fine to coarse sand (20% fine, 40% medium, 40% coarse); 5% gravel to 3/4"; gravel is quartz, feldspar,	
330										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **23 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
330	25.4				330 - 336		SW		and lithic fragments. Note: lense of poorly graded sand from 329.75 to 330 ft; 100% fine sand.	
									@330 ft: Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 30% medium, 40% coarse); 30% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
	27.2						CL		@332 ft: No recovery	
335	28.4						SW		@ 333 ft: Clay: 7.5 YR 5/3, brown; dry to slightly moist; medium dense to dense; plastic to very plastic; trace silt	
	21.6				336 - 340		SP		@ 334 ft: Well-graded sand with gravel: 10YR 5/3, brown; loose; dry to slightly moist; 70% fine to coarse sand (55% fine, 15% medium, 30% coarse); 30% gravel to 1"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments	
	27.3						SW		@ 336 ft: Poorly graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine to medium sand (70% fine, 30% medium); sand is quartz, feldspar, and lithic fragments	
340	21.6						SM		@ 337 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (20% fine, 70% medium, 10% coarse); 5% gravel to 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: trace silt at 339.5 ft. Lense of poorly graded sand from 340 - 340.5 ft.	
31.0	24.3		V, P		340 - 346		CL-ML			
							SW		@ 340.5 ft: Silty sand with gravel: 7.5 YR 4/3, brown; 40% sand; 30% gravel to 2"; subangular to subrounded; 30% silt and clay, slightly plastic; gravel is quartz and lithic fragments	
	31.7						CL			
345							SP		@ 341.5 ft: Silty clay: 7.5 YR 4/6, strong brown;	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **24 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
345							SP		dense; dry to slightly moist; slightly plastic; trace gravel	
	41.3				346 - 356		SW		@ 342.25 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (25% fine, 10% medium, 65% coarse); 10% gravel to 1 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments	
	42.2								@ 343 ft: Clay: 10YR 5/4, yellowish brown; dense, dry to slightly moist; slightly plastic; trace silt. Note: Clay breaks into 2" laminar planes	
350	31.6						GW		@344 ft: Poorly graded sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 100% fine sand. Note: lense of well-graded sand from 344 to 344.5 ft; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse); trace gravel to 1/2".	
0.8	30.0								@ 346 ft: Well-graded sand with gravel: 7.5 YR 6/2, pinkish gray, loose; slightly moist; 70% fine to coarse sand (40% fine, 30% medium, 30% coarse); 30% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 347 ft, sand is 60% fine to coarse (50% fine, 30% medium, 20% coarse); gravel is 40% to 3"; trace cobbles to 3.25".	
	36.9									
355	23.7				356 - 360		SW		@ 348 ft: Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 50% gravel to 3"; 50% fine to coarse sand (40% fine, 30% medium, 30% coarse); trace cobbles to 3.5"; gravel and cobbles are quartz, feldspar, and lithic fragments. Note: from 349.5 - 350 ft, gravel to 1 1/2"; no cobbles. From 350 - 351 ft, gravel is 60% to 3"; trace cobbles.	
	29.3									
1.3									@ 352 ft: Well-graded sand with gravel: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 60% fine to	
360										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **25 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360	21.4				360 - 366		SW		coarse sand (20% fine, 30% medium, 50% coarse); 40% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 353 ft, color changes to 10YR 5/3, brown; sand is 50% fine to coarse (10% fine, 15% medium, 60% coarse); gravel is 50% to 3". At 354 ft, sand is 70% fine to coarse (20% fine, 40% medium, 40% coarse); gravel is 30% to 2".	
	22.4						SP			
	28.4								Poorly graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine sand. Note: starting at 363.75, trace lithic gravel to 1/2", subrounded	
365							SW		Well-graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 90% fine to coarse sand (10% fine, 35% medium, 55% coarse); 10% gravel to 1"; subangular to subrounded, gravel is quartz, feldspar, and lithic fragments. Note: gravel content increases with depth to 40% gravel to 1 1/2" at 366 ft. No gravel from 366.25 - 367 ft.	
	28.3				366 - 370					
	31.5								Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine sand	
	2.1									
370	24.9						SP			
	2.2									
	25.1				370 - 376				Poorly graded sand: 10YR 5/3, brown; loose; slightly moist to moist; 95% fine to medium sand (30% fine, 70% medium); 5% gravel to 2 1/4"; subangular to subrounded; gravel is lithic fragments.	
	32.9									
375										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **26 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
375							SP			
	32.3				376 - 386				Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist, 85% fine to coarse sand (20% fine, 50% medium, 30% coarse); 15% gravel to 2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: at 378 ft, sand is 90% fine to coarse (35% fine, 45% medium, 20% coarse); 10% gravel to 1/2". At 380 ft, sand is 80% fine to coarse (25% fine, 50% medium, 25% coarse); 20% gravel to 1". At 382 ft, sand is 95% fine to coarse (15% fine, 75% medium, 10% coarse); gravel is 5% to 1/2"; at 384 ft, sand is 60% fine to coarse (20% fine, 30% medium, 50% coarse); 40% gravel.	Hydrated Uncoated Bentonite Chips, 3/8", 377 to 408.8 ft bgs
	31.7									
1.2										
380	26.8									
	35.2						SW			
	52.6									
385										
	21.9				386 - 390				Well-graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); trace gravel to 1/3"; subangular to subrounded; sand and gravel are quartz, feldspar, granite, and lithic fragments. Note: at 388 ft, sand is 95% fine to coarse sand (20% fine, 60% medium, 20% coarse); gravel is 5% to 1".	
	27.5									
1.5										
390										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **27 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390	26.3				390 - 396		SP		Poorly graded sand: 7.5 YR 6/3, light brown; loose; 100% fine sand. Note: 4" band of well-graded sand at 392 ft (20% fine, 70% medium, 10% coarse); trace gravel to 1"; gravel is quartz, feldspar, mica, and lithic fragments.	
	28.7									
	31.4						SW		Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (15% fine, 50% medium, 35% coarse); 20% gravel to 1 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments	
395	40.6				396 - 400		SP		@ 396 ft: Poorly graded sand: 7.5 YR 6/3, loose; 100% fine sand. Note: sand is coarsening downwards to medium.	
							SW		@ 397 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist to moist; 100% fine to coarse sand (5% fine, 85% medium, 10% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: sand is dry at 398 ft.	
	49.5						SP			
400	23.5				400 - 406		SW		@ 398.5 ft: Poorly graded sand: 7.5 YR 6/3, light brown; loose; dry to slightly moist; 100% very fine sand	
	22.9								@ 400 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (45% fine, 20% medium, 35% coarse); 5% gravel to 1"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: from 401.5 to 404 ft, gravel to 1/2".	
405	26.5								Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (10%	

1.4

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **28 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
405									fine, 35% medium, 55% coarse); 15% gravel to 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments	
	33.2				406 - 410				Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (60% fine, 30% medium, 10% coarse). Note: lense of poorly graded sand from 406 - 406.5 ft, 100% very fine sand; trace silt.	
	2.8									
	33.4						SW			10/20 Silica Sand, 408.8 to 440.1 ft bgs
	1.9									
410	22.9				410 - 416				Well-graded sand: 7.5 YR 4/3, brown; loose; slightly moist to moist; 100% very fine to coarse sand (20% very fine, 30% fine, 40% medium, 10% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 411 ft, sand is 40% very fine, 10% fine, 50% medium. At 412 feet, color is 7.5 YR 6/3, light brown; sand is 90% very fine to coarse (10% very fine, 30% fine, 30% medium, 30% coarse); 10% gravel to 3/4".	
	28.8									
	27.2						CL		Clay with sand: 7.5 YR 4/3, brown; medium dense; slightly moist; plastic; sand is coarse	
415			V, P				SW		Well-graded sand: 7.5 YR 4/3, loose; slightly moist; 100% fine to coarse sand (30% fine, 40% medium, 30% coarse); trace gravel to 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: lense of clay with sand from 415.75 - 416 ft, underlain by lense of poorly graded sand to 416.25 ft.	3" Schedule 80 PVC Screen, 0.010" slot, 413 to 438 ft bgs
	40.2				416 - 418		SP			
	28.7						SW		@ 417 ft: Poorly graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 55% medium to coarse sand (45% medium, 55% coarse); 45% gravel; subangular to subrounded; sand and gravel are	
	1.5									
420										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **29 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	25.2				418 - 426		SW		quartz, feldspar, and lithic fragments. Note: 2-3" caliche lense at 417 ft; white and pale yellow, moderately indurated.	
	27.9								@ 418 ft: Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (30% fine, 60% medium, 10% coarse; trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: well graded sand with gravel from 419.25 - 420 ft, 80% sand (30% fine, 35% medium, 35% coarse); 20% gravel to 2". gravel is mica. From 420 - 423.75, sand is 50% fine, 25% medium, 25% coarse; and coarsening downwards to 90% sand (10% fine, 25% medium, 65% coarse), 10% gravel to 1".	
	49.0									
425	29.3						SP		@ 423.75 ft: Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (10% fine, 20% medium, 70% coarse); 30% gravel to 1.5"; gravel is caliche, lithic fragments, and clay pieces. Note: at 425 ft, sand is 30% fine, 35% medium, 35% coarse.	
	32.7									
	1.8								@ 426 ft: Poorly graded sand: 10YR 5/3, brown; loose; moist; 100% medium sand. Note: lense of well-graded sand from 428 - 429 ft; 95% fine to coarse sand (20% fine, 65% medium, 20% coarse); 5% gravel to 1". Trace gravel at 429.75	
430	36.1				426 - 436					
	48.1						SW		@ 430 ft: Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (65% fine, 20% medium, 5% coarse); 5% gravel to 1/2"; subangular to subrounded; sand and gravel are quartz, feldspar, and ltihic fragments. Note: At 431 ft, gravel increases to 10%, and medium fraction of sand decreases.	
	1.7									
435	35.1								@ 432 ft: Well-graded sand with gravel: 10YR 4/3, brown; loose; slightly moist; 70% fine to coarse sand	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **30 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
435				W			SW		(15% fine, 25% medium, 60% coarse); 30% gravel to 2"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: lense of plastic clay from 433.75 - 434 ft. From 434 - 436 ft, core bag not opened; saved for analysis. At 436 ft, color is 7.5 YR 4/3, brown; gravel is up to 1 1/2".	
	23.5				436 - 440		GW			
	34.2						SP		@ 436.5 ft: Well-graded gravel with sand: 7.5 YR 5/3, loose; slighlty moist; 60% gravel to 2"; 40% fine to coarse sand (25% fine, 50% medium, 25% coarse); subangular to subrounded; sand and gravel are quartz, feldspar, lithic fragments, and clay pieces. Note: lense of well-graded sand from 437.5 to 438 ft; 95% fine to coarse sand (65% fine, 25% medium, 10% coarse); 5% gravel to 1".	
440	25.8						SW		@ 438 ft: Poorly graded sand: 7.5 YR 6/3, light brown; loose; slightly moist; 100% fine sand	
	31.9				440 - 446		SP		@ 439 ft: Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand: 15% fine, 65% medium, 20% coarse; trace gravel to 1/2"; subrounded; gravel is lithic fragments. Note: lense of plastic clay with caliche from 439.75 to 440 ft.	
	1.2									
	36.0								@ 442 ft: Poorly graded sand: 7.5 YR 6/3, light brown; loose to medium dense; slightly moist; 100% very fine sand. Note: At 444 ft, color is 7.5 YR 5/3, brown. At 445.75, sand is moist; medium stiff; trace silt.	
445	22.2						CL		@ 446 ft: Clay: 2.5 YR 6/3, lighty yellowish brown; dense; moist; slightly plastic. Note: at 447 ft, color changes to 7.5 YR 5/3, brown; slightly plastic to very plastic.	
	26.8				446 - 451		SM		@ 448 ft: Silty sand: 7.5 YR 5/3, brown; medium dense; moist; sand is very fine. Note: from 448 to 451, sand is fine.	
	0.5									
450										

3" Schedule 80 PVC Sump, 438 to 440 ft bgs

Hydrated Uncoated Bentonite Chips, 3/8", 440.1 to 444.9 ft bgs

10/20 Silica Sand, 444.9 to 496 ft bgs

3" Schedule 80 PVC Screen, 0.010" slot, 447 to 487 ft bgs

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **31 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	28.6						SM			
	26.2				451 - 456		SW		Well-graded sand: 7.5 YR 5/3, brown; loose; moist to slightly moist; 100% very fine to medium sand (20% very fine, 40% fine, 40% medium); trace coarse sand. Note: one piece of red basalt gravel present, 1 1/2"; subrounded. Moisture increases with depth.	
	26.7						SP		Poorly graded sand: 7.5 YR 5/3, brown; loose to medium dense; moist; 100% fine sand.	
455	36.9						SW		Well-graded sand: 7.5 YR 5/3, brown; loose to medium dense; moist to slightly moist; 100% very fine to medium sand (20% very fine, 40% fine, 40% medium); trace gravel. Note: at 456 ft, sand is 40% fine, 30% medium, 30% coarse.	
	24.3				456 - 461		SM		Silty sand: 10YR 5/3, brown; dense; moist	
	25.1			T, W			CL		Clay with silt: 7.5 YR 5/3, brown; medium dense; plastic; slight organic odor. Note: core bag not opened from 458 - 460, saved for sampling.	
	12.2									
460	159.0									
	96.1									
	27.6								Clay: 10YR 5/3, brown; medium dense to dense; slightly plastic to plastic; strongly weathered, organic vapor odor	
	27.6				461 - 466		SM		Silty sand: 10YR 5/3, brown; medium dense; moist; 70% very fine to fine sand; 30% silt; strong organic odor.	
	143.2									
	25.4			T, W			SW		Well-graded sand with gravel: 10YR 4/3, brown; loose; moist; 50% fine to coarse sand (20% fine, 30% medium, 50% coarse); 50% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar,	
465										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **32 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
465	305.0	26.5							and lithic fragments. Note: strong weathered organic odor. Core bag not opened for 463 - 465 ft, saved for sampling and logged through the bag; description based on 465 ft core. At 466 ft, color is 7.5YR 5/3, brown; sand is 60% fine to coarse (10% fine, 25% medium, 65% coarse); 40% gravel to 1". At 467.5 ft: 1 - 2" lense of white indurated caliche. At 468 ft, sand is 80% fine to coarse (5% fine, 30% medium, 60% coarse); gravel is 20% to 1".	
	379.8	23.2			466 - 471		SW			
		22.3							Well-graded sand: 10YR 5/3, brown; loose; slightly moist to moist; 90% fine to coarse sand (20% fine, 40% medium, 40% coarse); 10% gravel to 1"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: at 470 ft, sand is 95% fine to coarse (20% fine, 35% medium, 45% coarse); gravel is 5% to 2". At 471 ft, sand is 90% fine to coarse (45% fine, 10% medium, 45% coarse); gravel is 10% to 1". At 472 ft, gravel is red and gray clay pieces to 2".	
470	519.4									
	1440	23.7	P, V							
		21.3			471 - 476					
	2531									
		21.2					SP		Poorly graded sand: 10YR 4/2, dark grayish brown; medium dense; wet; 100% fine sand. At 457 ft, color is 10YR 3/3, dark brown, with visible black sediment.	
475			G, UV							
	2557	22.0	B, M							
		22.7					SW		Well-graded sand: 10YR 4/3, brown; loose to medium dense; 95% fine to coarse sand (80% fine, 10% medium, 10% coarse); 5% gravel to 1/2"; sand and gravel are quartz, feldspar, and lithic fragments. Note: strong odor	
			B, M, V, P				SC			
		27.1			476 - 482		SW		@ 477 ft: Clayey sand: 7.5 YR 5/2, brown; medium dense; 70% fine to coarse sand (50% fine, 25% medium, 25% coarse); 10% gravel to 1/2"; 20% clay, medium plastic. Note: Large caliche cobble, 6",	
480										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **33 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	1679	34.4					SC		subrounded; at 477.25 ft.	
		40.6		M	482 - 486				@ 478 ft: Well-graded sand: 7.5 YR 5/3, brown; medium dense; wet; 100% fine to coarse sand (85% fine, 10% medium, 5% coarse); trace gravel to 1/2"; subrounded; sand and gravel are quartz and litic fragments. Note: Petroleum hydrocarbon odor. 2" lense of indurated sand with carbonate cement at 479.75 ft.	
485	1565	25.8		G, UV					@ 480 ft: Clayey sand: 10YR 4/3, brown; dense; wet; 60% fine to coarse sand (50% fine, 20% medium, 30% coarse); 20% gravel to 3/4"; subangular to subrounded; 20% clay, medium plastic; sand and gravel are quartz, feldspar, caliche, and lithic fragments. Note: Lense of well-graded sand from 480 to 480.5; 100% fine to coarse sand (60% fine, 20% medium; 20% coarse); trace clay pieces to 1/2". Moderately indurated lense of caliche with sand from 481.75 to 482 ft, 10YR 6/3, pale borwn. Well-indurated lense of caliche from 482.5 - 483 ft, 10YR 8/1, white. Lense of caliche sand from 483.75 - 484 ft, 10YR 6/2, light brownish gray.	3" Schedule 80 PVC Sump, 487 to 489 ft bgs
		25.2			486 - 491		SP-SC			
		33.6								
490	1453	29.8		V, P			SP		@ 484 ft: Core bag not opened, used for LNAPL transmissivity analysis.	
		20.1		UV					@ 486 ft: Poorly graded sand with clay: 10YR 4/2, dark grayish brown; loose; wet; sand is medium, clay is nonplastic to slightly plastic. Note: petroleum odor present. No clay from 486 - 486.5 ft; 100% medium sand with indurated sandstone. Lense of well-indurated caliche from 487.75 to 489 ft; white; massive.	
		20.1		UV						
495		20.2							@ 489 ft: Poorly graded sand: 10YR 5/3, brown; loose; wet; 100% medium to coarse sand. Note: petroleum odor. Lense of well-indurated caliche from	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **10/6/2018**
Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**
Page: **34 of 34**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
495	4880	20.4		V, P, B, M	491-510		SW		489.75 to 490 ft, white, massive. At 490 ft, sand is 100% medium.	Native Soil/ Slough, 496 to 510 ft bgs
									@ 491 ft: Core bag not opened, used for UV analysis.	
	1496	20.4							@495 ft.: Well graded sand: 7.5 YR 4/1, dark gray; medium dense; wet; 90% fine to coarse sand (10% fine, 65% medium, 15% coarse), 10% gravel. Note: lense of well-graded sand with gravel from 496 to 496.5 ft; 70% sand; 30% gravel. At 496.5 ft, gravel is to 2"; quartz, feldspar, and lithic fragments. No gravel from 497 to 498.5 ft. From 498.5 to 499 ft, 5% gravel to 1"; quartz, feldspar, and lithic fragments; and clay nodules up to 2". From 499 to 500.75 ft, 10% silt. From 501 to 502 ft, sand is 100% fine to coarse (10% fine, 5% medium, 35% coarse); 5% gravel to 1 1/3"; subangular to subrounded; quartz, feldspar, and lithic fragments.	
		20.5								
500	230.8									
	419.9	20.7		V, P					@503 ft: No recovery from 503 to 510 ft.	
									Total depth = 510 ft	
505										
510										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0							SP		Poorly graded sand: 100% fine sand; trace fine gravel; gravel is feldspar and lithic fragments. Note: hydroknife to 8 ft for utilities clearance.	3" Schedule 80 PVC Riser, 2.06 ft above ground surface to 450 ft bgs; 3" Schedule 80 PVC Riser, 2 ft above ground surface to 416 ft bgs
5	26.8						CL		Clay: 7.5YR 5/3, brown; soft to medium stiff; slightly moist; medium plasticity; 90% clay; 10% fine to coarse sand (40% fine, 40% medium, 20% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 9 ft, 70% clay; 20% silt,	Neat Portland Cement, 5% Bentonite Solids, 0 to 30 ft bgs
10										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
10	0.3						CL		nonplastic; 10% sand. At 10 ft, 50% clay; 40% silt; 10% sand.	
					8 - 16				Silt: 5YR 5/4, reddish brown; soft; slightly moist; low to medium plasticity; 65% silt; 30% clay; 5% fine to medium sand; subangular to subrounded; sand is quartz and lithic fragments. Note: slightly mottled to 5YR 7/3, pink; secondary calcium carbonate present. At 14 ft, trace lithic gravel to 3/8".	
15							ML		Silt: 5YR 5/4, reddish brown; soft; slightly moist; low to medium plasticity; 70% silt; 20% clay; 10% fine to medium sand; subangular to subrounded; sand is quartz and lithic fragments. Note: slightly mottled to 5YR 7/3, pink; secondary calcium carbonate present. At 16 ft, silt with sand; 7.5YR 5/3, brown; 75% silt; 10% clay; 15% sand. At 17 ft, trace gravel to 1/2". At 18 ft, 90% silt, 5% clay; 5% sand; no gravel.	
	22.8				16 - 20					
20										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

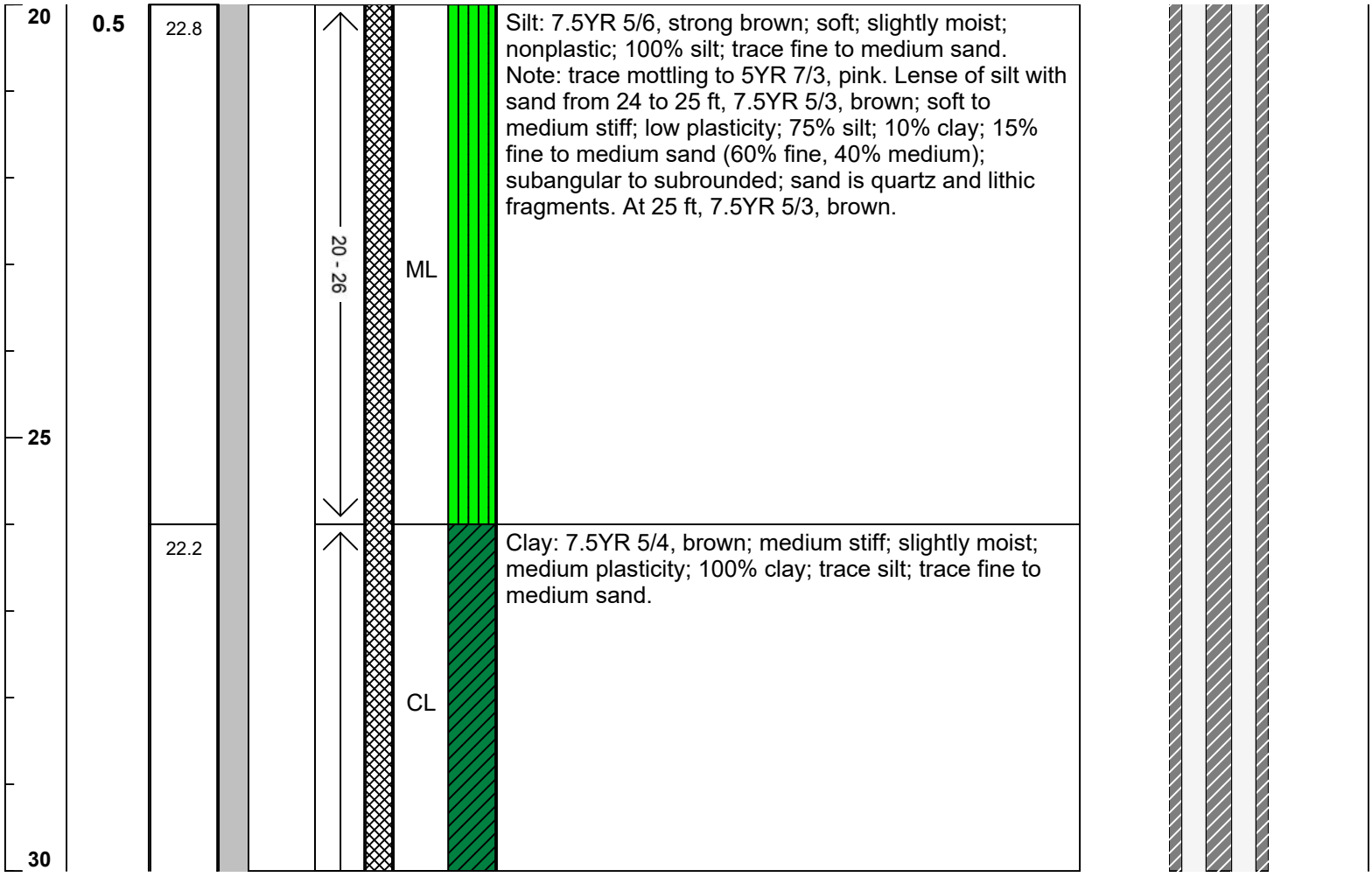
Well ID: **KAFB-106247**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
0.5	22.8				20 - 26		ML		Silt: 7.5YR 5/6, strong brown; soft; slightly moist; nonplastic; 100% silt; trace fine to medium sand. Note: trace mottling to 5YR 7/3, pink. Lense of silt with sand from 24 to 25 ft, 7.5YR 5/3, brown; soft to medium stiff; low plasticity; 75% silt; 10% clay; 15% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz and lithic fragments. At 25 ft, 7.5YR 5/3, brown.	
	22.2						CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand.	



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **4 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
30	0.2				26 - 36		ML		Silt: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; low plasticity; 85% silt; 15% clay; trace fine sand. Note: at 31 ft, 90% silt; 10% clay.	Hydrated Uncoated Bentonite Chips, 3/8"; 30 to 40 ft bgs
									Clay: 7.5YR 5/4, brown; medium stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand. Note: lense of silt from 35 to 36 ft, 5YR 5/6, yellowish red; soft; low plasticity; 80% silt; 10% clay; 10% sand (60% fine, 40% medium); trace coarse sand.	
35										
	26.7						CL		Clay with sand: 7.5YR 6/4, light brown; soft to medium stiff; slightly moist; medium plasticity; 65% clay; 10% silt; 25% fine to coarse sand (40% fine, 45% medium, 15% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: highly mottled throughout to 7.5YR 7/3, pink; secondary calcium carbonate present. At 39 ft, 90% clay; 5% silt; 5% sand.	
40										

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **5 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
40	0.6				36 - 46		SM		Silty sand: 7.5YR 5/3, brown; loose; slightly moist; 60% very fine to coarse sand (15% very fine, 30% fine, 40% medium, 15% coarse); subangular to subrounded; 30% silt, nonplastic; 10% clay; sand is quartz, feldspar, and lithic fragments. Note: moderately mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present. At 42 ft, 80% sand; trace lithic gravel to 3/8"; 15% silt; 5% clay. At 44 ft, 75% sand (30% fine, 60% medium, 10% coarse); trace gravel to 1/2"; 15% silt; 10% clay; gravel includes quartz; slightly mottled.	High Solids Bentonite Grout, 40 to 378 ft bgs
45	19.9						CL		Sandy clay: 7.5YR 5/3, brown; medium stiff; slightly moist; medium plasticity; 70% clay; trace silt; 30% very fine to coarse sand (20% very fine, 20% fine, 45% medium, 15% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: Lense of clay with sand from 48 to 49 ft, low plasticity; 60% clay; 15% silt; 25% sand.	
50							ML		Silt with sand: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 80% silt; trace clay; 20% very fine to medium sand (20% very fine, 50% fine, 30%	

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **6 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
50										
0.4					46 - 56		ML		medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of clay from 55 to 56 ft, 7.5YR 6/4, light brown; medium stiff; medium plasticity; 90% clay; 5% silt; 5% sand; trace gravel to 3/8"; highly mottled throughout to 7.5YR 7/3, pink; secondary calicum carbonate present.	
55										
21.5							CL		Sandy clay: 7.5YR 5/4, brown; medium stiff; slightly moist; low plasticity; 50% clay; 10% silt; 35% very fine to coarse sand (20% very fine, 20% fine, 40% medium, 20% coarse); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: moderately mottled to 7.5YR 7/3, pink; secondary calcium carbonate present. Lense of silt with sand from 57 to 58 ft, soft; nonplastic; 80% silt; trace clay; 20% sand (20% very fine, 50% fine, 30% medium); trace coarse sand; trace gravel to 1/2". At 58 ft, clay with sand; 70% clay; 5% silt; 25% sand; trace gravel to 3/8"; slightly mottled. At 59 ft, 7.5YR 5/3, brown. At	
60										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

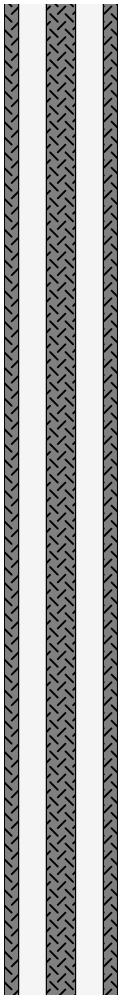
Well ID: **KAFB-106247**
Page: **7 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
60	0.9				56 - 66		CL		60 ft, 75% clay; 5% silt; 20% sand; trace gravel to 1/2".	
							ML		Silt with sand: 7.5YR 5/3, brown; soft to medium stiff; slightly moist; nonplastic; 75% silt; 10% clay; 15% very fine to medium sand (20% very fine, 50% fine, 30% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: silt from 64 to 65 ft and 66 to 67 ft, low to medium plasticity; 85% silt; 5% clay; 10% sand (20% very fine, 40% fine, 40% medium); trace coarse sand. Lense of sandy silt from 65 to 66 ft, soft; low plasticity; 65% silt; 5% clay; 30% sand (30% fine, 60% medium, 10% coarse. Lense of clay from 67 to 68 ft, 7.5YR 5/4, brown; stiff to very stiff; medium plasticity; 70% clay; 10% silt; 20% sand (20% very fine, 35% fine, 40% medium, 5% coarse); trace gravel to 3/8"; moderately mottled to 7.5YR 7/3, pink; secondary calicum carbonate present. At 68 ft, low plasticity; 75% silt; 5% clay; 20% sand (30% fine, 60% medium, 10% coarse); trace gravel to 3/8".	
65										
	22.4									
70							CL		Clay: 7.5YR 5/4, brown; stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand.	



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **8 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
70	1.1				66 - 76		CL		Clay: 7.5YR 5/4, brown; stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand. Note: lense of silt from 71.5 to 72 ft, 7.5YR 5/3, brown; soft; low plasticity; 85% silt; 5% clay; 10% sand (30% fine, 60% medium, 10% coarse); trace gravel to 3/8".	
							SM		Silty sand: 10YR 5/4, yellowish brown; loose; slightly moist; 70% very fine to coarse sand (20% very fine, 20% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of silt from 73 to 73.75 ft, 7.5YR 5/4, brown; soft; nonplastic; 100% silt; trace fine to medium sand. At 73.75 ft, 85% sand (30% fine, 50% medium, 20% coarse); trace quartz and lithic gravel to 2"; 15% silt.	
75	32.2						CL		Clay: 7.5YR 5/4, brown; stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand.	
							SW-SM		Well-graded sand with silt: 7.5YR 5/2, brown; loose; slightly moist; 85% fine to coarse sand (35% fine, 50% medium, 15% coarse); 5% gravel to 3/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
80							ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 100% silt; trace fine sand.	

Notes:
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▽ = Depth to water after completion
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bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **9 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
80										
0.8							ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 100% silt; trace fine sand.	
							CL		Clay: 5YR 4/4, reddish brown; very stiff; medium plasticity; 90% clay; 10% silt.	
					76 - 86		ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 100% silt; trace fine sand. Note: at 86 ft, trace fine to medium sand. At 87 ft, soft to medium stiff; low plasticity; 80% silt; 20% clay; trace fine to medium sand; slighlty mottled to 7.5YR 6/3, light brown, and 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
85										
34.5										
90							SM		Silty sand: 7.5YR 5/3, brown; loose; slightly moist; 65% very fine to coarse sand (25% very fine, 35% fine, 35% medium, 5% coarse); trace gravel to 1/2";	

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

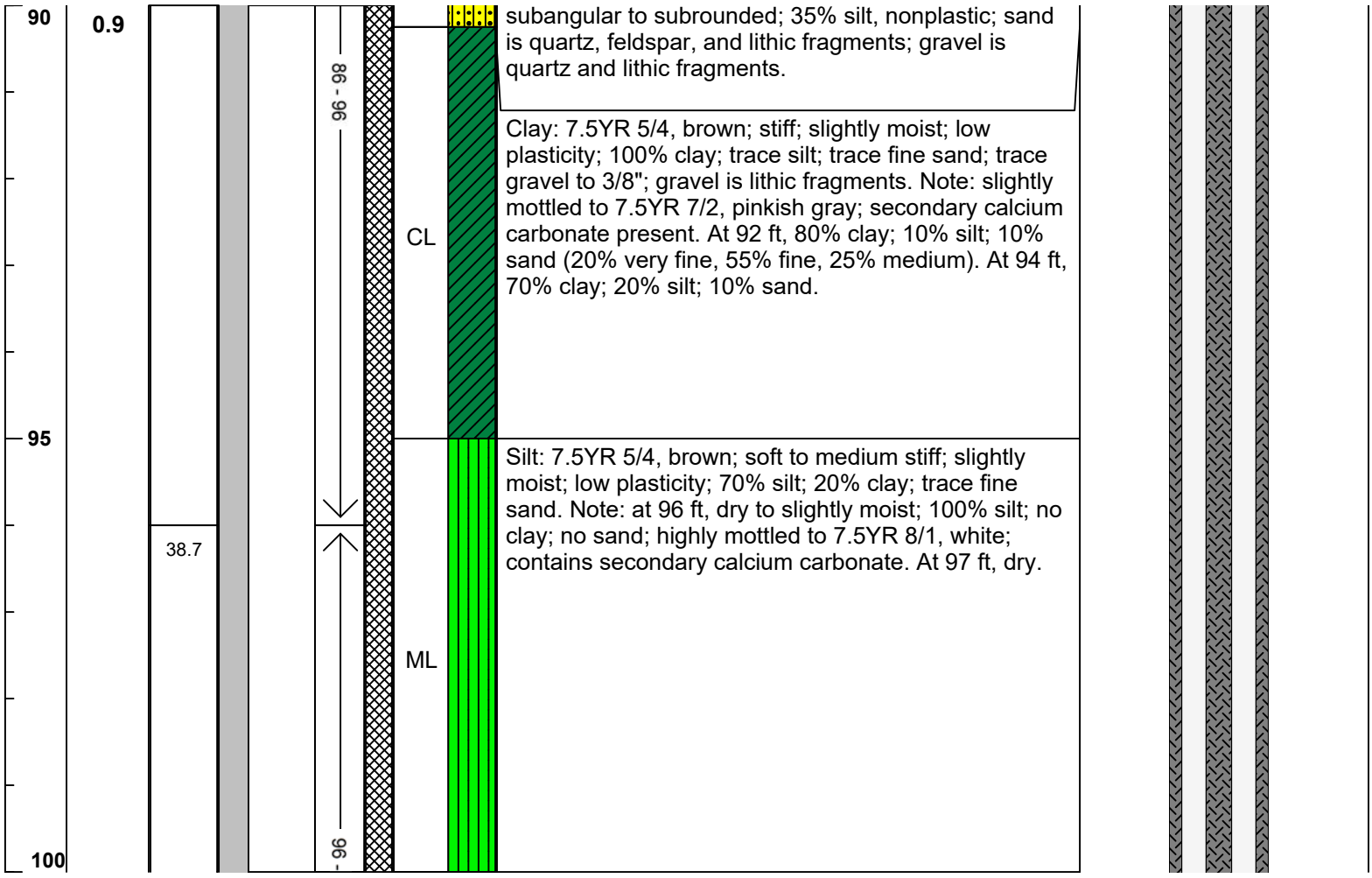
Well ID: **KAFB-106247**
Page: **10 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
90									subangular to subrounded; 35% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
0.9									Clay: 7.5YR 5/4, brown; stiff; slightly moist; low plasticity; 100% clay; trace silt; trace fine sand; trace gravel to 3/8"; gravel is lithic fragments. Note: slightly mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present. At 92 ft, 80% clay; 10% silt; 10% sand (20% very fine, 55% fine, 25% medium). At 94 ft, 70% clay; 20% silt; 10% sand.	
95					96 - 98		CL		Silt: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; low plasticity; 70% silt; 20% clay; trace fine sand. Note: at 96 ft, dry to slightly moist; 100% silt; no clay; no sand; highly mottled to 7.5YR 8/1, white; contains secondary calcium carbonate. At 97 ft, dry.	
					38.7		ML			
100					96 -					



Notes:
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▽ = Depth to water after completion
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bgs = below ground surface
DTW = depth to water
ft = feet
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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **11 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
100	1.1				104		ML		Silt: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; low plasticity; 90% silt; 10% clay; trace fine sand. Note: slightly mottled to 7.5YR 8/1, white; contains secondary calcium carbonate. At 102 ft, no mottling. At 103.75 ft, slightly mottled. At 104 ft, dry to slightly moisthighly mottled with significant secondary calcium carbonate.	
					38.5					
105							CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; low to medium plasticity; 80% clay; 20% silt. Note: slightly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 108 ft, trace fine to medium sand.	
110					104					

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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **12 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
110										
0.8					116		CL		Clay: 7.5YR 5/3, brown; very stiff to hard; dry to slightly moist; low to medium plasticity; 90% clay; 10% silt; trace fine to medium sand. Note: highly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 111 ft, 7.5YR 5/4, brown; slightly moist.	
115							ML		Silt: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; low plasticity; 90% silt; 10% clay; trace fine to medium sand. Note: slightly mottled to 7.5YR 8/1, white; contains secondary calcium carbonate. At 114 ft, trace fine to coarse sand; slightly mottled to 7.5YR 7/2, pinkish gray. At 116 ft, no mottling. At 117 ft, medium stiff to stiff. At 118 ft, 7.5YR 5/3, brown; low to medium plasticity.	
	24.9				116 - 118					
	27.2									
120										

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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **13 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
120	0.7			P, V, FOC	118 - 124		ML		Silt: 7.5YR 5/3, brown; soft to medium stiff to stiff; slightly moist; low to medium plasticity; 90% silt; 10% clay. Note: contains secondary calcium carbonate. At 122 ft, low plasticity; 95% silt; 5% clay; no sand. At 124 ft, medium stiff; medium plasticity; 85% silt; 15% clay. At 125 ft, 75% silt; 25% clay.	
125	24.6				124 - 130		CL		Clay: 7.5YR 5/3, brown; medium stiff; slightly moist; medium plasticity; 80% clay; 20% silt. At 127.75 ft, 80% clay; 10% silt; 10% very fine to medium sand (20% very fine, 45% fine, 35% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. At 128 ft, 90% clay; 10% silt; slightly mottled to 7.5YR 8/2, pinkish white; secondary calcium carbonate present.	
130										

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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **14 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
130	1.1	34.8			130 - 136		ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 95% silt; 5% clay; trace fine sand. Note: at 131.75 ft, trace fine to coarse sand. At 132 ft, 7.5YR 5/3, brown; low plasticity; 85% silt; 15% clay. At 134 ft, 65% silt; 35% clay.	
135		32.9			136 - 142		CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; medium plasticity. Note: slightly mottled to 7.5YR 8/1, white. At the interface between silt and clay at 135 ft, hard; dry; highly mottled; significant secondary calcium carbonate present. At 136 ft, soft to medium stiff; 95% clay; 5% silt; trace fine to medium sand; no mottling. At 137 ft, medium stiff to stiff. At the interface between clay and silt at 139 ft, 5Y 6/3, pale olive; no secondary calcium carbonate.	
140							ML		Silt: 2.5YR 5/4, reddish brown; soft to medium stiff; slightly moist; low plasticity; 80% silt; 20% clay.	

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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **15 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
140	0.7						ML		Silt: see description on previous page.	
							CL		Clay: 7.5YR 5/3, brown; hard; dry; nonplastic. Note: highly mottled throughout to 7.5YR 8/1, white; secondary calcium carbonate present. At 142 ft, medium stiff; slightly moist; medium plasticity; 80% clay; 20% silt.	
	28.7			B, M	142 - 146		ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; low plasticity; 80% silt; 20% clay.	
145				T					Core bag not opened; 144 to 146 ft sent to lab for thermal conductivity analysis.	
	35.6				146 - 152		ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 95% silt; 5% clay. Note: lense of clay from 149.25 to 149.8 ft, 7.5YR 5/3, brown; stiff; medium plasticity; mottled to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
150										

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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **16 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
150	0.6						ML		@ 149.8 ft - Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 90% silt; 10% clay. Note: clay is present as nodules with minor mottling to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present. At 152 ft, 80% silt; 20% clay; trace fine sand.	
	29.1				152 - 156		CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; medium plasticity; 100% clay; trace fine to medium sand. Note: interface between silt and clay at 153 ft is hard; dry; highly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 154 ft, stiff to very stiff. At 156 ft, stiff; slightly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 157.6 ft, soft; low plasticity; 70% clay; 30% silt.	
155										
	26.5				156 - 162		ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 80% silt; 20% clay; trace fine to medium sand; trace gravel to 3/8"; gravel is lithic fragments. Note: clay is present as nodules with minor mottling to 7.5YR 7/2, pinkish gray; secondary calcium carbonate present.	
160										

Notes:
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DTW = depth to water
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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **17 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
160	0.6						ML		Silt: 7.5YR 4/3, brown; medium stiff; slightly moist; low plasticity; 90% silt; 10% very fine to medium sand (25% very fine, 50% fine, 25% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
				P, V, FOC	162 - 166		SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (30% fine, 50% medium, 20% coarse); 35% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 162 ft, 10YR 6/3, pale brown; 80% sand (45% fine, 45% medium, 10% coarse); 20% gravel to 1 1/2"; trace silt. At 163 ft, 75% sand; 25% gravel; trace silt. At 164 ft, sand is 40% fine, 45% medium, 15% coarse.	
165							GW		Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 60% gravel to 2 1/4"; 40% fine to coarse sand (30% fine, 55% medium, 15% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (45% fine, 45% medium, 10% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: from 168 to 170 ft, well-graded sand with gravel;	
170										

17.5
24.7

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

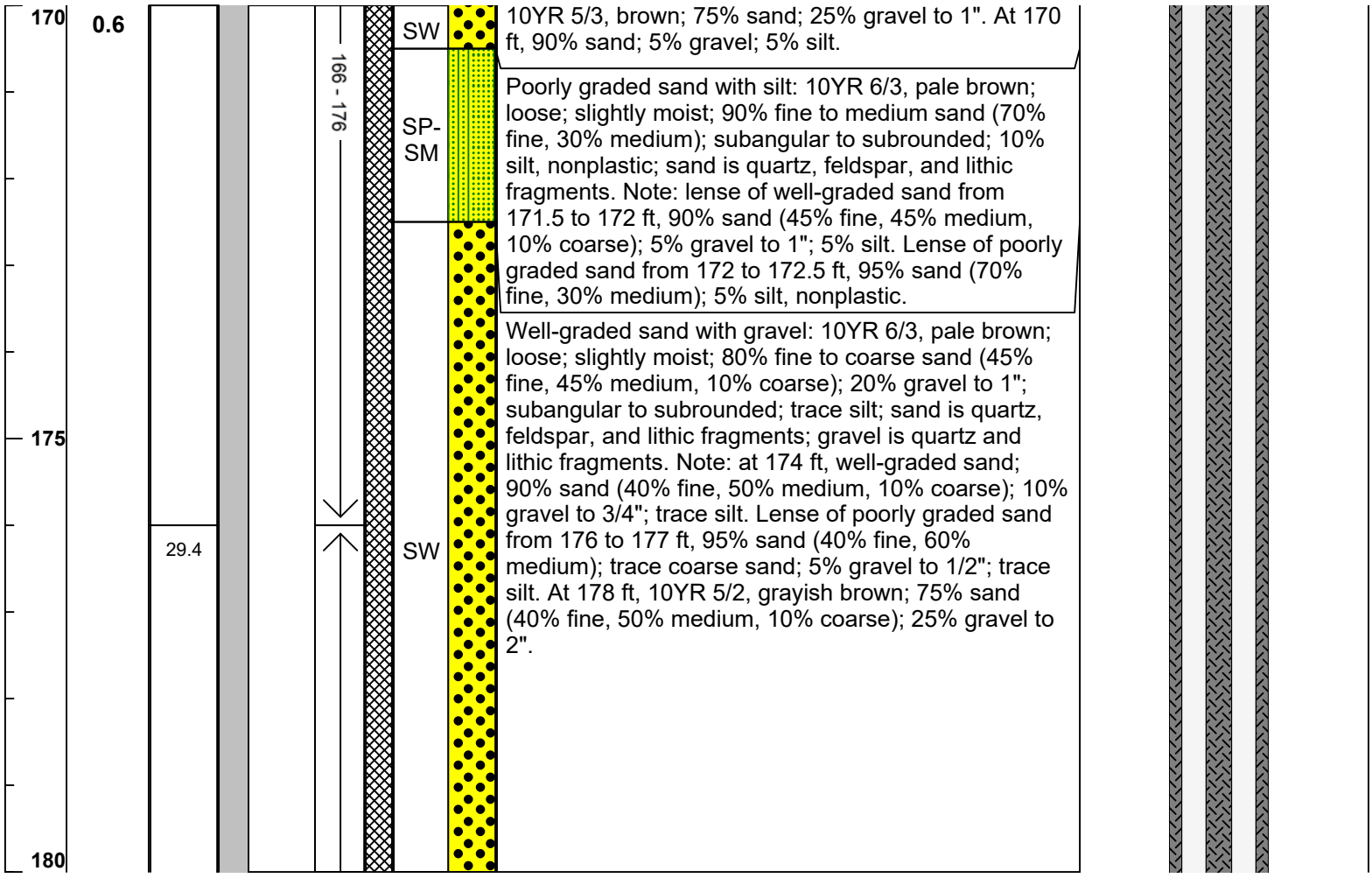
Well ID: **KAFB-106247**
Page: **18 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
170	0.6				166 - 176		SW		10YR 5/3, brown; 75% sand; 25% gravel to 1". At 170 ft, 90% sand; 5% gravel; 5% silt.	
							SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand from 171.5 to 172 ft, 90% sand (45% fine, 45% medium, 10% coarse); 5% gravel to 1"; 5% silt. Lense of poorly graded sand from 172 to 172.5 ft, 95% sand (70% fine, 30% medium); 5% silt, nonplastic.	
175							SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (45% fine, 45% medium, 10% coarse); 20% gravel to 1"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 174 ft, well-graded sand; 90% sand (40% fine, 50% medium, 10% coarse); 10% gravel to 3/4"; trace silt. Lense of poorly graded sand from 176 to 177 ft, 95% sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1/2"; trace silt. At 178 ft, 10YR 5/2, grayish brown; 75% sand (40% fine, 50% medium, 10% coarse); 25% gravel to 2".	
	29.4									
180										



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **19 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
180	0.5				176 - 186		SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 90% fine to medium sand (60% fine, 40% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 181 ft, 95% sand; 5% silt; no gravel. At 183 ft, 10YR 6/3, pale brown.	
185							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 55% medium, 15% coarse); 10% gravel to 5/8"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 186 ft, well-graded sand with gravel; 85% sand; 15% gravel.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (60% fine, 40% medium); trace coarse sand; subangular to	
190										

28.5

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **20 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
190	0.1				186 - 196		SP		subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of well-graded sand with clay from 190 to 191 ft, 10YR 5/3, brown; 80% sand (40% fine, 50% medium, 10% coarse); 10% gravel to 1 1/8"; 10% clay as nodules, low plasticity, 7.5YR 5/3, brown. At 191 ft, 90% sand; 5% gravel to 1"; 5% silt. At 192 ft, trace clay; no gravel.	
							SP-SM		Poorly graded sand with silt: 7.5YR 5/2, brown; loose; slightly moist; 90% very fine to medium sand (25% very fine, 55% fine, 20% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
195							SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 100% fine to medium sand (80% fine, 20% medium); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments. Note: from196 to 197.75 ft, sand is 45% fine, 55% medium; trace coarse sand; trace quartz and lithic gravel to 1"; trace silt.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 10% gravel to 1 1/4";	
200										

27.7

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **21 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
200	0.5				196 - 206		SW		subangular to subrounded; trace silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: from 200.25 to 200.5 ft, 10YR 6/2, light brownish gray. At 202 ft, no caliche. At 203.75 ft, 100% sand; trace gravel to 3/8"; trace silt.	
205	23.5			P, V, B, M	206 - 213		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (70% fine, 30% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragements. Note: at 206 ft, 10YR 5/3, brown; trace silt. Lense of well-graded sand from 208 to 209 ft, 95% sand (25% fine, 65% medium, 10% coarse); trace gravel to 3/8"; 5% clay nodules, low plasticity, 7.5YR 5/4, brown; no caliche. At 209 ft, 10YR 6/2, light brownish gray; 95% sand; trace gravel; 5% silt, nonplastic; no caliche.	
210										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **22 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
210	0.8						SC		Clayey sand: 10YR 5/2, grayish brown; loose; slightly moist; 85% very fine to medium sand (30% very fine, 50% fine, 20% medum); subangular to subrounded; 15% clay, low plasticity; sand is quartz, feldspar, and lithic fragments. Note: clay present as medium stiff nodules, 5YR 5/3, reddish brown. At 211 ft, 75% sand (20% very fine, 55% fine, 25% medium); 25% clay.	
							CL		@ 211.5 ft - Clay: 2.5Y 6/2, light brownish gray; soft; slightly moist; medium plasticity. Note: at 212 ft, 2.5Y 5/2, grayish brown; medium stiff to stiff. At 213 ft, 2.5Y 6/2, light brownish gray; soft to medium stiff.	
	19.6									
215					214 - 216		SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to fine sand (30% very fine, 70% fine); trace medium sand; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: lense of silty sand from 215 to 215.5 ft, 10YR 5/3, brown; 70% sand (40% very fine, 60% fine); 30% silt. Lense of sandy clay from 215.5 to 216 ft, 10YR 5/3, brown; very stiff; low plasticity; 70% clay; 30% sand (50% very fine, 50% fine).	
	26.0						SC			
							CL		@ 216 ft - Clayey sand: 10YR 5/3, brown; loose; slightly moist; 70% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 30% clay, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche.	
220									@ 217 ft - Clay: 10YR 6/2, light brownish gray; stiff to very stiff; slightly moist; low plasticity. Note: at 217.75 ft, soft to medium stiff. At 219 ft, 7.5YR 6/3, light	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **23 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
220	0.3				216 - 226		CL		brown; stiff to very stiff. At 219.25 ft, 10YR 6/3, pale brown; soft to medium stiff.	
225		26.7					SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (40% fine, 50% medium, 10% coarse); 25% gravel to 1 5/8"; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded gravel with sand from 222.25 to 223.25 ft, 10YR 6/3, pale brown; 70% gravel to 1 1/4"; 30% sand (20% fine, 60% medium, 20% coarse); trace silt. Lense of poorly graded sand from 223.25 to 224 ft, 90% sand (40% fine, 60% medium); trace coarse sand; 10% gravel to 5/8"; trace silt. At 224 ft, 75% sand (20% fine, 70% medium, 10% coarse); 25% gravel to 1 1/8"; trace silt. Lense of well-graded sand from 224.75 to 225.5 ft, 90% sand; 10% gravel. Lense of well-graded sand with clay from 225.75 to 226 ft, 85% sand; 5% gravel; 10% clay as nodules, 10YR 5/2, grayish brown. At 226 ft, 85% sand (35% fine, 55% medium, 10% coarse); 15% gravel to 1 1/8"; trace silt; sand includes caliche. Lense of well-graded gravel with sand from 227.5 to 228 ft, 60% gravel; 40% sand. At 228 ft, gravel to 1 1/2"; no caliche. At 229 ft, 65% sand; 35% gravel. Lense of well-graded sand from 229.5 to 230 ft, 95% sand; 5% gravel; sand contains caliche.	
230										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **24 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
230	0.5				226 - 236		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 75% fine to coarse sand (20% fine, 65% medium, 15% coarse); 25% gravel to 1 1/8"; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz, caliche and lithic fragments. Note:at 232 ft, 85% sand; 15% gravel to 2". At 233 ft, 65% sand; 35% gravel. At 233.25 ft, 10YR 6/2, light brownish gray; 75% sand; 25% gravel. At 234 ft, 10YR 6/3, pale brown; 80% sand; 15% gravel; 5% silt, nonplastic; no caliche. At 234.5 ft, 85% sand; 15% gravel; trace silt. At 235 ft, 75% sand; 25% gravel; trace silt. At 236 ft, 10YR 5/2, grayish brown; 55% sand; 45% gravel; trace silt.	
235										
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldpsar, and lithic fragments. Note: at 239 ft, 100% sand (40% fine, 60% medium); trace silt.	
240										

30.6

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **25 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
240	1.5				236 - 246		SP		Poorly graded sand: see description on previous page.	
							SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 60% medium, 10% coarse); 20% gravel to 1 1/8"; subangular to subrounded; trace silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: at 243 ft, 80% sand (20% fine, 60% medium, 20% coarse); 20% gravel. At 244 ft, 70% sand; 30% gravel. At 246 ft, 10YR 7/1, light gray; 85% sand; 15% gravel; trace silt. At 247 ft, 80% sand; 15% gravel; 5% silt, nonplastic. At 248 ft, 10YR 5/2, grayish brown; 60% sand; 35% gravel; 5% silt.	
245										
							SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to fine sand (20% very fine, 80% fine); trace medium sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
250										

34.5

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **26 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
250	0.8				246 - 256		SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to fine sand (20% very fine, 80% fine); trace medium sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 253 ft, sand is 20% very fine, 65% fine, 15% medium. At 254 ft, trace coarse sand; trace quartz and lithic gravel to 1".	
255	44.6						SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 60% medium, 20% coarse); 30% gravel to 2"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. At 257ft, 10YR 6/3, pale brown. At 257.75 ft, trace silt.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 65% fine, 15% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; trace clay;	
260										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **27 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
260	0.6				256 - 266		CL		sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. At 259.5 ft, 90% sand; 5% gravel; 5% silt, nonplastic. At 260 ft, 10YR 5/3, brown; 90% sand; 5% gravel; 5% clay nodules, low plasticity. @ 260.25 ft - Clay: 10YR 5/3, brown; stiff; slightly moist; medium plasticity; 100% clay. At 261.75 ft, soft; low plasticity; 80% clay; 10% silt; 10% sand (40% very fine, 60% fine); subangular to subrounded. At 262.25 ft, very stiff; 100% clay. At 263.5 ft, soft; 80% clay; 20% silt; trace very fine to fine sand.	
265							SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 10% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand from 265 to 266 ft, 10YR 6/3, pale brown; 95% sand (45% fine, 55% medium); trace coarse sand; trace gravel to 3/8"; 5% silt; sand includes caliche.	
	35.8						CL		@ 266 ft - Clay: 10YR 6/3, pale brown to 10YR 7/3, very pale brown; hard; slightly moist; nonplastic; 100% clay. Note: secondary calcium carbonate present. At 268 ft, soft to stiff; 85% clay; 15% silt; trace fine to medium caliche sand. At 269.75 ft, 5YR 5/4, reddish brown; soft to medium stiff; low plasticity; 100% clay; trace silt; trace fine to coarse caliche sand.	
270										

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
270										
0.7					266 - 276		ML		Silt: 7.5YR 5/2, brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche. Note: lense of silty sand from 270.25 to 270.75, 70% sand (20% very fine, 70% fine, 10% medium); 30% silt, nonplastic. Lense of well-graded sand from 270.75 to 272 ft, 10YR 6/3, pale brown; 90% sand (25% fine, 55% medium, 20% coarse); 10% gravel to 1"; trace silt. At 272 ft, 10YR 5/3, brown; stiff; 75% silt; 25% clay. At 273, ft, soft to medium stiff. At 275 ft, 70% silt; 20% clay; 10% sand (60% very fine, 40% fine).	
275										
30.4							CL		Clay: 7.5YR 5/3, brown; very stiff; slightly moist; low plasticity. Note: slightly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 277 ft, moderate mottling. At 277.5 ft, 7.5YR 5/2, brown; dry; nonplastic; highly mottled. At 278 ft, hard; highly mottled.	
280										

Notes:
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(2) Contingency Well
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bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **29 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
280										
0.3					276 - 286				Clay: 7.5YR 5/2, brown; very stiff; dry; nonplastic. Note: highly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 208.25 ft, 7.5YR 5/3, brown; stiff; slightly moist; low plasticity; slightly mottled. At 281 ft, weakly mottled. At 284 ft, very stiff; low plasticity; moderate mottling. At 285 ft, medium stiff to stiff; slightly moist; medium plasticity; 85% clay; 15% silt; no mottling. At 286 ft, hard; dry; nonplastic; highly mottled to 7.5YR 8/1, white. At 287 ft, 10YR 5/3, brown; soft to medium stiff; slightly moist; low plasticity; 85% clay; 15% silt. At 288.5 ft, 7.5YR 5/3, brown; very stiff; slightly moist; low plasticity; slightly mottled to 10YR 8/1, white.	
285							CL			
46.4										
290					286					

Notes:
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DTW = depth to water
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ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **30 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
290	1.2				294		CL		Clay: 10YR 4/2, dark grayish brown; very stiff; slightly moist; low plasticity. Note: weakly mottled to 10YR 8/2, very pale brown; secondary calcium carbonate present. At 291.5 ft, no mottling; 85% clay; 15% silt. At 293 ft, dry to slightly moist; 100% clay; weakly mottled. At 294 ft, hard; dry; moderate mottling. At 296 ft, hard; dry; no mottling.	
					46.9					
295										
300					294		SP		Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 95% very fine to medium sand (25%	

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **31 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
300										
	0.8				306		SP		very fine, 65% fine, 10% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 300 ft, 90% sand; 5% quartz and lithic gravel to 1"; 5% silt. At 301 ft, 10YR 7/1, light gray. At 301.25 ft, 10YR 6/2, light brownish gray. At 302 ft, 95% sand; trace lithic gravel to 1"; 5% silt.	
305							GW		Well-graded gravel with sand: 10YR 5/3, brown; loose; slightly moist; 70% gravel to 2 3/8"; 30% fine to coarse sand (20% fine, 40% medium, 40% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
							SW		@ 306 ft - Well-graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 60% fine to coarse sand (15% fine, 60% medium, 25% coarse); 40% gravel to 1 1/4"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							GW		@ 308 ft - Well-graded gravel with sand: 10YR 6/2, light brownish gray; loose; slightly moist; 65% gravel to 1 1/4"; 35% fine to coarse sand (20% fine, 40%	
310										

53.0

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

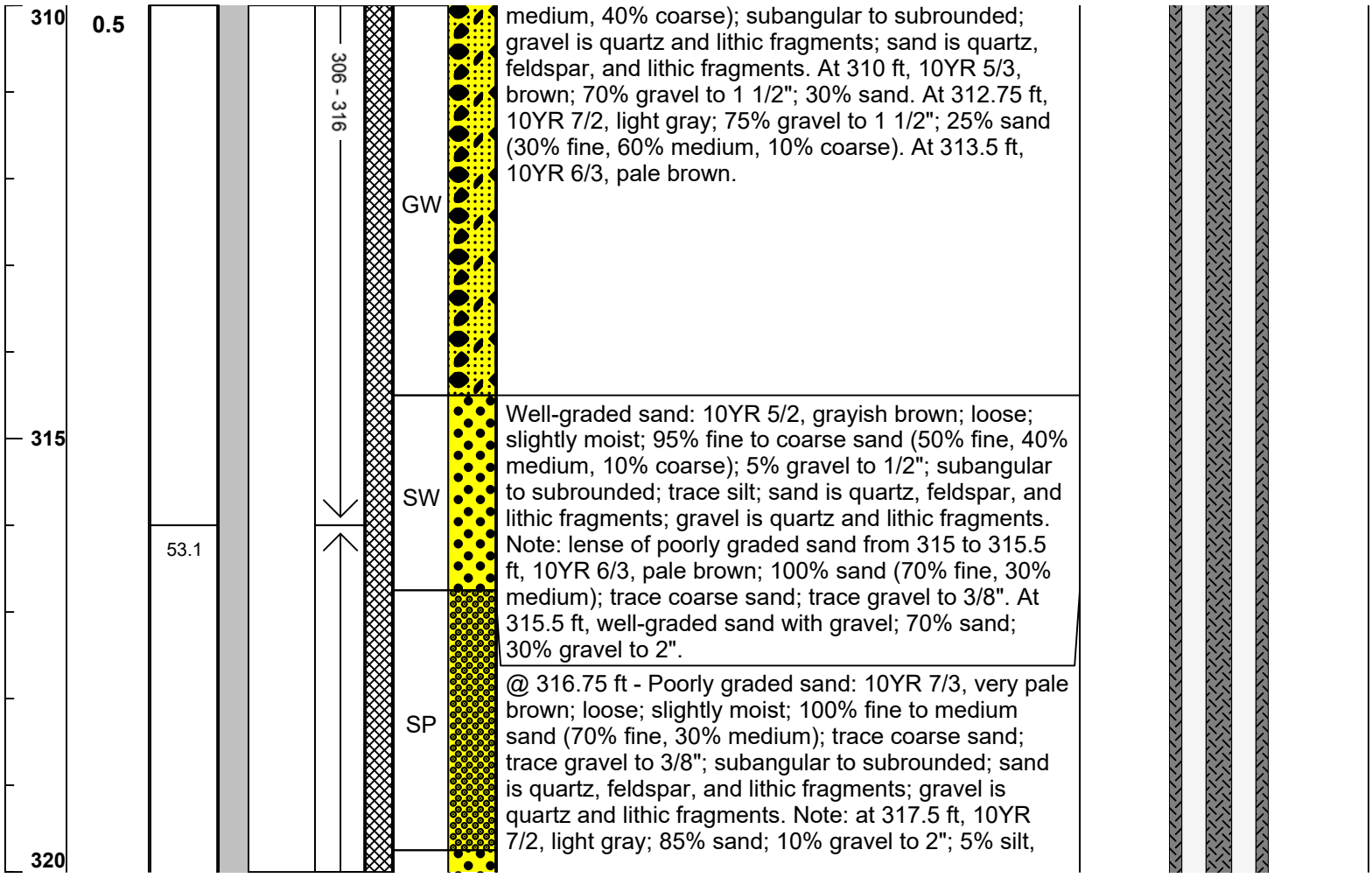
Well ID: **KAFB-106247**
Page: **32 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
310	0.5				306 - 316		GW		medium, 40% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. At 310 ft, 10YR 5/3, brown; 70% gravel to 1 1/2"; 30% sand. At 312.75 ft, 10YR 7/2, light gray; 75% gravel to 1 1/2"; 25% sand (30% fine, 60% medium, 10% coarse). At 313.5 ft, 10YR 6/3, pale brown.	
315							SW		Well-graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 95% fine to coarse sand (50% fine, 40% medium, 10% coarse); 5% gravel to 1/2"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of poorly graded sand from 315 to 315.5 ft, 10YR 6/3, pale brown; 100% sand (70% fine, 30% medium); trace coarse sand; trace gravel to 3/8". At 315.5 ft, well-graded sand with gravel; 70% sand; 30% gravel to 2".	
							SP		@ 316.75 ft - Poorly graded sand: 10YR 7/3, very pale brown; loose; slightly moist; 100% fine to medium sand (70% fine, 30% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 317.5 ft, 10YR 7/2, light gray; 85% sand; 10% gravel to 2"; 5% silt,	
320										



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **33 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
320	0.9				316 - 326		SW		nonplastic. At 318 ft, poorly graded sand with gravel; 70% sand; 25% gravel to 1 1/2"; 5% silt.	
							GW		@ 319.75 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (50% fine, 40% medium, 10% coarse); 15% gravel to 1/2"; trace cobbles to 3 1/8"; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments; cobbles are lithic fragments.	
							SP		@ 321 ft - Well-graded gravel with sand: 10YR 6/3, pale brown; loose; slightly moist; 80% gravel to 2 5/8"; 20% fine to coarse sand (30% fine, 50% medium, 20% coarse); subangular to subrounded; trace silt; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: at 322 ft, trace lithic cobbles to 3 1/2". Lense of well-graded sand with gravel from 323 to 323.75 ft, 10YR 6/2, light brownish gray; 70% sand (20% fine, 70% medium, 10% coarse); 25% gravel to 1 3/4"; 5% silt, nonplastic.	
325										
	36.1						GW		@ 323.75 ft - Poorly graded sand: 10YR 6/2, light brownish gray; 85% fine to medium sand (70% fine, 30% medium); trace coarse sand; 10% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 324.5 ft, 100% sand; trace gravel to 2"; trace silt. At 325.5 ft, 95% sand; 5% gravel to 1 1/4"; no silt.	
									@ 326 ft - Well-graded gravel with sand: 10YR 6/2, light brownish gray; loose; slightly moist; 80% gravel to 2 5/8"; 20% fine to coarse sand (30% fine, 50% medium, 20% coarse); trace cobbles to 4"; subangular	
330										

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **34 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
330	0.9				326 - 336		GW		to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments; cobbles are lithic fragments. At 328 ft, 65% gravel; 35% sand. At 330 ft, trace silt.	
							GW-GM		@ 330.5 ft - Well-graded gravel with silt: 10YR 7/2, light gray; loose; slightly moist; 50% gravel to 2 1/4"; 40% fine to coarse sand (40% fine, 50% medium, 10% coarse); subangular to subrounded; 10% silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: lense of clay from 331.5 to 331.75, 7.5YR 5/2, brown; hard; dry; low plasticity. Lense of poorly graded sand from 331.75 to 332 ft, 90% sand (70% fine, 30% medium); 5% gravel to 5/8"; 5% silt.	
335							SW		@ 332 ft - Well-graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 75% fine to coarse sand (25% fine, 60% medium, 15% coarse); 20% gravel to 1"; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of poorly graded sand from 332.75 to 333.25 ft, 10YR 6/2, light brownish gray; 90% sand (70% fine, 30% medium); 5% gravel to 5/8"; 5% silt, nonplastic. Lense of well-graded sand from 333.25 to 334 ft, 10YR 6/3, pale brown; 90% sand (20% fine, 70% medium, 10% coarse); 10% gravel to 1 1/8". At 334 ft, 10YR 5/3, brown; 80% sand; 20% gravel.	
					29.1		SP		@ 335.75 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (35% fine, 65% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; gravel	
340										

Notes:
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NA = Not Applicable
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **35 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
340	0.8				336 - 346		SP		is quartz and lithic fragments. Note: at 336 ft, trace silt. Lenses of well-graded sand with gravel from 338 to 338.75 ft and 340.75 to 341 ft, 70% sand (20% fine, 70% medium, 10% coarse); 30% gravel to 1 1/8"; trace silt. At 339 ft, 10YR 7/2, light gray; gravel to 1". At 339.5 ft, 10YR 6/3, pale brown.	
							SC		@ 341 ft - Clayey sand: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 65% medium, 15% coarse); 10% gravel to 1 1/8"; subangular to subrounded; 20% clay, medium plasticity; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present as stiff nodules, 7.5YR 5/3, brown. Lense of poorly graded sand with clay from 342 to 342.25 ft, 90% sand (40% fine, 60% medium); 10% clay, nonplastic.	
345							CL		@ 342.25 ft - Clay: 5Y 5/2, olive gray; stiff; slightly moist; medium plasticity. Note: lense of poorly graded sand with silt from 344 to 344.5 ft, 10YR 6/2, light brownish gray; 90% sand (40% fine, 60% medium); 10% silt, nonplastic.	
	48.2						SP		@ 345.5 ft - Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 95% very fine to medium sand (15% very fine, 40% fine, 45% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 346 ft, 100% sand. Lense of well-graded gravel with sand from 346.5 to 347.25 ft, 10YR 6/2, light brownish gray; 65% gravel to 2"; 35% sand (20% fine, 65% medium, 15% coarse).	
350							SW			

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **36 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
350	1.1				346 - 356		SW		@ 347.25 ft - Well-graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 70% fine to coarse sand (15% fine, 65% medium, 20% coarse); 30% gravel to 2 1/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 348 ft, gravel to 1 5/8"; trace silt. At 350 ft, well-graded sand; 95% sand; 5% gravel to 1"; no silt. At 351 ft, 85% sand; 15% gravel to 1 1/2". At 351.5 ft, 75% sand; 25% gravel to 2 1/4". At 352 ft, well-graded sand; 10YR 6/3, pale brown; 90% sand (25% fine, 65% medium, 10% coarse); 10% gravel to 1"; trace silt. At 354 ft, 10YR 6/2, light brownish gray; 85% sand; 15% gravel to 1 1/2"; trace silt. No silt from 355.5 to 357.25 ft.	
355										
	38.1									
							SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 95% very fine to medium sand (15% very fine, 40% fine, 45% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of well-graded sand with gravel from 359.25 to 360.25 ft, 85% sand (25% fine, 65% medium, 10% coarse); 15% gravel to 1 1/2"; trace silt.	
360										

Notes:
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(2) Contingency Well
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **37 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
360	1.1				356 - 366		SM		Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 70% very fine to medium sand (35% very fine, 55% fine, 10% medium); subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: poorly graded sand with silt from 361 to 362 ft, 10YR 6/4, light yellowish brown; 90% sand (25% very fine, 75% fine); trace medium sand; 10% silt.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (90% fine, 10% medium); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments. Note: at 364 ft, sand is 30% fine, 70% medium; trace coarse sand; trace lithic gravel to 1".	
365										
	40.1						GW-GC		Well-graded gravel with clay and sand: 10YR 5/3, brown; loose; slightly moist; 50% gravel to 2 1/2"; 40% fine to coarse sand (25% fine, 55% medium, 20% coarse); subangular to subrounded; 10% clay, medium plasticity; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: clay is present as very stiff nodules, 7.5YR 5/3, brown, and 10YR 5/3, brown. Lense of well-graded gravel with silt and sand from 368.75 to 369 ft, 50% gravel; 40% sand; 10% silt, nonplastic; trace clay. Lense of clay from 369 to 369.25 ft, 7.5YR 5/3, brown; hard; low plasticity. Lense of poorly graded sand from 369.25 to 370 ft, 10YR 6/3, pale	
370										

Notes:
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **38 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
370	1.1				366 - 376		GW		brown; 95% sand (15% very fine, 75% fine, 10% medium); trace coarse sand; 5% gravel to 1 1/4"; trace silt. At 370 ft, 65% sand; 35% gravel to 2 1/2".	
									@ 370.25 ft - Well-graded gravel with sand: 10YR 6/2, light brownish gray; loose; slightly moist; 60% gravel to 2 1/2"; 35% fine to coarse sand (20% fine, 65% medium, 15% coarse); subangular to subrounded; 5% silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
							SP		@ 372 ft - Poorly graded sand: 10YR 6/3, pale brown; slightly moist; loose; 95% very fine to medium sand (15% very fine, 75% fine, 10% medium); trace coarse sand; 5% gravel to 1 1/4"; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: poorly graded sand with gravel at 373 ft, 85% sand; 15% gravel; trace silt.	
375									@ 374 ft - Well-graded gravel with sand: 10YR 6/2, light brownish gray; loose; slightly moist; 75% gravel to 2"; 25% fine to coarse sand (20% fine, 65% medium, 15% coarse); subangular to subrounded; trace silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: at 375 ft, 10YR 5/3, brown; 65% gravel to 2 5/8"; 35% sand (20% fine, 50% medium, 30% coarse); trace silt. At 376 ft, 55% gravel to 2 1/2"; 45% sand (30% fine, 60% medium, 10% coarse); no silt. At 377 ft, 80% gravel to 3"; 20% sand (15% fine, 65% medium, 20% coarse); no silt. At 378 ft, gravel to 2 1/2"; trace cobbles to 4". At 380 ft, trace cobbles to 3 5/8".	
							GW			
	38.5									
380										Hydrated Uncoated Bentonite Chips, 3/8"; 378 to 413 ft bgs

Notes:
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(2) Contingency Well
▽ = Depth to water after completion
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **39 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
380	0.4				376 - 386		GW		Well-graded gravel with sand: see description on previous page.	
									Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 65% medium, 15% coarse); 30% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 381 ft, 10YR 6/3, pale brown; 70% sand (30% fine, 55% medium, 15% coarse); 30% gravel to 1 3/4"; trace silt. At 382 ft, 10YR 7/3, very pale brown; 65% sand; 30% gravel; 5% silt, nonplastic.	
385							SW			
	36.3								Well-graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 90% fine to coarse sand (20% fine, 65% medium, 15% coarse); 10% gravel to 1 1/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of clay from 387 to 387.25 ft, 7.5YR 6/3, light brown; hard; medium plasticity.	
390									@ 387.25 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (25% fine, 50% medium, 25% coarse); 25% gravel to 1 5/8"; subangular to subrounded; 5% clay; nonplastic; sand is quartz, feldspar, and lithic	

Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **40 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
390	1.5				386 - 396		SW		fragments; gravel is quartz and lithic fragments. Note: lense of poorly graded sand from 388.5 to 389.25 ft, 10YR 7/3, very pale brown; 95% sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 1 3/8"; 5% silt, nonplastic. At 389.25 ft, gravel to 2 5/8". At 390 ft, 75% sand; 25% gravel to 1 5/8"; trace silt. At 393 ft, 10YR 7/2, light gray; 75% sand; 20% gravel; 5% silt.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 5% silt; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 2.5YR 4/8, red. At 394 ft, no clay.	
395										
					48.3		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (25% fine, 60% medium, 15% coarse); 15% gravel to 1 1/8"; subangular to subrounded; trace silt; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 2.5Y 5/3, light olive brown.	
							SP		Poorly graded sand: 10YR 7/2, light gray; loose; slightly moist; 95% very fine to medium sand (20%	
400										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **41 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
400	0.3				396 - 406		SW		very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of well-graded sand from 399 to 399.25 ft, 85% sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1 1/8"; 5% silt, nonplastic. At 399.25 ft, trace lithic gravel to 1 1/4"; trace conglomerate cobble with secondary calcium carbonate cement.	
							SP			
							CL		@ 400 ft - Well-graded sand with gravel: 10YR 7/2, light gray; loose; slightly moist; 70% fine to coarse sand (25% fine, 60% medium, 15% coarse); 30% gravel to 2"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
405									@ 401 ft - Poorly graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium (30% fine, 70% medium); trace coarse sand; 10% gravel to 1 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
							SW		@ 402.75 ft - Clay: 10YR 5/3, brown; hard; slightly moist; nonplastic.	
					41.1				@ 403.25 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (25% fine, 60% medium, 15% coarse); 15% gravel to 1 1/8"; trace cobbles to 4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments; cobbles are lithic fragments. Note: at 404 ft, no cobbles. Lense of poorly graded sand from 404.75 to	
							SP			
410										

Notes:
(1) Current Water Table Well
(2) Contingency Well
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **42 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
410	0.2				406 - 416		SP		405.25 ft, 90% sand (30% fine, 70% medium); trace coarse sand; 10% gravel to 1 3/8". Lense of poorly graded sand from 406 to 407 ft, 95% sand (50% fine, 50% medium); 5% silt, nonplastic. At 407 ft, well-graded sand; 95% sand (20% fine, 60% medium, 20% coarse); 5% gravel to 1"; trace silt. At 408 ft, 90% sand; 10% gravel.	3" Schedule 80 PVC Screen, 0.010" slot, 416 to 441 ft bgs
									@ 409 ft - Poorly graded sand: 10YR 7/2, light gray; loose; slightly moist; 90% fine to medium sand (50% fine, 50% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and ltihic fragments; gravel is quartz and lithic fragments. Note: at 410 ft, 95% sand; trace gravel to 1"; 5% silt; trace clay as nodules, 5YR 3/4, dark reddish brown. At 411 ft, 100% sand; no gravel; no clay. Lense of well-graded sand from 413.5 to 413.75 ft, 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 1". At 414 ft, trace coarse sand; trace lithic gravel to 3/4"; trace silt. Lense of clay from 415 to 415.5 ft, 7.5YR 5/3, brown; hard; dry to slightly moist; low plasticity; slightly mottled to 7.5YR 8/1, white; secondary calcium carbonate present. At 415.5 ft, trace gravel to 3/8".	
415									No recovery from 416 to 418 ft.	
	51.2						ML		Silt: 10YR 7/1, light gray; soft; dry; nonplastic; 100% silt; trace clay. Note: clay is present as nodules, 10YR 3/3, dark brown; secondary calcium carbonate present.	
420										

Notes:
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(2) Contingency Well
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **43 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
420	4.5				416 - 430		ML		Silt: 10YR 7/1, light gray; soft; dry; nonplastic; 100% silt; trace gravel; trace cobbles; gravel and cobbles are fine to coarse sandstone with calcium carbonate cement. Note: at 422 ft, no clay; no gravel; no cobbles.	10/20 Silica Sand, 413 to 442.8 ft bgs
425							SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 100% fine to medium sand (80% fine, 20% medium); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 427 ft, 7.5YR 8/1, white; sand is highly cemented with calcium carbonate. Lense of poorly graded sand with silt from 428 to 429 ft, 10YR 6/3, pale brown; 90% sand (80% fine, 20% medium); 10% silt, nonplastic. At 429 ft, trace gravel to 1".	
430										

Notes:
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(2) Contingency Well
▽ = Depth to water after completion
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NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

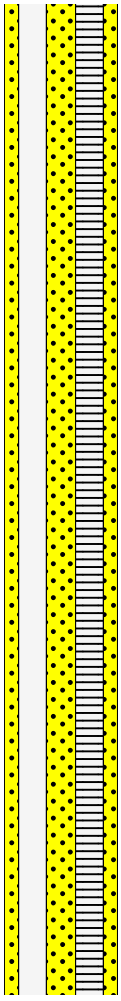
Well ID: **KAFB-106247**
Page: **44 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
430	4.7	65.3			430 - 435		ML		Silt: 10YR 7/1, light gray; soft; dry; nonplastic; 80% silt; 20% clay. Note: clay is present as nodules, 10YR 3/3, dark brown; secondary calcium carbonate present. At 431 ft, 100% silt; trace clay nodules; trace fine to coarse sand; trace gravel to 1/2".	
							SP		Poorly graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 100% fine to medium sand (80% fine, 20% medium); trace gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
435		21.2			435 - 441		ML		Silt: 10YR 7/1, light gray; soft; dry; nonplastic; 100% silt; trace clay; trace fine to coarse sand; trace gravel to 1/2". Note: clay is present as nodules, 10YR 3/3, dark brown; secondary calcium carbonate present.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 65% fine, 15% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 438 ft, 100% sand (60% fine, 40% medium); trace coarse sand; trace silt.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to coarse sand (30% fine, 60% medium, 10% coarse); 5% gravel to 2 1/8"; subangular to subrounded; sand is quartz, feldspar,	
440										



Notes:
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UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **45 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
440	0.5						SW		and lithic fragments; gravel is lithic fragments. Note: lense of well-graded sand with gravel from 440 to 440.5 ft, 10YR 6/2, light brownish gray; 65% sand; 35% gravel to 1 1/2".	
	31.2				441 - 450		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 443 ft, 10YR 7/3, very pale brown; 95% sand (60% fine, 40% medium); 5% silt, nonplastic. From 444 to 445 ft, 10YR 6/3, pale brown; 100% sand; trace coarse sand; trace silt.	Hydrated Uncoated Bentonite Chips, 3/8"; 444 to 448 ft bgs
445							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to coarse sand (25% fine, 65% medium, 10% coarse); 5% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 448 ft, 95% sand; 5% gravel to 1 5/8".	10/20 Silica Sand, 448 to 500 ft bgs
450										

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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **46 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
450	0.3	55.5			450 - 453		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 75% fine to coarse sand (40% fine, 45% medium, 15% coarse); 25% gravel to 1 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: well-graded sand from 452 to 453 ft, 90% sand; 10% gravel; trace silt. At 453 ft, 80% sand; 20% gravel to 1 3/8"; trace clay as nodules, 10YR 3/2, very dark grayish brown. At 454 ft, 10YR 6/2, light brownish gray; 85% sand; 15% gravel to 1 1/4"; no clay. At 455 ft, 10YR 6/3, pale brown; 75% sand; 25% gravel to 2 5/8". At 456 ft, 10YR 6/2, light brownish gray; 70% sand; 30% gravel to 2"; trace lithic cobbles to 3 1/2". At 458 ft, 70% sand; 30% gravel; no cobbles.	3" Schedule 80 PVC Screen, 0.010" slot, 450 to 490 ft bgs
		46.3			453 - 456					
455		34.9					SP		Poorly graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 100% fine to medium sand (45% fine, 55% medium); trace coarse	
460							SW			

Notes:
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DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

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Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **47 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
460									sand; trace gravel to 1"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
0.7					456 - 466		SW		Well-graded sand with gravel: 10YR 6/2, light brownish gray; loose; slightly moist; 70% fine to coarse sand (40% fine, 45% medium, 15% coarse); 30% gravel to 2 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of gravelly clay from 461.5 to 462 ft, 5Y 6/3, pale olive; very stiff; high plasticity; 50% clay; 30% gravel to 2 3/8"; 20% sand (35% fine, 55% medium, 10% coarse). At 462 ft, 60% sand; 35% gravel; 5% silt; nonplastic; trace clay, 5Y 6/3, pale olive.	
465									Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (45% fine, 55% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 464 ft, trace quartz and lithic gravel to 1/2".	
44.7					466 - 470		SP			
470										

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ft = feet
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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

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Start Date: **1/4/19**
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WELL LOG

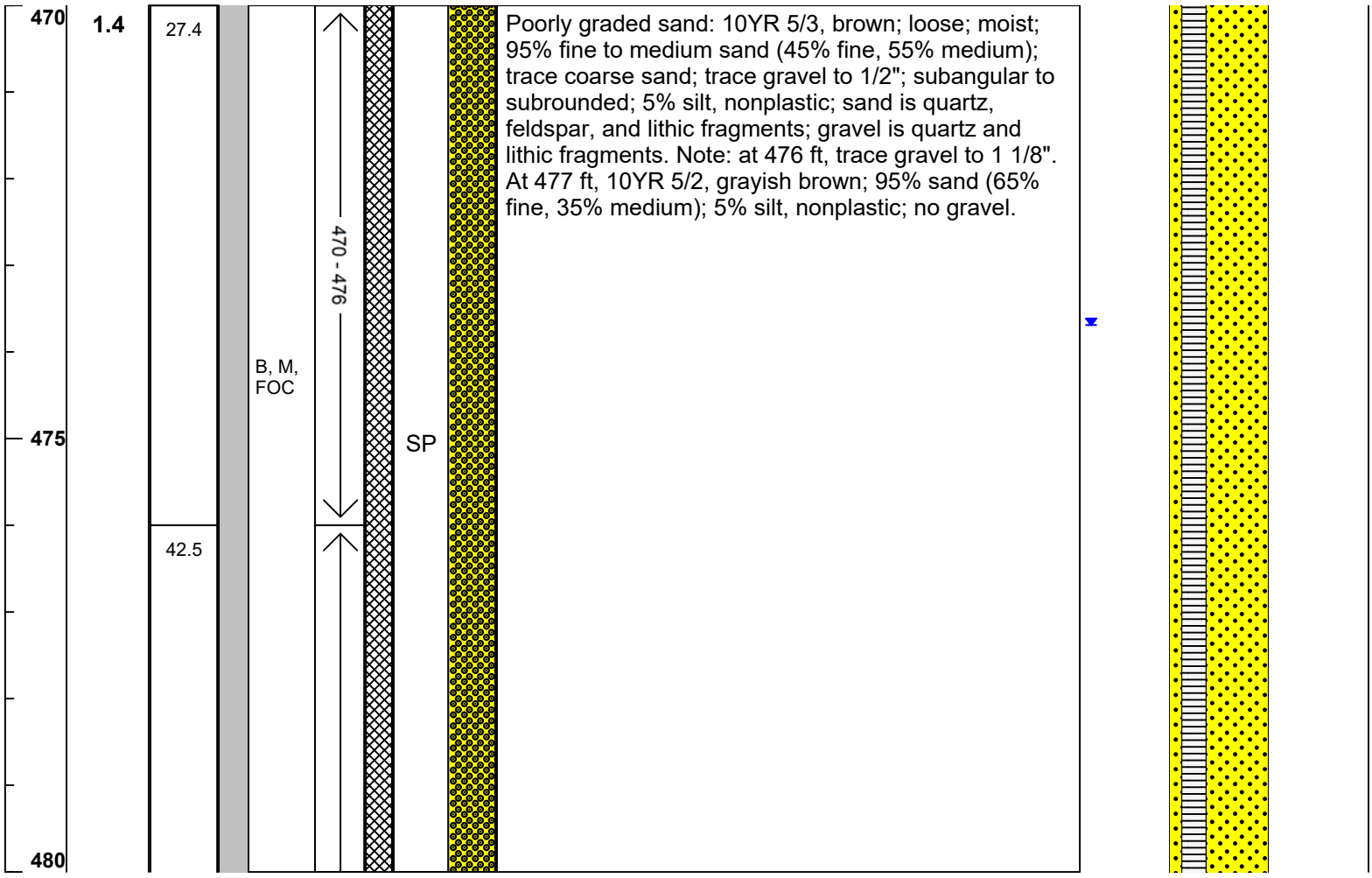
Well ID: **KAFB-106247**
Page: **48 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
470	1.4	27.4		B, M, FOC	470 - 476		SP		Poorly graded sand: 10YR 5/3, brown; loose; moist; 95% fine to medium sand (45% fine, 55% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 476 ft, trace gravel to 1 1/8". At 477 ft, 10YR 5/2, grayish brown; 95% sand (65% fine, 35% medium); 5% silt, nonplastic; no gravel.	
475		42.5								
480										



Notes:
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DTW = depth to water
ft = feet
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

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WELL LOG

Well ID: **KAFB-106247**
Page: **49 of 52**

Drilling Company: **Cascade**
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Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
480	1.4			B, M, P, V, FOC	476 - 486		SP		Poorly graded sand: 10YR 5/2, grayish brown; loose; moist; 95% fine to medium sand (65% fine, 35% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 480.75 ft, 10YR 5/3, brown; trace quartz gravel to 1 1/8". At 482 ft, trace lithic gravel to 1 7/8".	
485	34.7						SW		Well-graded sand: 10YR 5/3, brown; loose; moist; 90% fine to coarse sand (25% fine, 65% medium, 10% coarse); 10% gravel to 2 7/8"; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: well-graded sand with gravel at 487 ft, 75% sand; 25% gravel.	
490				B, M, P, V, FOC			SP		Poorly graded sand: 10YR 5/2, grayish brown; loose; moist; 95% fine to medium sand (65% fine, 35% medium); trace gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic	

Notes:
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

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EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **50 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
490	1.3			T	486 - 496				fragments. Core bag not opened, 490 to 492 ft sent to lab for thermal conductivity analysis.	3" Schedule 80 PVC Sump, 490 to 492 ft bgs
							GW		Well-graded gravel with sand: 10YR 4/2, dark grayish brown; loose; moist; 70% gravel to 2 7/8"; 30% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; trace clay; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: clay is present as nodules.	
495	34.3				496 - 500		SW-SC		Well-graded sand with clay and gravel: 10YR 5/2, grayish brown; loose; moist; 50% fine to coarse sand (20% fine, 65% medium, 15% coarse); 40% gravel to 2 1/4"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
				B, M, P, V			GW		Well-graded gravel with sand: 10YR 5/2, grayish brown; loose; moist; 50% gravel to 2 1/4"; 45% fine to coarse sand (20% fine, 65% medium, 15% coarse); subangular to subrounded; 5% clay, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
500										

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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**
Page: **51 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
500	0.6	34.4			500 - 515		GW			Native Soil/ Slough, 500 to 515 ft bgs
							SW		Well-graded sand: 10YR 5/2, grayish brown; loose; moist; 90% fine to coarse sand (15% fine, 75% medium, 10% coarse); 10% gravel to 2"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 502 ft, well-graded sand with gravel; 80% sand (15% fine, 65% medium, 20% coarse); 20% gravel to 3".	
							GW		Well-graded gravel with sand: 10YR 5/2, grayish brown; loose; moist; 60% gravel to 2 7/8"; 40% fine to coarse sand (20% fine, 65% medium, 15% coarse); subangular to subrounded; trace clay, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
505							SW		Well-graded sand with gravel: 10YR 5/2, grayish brown; loose; moist; 70% fine to coarse sand (15% fine, 65% medium, 20% coarse); 30% gravel to 2"; subangular to subrounded; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with clay and gravel from 505.75 to 506 ft, 70% sand; 20% gravel; 10% clay, low plasticity. Lense of clayey sand from 506 to 506.75 ft, 10YR 7.3, very pale brown; soft; 70% sand (35% very fine, 65% fine); trace medium sand; 30% clay, high plasticity; fine to medium sand with calcium carbonate cement from 506 to 506.15 ft.	
							CL		@ 506.75 ft - Clay: 10YR 6/2, light brownish gray; stiff; slightly moist; medium plasticity; 90% clay; 10% very fine to fine sand (35% very fine, 65% fine); trace medium sand; trace gravel to 3/8"; subangular to	
510										

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1014**
Location: **Kirtland AFB, New Mexico**
Start Date: **1/4/19**
Completion Date: **3/1/19**

WELL LOG

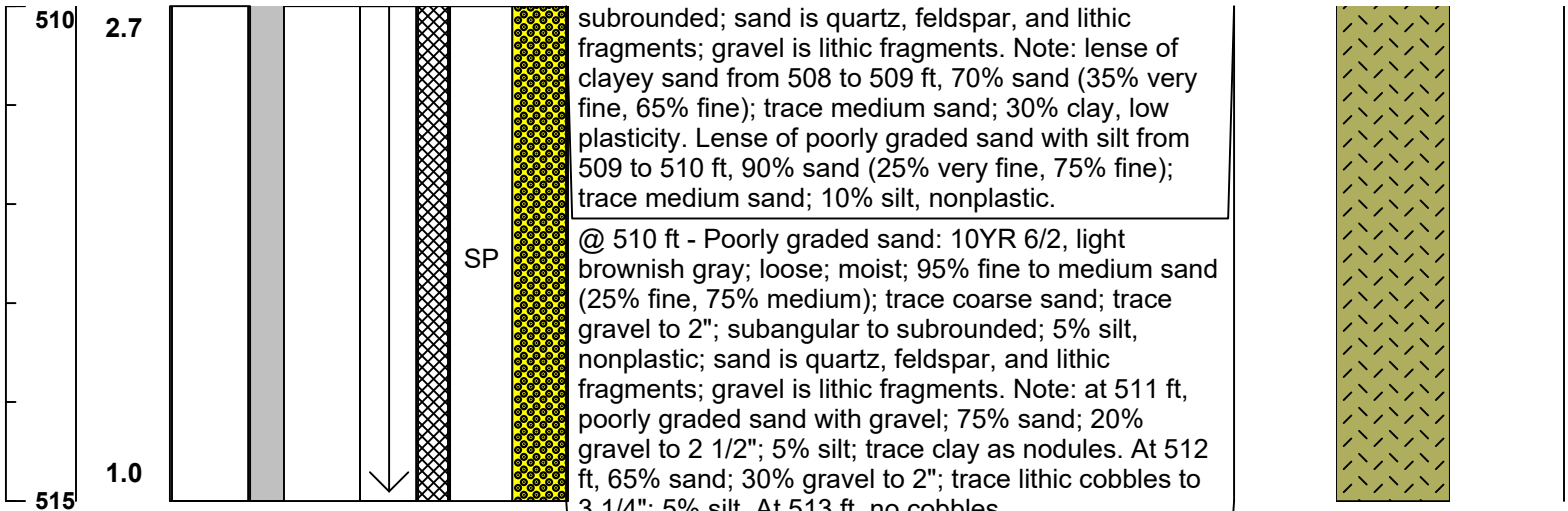
Well ID: **KAFB-106247**
Page: **52 of 52**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details (1) (2)
510	2.7						SP		subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of clayey sand from 508 to 509 ft, 70% sand (35% very fine, 65% fine); trace medium sand; 30% clay, low plasticity. Lense of poorly graded sand with silt from 509 to 510 ft, 90% sand (25% very fine, 75% fine); trace medium sand; 10% silt, nonplastic. @ 510 ft - Poorly graded sand: 10YR 6/2, light brownish gray; loose; moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; trace gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: at 511 ft, poorly graded sand with gravel; 75% sand; 20% gravel to 2 1/2"; 5% silt; trace clay as nodules. At 512 ft, 65% sand; 30% gravel to 2"; trace lithic cobbles to 3 1/4"; 5% silt. At 513 ft, no cobbles. TD = 515 ft	
515	1.0									



Notes:
(1) Current Water Table Well
(2) Contingency Well
▽ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
DTW = depth to water
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **1 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
0							SW		Well-graded sand with gravel and cobbles; brown; slightly moist; gravel to 1 1/2"; cobbles to 4"; subrounded. Note: hydroknife to 8 ft for utilities clearance on 10/18/18.	Top of Casing, 0.5 ft, 3/4" Schedule 80 PVC Riser
5										Neat Portland Cement, 5% Bentonite Solids, 1 to 3 ft bgs
										Hydrated Uncoated Bentonite Chips, 3/8", 3 to 99 ft bgs
10										
24.5							SW-SM		Well-graded sand with silt and gravel: 5YR 4/6, yellowish red; loose; slightly moist; 75% fine to coarse sand (20% fine, 60% medium, 20% coarse); 15% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 9 ft, 5YR 4/4, reddish brown; 70% sand; 15%	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **2 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
10	36.1				8 - 16		SW-SM		gravel; 10% silt; 5% clay, nonplastic.	
							CL		Clay with sand: 5YR 5/4, reddish brown; medium stiff; low plasticity; 60% clay; 5% silt, nonplastic; 25% fine to coarse sand (30% fine, 40% medium, 30% coarse); 10% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is mottled to 5YR 7/2, pinkish gray, and includes secondary calcium carbonate. Weak product odor.	
15	24.9				16 - 22		ML		Silt: 5YR 5/6, yellowish red; soft; slightly moist; 80% silt; 20% clay; nonplastic. Note: product odor. From 14 to 14.5 ft, stiff; stringers of secondary calcium carbonate present, 5YR 7/2, pinkish gray. At 14.5 ft, trace fine to medium sand. At 15.5 ft, trace fine to medium sand; trace gravel to 3/8"; sand is quartz and lithic fragments; gravel is lithic fragments; strong product odor.	
							SC		Clayey sand: 5YR 5/6, yellowish red; loose; slightly moist; 70% very fine to coarse sand (10% very fine, 20% fine, 40% medium, 30% coarse); 10% gravel to 1 1/8"; subangular to subrounded; 15% clay; 5% silt; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
20							ML		Silt: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 80% silt; 20% clay; nonplastic; trace	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **3 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
20	2547								fine to medium sand; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 20 ft, trace lithic gravel to 1/2".	
	24.9				22 - 26		ML		Silt with sand: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 75% silt; 10% clay; nonplastic; 15% very fine to medium sand (30% very fine, 30% fine, 40% medium); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
25	22.1				26 - 32				Silt: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to coarse sand; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 24 ft, trace lithic gravel to 1/2". At 26 ft, 5YR 5/4, reddish brown.	
30										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
30	2330								Silt: see description on previous page. At 31 ft, 5YR 6/4, light reddish brown; trace fine to coarse sand; trace gravel to 5/8"; sand is quartz and lithic fragments; gravel is lithic fragments.	
	22.7				32 - 36		ML		Silt with sand: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 75% silt; 10% clay; nonplastic; 15% very fine to medium sand (30% very fine, 30% fine, 40% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 34 ft, gravel to 5/8"; sand and gravel include caliche.	
35	21.6				36 - 42				Silt: 5YR 4/6, yellowish red; soft; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to medium sand; sand is quartz, lithic fragments, and caliche. Note: strong product odor. At 39 ft, 5YR 5/4, reddish brown.	
40										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **5 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
40	2434				42 - 46		ML		Silt: 5YR 5/4, reddish brown; soft; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to medium sand; sand is quartz, lithic fragments, and caliche. Note: strong product odor. At 44 ft, 5YR 5/6, yellowish red. Lense of silt with sand from 46.8 to 47.2 ft, 5YR 5/6, yellowish red; 75% silt; 10% clay; 15% very fine to medium sand.	
45	22.7				46 - 52				Silt: 5YR 4/4, reddish brown; soft to medium stiff; slightly moist; low plasticity; 80% silt; 20% clay; trace fine to medium sand; sand is lithic fragments and caliche. Note: strong product odor. At 49 ft, 7.5YR 5/4, brown.	
50	21.9									

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
50	2991								Silt: 7.5YR 5/4, brown; soft to medium stiff; low plasticity; 80% silt; 20% clay; trace fine to medium sand; sand is lithic fragments and caliche. Note: strong product odor. At 52 ft, trace gravel to 3/8"; lithic fragments and caliche.	
	22.6				52 - 56		ML		Silt: 7.5YR 5/4, brown; soft to medium stiff; low plasticity; 70% silt; 20% clay; 10% fine to coarse sand (40% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor. At 56 ft, nonplastic; 80% silt; 20% clay; trace fine to medium sand; trace gravel to 1/2". At 58 ft, 75% silt, 20% clay; 5% fine to coarse sand; trace gravel to 3/8". At 59 ft, 7.5YR 5/6, strong brown.	
55	22.1				56 - 62					
60										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **7 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
60	3131			P, V			ML		Silt: 7.5YR 5/6, strong brown; soft; nonplastic; slightly moist; 75% silt; 20% clay; 5% fine to coarse sand (40% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; sand is lithic fragments and caliche; gravel is lithic fragments. Note: strong product odor.	
	21.4				62 - 66		SM		Silty sand: 5YR 5/4, reddish brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
65							ML		Silt: 5YR 5/6, yellowish red; soft; slightly moist; nonplastic; 90% silt; 10% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace gravel to 5/8"; subangular to subrounded; sand is quartz and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
	22.5				66 - 72		SW-SM		Well-graded sand with silt: 7.5YR 5/3, brown; loose; slightly moist; 85% very fine to coarse sand (15% very fine; 35% fine, 30% medium, 20% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
							ML		@ 68 ft - Silt: 7.5YR 5/4, brown; soft; nonplastic; 80% silt; 20% clay. Note: clay is present as nodules. Strong	
70										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **8 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
70	2834						SW-SM		product odor.	
									@ 70 ft - Well-graded sand with silt: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (45% fine, 45% medium, 10% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and quartz. Note: strong product odor.	
	24.3				72 - 76				@ 71 ft - Silt: 7.5YR 5/4, brown; soft; nonplastic; 80% silt; 20% clay. Note: clay is present as nodules. Strong product odor.	
75							ML		@ 72 ft - Silt: 7.5YR 5/6, strong brown; soft to medium stiff; 80% silt, 10% clay; 10% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; sand is lithic fragments and caliche; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. Strong product odor. At 74 ft, 5% clay; 5% gravel to 5/8". At 76 ft, 90% silt, 5% clay; 5% sand; trace gravel to 3/8".	
	22.5				76 - 82					
80										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **9 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
80	2271				82 - 86		ML		Silt: 7.5YR 5/6, strong brown; soft to medium stiff; 80% silt; 15% clay; 5% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace coarse sand; sand is lithic fragments and caliche. Note: secondary calcium carbonate coating and staining throughout core. Strong product odor. At 82 ft, soft to hard; 80% silt; 20% clay; no sand.	
					23.1					
85					86 - 92				Sandy silt: 7.5YR 5/6, strong brown; soft; slightly moist; 50% silt, nonplastic; 10% clay; 40% very fine to medium sand (30% very fine, 30% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present as medium stiff nodules. Strong product odor.	
					22.2		SM		Silty sand: 7.5YR 5/3, brown; loose; slightly moist; 60% very fine to medium sand (20% very fine, 65% fine, 15% medium); subangular to subrounded; 30% silt, nonplastic; 10% clay; sand is quartz, feldspar, and	
90										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **10 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
90	2546						SM		lithic fragments. Note: clay is present as nodules to 5" with calcium carbonate cement. At 89 ft, 80% sand; 15% silt; 5% clay; clay nodules are smaller and hard; strong product odor.	
	22.4				92 - 96		SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% very fine to medium sand (30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
95							SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor.	
	23.2				96 - 102		SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% very fine to medium sand (30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
100							SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong	10/20 Silica Sand, 99 to 103.5 ft bgs

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **11 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
100	3097			P, V	102 - 106		SP		product odor. Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 102 ft, trace clay is present as nodules. At 106 ft, no clay. At 107 ft, trace clay is present as nodules; sand includes caliche.	3/4" Schedule 80 PVC Screen, 0.010" slot, 100.1 to 102.1 ft bgs
	2560									Hydrated Uncoated Bentonite Chips, 3/8", 103.5 to 109.5 ft bgs
	30.8									
	2600									
105	35.5						CL		Clay: 7.5YR 5/3, brown; medium stiff; medium plasticity.	10/20 Silica Sand, 109.5 to 114.6 ft bgs
							SP		Poorly graded sand: 10YR 5/4, yellowish brown;	
110										

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **12 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
110					106 - 115		SP		loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, caliche, and lithic fragments; gravel is lithic fragments. Note: Clay is present as nodules. Strong product odor.	3/4" Schedule 80 PVC Screen, 0.010" slot, 110.6 to 112.6 ft bgs
							CL		@110.8 ft - Clay: 7.5YR 5/3, brown; stiff to very stiff; medium plasticity.	
							SW-SC		@ 111.4 ft - Well-graded sand with clay: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (50% fine, 35% medium, 15% coarse); 5% gravel to 5/8", subangular to subrounded; 10% clay, medium plasticity; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: clay is present as medium stiff nodules, 7.5YR 5/4, brown.	
115	3825	30.7		P, V			CL		@ 112.8 ft - Clay: 7.5YR 5/4, brown; medium stiff; medium plasticity. Note: strong product odor. At 113 ft, 7.5YR 4/6, strong brown; stiff; secondary calcium carbonate coating throughout core. At 116 ft, 7.5YR 4/6, strong brown; very stiff.	Hydrated Uncoated Bentonite Chips, 3/8", 114.6 to 156.5 ft bgs
	3402	31.1			115 - 120					
	2981	28.7					ML		Silt: 10YR 5/4, yellowish brown; soft; nonplastic; 90% silt, 10% clay. Note: strong product odor. Lense of clay from 117.8 to 118 ft, 7.5YR 4/6, strong brown; stiff; medium plasticity; secondary calcium carbonate coating throughout core. At 118 ft, 80% silt; 20% clay; trace caliche gravel to 1 1/2".	
120										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **13 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
120	2179	29.3	UV		120 - 126				Core bag not opened, 120 to 122 ft and 122 to 124 ft sent to lab for UV analysis.	
			B, M, UV				CL		Clay: 7.5YR 5/4, brown; very stiff; medium plasticity. Note: mottled to 7.5YR 7/2, pinkish gray. Secondary calcium carbonate present. Weak product odor.	
125		28.8			126 - 130		ML		Silt: 7.5YR 5/4, brown; soft to medium stiff; nonplastic; 70% silt, 30% clay, medium plasticity. Note: strong product odor.	
							CL		Clay: 7.5YR 5/4, brown; very stiff; medium plasticity. Note: strong product odor.	
							ML		Silt: 7.5YR 5/3, brown; soft; nonplastic; 90% silt, 10% clay. Note: clay is present as nodules. Strong product odor.	
130							SP-SM		Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 85% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **14 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
130	3278	25.1			130 - 136		SP		subrounded; 10% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as nodules. Strong product odor.	
									Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor. From 132.8 to 133.8 ft, 95% sand (45% fine, 55% medium, trace coarse); 5% gravel to 1 1/4"; no silt; gravel is quartz and lithic fragments.	
							SP-SM		Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: Strong product odor.	
135							SW			
		26.5			136 - 140				@ 135 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 65% medium, 15% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 136 ft, well-graded sand with gravel; 80% sand (20% fine, 60% medium, 20% coarse); 15% gravel to 1"; 5% silt.	
	3246						SP		@ 137 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz,	
140										

Notes:
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NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **15 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
140	31.1			P, V	140 - 146		ML		feldspar, caliche, and lithic fragments. Note: strong product odor. At 138 ft, trace gravel to 3/8"; gravel is quartz and lithic fragments. From 138.8 to 139.2 ft, 90% very fine to medium sand; trace coarse sand; 5% gravel to 2". Silt: 7.5YR 5/6, strong brown; soft to medium stiff; nonplastic; 80% silt; 20% clay, low plasticity. Note: clay is present as nodules; mottled to 10YR 7/3, very pale brown; secondary calcium carbonate present. Strong product odor. At 142 ft, 10YR 6/4, light yellowish brown to 10YR 6/3, pale brown; soft to very stiff; low plasticity; 70% silt; 30% clay.	
145							CL		Clay: 10YR 7/3, very pale brown; stiff; medium plasticity; 80% clay; 20% silt. Note: secondary calcium carbonate cement present. Strong product odor. At 144.75 ft, 10YR 5/4, yellowish brown; medium stiff to stiff; low plasticity. Lense of poorly graded sand with silt from 145.8 to 146 ft, trace gravel to 3/8".	
150	27.2				146 - 150		SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 60% medium, 10% coarse); 5% gravel to 1 3/4"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Clay is present as nodules. At 148 ft, 85% sand (20% fine, 65% medium, 15% coarse); 10% gravel to 1 1/8"; 5% silt; no clay.	

Notes:
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NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

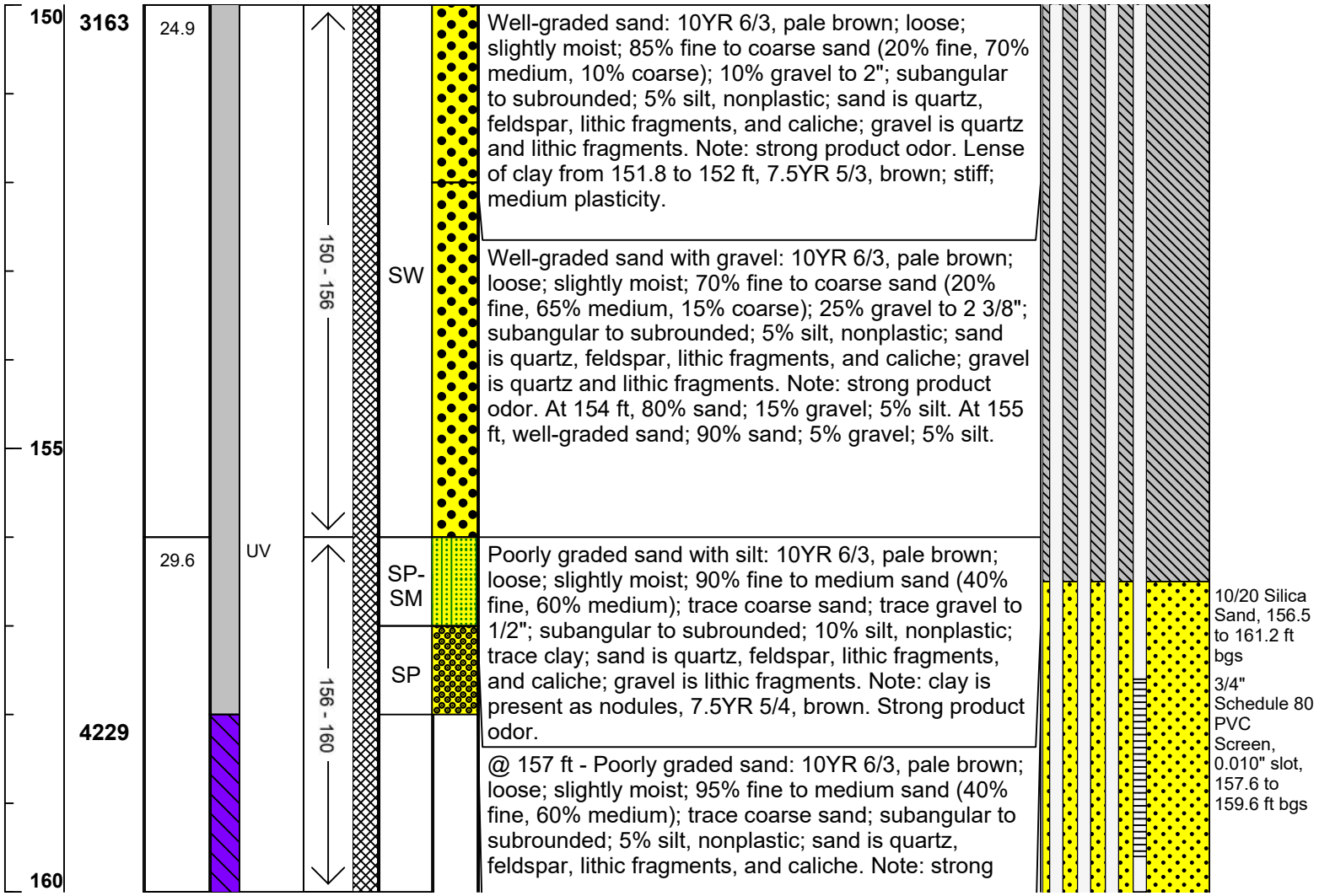
WELL LOG

Well ID: **KAFB-106V1**
Page: **16 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **17 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
160	5743	32.3		P, V, B, M	160 - 166		CL		product odor. @ 158 ft - Core bag not opened, 158 to 160 ft sent to lab for UV analysis. @ 160 ft - Clay: 10YR 5/4, yellowish brown; medium stiff; medium plasticity. Note: mottled to 10YR 7/2, light gray. Mottled areas contain secondary calcium carbonate. Brownish yellow and black staining around mottling. Strong product odor.	Hydrated Uncoated Bentonite Chips, 3/8", 161.2 to 214 ft bgs
	4270			UV					Core bag not opened, 162 to 164 ft and 164 to 166 ft sent to lab for UV analysis.	
165				UV						
		29.4			166 - 170		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (60% fine, 40% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: strong product odor. Lense of clay from 168.6 to 168.8 ft, 7.5YR 5/3, brown; medium stiff; medium plasticity; interbedded with secondary calcium carbonate stringers. At 168.8 ft, trace gravel to 5/8".	
170										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **18 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
170	4338	28.6			170 - 176		SP		Poorly graded sand: see description on previous page.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: Strong product odor. Lense of clay from 171.8 to 172 ft; 7.5YR 5/4, brown; stiff; medium plasticity; clay nodules have center that is 7.5YR 8/2, pinkish white, with secondary calcium carbonate. At 172 ft; 85% sand; 10% gravel; 5% clay as nodules. At 174 ft, 5% silt, nonplastic; trace clay.	
175		36.1			176 - 180		SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% fine to medium sand (50% fine, 50% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: strong product odor.	
180										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **19 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
180	3578	33.4			180 - 186		SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 60% medium, 10% coarse); 5% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: Strong product odor. At 184 ft, 95% sand; trace gravel to 1 1/8"; 5% silt.	
185		37.6					SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to coarse sand (30% fine, 60% medium, 10% coarse); trace gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel	
190										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **20 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
190	3463				186 - 196		SW		is quartz and lithic fragments. Note: Strong product odor. Lense of poorly graded sand from 189 to 189.5 ft, 95% sand (40% fine, 60% medium); 5% silt, nonplastic. At 189.5 ft, well-graded sand with gravel; 65% sand; 30% gravel to 1 7/8"; 5% silt. Lense of poorly graded sand with gravel from 190 to 190.5 ft, 85% fine to medium sand; 15% gravel to 2".	
							SP			
							SW		@ 190.5 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 65% fine to coarse sand (30% fine, 60% medium, 10% coarse); 30% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: Strong product odor.	
							CL		@ 191.5 ft - Poorly graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to medium sand (40% fine, 60% medium); trace coarse sand; 15% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
195							SP			
	33.4				196 - 200		SW		@ 192.4 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 65% fine to coarse sand (30% fine, 60% medium, 10% coarse); 30% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: Strong product odor. Lense of well-graded sand with clay and gravel from 193.8 to 194 ft, 60% sand; 30% gravel; 10% clay nodules, 7.5YR 5/3, brown.	
200									@ 194 ft - Clay: 7.5YR 5/3, brown; medium stiff to stiff; medium plasticity. Note: strong product odor.	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **21 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
200	3201	27.2	UV		200 - 204		SW		@ 195 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 100% fine to medium sand (40% fine, 60% medium); trace coarse sand; trace gravel to 1 1/4"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
									@ 196 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 60% medium, 10% coarse); 10% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: clay is present as nodules. Strong product odor. At 197 ft, well-graded sand with gravel, 75% sand; 20% gravel; 5% silt. At 198 ft, 80% sand (30% fine, 50% medium, 20% coarse); 15% gravel to 1 1/4". Lense of poorly graded sand with silt from 199.8 to 200 ft; 10YR 6/2, light brownish gray; 90% fine to medium sand; trace coarse sand; trace gravel to 1/2"; 10% silt.	
205		30.4			204 - 210		SW		@ 202 ft - Core bag not opened, 202 to 204 ft sent to lab for UV analysis.	
							ML		@ 204 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 75% fine to coarse sand (30% fine, 60% medium, 10% coarse); 20% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: clay is present as nodules. Strong product odor. Lense of clay from 204.9 to 205.25 ft, 7.5YR 5/2, brown; medium stiff; medium plasticity; black staining present.	
							SP			
							SW		@ 205.25 ft - Silt: 7.5YR 5/2, brown; soft; nonplastic;	
210										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

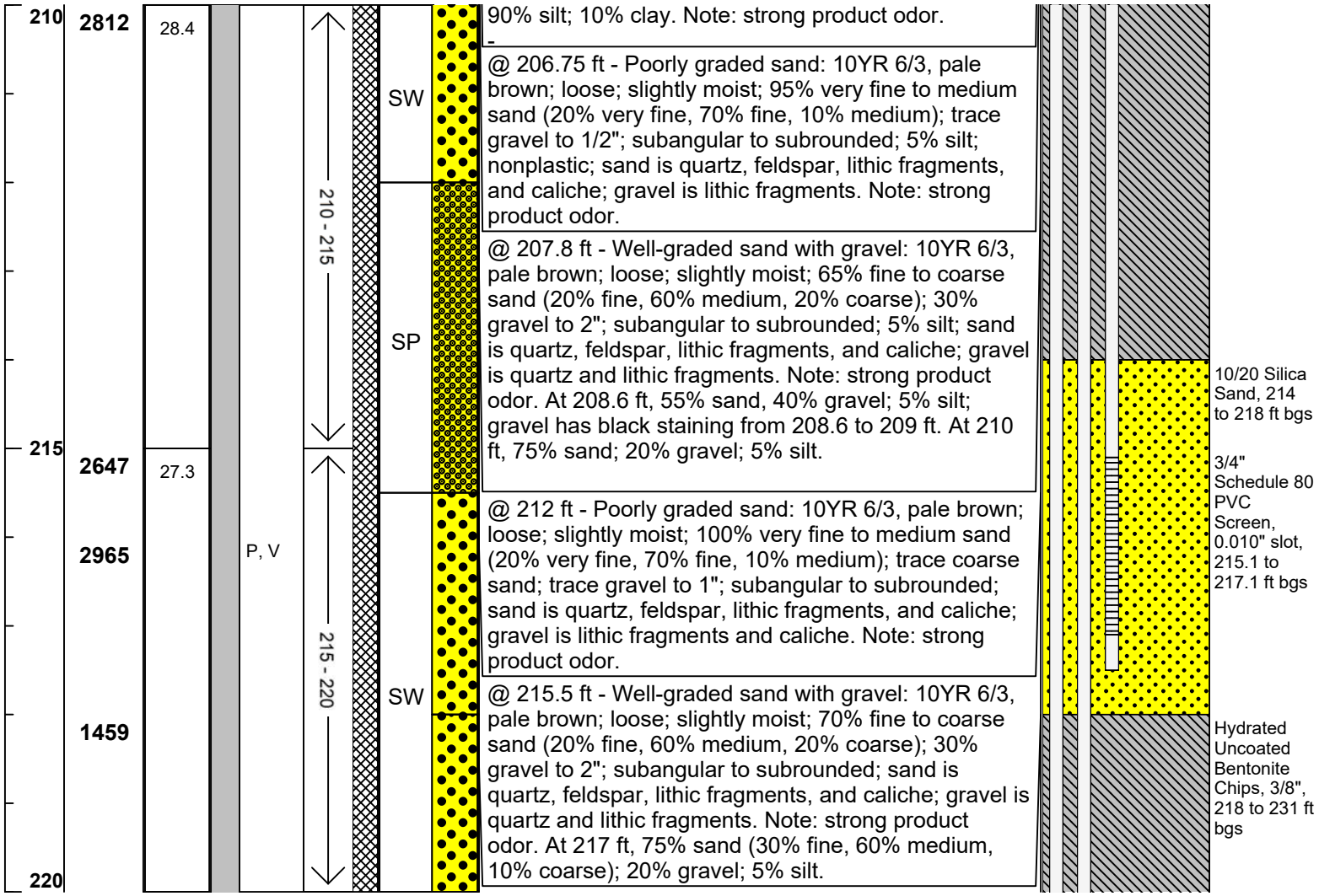
WELL LOG

Well ID: **KAFB-106V1**
Page: **22 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **23 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
220	3491	26.1			220 - 222		SP		@ 218 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (30% fine, 60% medium, 10% coarse); 10% gravel to 2"; subangular to subrounded; 5% silt; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: Clay is present as hard nodules, 7.5YR 4/4, brown, low plasticity. Strong product odor.	
		30.5			222 - 230		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; 5% silt; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor. Lense of well-graded sand from 222.8 to 223.5 ft, 10YR 7/2, light gray; 90% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% caliche gravel to 1".	
225							SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 15% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Lense of clay from 225.4 to 225.6 ft, 7.5YR 5/3, brown; medium stiff; medium plasticity.	
							SP		@ 225.6 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (10% fine, 70% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
230							SW			

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **24 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
230	2154	34.4			230 - 234		SP-SM		@ 227.5 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% silt; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	10/20 Silica Sand, 231 to 235 ft bgs
									@ 229 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 15% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Clay is present as nodules.	
		25.7			234 - 240		SW		@ 230 ft - Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 30% fine, 50% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor. Lense of silt from 231 to 232 ft, soft; 85% silt; 15% clay. At 232 ft, trace coarse sand.	Hydrated Uncoated Bentonite Chips, 3/8", 235 to 248.8 ft bgs
235							SP		@ 233 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: clay is present as a coating on gravel. Strong product odor. At 234 ft, well-graded sand with gravel, 75% sand; 20% gravel to 1 1/2"; 5% silt.	
							SW		@ 235.8 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% silt. Note: strong product odor.	
240										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **25 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
240	6831	32.7			240 - 245		SW		@ 237 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 60% fine to coarse sand (10% fine, 70% medium, 20% coarse); 35% gravel to 1 1/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 240 ft, 80% sand; 15% gravel; 5% silt.	
							SP-SM		Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 30% fine, 50% medium); trace coarse sand; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
245		30.4			245 - 250		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% silt. Note: strong product odor. At 245 ft, trace clay as nodules.	
							SW		Well-graded sand: 10YR 6/2, light brownish gray; loose; slightly moist; 95% fine to coarse sand (25% fine, 60% medium, 15% coarse); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
250							SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% silt; trace clay.	10/20 Silica Sand, 248.8 to 253 ft bgs

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **26 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
250	4450	24.0		P, V	250 - 255		SP		Note: clay is present as nodules. Strong product odor. At 251 ft, 10YR 5/3, brown. Lense of well-graded sand from 254 to 254.5 ft, 10YR 6/3, pale brown; 95% fine to coarse sand (25% fine, 60% medium, 15% coarse); 5% gravel to 1/2"; subangular to subrounded.	3/4" Schedule 80 PVC Screen, 0.010" slot, 250.1 to 252.1 ft bgs
	7263									
	8563									Hydrated Uncoated Bentonite Chips, 3/8", 253 to 260 ft bgs
255		24.3			255 - 260		SP-SM		Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 30% fine, 50% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
							SP		@ 258 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to medium sand (25% fine, 75% medium); trace coarse sand; 5% silt; trace clay. Note: clay is present as nodules. Strong product	
260										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **27 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
260	4049	28.1			260 - 266		SP		odor. At 260 ft, 10YR 5/2, grayish brown; trace gravel to 3/8"; gravel is lithic fragments.	10/20 Silica Sand, 260 to 266 ft bgs; 3/4" Schedule 80 PVC Screen, 0.010" slot, 260.6 to 262.6 ft bgs
							SP-SM		Poorly graded sand with silt: 10YR 5/2, grayish brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 30% fine, 50% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
265		26.7			266 - 270		CL		Clay: 7.5YR 4/4, brown; hard; dry; medium plasticity. Note: black staining present. Secondary calcium carbonate throughout. Strong product odor. From 267 to 267.5 ft, 5Y 5/2, olive gray. From 267.5 to 268 ft, 7.5YR 5/2, brown. At 268 ft, mottled to 7.5YR 6/2, pinkish gray.	Native Soil/Slough, 266 to 285 ft bgs
							ML		Silt: 7.5YR 5/3, brown; soft; nonplastic; 85% silt; 15% clay. Note: strong product odor.	
270										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **28 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
270	1788	35.4		P, V	270 - 275		CL		Clay: 7.5YR 5/3, brown; hard; dry; low to medium plasticity; 100% clay; trace caliche gravel and cobbles. Note: strong product odor. Secondary calcium carbonate staining throughout, 7.5YR 8/1, white.	
									Clay: 7.5YR 5/3, brown; soft to hard; 90% clay; 10% silt, nonplastic; trace cobbles; cobbles are caliche. Note: clay contains secondary calcium carbonate staining. Strong product odor.	
275		28.3			275 - 281				Clay: 7.5YR 5/3, brown; very stiff; dry to slightly moist; medium plasticity. Note: secondary calcium carbonate staining throughout. Strong product odor.	
							ML		Silt: 10YR 5/3, brown; soft; nonplastic; slightly moist; 70% silt; 30% clay, medium plasticity. Note: Clay is present as medium stiff nodules, 10YR 5/4, yellowish	
280										

Notes:
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NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/16/2018**
Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**
Page: **29 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" Slot Screen**
Seal Material(s): **Cement, Bentonite, High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
280	3681								brown. Strong product odor.	
	1439	27.4					CL		Clay: 10YR 5/4, yellowish brown; very stiff; medium plasticity; dry to slightly moist. Note: strong product odor. Lense of silty sand with clay from 281 to 281.5 ft, 10YR 5/3, brown; 75% very fine to medium sand; 15% silt, nonplastic; 10% clay as nodules, 7.5YR 4/6, strong brown.	
	1363				281 - 285		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (10% fine, 50% medium, 40% coarse); 30% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 282.5 ft, 60% sand (10% fine, 75% medium, 15% coarse); 40% gravel. At 283.8 ft, 85% sand; 15% gravel.	
285	1160			P, V			SP-SM		Poorly graded sand with silt: 10YR 6/3, pale brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 50% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. TD = 285 ft	
290										

Notes:
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NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **1 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
0							SW		Well-graded sand with gravel and cobbles: brown; slightly moist; gravel to 1 1/2"; subrounded; cobbles to 4"; subrounded. Note: Hydroknife to 8 ft for utilities clearance on 10/18/2018.	Top of Casing, 0.5 ft, 3/4" Schedule 80 PVC Riser
5					8 - 10				No recovery	Neat Portland Cement, 5% Bentonite Solids, 1 to 3 ft bgs
10										Hydrated Uncoated Bentonite Chips, 3/8", 3 to 98.5 ft bgs

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
10	173.0				10 - 16		ML		Silt: 5YR 5/6, yellowish red; soft; slightly moist; nonplastic; 90% silt; 10% clay.	
							SC		Clayey sand: 5YR 5/6, yellowish red; loose; slightly moist; 70% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); 5% gravel to 3/8"; subangular to subrounded; 15% clay; 10% silt; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
							CL		Clay: 5YR 5/4, reddish brown; soft to medium stiff; medium plasticity; 100% clay; trace sand. Note: at 13.5 ft, 80% clay; 20% silt.	
15									Clay with sand: 5YR 5/4, reddish brown; soft to medium stiff; medium plasticity; 70% clay; 10% silt; 20% fine to coarse sand (20% fine, 40% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
					16 - 21		ML		Silt: 5YR 5/6, yellowish red; soft; slightly moist; medium plasticitiy; 70% silt; 20% clay; 10% fine to coarse sand (30% fine, 30% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
							SC		Clayey sand: 5YR 5/6, yellowish red; loose; slightly moist; 60% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); subangular to subrounded; 20% clay; 20% silt; nonplastic; sand is quartz, feldspar, and lithic fragments.	
20							SM		Silty sand: 5YR 5/6, yellowish red; loose; slightly	

23.0 — 24.5

Notes:
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NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **3 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
20										
384.0									moist; 50% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); subangular to subrounded; 30% silt; 20% clay; nonplastic; sand is quartz, feldspar, and lithic fragments.	
24.1					21 - 26		ML		Silt: 5YR 5/6, yellowish red; soft; slightly moist; medium plasticitiy; 70% silt; 20% clay; 10% fine to coarse sand (30% fine, 30% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 21 ft, 5YR 5/4, reddish brown; 70% silt; 25% clay; 5% sand.	
							CL		Clay: 5YR 4/4, reddish brown; soft; slightly moist; medium plasticity; 75% clay; 25% silt.	
25										
24.4					26 - 31		ML		Silt: 5YR 5/3, reddish brown; soft; slightly moist; low plasticity; 80% silt; 20% clay. Note: at 26 ft, soft to very stiff; 60% silt; 40% clay. At 28 ft; 5YR 4/6, yellowish red; soft to stiff; trace sand. At 29 ft; trace gravel to 1 1/4".	
30										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
30	221.9						ML		Silt: see description on previous page.	
						27.4	CL		Clay: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; medium plasticity; 60% clay; 40% silt; trace sand.	
					31 - 36		ML		Silt: 5YR 4/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace sand; trace gravel to 1 1/4". Note: at 34 ft, 5YR 5/4, reddish brown.	
35							CL		Clay: 5YR 5/4, reddish brown; soft to stiff; slightly moist; medium plasticity; 75% clay; 25% silt; trace sand. Note: at 36 ft, 5YR 4/4, reddish brown; soft to medium stiff; 60% clay, 40% silt.	
						27.4				
					36 - 41		ML		Silt: 5YR 5/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace gravel to 3/8"; trace sand.	
40										

Notes:
UV = ultraviolet fluorescence
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
40										
373.6									Silt: 5YR 5/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace sand. Note: at 41 ft, weak product odor. At 42 ft, 50% silt; 40% clay; 10% fine to coarse sand (30% fine, 50% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; product odor.	
24.4					41 - 46		ML		Silt with sand: 5YR 5/4, reddish brown; soft to stiff; slightly moist; low plasticity; 50% silt; 30% clay; 20% fine to coarse sand (30% fine, 50% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
45										
27.7					46 - 51				Silt: 7.5YR 4/4, brown; soft to stiff; slightly moist; low plasticity; 60% silt; 30% clay; 10% fine to coarse sand (30% fine, 50% medium, 20% coarse); sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
50									Silt with sand: 5YR 5/4, reddish brown; soft to stiff; slightly moist; low plasticity; 50% silt; 30% clay; 20%	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
50	2701				51 - 56		ML		fine to coarse sand (30% fine, 50% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 51 ft, 65% silt; 10% clay; 25% sand; trace gravel to 1/2". At 52 ft; 75% silt; 5% clay; 20% sand (60% fine, 40% medium, trace coarse); trace gravel to 3/8". At 53 ft, 80% silt; 5% clay; 15% sand.	
55	23.4									
	25.0				56 - 61				Silt: 5YR 5/4, reddish brown; soft to stiff; slightly moist; low plasticity; 90% silt; 10% fine to coarse sand; trace gravel to 1 1/2". Note: strong product odor.	
60										

Notes:
UV = ultraviolet fluorescence
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

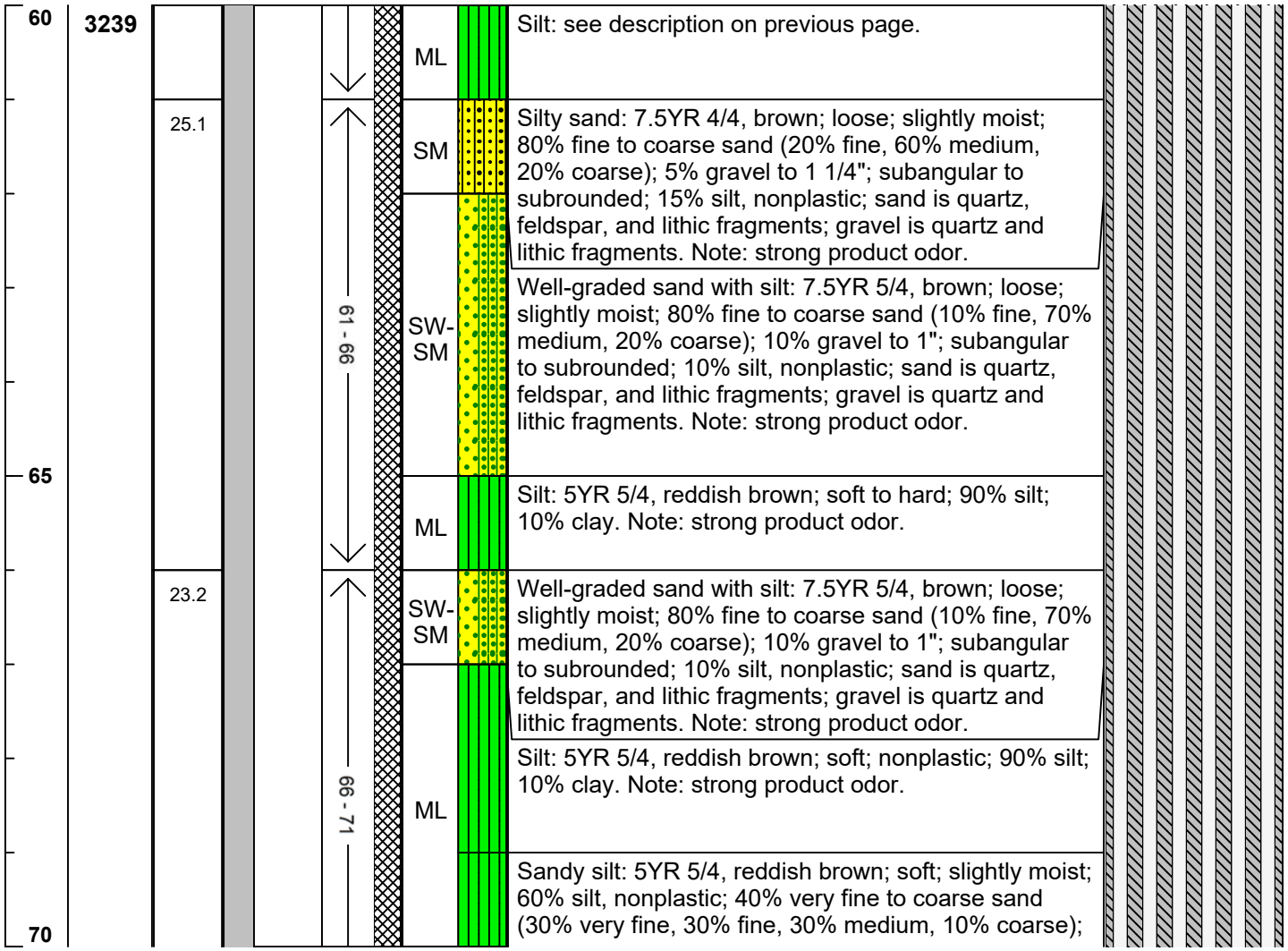
WELL LOG

Well ID: **KAFB-106V2**
Page: **7 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**



Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
							ML		Silt: see description on previous page.	
	25.1				61 - 66		SM		Silty sand: 7.5YR 4/4, brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 60% medium, 20% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
							SW-SM		Well-graded sand with silt: 7.5YR 5/4, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
							ML		Silt: 5YR 5/4, reddish brown; soft to hard; 90% silt; 10% clay. Note: strong product odor.	
	23.2				66 - 71		SW-SM		Well-graded sand with silt: 7.5YR 5/4, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
							ML		Silt: 5YR 5/4, reddish brown; soft; nonplastic; 90% silt; 10% clay. Note: strong product odor.	
									Sandy silt: 5YR 5/4, reddish brown; soft; slightly moist; 60% silt, nonplastic; 40% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse);	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
70	2359								subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong odor.	
		24.4			71 - 76				Silt: 5YR 5/4, reddish brown; soft; slightly moist; 80% silt; 10% clay; 10% very fine to coarse sand; trace gravel to 2". Note: strong product odor. At 71 ft; 7.5YR 5/4, brown; nonplastic; 90% silt; 10% clay. At 72 ft, soft to stiff.	
75		28.9			76 - 81		ML		Silt with sand: 7.5YR 5/4, brown; soft; nonplastic; slightly moist; 70% silt; 10% clay; 20% very fine to medium sand (20% very fine; 20% fine, 60% medium); trace coarse sand; trace gravel to 1/2"; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 75 ft, 70% silt; 10% clay; 20% sand. At 77.75 ft, gravel to 1 1/4". At 79 ft; 75% silt; 10% clay; 15% sand.	
80										

Notes:
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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **9 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
80	3254			V, P	81 - 86	22.6	ML		Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 75% silt; 15% clay; 10% very fine to medium sand. Note: strong product odor. At 81 ft, trace gravel to 1 1/2"; silt and clay present as nodules coated in secondary calcium carbonate. At 84 ft, trace coarse sand.	
85					86 - 88	25.4	SM		Silty sand: 5YR 5/4, reddish brown; loose; slightly moist; 65% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; 35% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: At 88 ft; 60% sand; 5% gravel to 1"; 25% silt; 10% clay.	
90					88 - 91	67.9	SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 85% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace	

Notes:
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ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **10 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
90	2288				91 - 96		SP-SM		coarse sand; 5% gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. At 91 ft, 10YR 6/3, pale brown.	10/20 Silica Sand, 98.5 to 103.5 ft bgs
	24.7						SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (40% very fine, 50% fine, 10% medium); trace gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
95					96 - 100		SP-SC		Poorly graded sand with clay: 10YR 6/2, light brownish gray; loose; slightly moist; 90% very fine to medium sand (30% very fine, 50% fine, 20% medium); trace coarse sand; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
	59.9						SW		@ 97 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% very fine to coarse sand (20% very fine, 50% fine, 20% medium, 10% coarse); 10% gravel to 5/8"; subangular to subrounded; 5% silt; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note:	
100										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **11 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
100	1778	57.2	V, P		100 - 105		SP		strong product odor. @ 98 ft - No recovery Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 60% fine, 10% medium); trace gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 101 ft, 10YR 6/2, light brownish gray; 90% sand (20% very fine, 60% fine, 20% medium, trace coarse); 5% gravel to 1/2". At 102 ft, no gravel. At 105 ft, no silt or gravel; 5% soft nonplastic clay nodules, 7.5YR 5/3, brown.	3/4" Schedule 80 PVC Screen, 0.010" slot, 100.2 to 102.2 ft bgs Hydrated Uncoated Bentonite Chips, 3/8", 103.5 to 113.9 ft bgs
		38.8								
		48.5								
105		37.8			105 - 110		ML		Silt: 10YR 6/4, light yellowish brown; soft; slightly moist; nonplastic; 100% silt. Note: strong product odor.	
							CL		Clay: 7.5YR 5/4, brown; medium stiff to very stiff; medium plasticity. Note: strong product odor.	
110							SP		Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 60% fine, 10% medium); subangular to	

Notes:
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

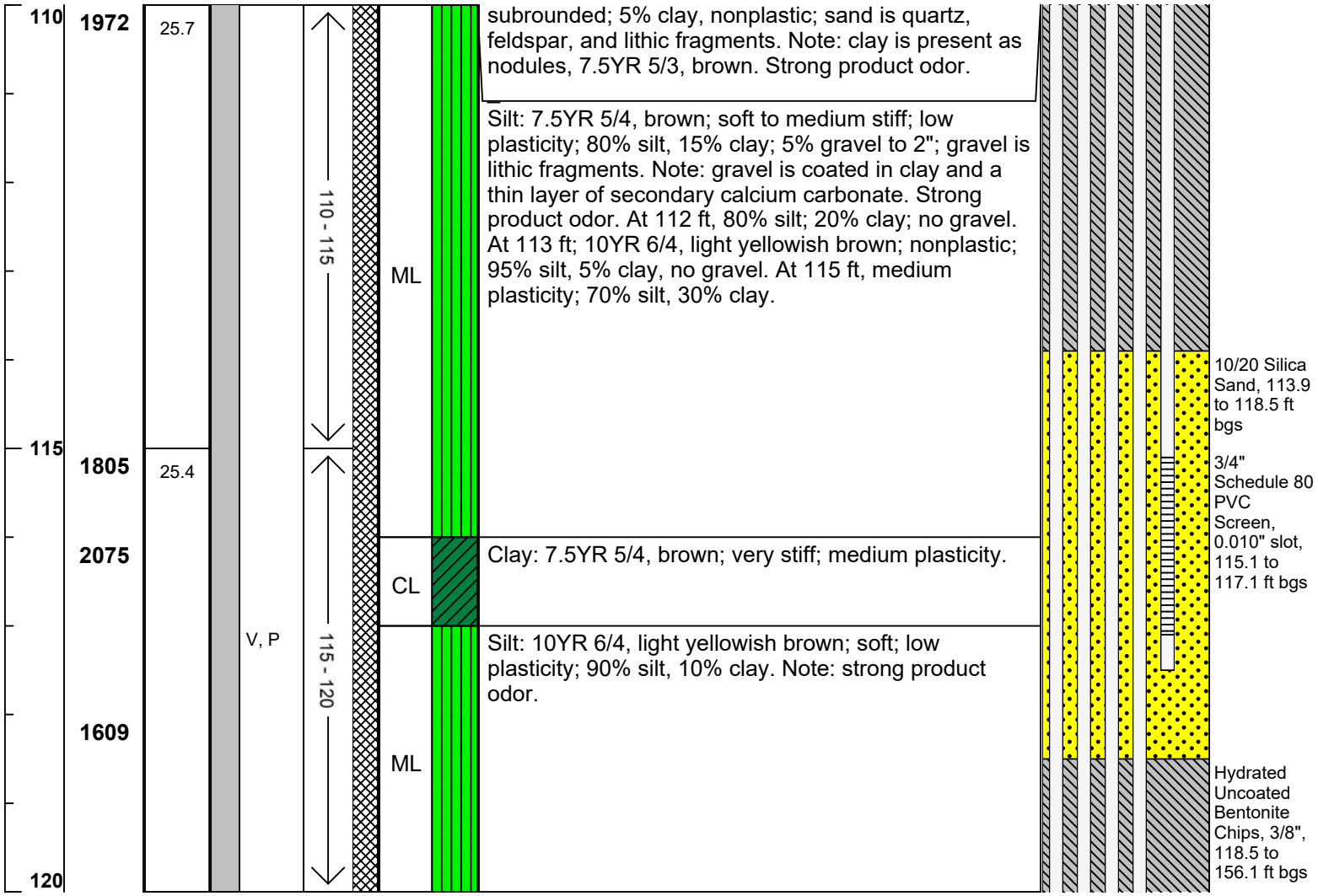
WELL LOG

Well ID: **KAFB-106V2**
Page: **12 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **13 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
120	1724			UV	120 - 126				Core bag not opened; 120 -122 ft and 122 - 124 ft sent to lab for UV analysis.	
				UV						
125							CL		Clay: 7.5YR 5/4, brown; very stiff; medium plasticity. Note: strong product odor. From 126 - 127 ft, trace caliche gravel and cobbles with a clay coating. At 127 ft, medium stiff.	
					126 - 130		ML		Silt: 7.5YR 5/3, brown; soft; nonplastic; 80% silt; 20% clay. Note: clay is present as nodules; strong product odor. Lense of poorly graded sand with silt from 129.5 to 130 ft; 10YR 5/3, brown; loose; 85% very fine to medium sand; 10% nonplastic silt; 5% clay as nodules; sand includes caliche.	
130										

29.0
25.7

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
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ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **14 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
130	1904	27.7			130 - 136		SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 65% fine, 15% medium); subangular to subrounded; 5% silt; nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
							SP-SM		Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 85% very fine to medium sand (20% very fine, 65% fine, 15% medium); subangular to subrounded; 10% silt, nonplastic; 5% clay; sand is quartz, feldspar, and lithic fragments. Note: clay is present as nodules. Strong product odor. At 134 ft, 90% very fine to medium sand; trace coarse sand; 10% silt; trace clay as nodules.	
135							SW		Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 136 ft, well-graded sand with gravel; 80% sand; 15% gravel; 5% silt.	
		30.3			136 - 140		SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to medium sand (70% fine, 30% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
140							SP-SM			

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ppmv = parts per million by volume
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UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **15 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
140	2230	29.5		B, M, T	140 - 146		ML		@ 138.5 ft - Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 85% very fine to medium sand (20% very fine, 65% fine, 15% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: clay is present as nodules. Lense of well-graded sand with gravel from 139.4 to 140, 75% fine to coarse sand; 20% gravel to 2"; 5% silt.	
							CL		@ 140 ft - Silt: 7.5YR 5/4, brown; soft; low plasticity; 70% silt; 30% clay. Note: strong product odor. Slightly mottled to 10YR 7/3, very pale brown.	
145									@ 142.8 ft - Clay: 10YR 7/3, very pale brown; stiff; 60% clay; 40% silt. Note: mottled to 7.5YR 5/4, brown. Strong product odor.	
									@ 144 ft - Core bag not opened, 144 to 146 ft sent to lab for analysis.	
		31.1			146 - 150		SP-SM		@ 146 ft - Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 65% fine, 15% medium); trace coarse sand; subangular to subrounded; 10% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as nodules.	
150							SW		@ 147 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 5% gravel to 2 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product	

Notes:
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NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **16 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
150	1806	27.4			150 - 156		SP		odor. At 148 ft, 85% sand; 10% gravel to 2"; 5% silt.	
									Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to medium sand (40% fine, 60% medium); trace coarse sand. 5% gravel to 2 3/8"; 5% silt; sand and gravel are quartz and lithic fragments. Note: strong product odor.	
							SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 75% fine to coarse sand (25% fine, 60% medium, 15% coarse); 20% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Lense of clay from 152.5 to 153 ft, 10YR 5/4, yellowish brown; stiff; medium plasticity; 75% clay, 25% silt. At 153 ft, well-graded sand; 90% fine to coarse sand; 5% gravel to 1 1/2"; 5% silt. Lense of clay from 154 to 154.5 ft, 7.5YR 5/3, brown; stiff to very stiff.	
155										
		26.2			156 - 158		SM		Silty sand: 10YR 5/4, yellowish brown; loose; slightly moist; 85% very fine to medium sand (30% very fine, 45% fine, 25% medium); subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor. At 156 ft, 65% very fine to medium sand; trace coarse sand; 35% silt. Lense of well-graded sand with silt from 157.8 to 158 ft, 7.5YR 5/3, brown; loose; 85% fine to coarse sand; 5% gravel to 3/8"; 10% silt, nonplastic.	
	2264	20.8		P, V			SW		Well-graded sand: 7.5YR 5/3, brown; loose; slighlty moist; 90% fine to coarse sand (50% fine, 30% medium, 20% coarse); 5% gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz,	10/20 Silica Sand, 156.1 to 161.5 ft bgs 3/4" Schedule 80 PVC Screen, 0.010" slot, 157.9 to 159.9 ft bgs
160										

Notes:
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ft = feet
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ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
160	2040	23.9			158 - 163		SP		feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	Hydrated Uncoated Bentonite Chips, 3/8", 161.5 to 213.2 ft bgs
	1944	25.4					SW		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (60% fine, 40% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
		30.9							Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (50% fine, 40% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
165					163 - 170		SP		@ 163 ft - Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 95% fine to medium sand (60% fine, 40% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
			UV						Core bag not opened, 168 - 170 ft sent to lab for UV analysis.	
170										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **18 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
170	2706	25.9			170 - 176		SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (40% fine, 50% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 5% clay, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: clay is present as a coating on the gravel. Strong product odor. Lense of clay from 170.8 to 171.2 ft, 7.5YR 5/4, brown; soft, medium plasticity; 90% clay, 10% gravel to 1". At 172 ft, sand is 30% fine, 50% medium, 20% coarse; 5% silt, nonplastic; no clay.	
175		28.1			176 - 180		SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% fine to medium sand (55% fine, 45% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor.	
180		26.7								

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **19 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
180	2385	27.4			180 - 186		SP-SM		Poorly graded sand with silt: see description on previous page.	
							SW		Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments.	
185		24.1			186 - 189		SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to medium sand (45% fine, 55% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor. At 188 ft, trace gravel to 5/8". At 189 ft, 100% sand; no silt; trace gravel.	
		28.8								
190										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **20 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
190	2687						SP		Poorly graded sand: see description on previous page.	
					189 - 196		SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 55% fine to coarse sand (25% fine, 50% medium, 25% coarse); 40% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 192 ft, 65% sand, 30% gravel; 5% silt; gravel includes caliche.	
			UV						Core bag not opened, 194 - 196 ft sent to lab for UV analysis.	
195										
	30.2				196 - 198		SW		Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (25% fine, 50% medium, 25% coarse); 30% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: strong product odor. At 198 ft, 10YR 6/3, pale brown; 80% sand; 15% gravel.	
	32.8									
200										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **21 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
200	3331				198 - 206		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (25% fine, 50% medium, 25% coarse); 25% gravel to 2 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: strong product odor. At 202 ft; 85% sand (30% fine, 60% medium, 10% coarse); 10% gravel to 2"; 5% silt. At 204 ft, 75% sand; 20% gravel to 1 1/2"; 5% silt; no caliche. At 206 ft, 65% sand; 30% gravel to 1 5/8".	
205					24.3					
					206 - 212		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to medium sand (50% fine, 50% medium); trace coarse sand; 10% gravel to 1";	
210										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **22 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
210	3351	25.6	UV		212 - 215		SP		subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 210 ft, gravel to 1 3/8"; gravel includes caliche. At 212 ft, 95% sand; trace gravel to 1 1/2"; 5% silt.	10/20 Silica Sand, 213.2 to 218.7 ft bgs
									Core bag not opened, 214 to 215 ft sent to lab for UV analysis.	
215	3023	31.2		P, V, B, M	215 - 220		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% fine to medium sand (45% fine, 55% medium); trace coarse sand; 10% gravel to 1 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 216 ft, 95% sand; 5% silt; no gravel. At 220 ft, 10YR 6/4, light yellowish brown; 95% sand (80% fine, 20% medium); trace quartz gravel to 1/2".	3/4" Schedule 80 PVC Screen, 0.010" slot, 215.1 to 217.1 ft bgs
	2552	23.3								
	2233	22.0								Hydrated Uncoated Bentonite Chips, 3/8", 218.7 to 249.2 ft bgs
220										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **23 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
220	3087	34.5			220 - 226		SP		Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 95% fine to medium sand (80% fine, 20% medium); trace gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.	
							SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 15% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 222.5 ft, 70% sand; 25% gravel; 5% silt.	
225							SP		Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 5% silt; 5% clay; nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as small nodules. At 224 ft, 95% sand; 5% silt; trace clay; trace lithic gravel to 1/2". Strong product odor.	
		32.2					SW		Well-graded sand with gravel: 10YR 5/8, yellowish brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 45% medium, 25% coarse); 15% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 226.8 ft, 10YR 5/4, yellowish brown; 90% sand; 5% gravel; 5% clay as nodules.	
							SP			
230							SW		@ 227 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel	

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**
Page: **24 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
230	3633				226 - 236		SW		to 1/2"; subangular to subrounded; 5% silt; trace clay; nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments. Note: strong product odor. @ 229 ft - Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 65% fine to coarse sand (40% fine, 50% medium, 10% coarse); 30% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Lense of clay from 229.5 to 232.2 ft, 7.5 YR 5/3, brown; medium stiff, medium plastic. At 235 ft, 75% sand; 15% gravel to 1 1/2"; 5% silt, 5% clay. At 236 ft, sand is 30% fine, 40% medium, 30% coarse.	
235										
240										

42.9

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

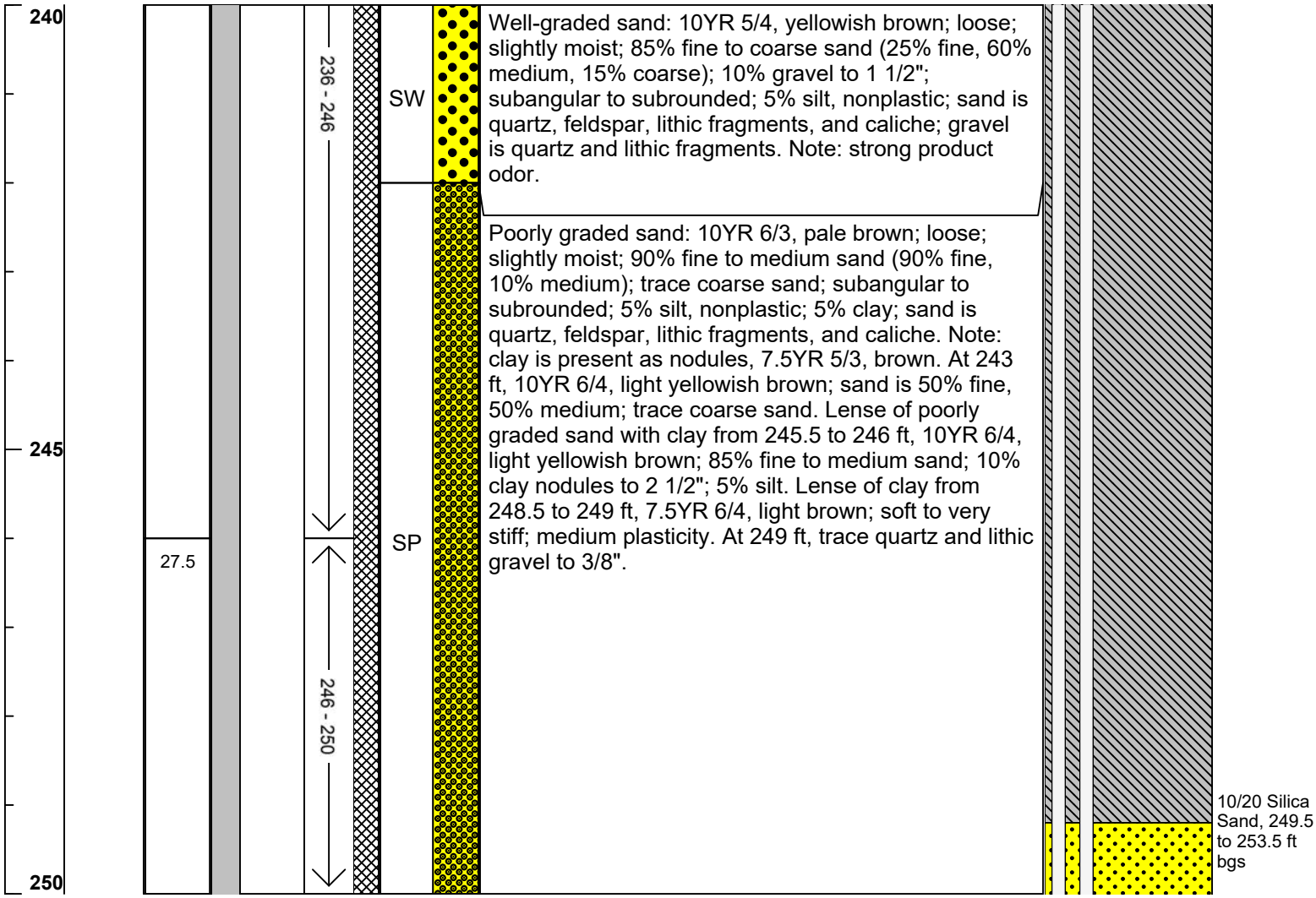
Well ID: **KAFB-106V2**
Page: **25 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
250	3033	28.5		P, V	250 - 256		SP		Poorly graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to medium sand (90% fine, 10% medium); trace coarse sand; subangular to subrounded; 5% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as nodules, 7.5YR 5/3, brown. At 256 ft, 10YR 5/3, brown; trace gravel to 3/8"; gravel is quartz and lithic fragments.	3/4" Schedule 80 PVC Screen, 0.010" slot, 250.2 to 252.2 ft bgs
	3507									Hydrated Uncoated Bentonite Chips, 3/8", 253.5 to 266.4 ft bgs
255	3334	26.0			256 - 260				Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slighlty moist; 90% fine to medium sand (50% fine, 50% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Clay is present as soft nodules, 7.5YR 5/3, brown.	
260										

Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

WELL LOG

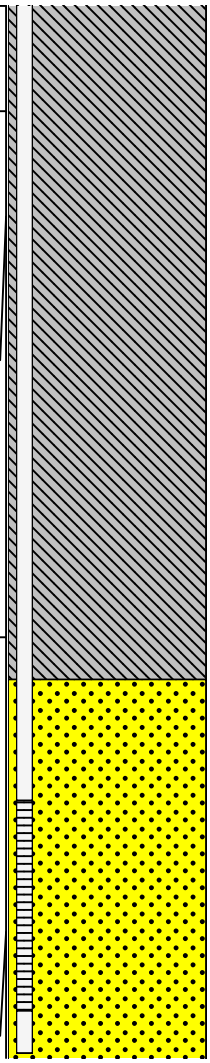
Well ID: **KAFB-106V2**
Page: **27 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
260	3707	23.4			260 - 266		SP		Poorly graded sand: see description on previous page.	
							SW		Well-graded sand: 7.5YR 6/4, light brown; loose; slightly moist; 85% fine to coarse sand (20% fine, 70% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 5% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor. Clay is present as nodules, 7.5YR 5/8, strong brown.	
							SP		Poorly graded sand: 10YR 5/3, brown; loose; slighlty moist; 90% fine to medium sand (90% fine, 10% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 5% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. Clay is present as soft nodules, 7.5YR 5/3, brown.	
265		25.5			266 - 270		SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 70% fine to coarse sand (35% fine, 45% medium, 20% coarse); 30% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. Lense of silty sand from 267 to 267.4 ft, 85% very fine to medium sand; 15% silt, nonplastic. At 267.4 ft, 85% sand (10% fine, 75% medium, 15% coarse); 15% gravel to 1 1/4". At 268 ft, 7.5YR 4/4, brown; 60% sand (10% fine, 60% medium, 30% coarse); 35% gravel to 1 1/4", 5% silt, nonplastic; sand includes caliche.	
							CL			
270										



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

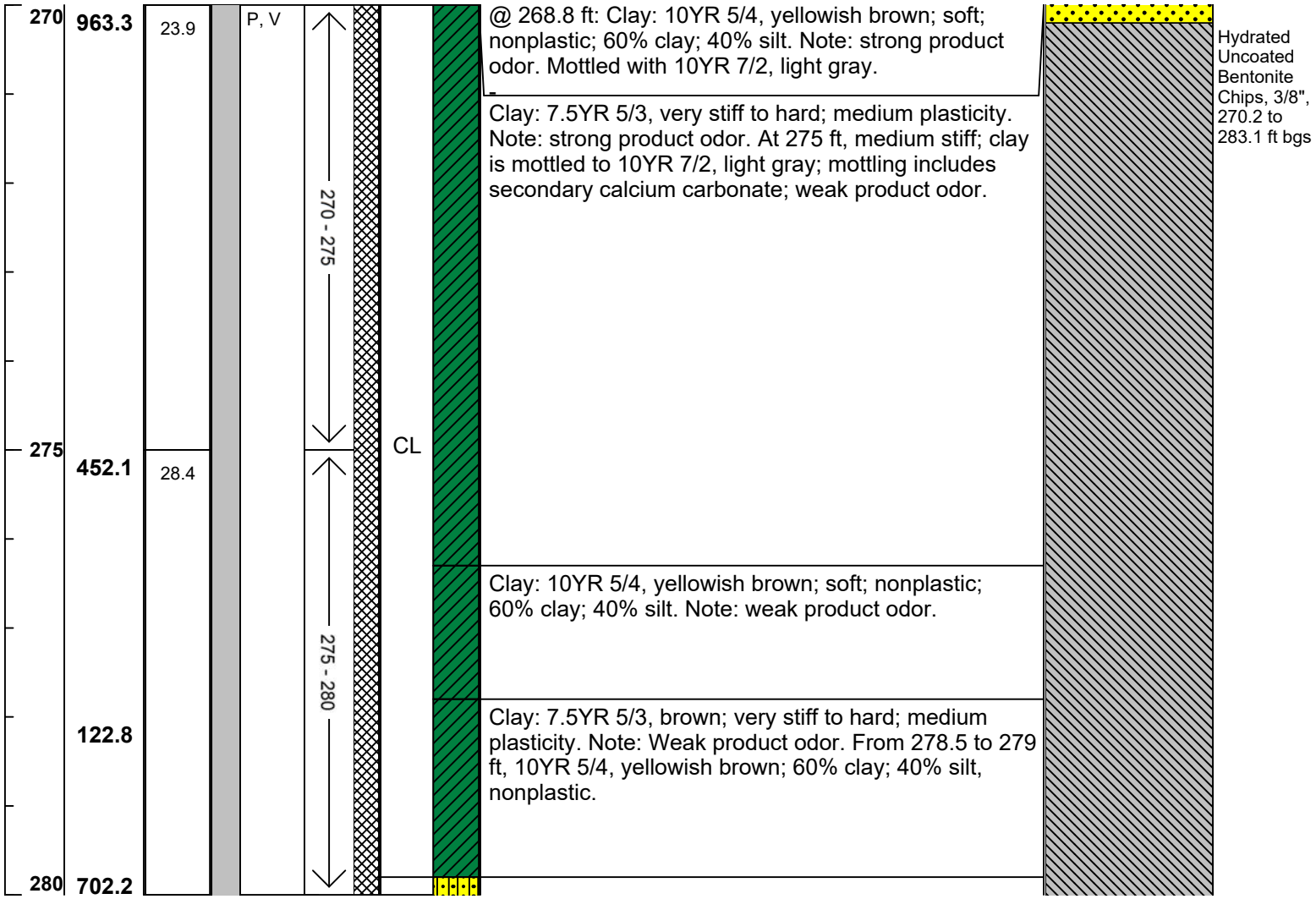
WELL LOG

Well ID: **KAFB-106V2**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

EA Engineering, Science, and Technology, Inc., PBC

Project: **62735DM02.1017**
Location: **Kirtland AFB, New Mexico**
Start Date: **12/11/2018**
Completion Date: **1/24/19**

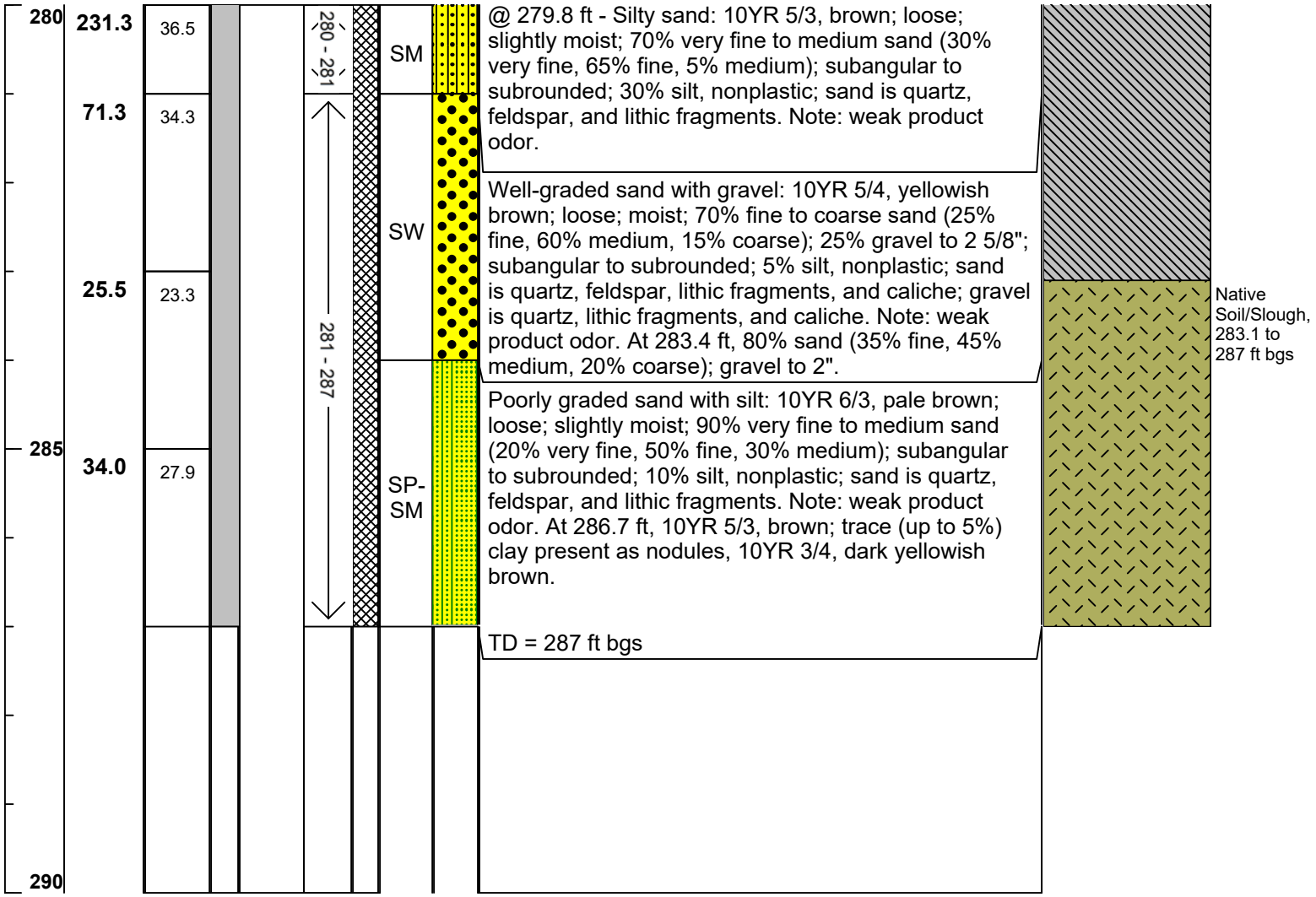
WELL LOG

Well ID: **KAFB-106V2**
Page: **29 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC 0.010" slot screen**
Seal Material(s): **Cement; Bentonite; High Solids Bentonite Grout**
Filter Pack: **10/20 Silica Sand**



Notes:
UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test
Not Tested
None
Interval Fluoresced

Core Recovery
No Recovery
Complete
Disturbed Core

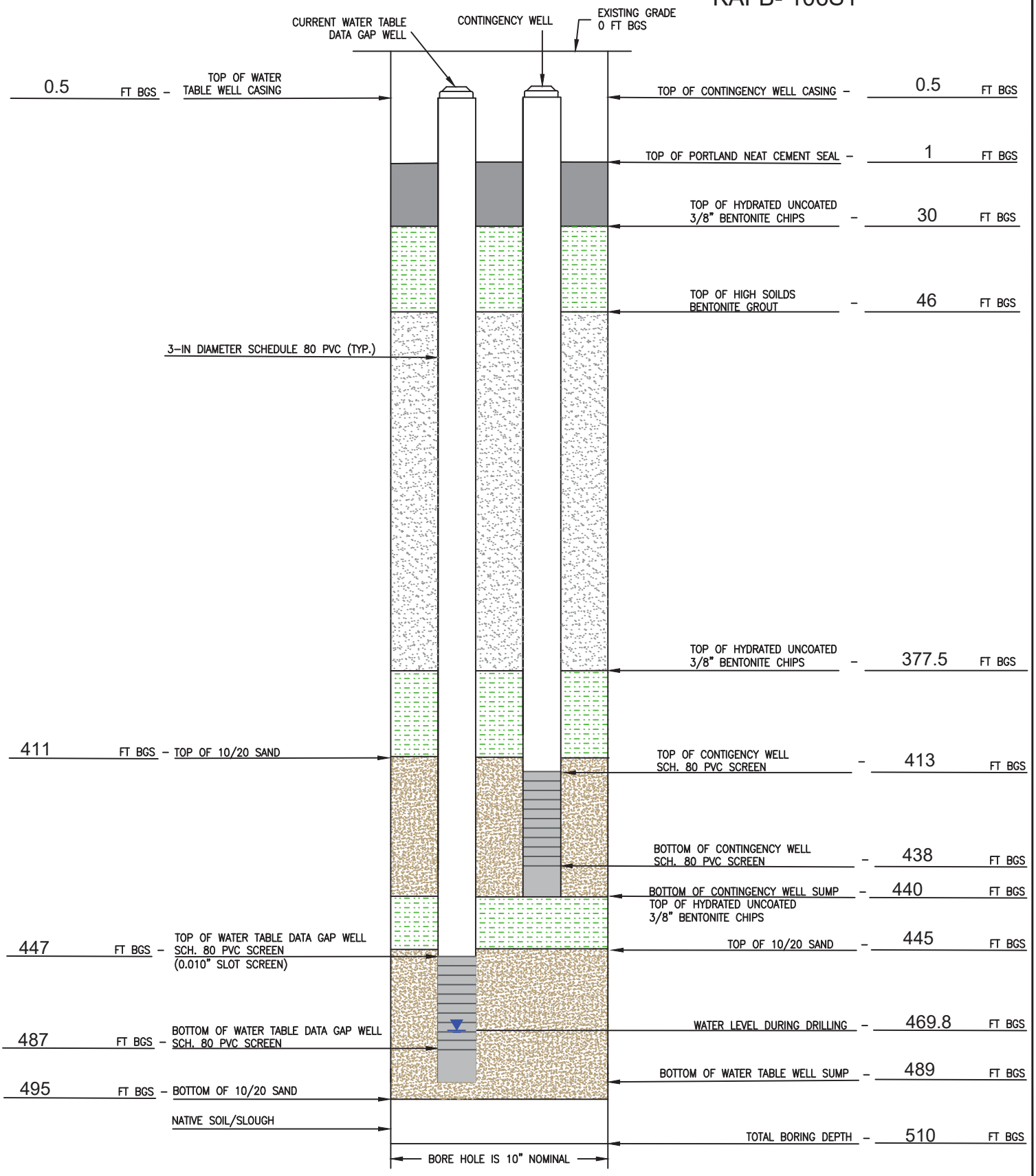
Following coring, the borehole was overdrilled using ARCH for well installation
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
There is a 0.4 ft sump underlying each screen.

APPENDIX C

MONITORING WELL CONSTRUCTION DIAGRAMS

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S1



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

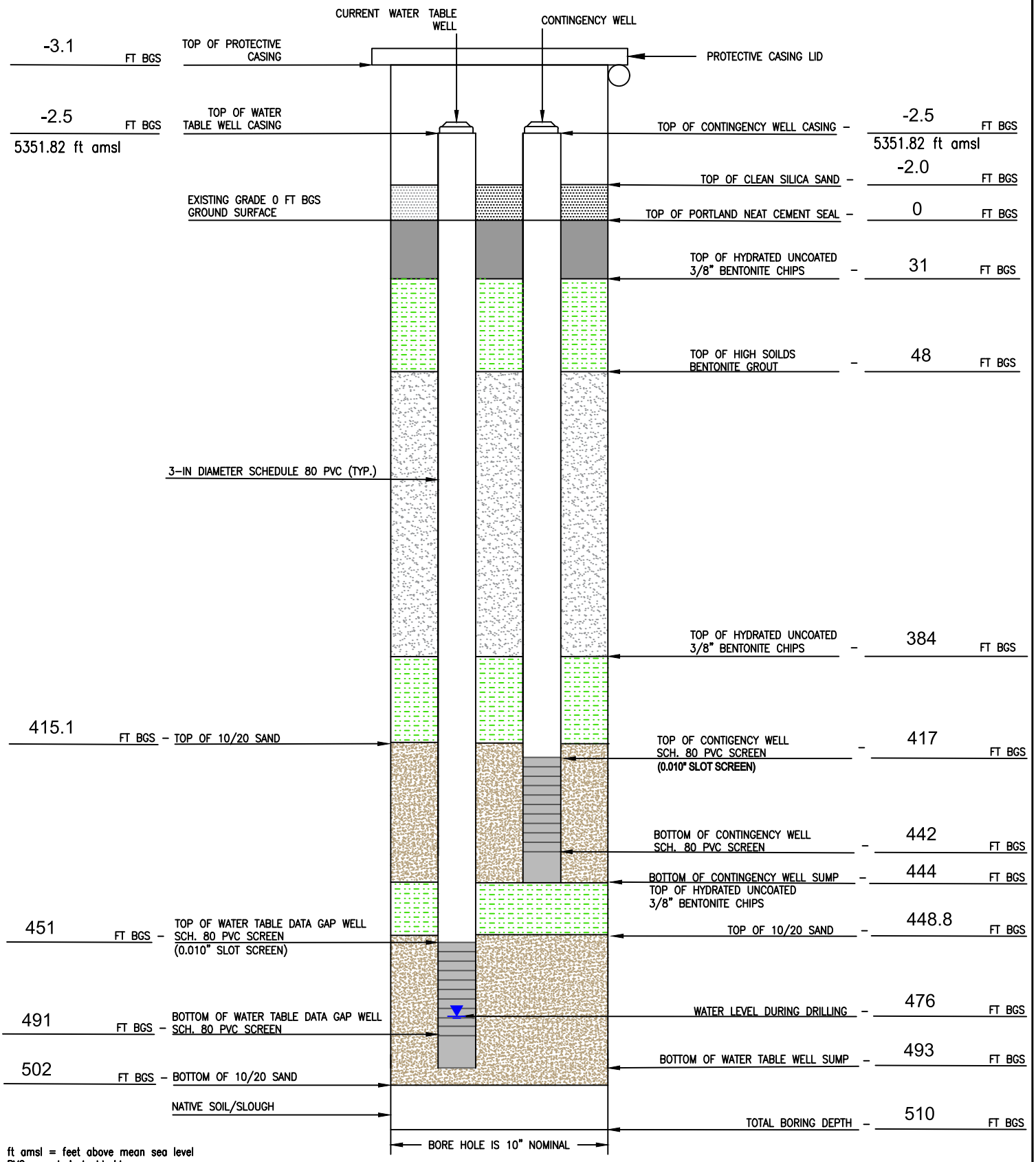
CAD FILE: \\ABQ\Projects\Active Projects\62599DM01 Kirtland BFF_USACE\01_Work Plan\19.0 Data Gap Wells WP\Figures\Nested Monitoring well Field Form.dwg PLOT DATE/TIME: 8/20/2018 – 11:52am

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 18OCT18	INSTALLATION END DATE/TIME: 18FEB19
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106S1	GEOLOGIST: L. Andress/ J. Messenger	DRILLER: R. Rodriquez

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S2



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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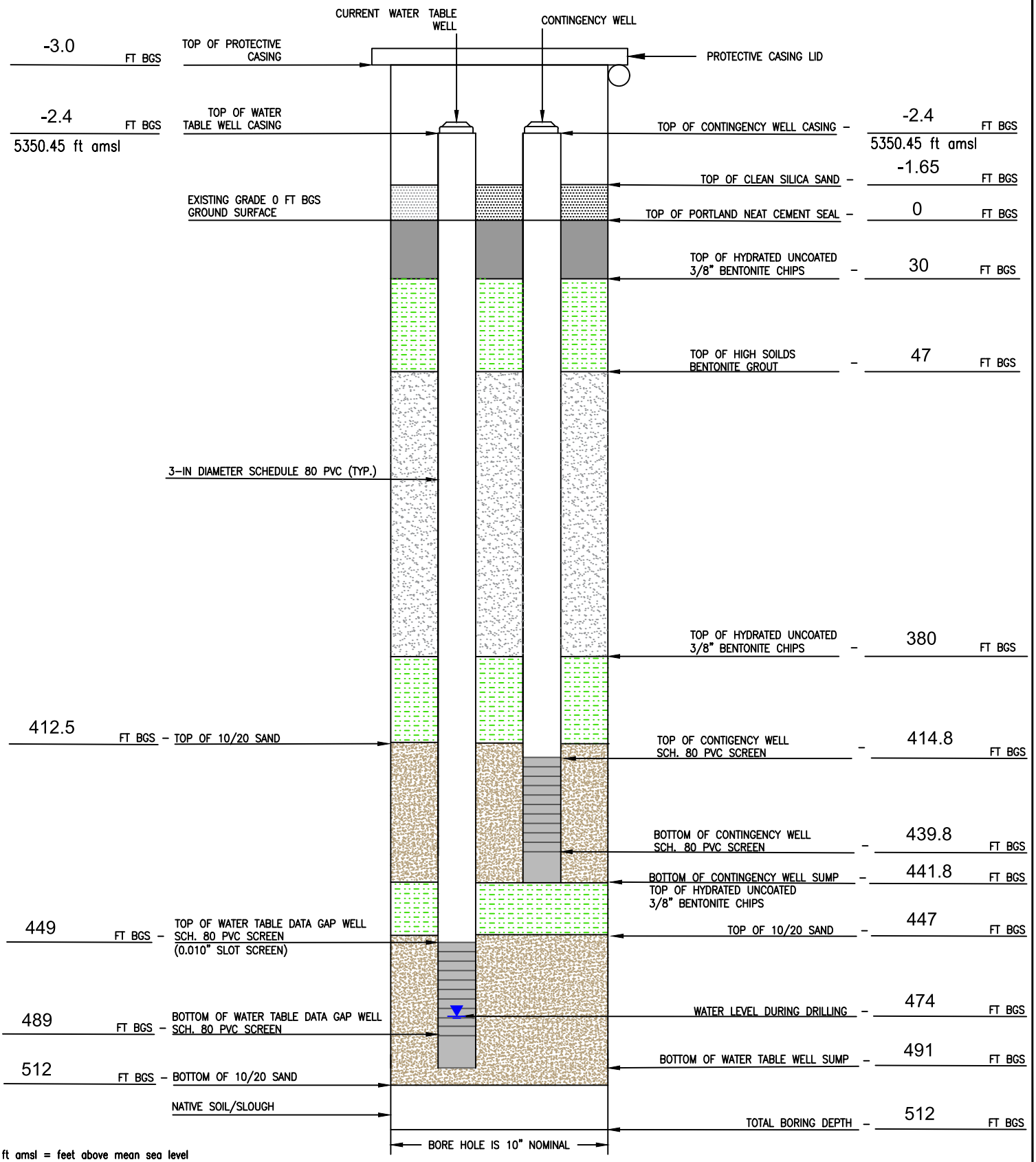
KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 05OCT18	INSTALLATION END DATE/TIME: 21NOV18
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106S2	GEOLOGIST: L. Andress, B. Bockisch, C. Landers	DRILLER: R. Rodriquez

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S3



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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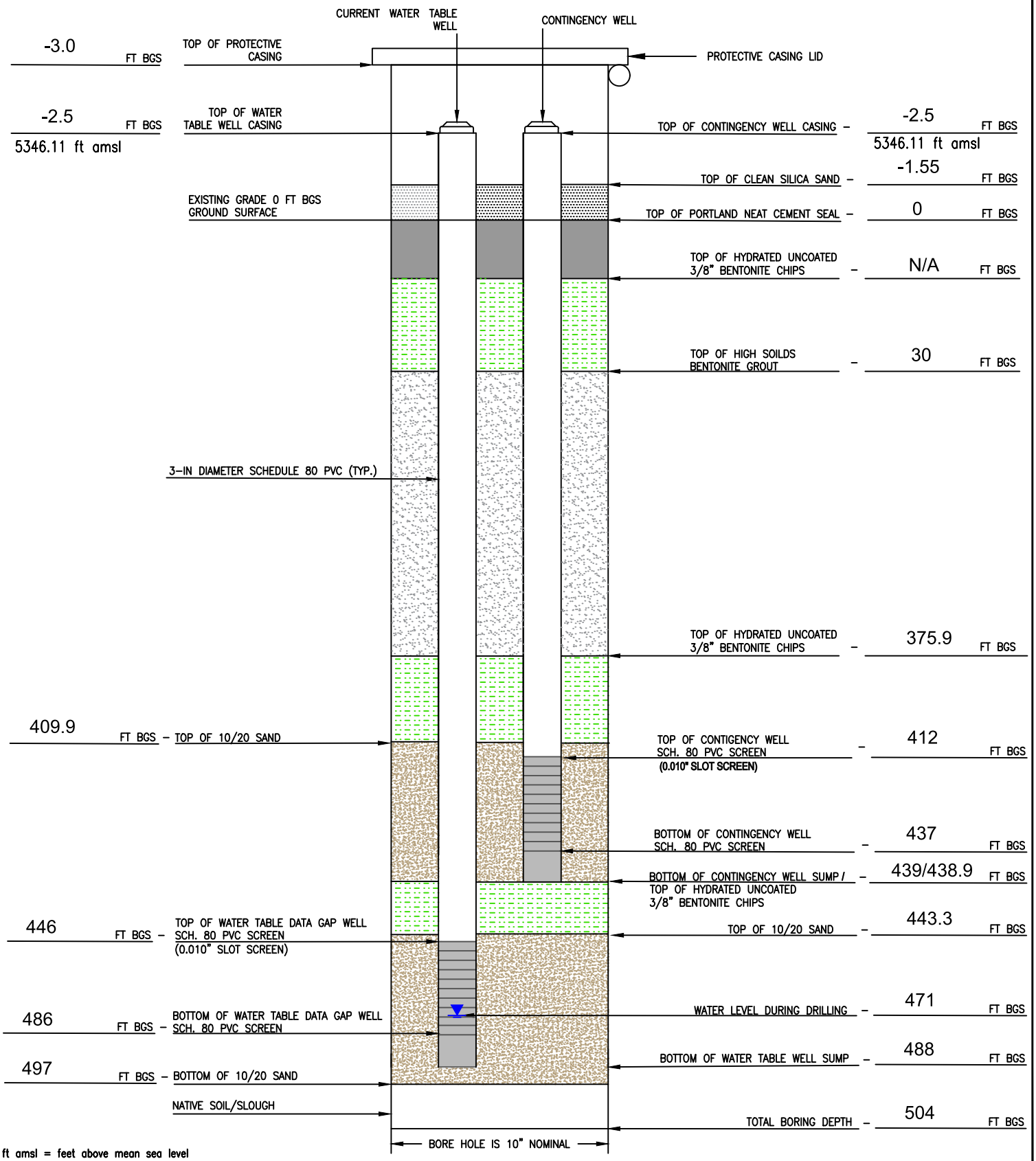
KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 18OCT18	INSTALLATION END DATE/TIME: 29NOV18
PROJECT NO.: 62735DM02.1018	WELL ID: KAFB-106S3	GEOLOGIST: L.Andress, J.Messenger	DRILLER: R. Rodriquez M. Green, F. Chattin

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S4



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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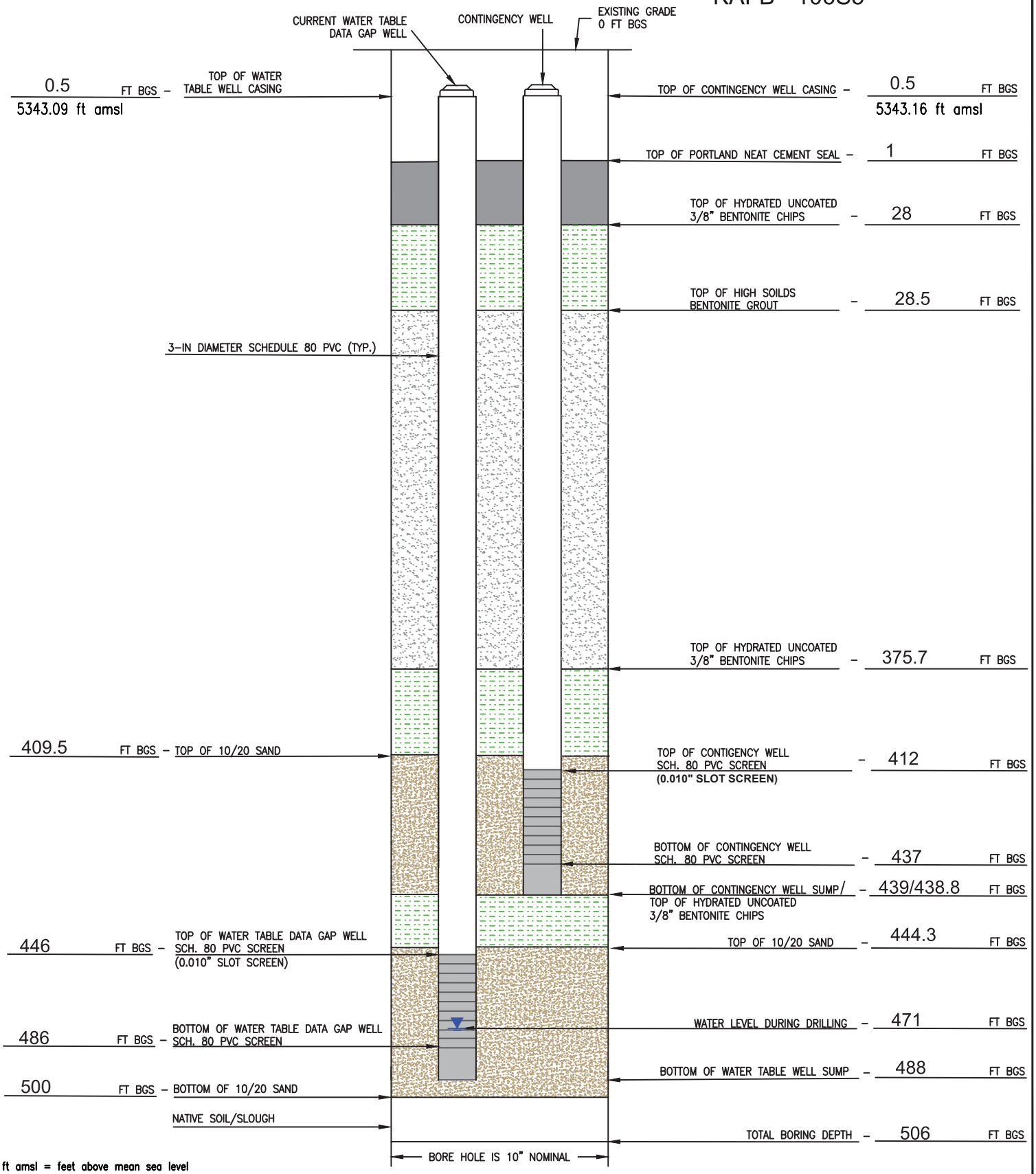
KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 05OCT18	INSTALLATION END DATE/TIME: 16NOV18
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106S4	GEOLOGIST: L. Andress, J. Messenger	DRILLER: R. Rodriquez M. Green, F. Chattin

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S5



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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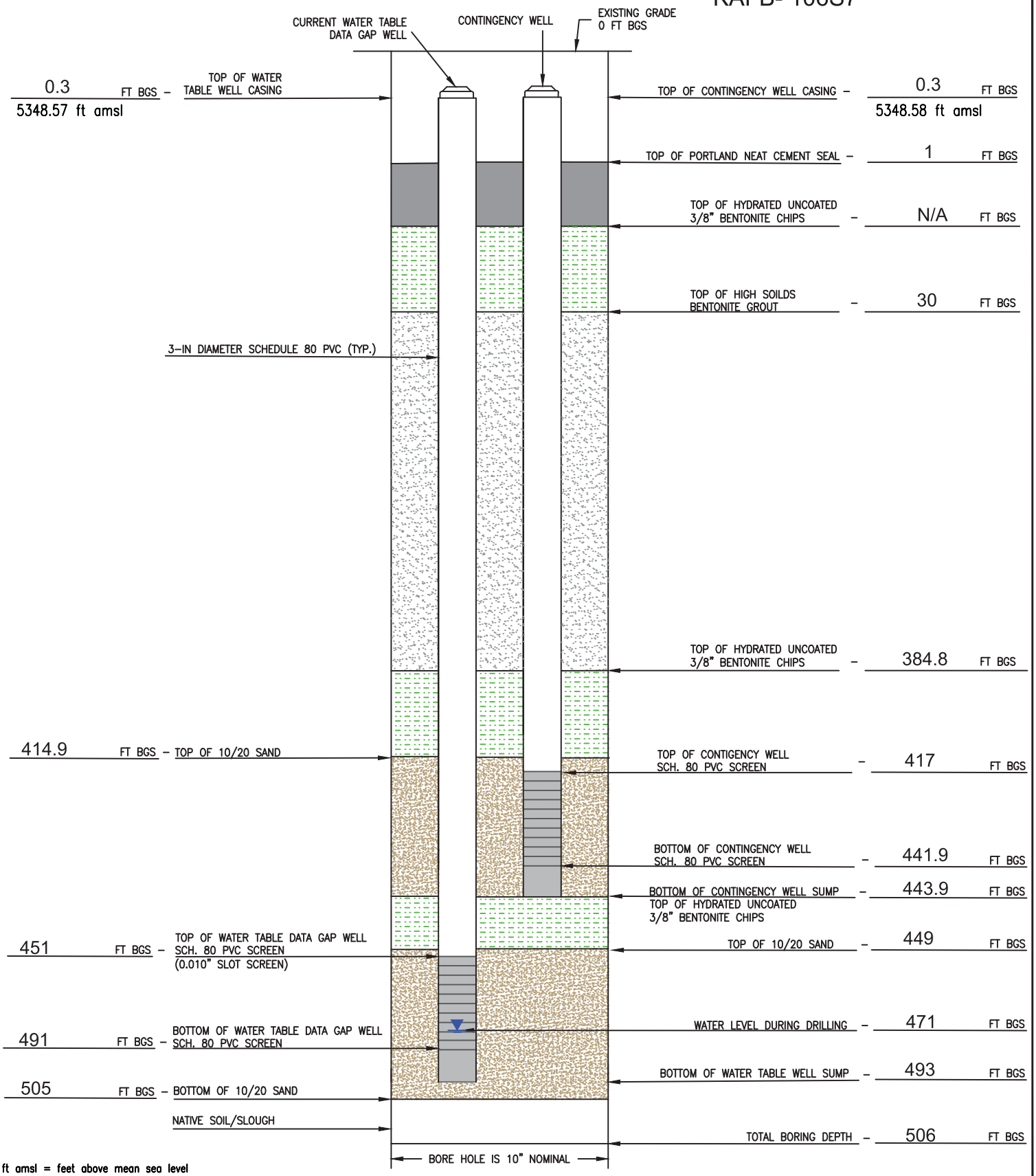
KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 05OCT18	INSTALLATION END DATE/TIME: 05NOV18
PROJECT NO.: 62735DM02 1017	WELL ID: KAFB-106S5	GEOLOGIST: L. Andress J. Messenger	DRILLER: R. Rodriquez M. Green

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S7



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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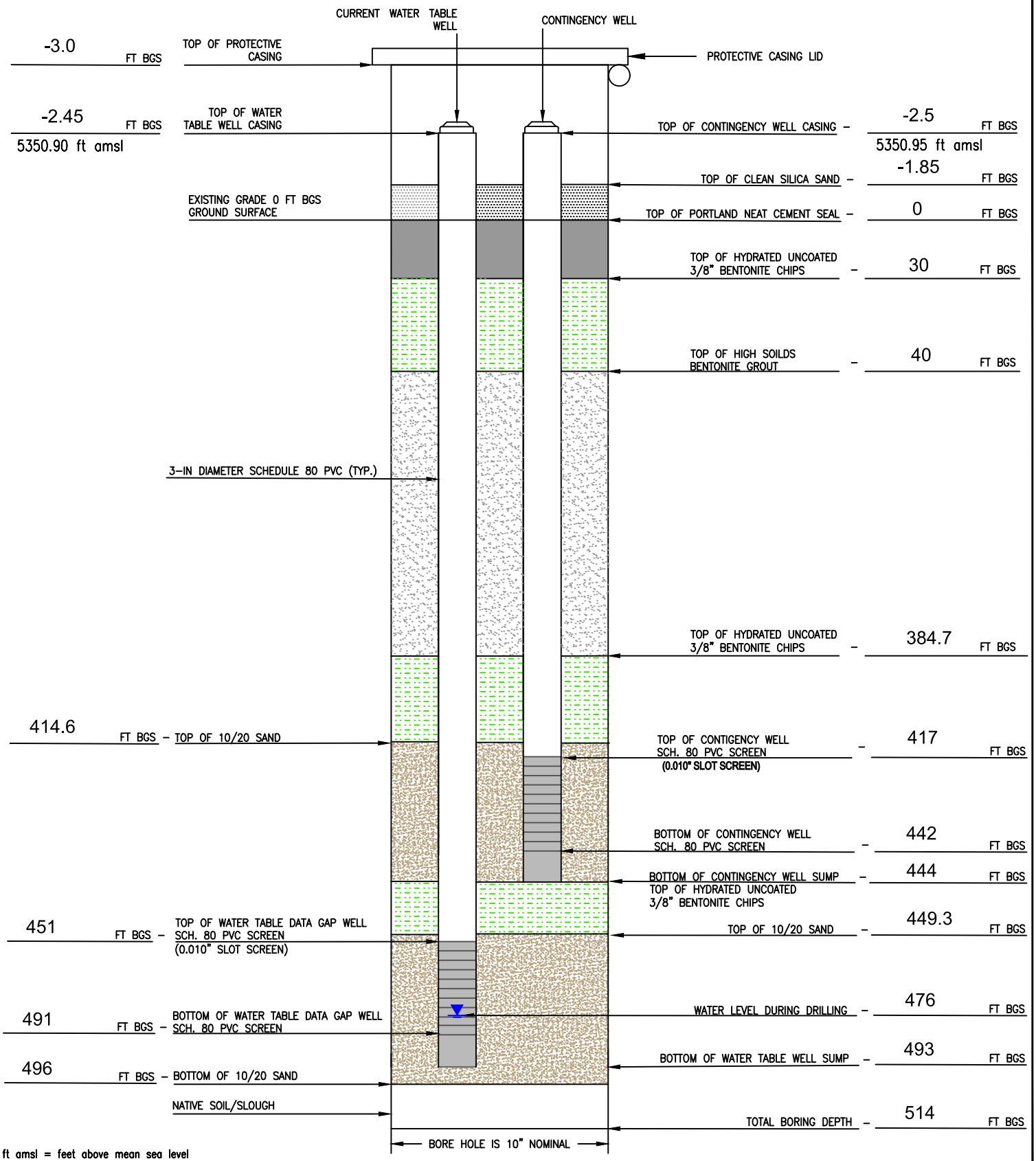
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 10JAN19	INSTALLATION END DATE/TIME: 04FEB19
PROJECT NO.: 62735DM02.1018	WELL ID: KAFB-106S7	GEOLOGIST: L. Andress/ J. Messenger	DRILLER: R. Rodriquez/ M. Green

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S8



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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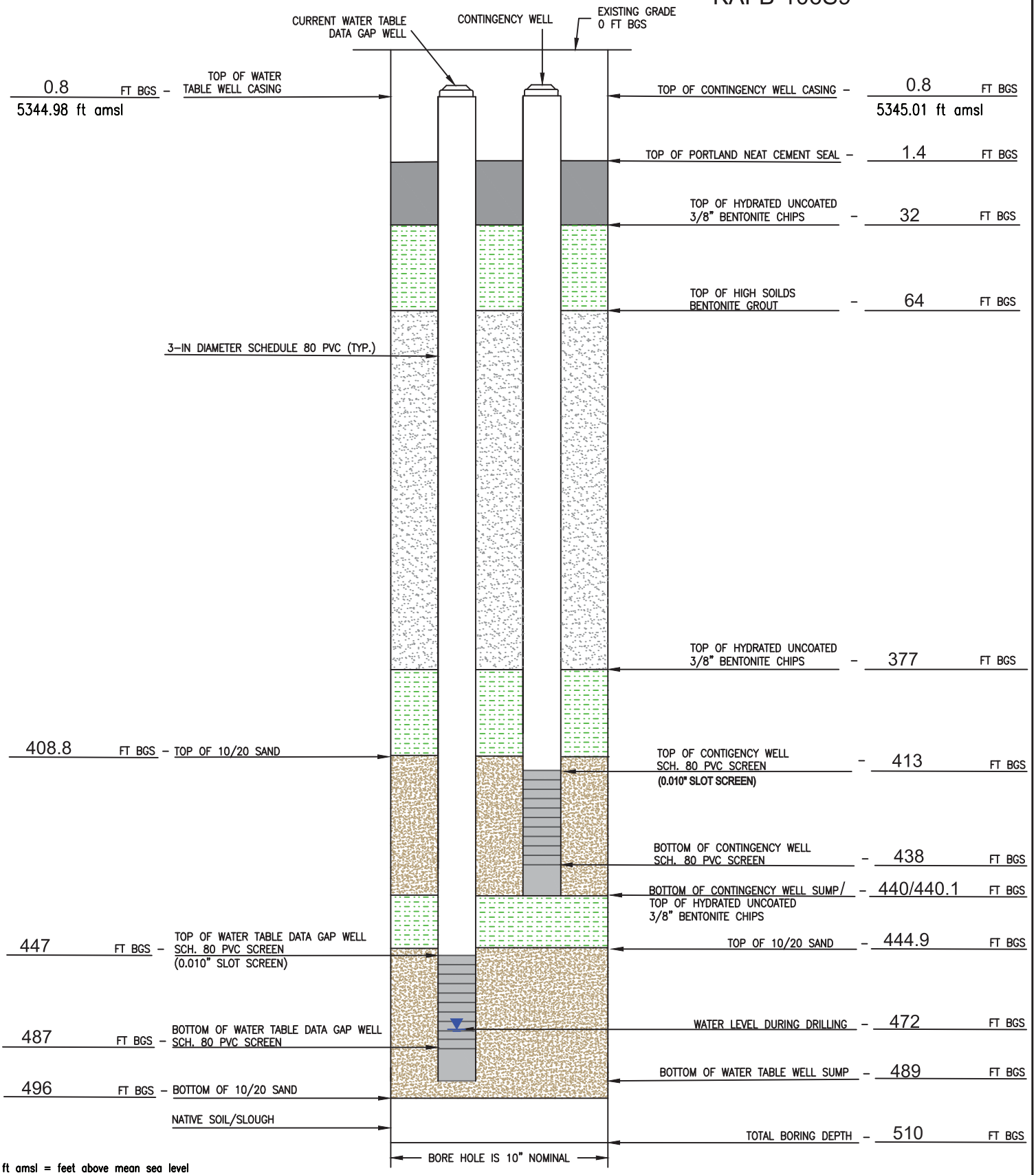
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 04JAN19	INSTALLATION END DATE/TIME: 01MAR19
PROJECT NO.: 62735DM02.1019	WELL ID: KAFB-106S8	GEOLOGIST: J.Messenger	DRILLER: R. Rodriquez

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S9



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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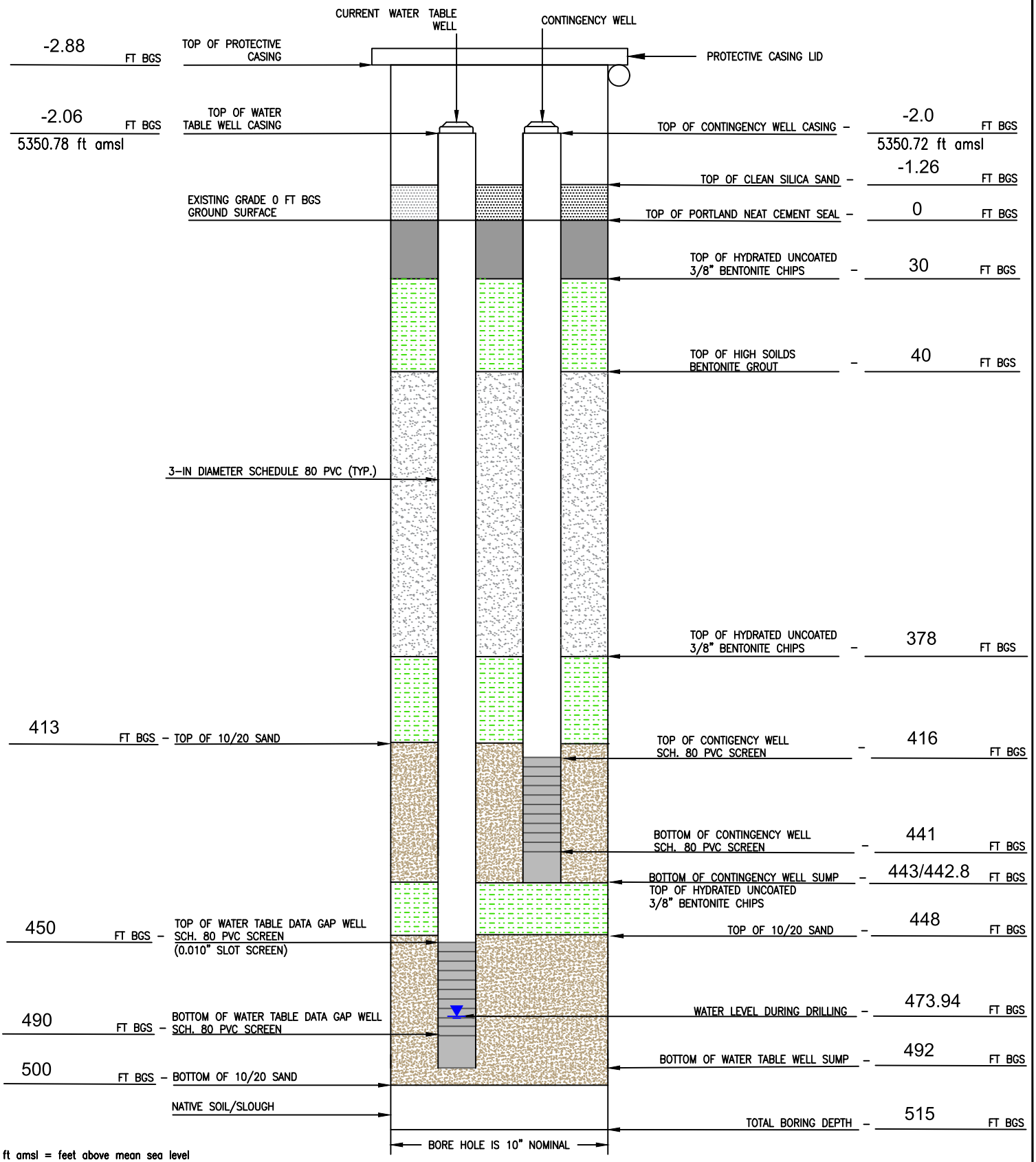
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 05OCT18	INSTALLATION END DATE/TIME: 08NOV18
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106S9	GEOLOGIST: L. Andress	DRILLER: R. Rodriquez

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106247



ft amsl = feet above mean sea level
PVC = polyvinyl chloride
SCH = schedule

NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET

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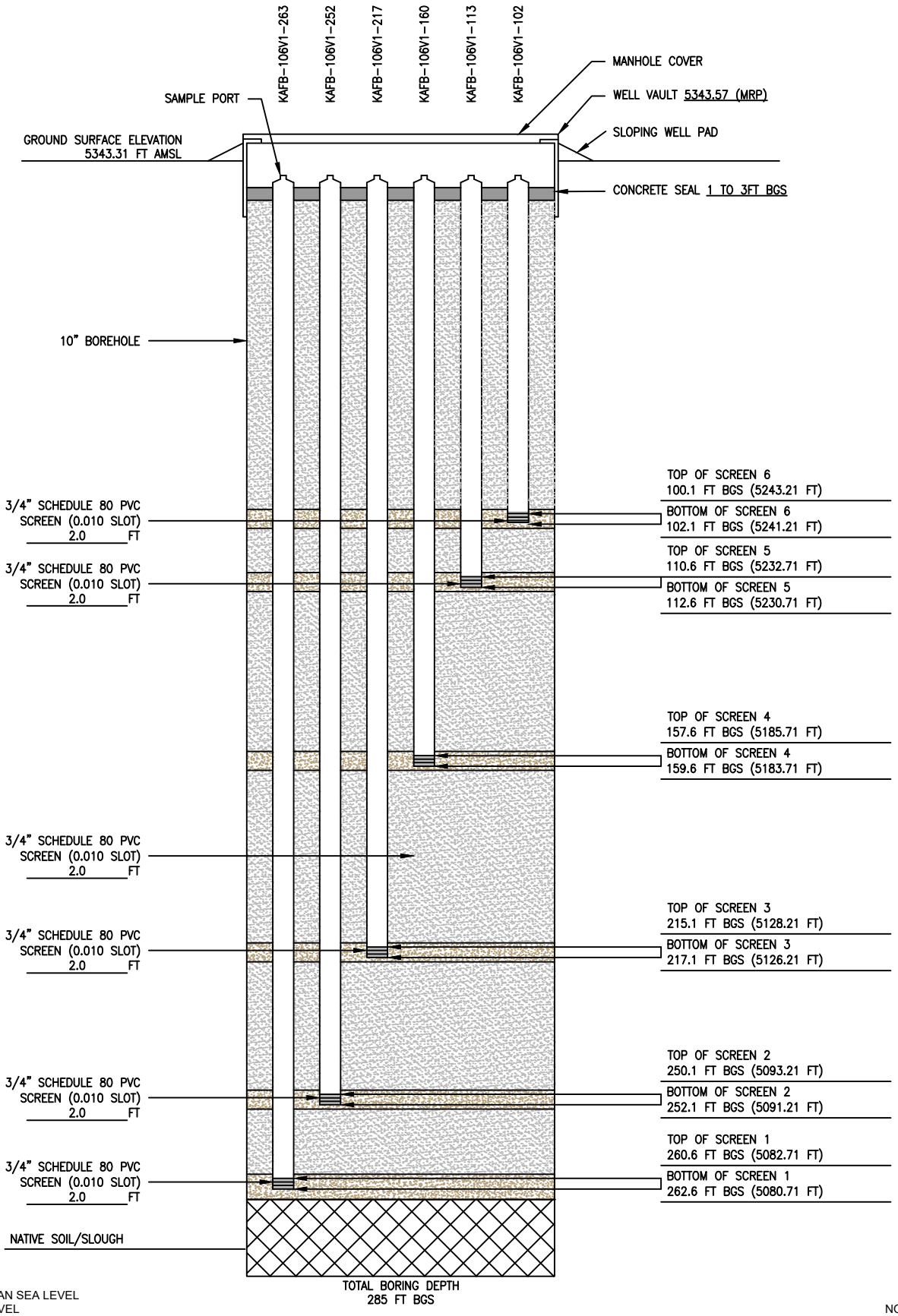
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 29JAN19	INSTALLATION END DATE/TIME: 01MAR19
PROJECT NO.: 62735DM02.1014	WELL ID: KAFB-106247	GEOLOGIST: J. Messenger	DRILLER: R. Rodriquez

FIGURE B-1: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V1



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET

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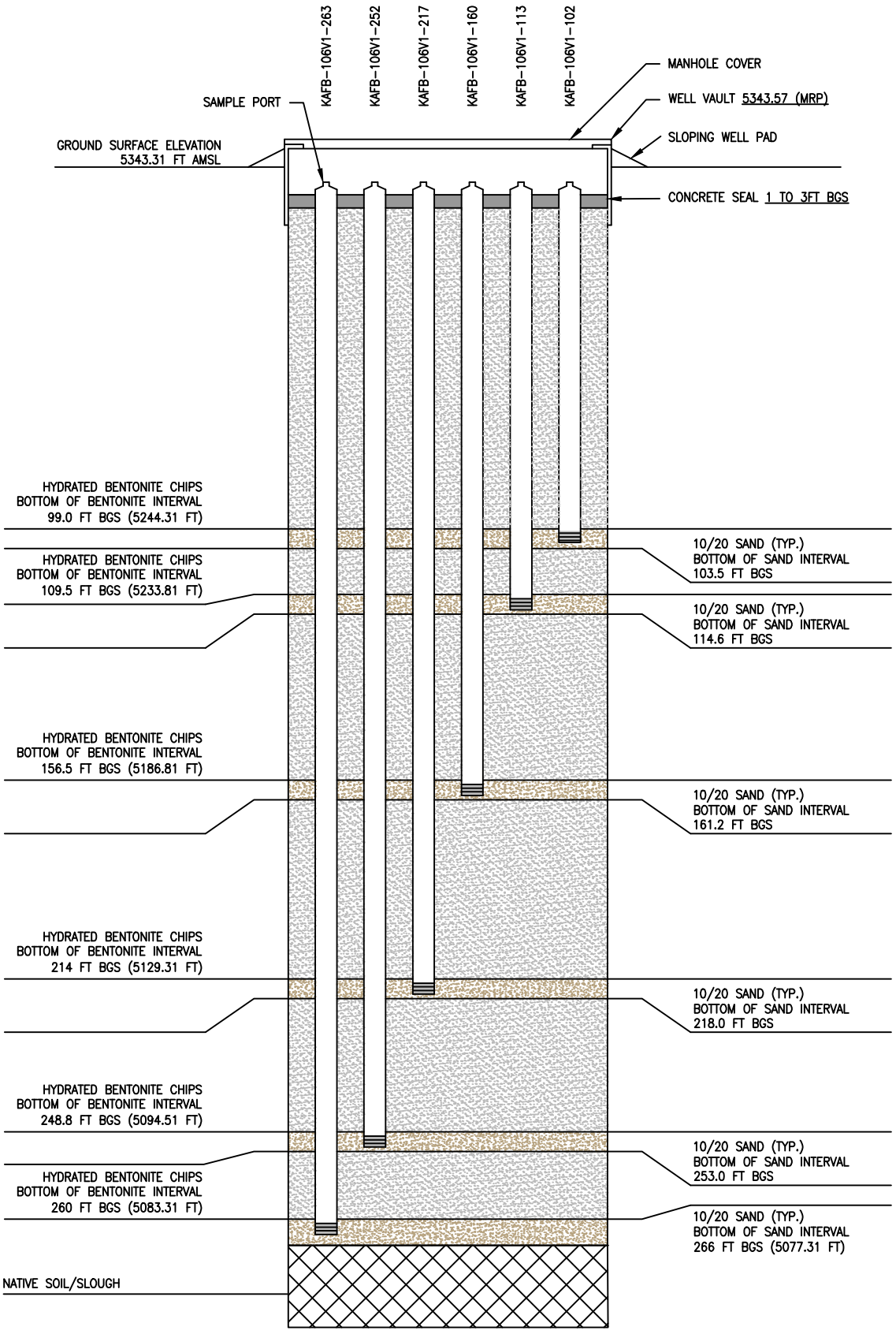
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 16DEC18	INSTALLATION END DATE/TIME: 10JAN19
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V1	GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

CAD FILE: P:\Active Projects\62735DM02 Kirtland Vadose Zone\01.1_VZ Coring Work Plan_RO\04_VZ WP Appendices_RO\VZ WP App B_RO- Well Construction\CADD\Well Completion Diagram - KAFB-106V1.dwg PLOT DATE/TIME: 4/12/2019 - 12:38pm

FIGURE B-2: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V1



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET

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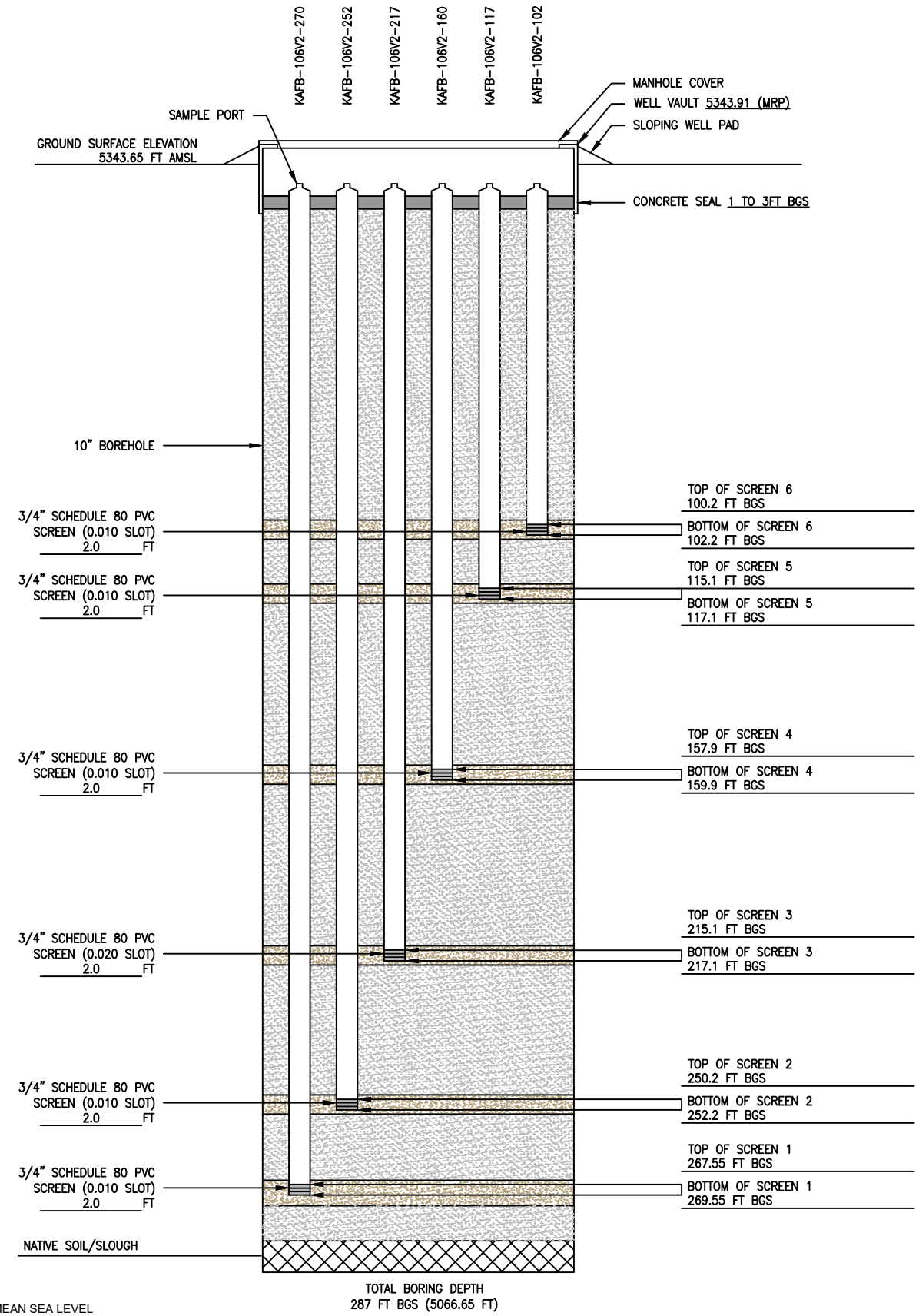
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 16DEC18	INSTALLATION END DATE/TIME: 10JAN19
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V1	GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

CAD FILE: P:\Active Projects\62735DM02 Kirtland Vadose Zone\01.1_VZ Coring Work Plan_R0\04_VZ WP Appendices_R0\VZ WP App B_R0- Well Construction\CADD\Well Completion Diagram - KAFB-106V1.dwg PLOT DATE/TIME: 4/12/2019 - 12:38pm

FIGURE B-4: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET

CAD FILE: P:\Active Projects\62735DM02 Kirtland Vadose Zone\01.1_VZ Coring Work Plan_R0\04_VZ WP Appendices_R0\VZ WP App B_R0_ Well Construction\CADD\Well Completion Diagram – KAFB-106V2.dwg PLOT DATE/TIME: 4/12/2019 – 12:37pm

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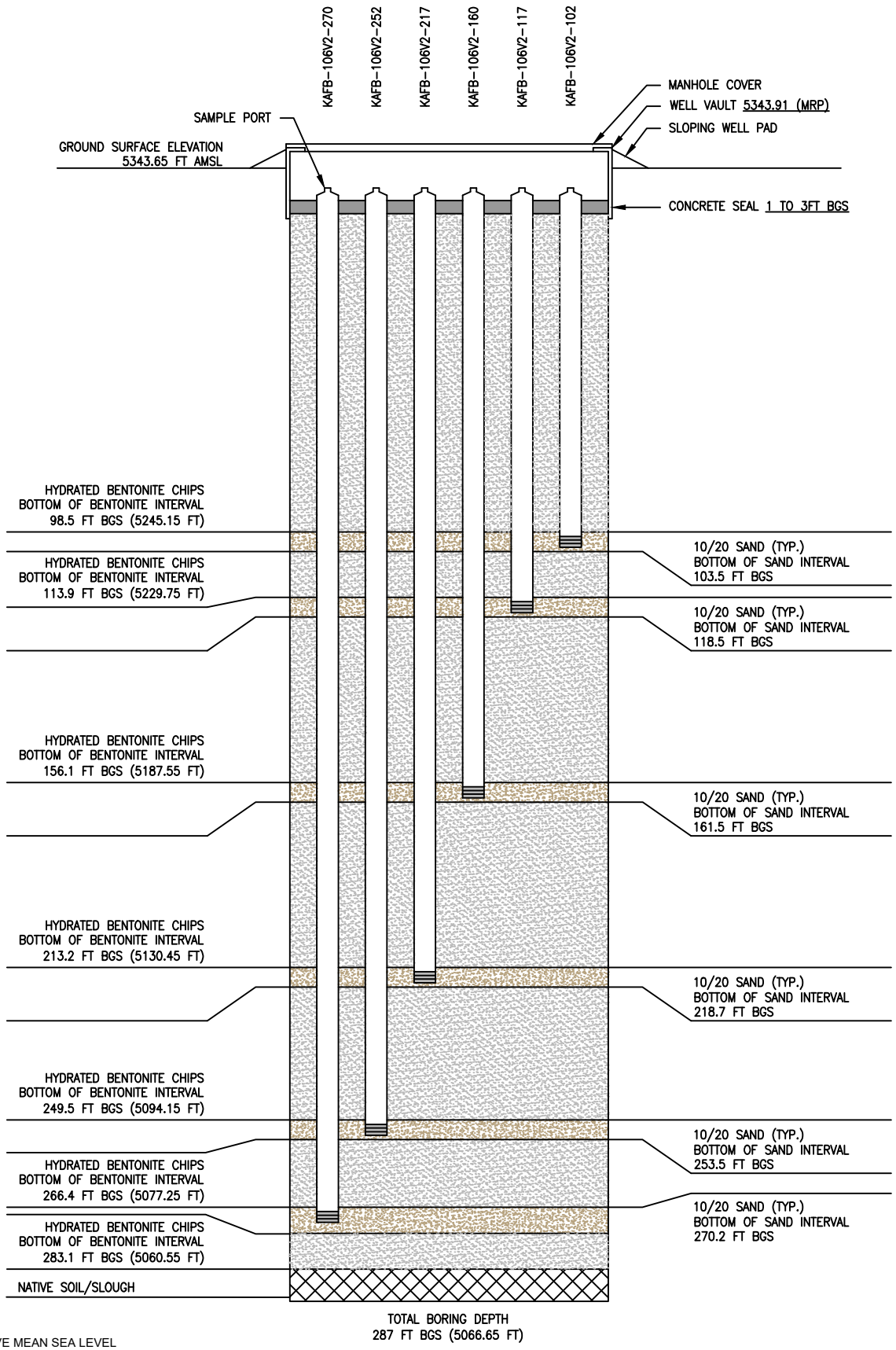
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 12DEC18	INSTALLATION END DATE/TIME: 10JAN19
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V2	GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

FIGURE B-5: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET

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Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 12DEC18	INSTALLATION END DATE/TIME: 10JAN19
PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V2	GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

CAD FILE: P:\Active Projects\62735DM02 Kirtland Vadose Zone\01.1_VZ Coring Work Plan_R0\04_VZ WP Appendices_R0\VZ WP App B_R0- Well Construction\CADD\Well Completion Diagram - KAFB-106V2.dwg PLOT DATE/TIME: 4/12/2019 - 12:38pm

APPENDIX D

WELL DEVELOPMENT RECORDS

FIELD RECORD OF WELL DEVELOPMENT

62735DM02 ~~1017~~ DM

Project Name: Kirtland Vadose Zone Coring	Project No:	Date/Time: 3/4/19 0800	
EA Personnel: J. Messenger	Development Method: Surge & Bail		
Equipment Used: YSI Pro Plus / Hach 2100Q Turbidity Meter		Equipment Calibrated: Y N	
Weather/Temperature/Barometric Pressure: See DQCR		Date/Time: 3/4/19 0745	

Well No.: KAFB - 106S1 - Deep		Well Condition: NEW	
Well Diameter: 3"		Measurement Reference: TOC - below ground surface	
Well Volume Calculations			
A. Depth To Water (ft): 469.8'		D. Well Volume/ft: ~~DM 0.766142~~ 0.36 gal/ft	
B. Total Well Depth (ft): 489.48'		E. Total Well Volume (gal)[C*D]: 7.17 gal	
C. Water Column Height (ft): 19.68		F. Five Well Volumes (gal): 35.84 gal	

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0926	0938	1004	1032	1056	1110
Depth to Water (ft)	469.8					
Purge Rate (gpm)						
Volume Purged (gal)	2.5	≈ 7 gal	≈ 14 gal	≈ 21.5 gal	≈ 30 gal	≈ 36 gal
pH (Δ<0.2)	6.89	7.15	7.10	7.05	6.93	6.93
Temperature (°F) (Δ<10%)	18.3	18.5	18.6	18.5	18.8	19.0
Conductivity (µmhos/cm) (Δ<10%)	488.1	* ~~274.5~~ 520.2 DM	574	525.5	570	572
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1142	1152	1223	1235	1310	
Depth to Water (ft)	469.8					
Purge Rate (gpm)						
Volume Purged (gal)	≈ 43 gal	≈ 50 gal	≈ 60 gal	≈ 66 gal	≈ 75 gal	
pH (Δ<0.2)	6.99	7.03	7.07	7.03	7.16	
Temperature (°F) (Δ<10%)	19.6	19.1	19.9	19.4	20.2	
Conductivity (µmhos/cm) (Δ<10%)	601	604	593	605	611	
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	888	

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS: * conductivity @ 1 volume = 520.2 µmhos/cm

Page 1

FIELD RECORD OF WELL DEVELOPMENT

627350M02

Project Name: Kirtland Vadose Zone Coring	Project No:	Date/Time: 3/4/19 0800
EA Personnel: J. Messenger	Development Method:	Surge & Bail
Equipment Used: YSI Pro Plus / Hatch 2100Q Turb. Meter		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: see DQCR		Date/Time: 3/4/19 0745

Well No.:	Well Condition:
Well Diameter:	Measurement Reference: see page 1
Well Volume Calculations	
A. Depth To Water (ft):	D. Well Volume/ft:
B. Total Well Depth (ft):	E. Total Well Volume (gal)[C*D]:
C. Water Column Height (ft):	F. Five Well Volumes (gal):

Parameter	Beginning	11 Volume	12 Volumes	13 Volumes	14 Volumes	15 Volumes
Time (min)		1330	1350	1418		
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)		≈ 83.5 gal	≈ 91 gal	≈ 100 gal		
pH (Δ<0.2)		6.92	7.06	6.93		
Temperature (°F) (Δ<10%)		19.4	19.5	18.8		
Conductivity (µmhos/cm) (Δ<10%)		623	627	637		
Turbidity (NTU) (<10 NTU*)		>1,000	701	866		

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS: 13 volumes completes well development (x100 gal)

page 2

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BEF VADOSE ZONE WELL DEV.	Project No: 62735DM02	Date/Time: 12/11/18 0500
EA Personnel: M. McVEY	Development Method: BAILER / SWAB	
Equipment Used: YSI PRO, TURBIDITY METER		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: COLD, CLEAR		Date/Time: 12/11/18 0645

Well No.: KAFB 10652	Well Condition: Good
Well Diameter: 3"	Measurement Reference: MRP
Well Volume Calculations	
A. Depth To Water (ft): 478.82	D. Well Volume/ft: .8678
B. Total Well Depth (ft): 496.50	E. Total Well Volume (gal)[C*D]: 6.49
C. Water Column Height (ft): 17.68	F. Five Well Volumes (gal): 32.46

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0934	0956	1026	1050	1119	1220
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	3.2	12	22	32	43	55
pH (Δ<0.2)	7.37	7.47	7.42	7.45	7.46	7.46
Temperature (°F) (Δ<10%)	16.1°C	16.0°C	15.6°C	16.8°C	16.4°C	16.1°C
Conductivity (µmhos/cm) (Δ<10%)	568.1	533.1	539.0	566.9	583.6	593.7
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1304	1325	1347	1410		
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	68	78	86	95		
pH (Δ<0.2)	7.42	7.41	7.38	7.47		
Temperature (°F) (Δ<10%)	16.0°C	14.2°C	14.2°C	15.7°C		
Conductivity (µmhos/cm) (Δ<10%)	616.0	628.3	636.0	647.0		
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000		

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BFF - Vadose Zone	Project No: 1017 627350.0002	Date/Time: ~~10~~ 12/3/18 / 1330
EA Personnel: Lane Andress	Development Method: surge & bail	
Equipment Used: YSI professional Plus / Hach 2100Q turbidity meter		Equipment Calibrated: Y N
Weather/Temperature/Barometric Pressure: 38°F, partly cloudy 50% humidity, slight breeze - barometer 30.16 ↓		Date/Time: 12/3/18 - AM

Well No.: KAFB-10653-Deep	Well Condition: New
Well Diameter: 3"	Measurement Reference: below ground surface

Well Volume Calculations	
A. Depth To Water (ft): 474.94 ft bgs	D. Well Volume/ft: 0.36 gal/ft
B. Total Well Depth (ft): 491.29 ft bgs	E. Total Well Volume (gal)[C*D]: 5.89
C. Water Column Height (ft): 16.35	F. Five Well Volumes (gal): 29.43

Parameter	Beginning	~~1 Volume~~	~~2 Volumes~~	~~3 Volumes~~	~~4 Volumes~~	~~5 Volumes~~
Time (min)	1330	1402	1410	~~1420~~ 1430	1433	1447
Depth to Water (ft) bgs	474.94					
~~Purge Rate (gpm)~~ surge bail						
Volume Purged (gal)	~2 gal	4 gal	5 gal		7 gal	9 gal
pH (Δ<0.2)	6.98	7.24	Begin	Resume	7.21	7.29
~~Temperature (°F)~~ (Δ<10%) °C	17.5	17.7	swabbing	Bailing	16.7	17.2
~~Conductivity (µmhos/cm)~~ (Δ<10%) µS/cm	1164	1152	entire 40 ft of screen		1171	1162
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000			>1,000	>1,000

Parameter	~~6 Volumes~~	~~7 Volumes~~	~~8 Volumes~~	~~9 Volumes~~	~~10 Volumes~~	~~End~~
Time (min)	1459	1533	1602	1639	12-4-18 0735	0854
~~Depth to Water (ft)~~ surge bail	WV=2	WV=3.2	WV=~4	WV=~5	DTW 477.54	WV=~7
~~Purge Rate (gpm)~~ surge bail						
Volume Purged (gal)	12 gal	19 gal	24 gal	30 gal	35 gal	41
pH (Δ<0.2)	7.32	7.43	7.36	7.65	7.46	7.66
~~Temperature (°F)~~ (Δ<10%) °C	16.9	15.3	15.5	14.1	13.8	15.1
~~Conductivity (µmhos/cm)~~ (Δ<10%) µS/cm	1148	1090	1107	990	1359	~~1277~~ 1077
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
WV = well volumes
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS: Petroleum odor w/ first bail - dark silty waters - reddish/yellowish brown - sheen - very spotty at 7 gal removed

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BAF - Vadose Zone	Project No: 60335DM62	Date/Time: 12-4-18 ~~12/5/18~~ 12/5/18	
EA Personnel: T. Curley	Development Method: Surge & Bail		
Equipment Used: YSI Pro Plus / Hach 2100 Q		Equipment Calibrated: (Y) N	
Weather/Temperature/Barometric Pressure: see DQCR		Date/Time: 12-4-18 0745	

Well No.: KAFB 10CS3-Deep	Well Condition: New
Well Diameter: 3"	Measurement Reference: TOC
Well Volume Calculations	
A. Depth To Water (ft): See Pg 1	D. Well Volume/ft:
B. Total Well Depth (ft):	E. Total Well Volume (gal)[C*D]:
C. Water Column Height (ft):	F. Five Well Volumes (gal):

~~12/5/18~~ 12/5/18

Parameter	~~Beginning~~	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0940					
Depth to Water (ft)						
~~Purge Rate (gpm)~~	Surface + Bail					
Volume Purged (gal)	47 gal					
pH (Δ<0.2)	7.47					
Temperature (°F) (Δ<10%)	53					
Conductivity (µmhos/cm) (Δ<10%)	1096					
Turbidity (NTU) (<10 NTU*)	>1000					

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
~~Purge Rate (gpm)~~	5					
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS: 3rd Turbidity taken @ 47 gal

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BEF VADOSE ZONE WELL DEV	Project No: 62735DM02	Date/Time: 12/13/18 1350
EA Personnel: M. McVEY	Development Method: BAILER/SWAB	
Equipment Used: YSI PRO, TURBIDITY METER		Equipment Calibrated? (Y) N
Weather/Temperature/Barometric Pressure: COLD, CLEAR, SL. WIND		Date/Time: 12/13/18 1245

Well No.: KAFB 10653	Well Condition: GOOD
Well Diameter: 3"	Measurement Reference: MRP
Well Volume Calculations	
A. Depth To Water (ft): 477.88	D. Well Volume/ft: .05
B. Total Well Depth (ft): 493.00	E. Total Well Volume (gal)[C*D]: 5.68
C. Water Column Height (ft): 15.12	F. Five Well Volumes (gal): 28.42

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	1400	1422	1444	1520	1552	1617
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	3.2	12	22	32	42	50
pH (Δ<0.2)	7.22	7.23	7.21	7.17	7.15	7.17
Temperature (°F) (Δ<10%)	15°C	15°C	14.4°C	14.2°C	14.1°C	13.7°C
Conductivity (µmhos/cm) (Δ<10%)	954	946	933	921	919	912
Turbidity (NTU) (<10 NTU*)	64.5	>1,000	>1,000	874	727	515

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB 13FF VADOSE ZONE WELL DEV.	Project No: 62135DM02	Date/Time: 12/10/18 0900
EA Personnel: M. McVEY	Development Method: BAIL/SWAB	
Equipment Used: TURBIDITY METER, YSI PRO		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: COLD 37°F, CLEAR		Date/Time: 12/10/18 0710

Well No.: KAFB-10654	Well Condition: (GOOD)
Well Diameter: 3"	Measurement Reference: MRP
Well Volume Calculations	
A. Depth To Water (ft): 472.94	D. Well Volume/ft: 0.3650
B. Total Well Depth (ft): 492.60	E. Total Well Volume (gal)[C*D]: 7.21
C. Water Column Height (ft): 19.66	F. Five Well Volumes (gal): 36.05

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0915	1015	1047	1110	1147	1313
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	3.2	12	22	30	50	68
pH (Δ<0.2)	7.44	7.48	7.76	7.91	7.86	7.74
Temperature (°F) (Δ<10%)	16°C	16.2°C	16.4°C	17.1°C	17.0°C	17.3°C
Conductivity (µmhos/cm) (Δ<10%)	1,335	1,448	1,441	1,437	1,442	1,448
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1347	1416				
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	77	86				
pH (Δ<0.2)	7.80	7.91				
Temperature (°F) (Δ<10%)	16.7°C	16.0°C				
Conductivity (µmhos/cm) (Δ<10%)	1,453	1,453				
Turbidity (NTU) (<10 NTU*)	>1,000	837				

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

1 of 2

Project Name: KAFB BFF Vadose Zone		Project No: 637999.1017	Date/Time: 12/6/18 - 0920
EA Personnel: Lane Andress 2100A		Development Method: surge & bail	
Equipment Used: YSI Pro Plus / Hach 2100 turbidity meters			Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: 54% humidity - slight breeze, @9am - 31°F, overcast, barometer 30.20"			Date/Time: 12/6/18 ~0745

Well No.: KAFB-10655		Well Condition: New	
Well Diameter: 3"		Measurement Reference: top of Casing	
Well Volume Calculations			
A. Depth To Water (ft): 469.65		D. Well Volume/ft: 0.36 gal/ft	
B. Total Well Depth (ft): 487.7		E. Total Well Volume (gal)[C*D]: 6.5	
C. Water Column Height (ft): 18.05		F. Five Well Volumes (gal): 32.5	

Parameter	Beginning	~~1 Volume~~	~~2 Volumes~~	~~3 Volumes~~	~~4 Volumes~~	~~5 Volumes~~
Time (min)	0920	0942		1009	1018	~~1056~~ 1101
Depth to Water (ft)	469.65	—	—	—	—	—
Purge Rate (gpm) surge & bail	Join w/ bailer	- surge &	bail			
Volume Purged (gal)		3.2	~9	~17	20	Begin
pH (Δ<0.2)		7.29	7.27	7.44	7.47	Swabbing
Temperature (°F) (Δ<10%) °C		16.0	17.2	16.4	15.9	w tight
Conductivity (~~µmhos/cm~~) (Δ<10%) µS/cm		418.4	423.8	426.5	421.7	fitting swab disk - whole foot section
Turbidity (NTU) (<10 NTU*)		>1,000	>1,000	>1,000	>1,000	

Not spc →

Parameter	~~6 Volumes~~	~~7 Volumes~~	~~8 Volumes~~	~~9 Volumes~~	~~10 Volumes~~	~~End~~
Time (min)	1138	1211	1323	1415	1446	1526
~~Depth to Water (ft)~~ well volumes	WV=3.5	~~46.4 WV~~ 4 WV 27.00	6 WV	7.4 WV	9 WV	10.5 WV
Purge Rate (gpm) surge & bail						
Volume Purged (gal)	23.2	~~41.75~~	30	48	58	~~78~~ 68
pH (Δ<0.2)	7.77	7.46	7.43	7.62	7.42	7.63
Temperature (°F) (Δ<10%) °C	17.0	16.1	16.1	17.6	17.7	17.4
Conductivity (~~µmhos/cm~~) (Δ<10%) µS/cm	421.1	431.5	434.0	445.7	450.8	454.3
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

initial Inhoff cone @ 3.2 gal WV = well volumes

COMMENTS AND OBSERVATIONS: 2nd Inhoff cone taken at 20 gal, 3rd Inhoff cone taken @ 58 gal

Dark and silty on starting - strong petroleum odor throughout - possible light sheen

FIELD RECORD OF WELL DEVELOPMENT

2 of 2

Project Name: KAFB BFF- Vadose Zone	Project No:	Date/Time: 12/6/18 0920
EA Personnel: Lane Andress	Development Method:	
Equipment Used: see page 1		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: see page 1		Date/Time: see P. 1

Well No.: KAFB-10655	Well Condition: New
Well Diameter: 3"	Measurement Reference: top of casing
Well Volume Calculations	
A. Depth To Water (ft): 469.65	D. Well Volume/ft: 0.36 gal/ft
B. Total Well Depth (ft): 487.7	E. Total Well Volume (gal)[C*D]: 6.5
C. Water Column Height (ft): 18.05	F. Five Well Volumes (gal): 32.5

Parameter	~~Beginning~~	~~1 Volume~~	~~2 Volumes~~	~~3 Volumes~~	~~4 Volumes~~	~~5 Volumes~~
Time (min)	1554	1627	1645			
Depth to Water (ft)						
~~Purge Rate (gpm)~~ WV	WV=12.30	WV=13	WV=13.8			
volume purged - surge & bail ~~Volume Purged (gal)~~	~~80 gal~~	84 GAL	98 GAL			
pH (Δ<0.2)	7.49	7.79	7.76			
Temperature ~~(°F)~~ (Δ<10%) °C	16.7	15.6	15.6			
Conductivity ~~(µmhos/cm)~~ (Δ<10%) uS/cm	446.7	442.3	431.9			
Turbidity (NTU) (<10 NTU*)	>1,000	>1000	>1000			

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

WV = well volumes

COMMENTS AND OBSERVATIONS: 4th imhoff cone taken at 80 gal

FIELD RECORD OF WELL DEVELOPMENT

Project Name: 10657 Well Development	Project No: 62735.0002	Date/Time: 3/7/19 0800
EA Personnel: EARL Moore	Development Method: Surge /	
Equipment Used: YSI, Hatch turbidity		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: overcast, breezy		Date/Time: 3/7/19 0630

Well No.: 10657	Well Condition: New
Well Diameter: 3" Sch 80	Measurement Reference: TOC
Well Volume Calculations	
A. Depth To Water (ft): 473.82'	D. Well Volume/ft: 0.36
B. Total Well Depth (ft): 492.23'	E. Total Well Volume (gal)[C*D]: 6.6 gal / Volume
C. Water Column Height (ft): 18.41'	F. Five Well Volumes (gal): 33.14

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)		0856	0918	0937	0948	1001
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)		7	15	21	29	35
pH (Δ<0.2)		6.72	6.97	7.03	7.04	6.98
Temperature (°C) (Δ<10%)		18.3c	18.5c	18.3c	17.8c	17.9c
Conductivity (µmhos/cm) (Δ<10%)		876	872	780	887	894
Turbidity (NTU) (<10 NTU*)		>1000	>1000	>1000	>1000	>1000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1018	1031	1101	1109	1120	
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	42	50	58	65	72	
pH (Δ<0.2)	6.96	7.02	6.90	6.81	6.88	
Temperature (°C) (Δ<10%)	18.9c	19.1c	20°c	19.5c	20.3c	
Conductivity (µmhos/cm) (Δ<10%)	923	1051	941	927	938	
Turbidity (NTU) (<10 NTU*)	>1000	>1000	>1000	>1000	>1000	

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

Earl Moore 3/7/19

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BFF	Project No: 67750.017	Date/Time: 3-7-19	
EA Personnel: Earl Morse	Development Method: Surge/bail		
Equipment Used: YST, Hatch turbidity		Equipment Calibrated: (Y) N	
Weather/Temperature/Barometric Pressure: Warm, windy		Date/Time: 3/7/19 @630	

Well No.: 10657		Well Condition: New	
Well Diameter: 3" Sch 80		Measurement Reference: TOC	
Well Volume Calculations			
A. Depth To Water (ft): 473.82'		D. Well Volume/ft: 0.38	
B. Total Well Depth (ft): 492.23'		E. Total Well Volume (gal)[C*D]: 6.6gal/vol	
C. Water Column Height (ft): 18.41'		F. Five Well Volumes (gal): 33.14	

Parameter	Beginning	~~1~~ Volume	~~2~~ Volumes	~~3~~ Volumes	~~4~~ Volumes	~~5~~ Volumes
Time (min)		1130	1145	1206	1212	
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)		80	87	93	98	
pH (Δ<0.2)		6.82	6.84	6.88	6.88	
Temperature (°F) (Δ<10%)		19.6	19.7C	19.7C	18.5°C	
Conductivity (µmhos/cm) (Δ<10%)		920	906	910	847	
Turbidity (NTU) (<10 NTU*)		>1000	1000	1000	1000	

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

Earl Morse 3/7/19

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

62735DM02

Project Name: Kirtland Vadose Zone Coring		Project No:	Date/Time: 5MARCH19 0730
EA Personnel: J. Messenger		Development Method:	Surge & Bail
Equipment Used: YSI Pro Plus + Hatch 2100Q Turb. Meter			Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: see DQCR			Date/Time: 5MAR19 0645

Well No.: KAFB - 10658		Well Condition: NEW	
Well Diameter: 3"		Measurement Reference: TOC	
Well Volume Calculations			
A. Depth To Water (ft): 476.12'		D. Well Volume/ft: 0.36	
B. Total Well Depth (ft): 491.42'		E. Total Well Volume (gal)[C*D]: 5.508	
C. Water Column Height (ft): 15.3'		F. Five Well Volumes (gal): 27.54	

Parameter	Initial Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0834	0847	0900	0914	0932	0945
Depth to Water (ft)	SAA					
Purge Rate (gpm)						
Volume Purged (gal)	≈ 1.25 gal	≈ 5.75 gal	≈ 12 gal	≈ 16.5 gal	≈ 25 gal	≈ 30 gal
pH (Δ<0.2)	7.49	7.46	7.54	7.59	7.70	7.73
Temperature (°F) (Δ<10%)	18.4	17.4	17.1	17.4	17.2	17.2
Conductivity (µmhos/cm) (Δ<10%)	643	635	636	632	632	629
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	0958	1015	1028	1056	1111	
Depth to Water (ft)	SAA					
Purge Rate (gpm)						
Volume Purged (gal)	≈ 35 gal	≈ 40 gal	≈ 45 gal	≈ 50 gal	≈ 56 gal	
pH (Δ<0.2)	7.64	7.53	7.57	7.55	7.67	
Temperature (°F) (Δ<10%)	17.8	18.3	18.7	18.9	18.6	
Conductivity (µmhos/cm) (Δ<10%)	624	615	633	619	650	
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

page 1 of 2

FIELD RECORD OF WELL DEVELOPMENT

62735DM02

Project Name: Kirtland Vadose Zone Coring	Project No:	Date/Time: 05MAR19 0730
EA Personnel: J. Messenger	Development Method: Surge & Bail	
Equipment Used: YSI Pro Plus / 2100Q Hatch Turb. Meter		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: see DQCR		Date/Time: 05MAR19 0645

Well No.:	Well Condition:
Well Diameter:	Measurement Reference: see page 1
Well Volume Calculations	
A. Depth To Water (ft):	D. Well Volume/ft:
B. Total Well Depth (ft):	E. Total Well Volume (gal)[C*D]:
C. Water Column Height (ft):	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)		1122	1135	1221	1233	1252
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)		≈ 63 gal	≈ 70 gal	≈ 76 gal	≈ 83 gal	≈ 90 gal
pH (Δ<0.2)		7.61	7.60	7.64	7.66	7.57
Temperature (°F) (Δ<10%)		18.4	18.3	18.4	18.5	18.3
Conductivity (µmhos/cm) (Δ<10%)		626	639	645	648	658
Turbidity (NTU) (<10 NTU*)		>1,000	881	713	439	398

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

Project Name: KAFB BEE VADOSE ZONE WELL DEV.	Project No: 627350.002	Date/Time: 12/12/18 0800	
EA Personnel: M. McVey	Development Method: BAILER / SWAB		
Equipment Used: YSI PRO, TURBIDITY METER	Equipment Calibrated: (Y) N		
Weather/Temperature/Barometric Pressure: COLD, CLEAR	Date/Time: 12/12/18 0700		

Well No.: KAFB 106 59	Well Condition: Good
Well Diameter: 3"	Measurement Reference: MRP
Well Volume Calculations	
A. Depth To Water (ft): ~~472.8~~ 472.26	D. Well Volume/ft: .05
B. Total Well Depth (ft): 489.25	E. Total Well Volume (gal)[C*D]: 6.35
C. Water Column Height (ft): 16.99	F. Five Well Volumes (gal): 31.77

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0906	0934	1003	1031	1054	1115
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	3.2	15	25	36	45	56
pH (Δ<0.2)	6.83	6.79	6.81	6.68	6.76	6.66
Temperature (°F) (Δ<10%)	16.8°C	16.2°C	16.1°C	17.7°C	16.2°C	17.5°C
Conductivity (µmhos/cm) (Δ<10%)	1,114	1,030	963.0	960.0	998.0	1,037
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1155	1250	1323	1346		
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)	68	78	88	100		
pH (Δ<0.2)	6.68	6.80	6.63	6.69		
Temperature (°F) (Δ<10%)	18.0°C	18.8°C	18.7°C	18.7°C		
Conductivity (µmhos/cm) (Δ<10%)	896.0	860.0	944.0	748.0		
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000		

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

FIELD RECORD OF WELL DEVELOPMENT

62735DM02

Project Name: Kirtland Vadose Zone Coring	Project No:	Date/Time: 06MAR19 0700
EA Personnel: J. Messenger	Development Method: Surge & Bail	
Equipment Used: YSI Pro Plus + Hatch 2100Q Turb. Meter		Equipment Calibrated: (Y) N
Weather/Temperature/Barometric Pressure: see DQCR		Date/Time: 06MAR19 0645

Well No.: KAFB-106247	Well Condition: NEW
Well Diameter: 3"	Measurement Reference: TOC
Well Volume Calculations	
A. Depth To Water (ft): 476.00'	D. Well Volume/ft: 0.36
B. Total Well Depth (ft): 494.82'	E. Total Well Volume (gal)[C*D]: 6.7752 gal
C. Water Column Height (ft): 18.82'	F. Five Well Volumes (gal): 33.876 gal

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min)	0812	0832	0855	0936	0955	1003
Depth to Water (ft)	476.00					
Purge Rate (gpm)						
Volume Purged (gal)	≈ 1.5	≈ 8	≈ 15	≈ 23	≈ 30	≈ 36
pH (Δ<0.2)	7.89	7.79	7.72	7.60	7.64	7.77
Temperature (°F) (Δ<10%)	16.6	16.6	17.6	18.3	18.2	17.8
Conductivity (µmhos/cm) (Δ<10%)	499.8	506.0	504.8	496.3	495.1	485.4
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
Time (min)	1025	1040	1112	1130	1147	
Depth to Water (ft)	476.00					
Purge Rate (gpm)						
Volume Purged (gal)	≈ 43	≈ 50	≈ 57	≈ 66	≈ 70	
pH (Δ<0.2)	7.73	7.83	7.74	7.69	7.67	
Temperature (°F) (Δ<10%)	18.0	18.2	18.8	18.8	18.9	
Conductivity (µmhos/cm) (Δ<10%)	494.6	493.4	478.6	479.8	464.5	
Turbidity (NTU) (<10 NTU*)	>1,000	>1,000	>1,000	>1,000	920	

NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

page 1 of 2

FIELD RECORD OF WELL DEVELOPMENT

627351M02

Project Name: Kirtland Vadose Zone Coring	Project No:	Date/Time: 06MAR19 0700
EA Personnel: J. Messenger	Development Method:	
Equipment Used: YSI Pro Plus + Hatch 2100Q Turb. Meter		Equipment Calibrated: Y N
Weather/Temperature/Barometric Pressure: See DQCR		Date/Time: 06MAR19 0645

Well No.: KAFB-106247	Well Condition: NEW
Well Diameter: 3"	Measurement Reference: TOC
Well Volume Calculations	
A. Depth To Water (ft):	D. Well Volume/ft:
B. Total Well Depth (ft): see page 1	~~E. Total Well Volume (gal)[C*D]:~~
~~C. Water Column Height (ft):~~	F. Five Well Volumes (gal):

Parameter	Beginning	11 Volume	12 Volumes	13 Volumes	14 Volumes FINAL	5 Volumes
Time (min)		1242	1256	1318	1338	
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)		≈77	≈85	≈92	≈100	
pH (Δ<0.2)		7.79	7.73	7.65	7.60	
Temperature (°F) (Δ<10%)		19.9	19.8	19.9	19.9	
Conductivity (µmhos/cm) (Δ<10%)		470.6	464.0	458.6	460.9	
Turbidity (NTU) (<10 NTU*)		736	579	399	315	

Parameter	6 Volumes	7 Volumes	8 Volumes	9 Volumes	10 Volumes	End
~~Time (min)~~						
~~Depth to Water (ft)~~						
Purge Rate (gpm)						
Volume Purged (gal)						
pH (Δ<0.2)						
Temperature (°F) (Δ<10%)						
Conductivity (µmhos/cm) (Δ<10%)						
Turbidity (NTU) (<10 NTU*)						

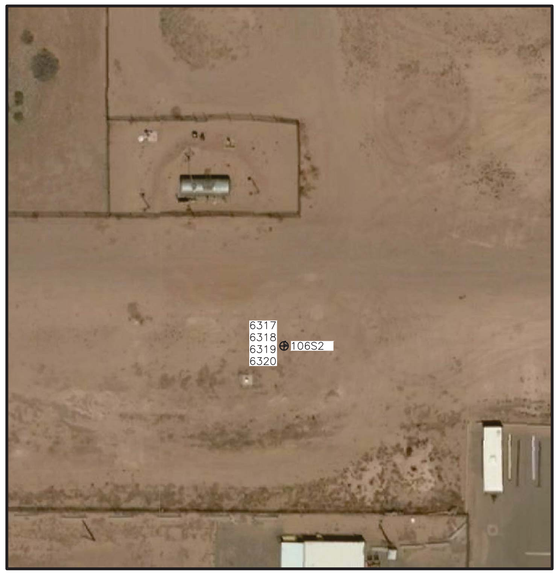
NOTE: NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
* = If <10 NTU is not able to be achieved, <100 NTU is acceptable
Parameter stabilization requires four consecutive readings [four consecutive differences (Δ)] to meet parameter stabilization requirements listed.

COMMENTS AND OBSERVATIONS:

page 2 of 2

APPENDIX E

WELL SURVEY INFORMATION



WELL 106S2

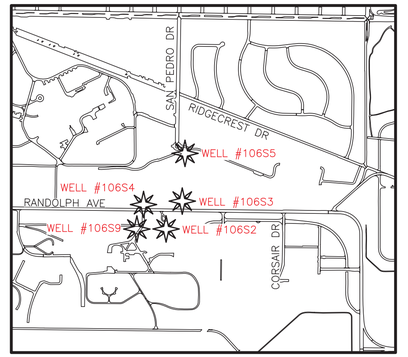
SCALE: 1" = 30'

WELL 106S3

SCALE: 1" = 30'

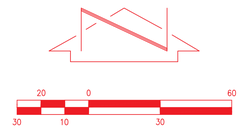
WELL 106S4

SCALE: 1" = 30'



VICINITY MAP M-18

SCALE: 1" = 1000'



SCALE: 1" = 30'

WELL 106S5

SCALE: 1" = 30'

WELL 106S9

SCALE: 1" = 30'

SURVEY CONTROL

PROJECT	POINT NO.	NORTHING-GRID	EASTING-GRID	ELEVATION	DESCRIPTION	LATITUDE-NORTH	LONGITUDE-WEST	Y-METER	X-METER	Z-METER
BENCHMARK	G-2	1476630.47	1544945.86	5337.43	G-2(Project Benchmark)	35°03'29.55211"	106°34'08.48412"	450077.87	470900.44	1626.85

COORDINATE TABLE

	POINT NO.	NORTHING-GRID	EASTING-GRID	ELEVATION	DESCRIPTION	LATITUDE-NORTH	LONGITUDE-WEST	Y-METER	X-METER	Z-METER
WELL KAFB-106S5	6301	1474744.16	1542453.94	5343.52	TCP (TOP OF CONCRETE)	35°03'10.81385"	106°34'38.38623"	449502.92	470140.90	1628.71
	6302	1474743.06	1542453.66	5343.58	TOPC (LID-NORTH SIDE)	35°03'10.80297"	106°34'38.38950"	449502.58	470140.82	1628.73
	6303	1474742.59	1542453.32	5343.09	TOC*-DEEP	35°03'10.79830"	106°34'38.39358"	449502.44	470140.71	1628.58
	6304	1474742.29	1542453.71	5343.16	TOC*-SHALLOW	35°03'10.79538"	106°34'38.38885"	449502.35	470140.83	1628.60
WELL KAFB-106S4	6305	1474028.40	1541872.49	5343.61	TCP (TOP OF CONCRETE)	35°03'03.71501"	106°34'45.35187"	449284.75	469963.68	1628.74
	6306	1474026.95	1541872.61	5346.57	TOPC (LID-NORTH SIDE)	35°03'03.70068"	106°34'45.35036"	449284.31	469963.71	1629.64
	6307	1474026.57	1541872.34	5346.11	TOC*-SHALLOW	35°03'03.69696"	106°34'45.35366"	449284.20	469963.63	1629.50
	6308	1474026.65	1541872.75	5346.11	TOC*-DEEP	35°03'03.69773"	106°34'45.34871"	449284.22	469963.75	1629.50
WELL KAFB-106S3	6309	1474077.44	1542418.51	5348.01	TCP (TOP OF CONCRETE)	35°03'04.21787"	106°34'38.78606"	449299.70	470130.10	1630.08
	6310	1474075.96	1542418.67	5351.01	TOPC (LID-NORTH SIDE)	35°03'04.20326"	106°34'38.78412"	449299.25	470130.15	1630.99
	6311	1474075.65	1542418.47	5350.45	TOC*-SHALLOW	35°03'04.20016"	106°34'38.78649"	449299.16	470130.09	1630.82
	6312	1474075.66	1542418.88	5350.45	TOC*-DEEP	35°03'04.20034"	106°34'38.78149"	449299.16	470130.22	1630.82
WELL KAFB-106S9	6313	1473694.65	1541783.19	5345.79	TCP (TOP OF CONCRETE)	35°03'00.41089"	106°34'46.41274"	449183.03	469936.46	1629.40
	6314	1473693.47	1541783.13	5345.82	TOPC (LID-NORTH SIDE)	35°03'00.39915"	106°34'46.41348"	449182.67	469936.44	1629.41
	6315	1473692.91	1541782.91	5345.01	TOC*-SHALLOW	35°03'00.39368"	106°34'46.41604"	449182.50	469936.37	1629.16
	6316	1473692.77	1541783.29	5344.98	TOC*-DEEP	35°03'00.39225"	106°34'46.41150"	449182.45	469936.49	1629.15
WELL KAFB-106S2	6317	1473689.19	1542191.43	5349.33	TCP (TOP OF CONCRETE)	35°03'00.37015"	106°34'41.50210"	449181.36	470060.89	1630.48
	6318	1473687.57	1542191.53	5352.40	TOPC (LID-NORTH SIDE)	35°03'00.35417"	106°34'41.50079"	449180.87	470060.92	1631.42
	6319	1473687.54	1542191.48	5351.82	TOC*-DEEP	35°03'00.35382"	106°34'41.50141"	449180.86	470060.90	1631.24
	6320	1473687.22	1542191.37	5351.82	TOC*-SHALLOW	35°03'00.35072"	106°34'41.50275"	449180.76	470060.87	1631.24

GENERAL NOTES

1. AN UNCLASSIFIED SURVEY FOR WELL LOCATIONS WAS PERFORMED ON DECEMBER 11, 2018. THIS IS NOT A BOUNDARY SURVEY.
2. WELL LOCATIONS ARE NAD 83 GRID COORDINATES (NEW MEXICO CENTRAL 3002).
3. SITE LOCATED WITHIN SECTION 36, TOWNSHIP 10 NORTH, RANGE 3 EAST N.M.P.M.
4. THE PHOTOBASED IMAGE, DEPICTED ON THIS SURVEY, WAS IMPORTED FROM THE USGS WEB SITE. THIS PHOTOBASE IMAGE IS SHOWN TO PROVIDE A GENERAL SITE ORIENTATION AND MAY NOT REFLECT THE CURRENT SITE CONDITIONS.
5. THE PURPOSE OF THIS SURVEY IS TO ESTABLISH NEW MEXICO STATE PLANE GRID COORDINATES FOR THE LOCATIONS OF THE EA ENGINEERING, SCIENCE AND TECHNOLOGY, INC. MONITORING AND EXTRACTION WELLS.

CONTROL SURVEY NOTE

A CONTROL SURVEY WAS CONDUCTED AT THE SITE ON DECEMBER 08, 2016. CONTROL WAS PROJECTED ONTO THE SUBJECT SITE UTILIZING RTK GPS OBSERVATIONS COMBINED WITH GEOID 12B (CONUS) TO ESTABLISH HORIZONTAL AND VERTICAL POSITIONS BASED UPON NAD83/NAVD 88 DATUM. THE POINTS OBSERVED HAVE BEEN QUALITY CONTROLLED FOR RELATIVE ACCURACY. AN NMSHC BENCHMARK (G-2) IN THE VICINITY OF THE PROJECT WAS OBSERVED IN ORDER TO PROVIDE REFERENCE TIES TO THE SITE. THE COORDINATES LISTED BELOW ARE GRID COORDINATES:
LATITUDE: N35°03'29.55211", LONGITUDE: W106°34'08.48412", ELLIPSOID HEIGHT 1605.871 METERS.

ELEVATIONS SHOWN HAVE BEEN QUALITY CONTROLLED BASED UPON USGS PROVISIONAL CONTROL DATA BY PERFORMANCE OF A CLOSED SPIRIT LEVEL LOOPS BETWEEN EXISTING KAFB WELLS.

PROJECT BENCHMARK: G-2

AN NMSHC CONTROL MONUMENT BRASS CAP SET IN CONCRETE STAMPED "STA. G-2". THE STATION IS LOCATED IN THE CENTER OF THE EASTERN ISLAND OF THE INTERSECTION OF GIBSON BLVD S.E. AND LOUISIANA BLVD S.E.
ELEVATION = 5337.43 FEET (NAVD 1988)

SURVEYORS CERTIFICATION

I, JOSEPH M. SOLOMON, JR., NEW MEXICO PROFESSIONAL SURVEYOR NO. 15075, DO HEREBY CERTIFY; THAT THIS UNCLASSIFIED SURVEY AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JOSEPH M. SOLOMON, JR., NMPS 15075

JOSEPH M. SOLOMON, JR. NEW MEXICO 15075 REGISTERED PROFESSIONAL SURVEYOR

December 17, 2018
DATE

HIGH MESA Consulting Group
Engineers, Surveyors & Hazardous Utility Consultants
6010-B Midway Park Blvd. NE • Albuquerque, New Mexico 87109
Phone: 505.345.4250 • Fax: 505.345.4254 • www.highmesacg.com

UNCLASSIFIED SURVEY - WELL LOCATION SURVEY
EA ENGINEERING KAFB WELLS

SURVEYED BY M.V.Z./D.R.
DRAWN BY P.J.S.
APPROVED BY J.M.S.

NO.	DATE	BY	REVISIONS

JOB NO. 2018.060.1
DATE 12-2018
SHEET 1 OF 1

File Name: P:\data\2018\2018.060.1\SUR\20180601.dwg - DEC 11 Plot Date: 12/14/18 Plot Time: 10:08

WELL KAFB 106-S7

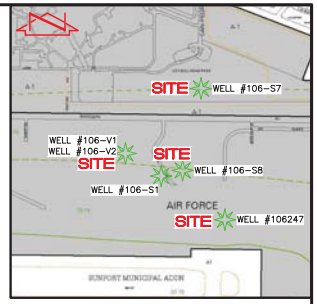
SCALE: 1" = 30'

WELL KAFB 106247

SCALE: 1" = 30'

GENERAL NOTES

1. AN UNCLASSIFIED SURVEY FOR WELL LOCATIONS (106247, 106-S1, 106-S7, 106-S8, 106-V1 & 106-V2) WAS PERFORMED ON MARCH 4, 2019. THIS IS NOT A BOUNDARY SURVEY OR A RIGHT-OF-WAY SURVEY.
2. WELL LOCATIONS ARE NAD 83 GRID COORDINATES (NEW MEXICO CENTRAL 3002). ELEVATIONS ARE NAVD 88 VERTICAL DATUM.
3. SITE LOCATED WITHIN SECTION 36, TOWNSHIP 10 NORTH, RANGE 3 EAST N.M.P.M.
4. THE PHOTOBASED IMAGE, DEPICTED ON THIS SURVEY, WAS IMPORTED FROM THE USGS WEB SITE. THIS PHOTOBASE IMAGE IS SHOWN TO PROVIDE A GENERAL SITE ORIENTATION AND MAY NOT REFLECT THE CURRENT SITE CONDITIONS.
5. THE PURPOSE OF THIS SURVEY IS TO ESTABLISH NEW MEXICO STATE PLANE GRID COORDINATES AND ELEVATIONS FOR THE LOCATIONS OF THE EA ENGINEERING, SCIENCE AND TECHNOLOGY, INC. MONITORING AND EXTRACTION WELLS.



VICINITY MAP M-18

SCALE: 1" = 750'

COORDINATE TABLE

POINT NO.	NORTHING-GRID	EASTING-GRID	ELEVATION	DESCRIPTION	LATITUDE-NORTH	LONGITUDE-WEST	X-METER	Y-METER	Z-METER
	1476630.47	1544945.86	5337.43	G-2(Project Benchmark)	35°03'29.55211"	106°34'08.48412"	470900.438	450077.868	1626.849

	POINT NO.	NORTHING-GRID	EASTING-GRID	ELEVATION	DESCRIPTION	LATITUDE-NORTH	LONGITUDE-WEST	Y-METER	X-METER	Z-METER
	6321	1474335.657	1542361.142	5348.88	TCP (TOP OF CONCRETE)	35°03'06.77019"	106°34'39.48630"	449378.407	470112.616	1630.342
	6322	1474334.988	1542361.017	5348.88	TOPC (LID-NORTH SIDE)	35°03'06.76356"	106°34'39.48777"	449378.203	470112.578	1630.342
WELL KAFB-106-S7	6323	1474334.768	1542360.924	5348.58	TOC*-SHALLOW	35°03'06.76138"	106°34'39.48888"	449378.136	470112.550	1630.250
	6324	1474334.546	1542361.208	5348.57	TOC*-DEEP	35°03'06.75920"	106°34'39.48546"	449378.068	470112.656	1630.247
	6325	1474336.503	1542361.302	5348.93	GRASS	35°03'06.77856"	106°34'39.48441"	449378.665	470112.685	1630.357
	6326	1473291.058	1542125.564	5348.23	DIRT	35°02'56.42991"	106°34'42.27860"	449060.013	470040.812	1630.144
	6327	1473290.122	1542125.631	5348.45	TCP (TOP OF CONCRETE)	35°02'56.42065"	106°34'42.27777"	449059.727	470040.832	1630.211
WELL KAFB-106-S8	6328	1473288.834	1542125.693	5351.45	TOPC (LID-NORTH SIDE)	35°02'56.40791"	106°34'42.27696"	449059.335	470040.851	1631.125
	6329	1473288.630	1542125.842	5350.95	TOC*-SHALLOW	35°02'56.40590"	106°34'42.27517"	449059.273	470040.897	1630.973
	6330	1473288.318	1542125.669	5350.90	TOC*-DEEP	35°02'56.40281"	106°34'42.27724"	449059.177	470040.844	1630.958
	6331	1473218.162	1541851.502	5345.20	TCP (TOP OF CONCRETE)	35°02'55.69992"	106°34'45.57458"	449037.794	469957.217	1629.220
WELL KAFB-106-S1	6332	1473217.359	1541851.273	5345.22	TOPC (LID-NORTH SIDE)	35°02'55.69197"	106°34'45.57489"	449037.549	469957.208	1629.226
	6333	1473216.855	1541851.285	5344.68	TOC*-SHALLOW	35°02'55.68699"	106°34'45.57474"	449037.395	469957.212	1629.062
	6334	1473216.755	1541850.937	5344.69	TOC*-DEEP	35°02'55.68599"	106°34'45.57892"	449037.365	469957.105	1629.065
	6335	1472660.570	1542666.400	5348.26	DIRT	35°02'50.21101"	106°34'35.74852"	448867.839	470205.659	1630.153
	6336	1472659.358	1542666.154	5348.72	TCP (TOP OF CONCRETE)	35°02'50.19902"	106°34'35.75143"	448867.470	470205.584	1630.293
WELL KAFB-106247	6337	1472658.065	1542665.996	5351.60	TOPC (LID-NORTH SIDE)	35°02'50.18623"	106°34'35.75328"	448867.076	470205.536	1631.171
	6338	1472657.820	1542665.809	5350.72	TOC*-SHALLOW	35°02'50.18379"	106°34'35.75552"	448867.001	470205.479	1630.903
	6339	1472657.798	1542666.173	5350.78	TOC*-DEEP	35°02'50.18358"	106°34'35.75113"	448866.994	470205.590	1630.921
	6340	1473523.574	1541443.147	5343.65	DIRT	35°02'58.70754"	106°34'50.49610"	449130.884	469832.811	1628.748
	6341	1473522.541	1541443.238	5343.88	TCP (TOP OF CONCRETE)	35°02'58.69732"	106°34'50.49496"	449130.569	469832.839	1628.818
	6342	1473521.791	1541443.318	5343.91	TOPC (LID-NORTH SIDE)	35°02'58.68990"	106°34'50.49397"	449130.340	469832.863	1628.827
	6343	1473521.029	1541443.267	5343.49	TOC*-#3 (217.5°)	35°02'58.68236"	106°34'50.49455"	449130.108	469832.847	1628.699
WELL KAFB-106-V2	6344	1473521.279	1541443.284	5343.49	TOC*-#1 (267°)	35°02'58.68484"	106°34'50.49436"	449130.184	469832.853	1628.699
	6345	1473521.093	1541443.060	5343.51	TOC*-#2 (250°)	35°02'58.68299"	106°34'50.49705"	449130.127	469832.784	1628.705
	6346	1473521.177	1541443.453	5343.50	TOC*-#4 (160°)	35°02'58.68383"	106°34'50.49232"	449130.153	469832.904	1628.702
	6347	1473520.945	1541443.508	5343.46	TOC*-#5 (117.5°)	35°02'58.68154"	106°34'50.49165"	449130.082	469832.921	1628.690
	6348	1473521.124	1541443.655	5343.47	TOC*-#6 (102.5°)	35°02'58.68332"	106°34'50.48989"	449130.137	469832.966	1628.693
	6349	1473508.085	1541395.377	5343.31	DIRT	35°02'58.55276"	106°34'51.07007"	449126.163	469818.250	1628.644
	6350	1473507.146	1541395.285	5343.57	TCP (TOP OF CONCRETE)	35°02'58.54347"	106°34'51.07114"	449125.876	469818.222	1628.723
	6351	1473506.386	1541395.250	5343.57	TOPC (LID-NORTH SIDE)	35°02'58.53595"	106°34'51.07153"	449125.645	469818.212	1628.723
	6352	1473505.749	1541395.289	5343.26	TOC*-#1 (263°)	35°02'58.52965"	106°34'51.07103"	449125.450	469818.224	1628.629
	6353	1473505.589	1541395.216	5343.25	TOC*-#2 (252.5°)	35°02'58.52807"	106°34'51.07190"	449125.402	469818.202	1628.626
	6354	1473505.758	1541394.951	5343.25	TOC*-#3 (217.5°)	35°02'58.52973"	106°34'51.07510"	449125.453	469818.121	1628.626
	6355	1473505.393	1541395.278	5343.26	TOC*-#4 (160°)	35°02'58.52613"	106°34'51.07115"	449125.342	469818.220	1628.629
	6356	1473505.624	1541395.620	5343.24	TOC*-#5 (113°)	35°02'58.52843"	106°34'51.06705"	449125.413	469818.325	1628.623
	6357	1473505.972	1541395.116	5343.26	TOC*-#6 (102.5°)	35°02'58.53185"	106°34'51.07312"	449125.518	469818.171	1628.629

WELLS KAFB 106-V1 & 106-V2

SCALE: 1" = 30'

WELL KAFB 106-S1 & 106-S8

SCALE: 1" = 30'

CONTROL SURVEY NOTE

A CONTROL SURVEY WAS CONDUCTED AT THE SITE ON DECEMBER 08, 2016. CONTROL WAS PROJECTED ONTO THE SUBJECT SITE UTILIZING RTK GPS OBSERVATIONS COMBINED WITH GEOID 12B (CONUS) TO ESTABLISH HORIZONTAL AND VERTICAL POSITIONS BASED UPON NAD83/NAVD 88 DATUM. THE POINTS OBSERVED HAVE BEEN QUALITY CONTROLLED FOR RELATIVE ACCURACY. AN NMSHC BENCHMARK (G-2) IN THE VICINITY OF THE PROJECT WAS OBSERVED IN ORDER TO PROVIDE REFERENCE TIES TO THE SITE. THE COORDINATES LISTED BELOW ARE GRID COORDINATES:
LATITUDE: N35°03'29.55211", LONGITUDE: W106°34'08.48412", ELLIPSOID HEIGHT 1605.871 METERS.

ELEVATIONS SHOWN HAVE BEEN QUALITY CONTROLLED BASED UPON USGS PROVISIONAL CONTROL DATA BY PERFORMANCE OF A CLOSED SPIRIT LEVEL LOOPS BETWEEN EXISTING KAFB WELLS.

PROJECT BENCHMARK: G-2

AN NMSHC CONTROL MONUMENT BRASS CAP SET IN CONCRETE STAMPED "STA. G-2". THE STATION IS LOCATED IN THE CENTER OF THE WESTERN ISLAND OF THE INTERSECTION OF GIBSON BLVD S.E. AND LOUISIANA BLVD S.E.
ELEVATION = 5337.43 FEET (NAVD 1988)

SURVEYORS CERTIFICATION

I, JOSEPH M. SOLOMON, JR., NEW MEXICO PROFESSIONAL SURVEYOR NO. 15075, DO HEREBY CERTIFY; THAT THIS UNCLASSIFIED SURVEY AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JOSEPH M. SOLOMON, JR., NMPS 15075

JOSEPH M. SOLOMON, JR. NEW MEXICO 15075 REGISTERED PROFESSIONAL SURVEYOR

March 12, 2019
DATE

HIGH MESA Consulting Group
6010-B Midway Park Blvd. NE • Albuquerque, New Mexico 87109
Phone: 505.345.4250 • Fax: 505.345.4254 • www.highmesaeg.com

UNCLASSIFIED SURVEY - WELL LOCATION SURVEY
EA ENGINEERING KAFB WELLS

SURVEYED BY M.V.Z.
DRAWN BY E.J.S.
APPROVED BY J.M.S.

NO.	DATE	BY	REVISIONS

JOB NO. 2018.060.1
DATE 03-2019
SHEET 1 OF 1

File Name: P:\data\2018\2018.060.1\SURV\2018060.1_SH1_grid_3-4-19.dwg - HMCG-D Plot Date: 3/12/19 Plot Time: 11:35

APPENDIX F

INVESTIGATION-DERIVED SOIL WASTE DOCUMENTATION

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

10 January 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 4 January 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S1

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S1, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **PT-4380** and **4536**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586 Digitally signed by WHEELOCK.KATRINA.E.1402749586 Date: 2019.01.10 13:49:55 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

January 4, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S1-1 (Bin ID #4536)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S1-1 (Bin ID #4536) contains approximately 14 cubic yards of soil in a 15-yard, hard top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S1, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1812712) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1812712

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S1-1-idw		
			SAMPLE DATE		11-Dec-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S1-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	84.4	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.05	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.7
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 27, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1812712

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-1-idw
Project: Kirtland AFB BFF
Collection Date: 12/11/2018 12:35:00 PM
Lab ID: 1812712-001 **Matrix:** SOIL **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/20/2018 5:42:14 PM	42238
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/20/2018 12:01:18 PM	42203
Barium	ND	100		mg/L	1	12/20/2018 12:01:18 PM	42203
Cadmium	ND	1.0		mg/L	1	12/20/2018 12:01:18 PM	42203
Chromium	ND	5.0		mg/L	1	12/20/2018 12:01:18 PM	42203
Lead	ND	5.0		mg/L	1	12/20/2018 12:01:18 PM	42203
Selenium	ND	1.0		mg/L	1	12/20/2018 12:01:18 PM	42203
Silver	ND	5.0		mg/L	1	12/20/2018 12:01:18 PM	42203
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **AG**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/19/2018 5:01:57 PM	42100
Surr: BFB	96.1	70-130		%Rec	1	12/19/2018 5:01:57 PM	42100
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/21/2018 11:07:47 AM	42111
Endrin	ND	0.020		mg/L	1	12/21/2018 11:07:47 AM	42111
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/21/2018 11:07:47 AM	42111
Heptachlor	ND	0.0080		mg/L	1	12/21/2018 11:07:47 AM	42111
Heptachlor epoxide	ND	0.0080		mg/L	1	12/21/2018 11:07:47 AM	42111
Methoxychlor	ND	10		mg/L	1	12/21/2018 11:07:47 AM	42111
Toxaphene	ND	0.50		mg/L	1	12/21/2018 11:07:47 AM	42111
Surr: Decachlorobiphenyl	74.2	58.3-109		%Rec	1	12/21/2018 11:07:47 AM	42111
Surr: Tetrachloro-m-xylene	70.9	40.1-101		%Rec	1	12/21/2018 11:07:47 AM	42111
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	12/17/2018 3:26:21 PM	42114
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/17/2018 3:26:21 PM	42114
Surr: DNOP	97.9	50.6-138		%Rec	1	12/17/2018 3:26:21 PM	42114
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/19/2018 4:52:36 PM	42166
3+4-Methylphenol	ND	200		mg/L	1	12/19/2018 4:52:36 PM	42166
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/19/2018 4:52:36 PM	42166
Hexachlorobenzene	ND	0.13		mg/L	1	12/19/2018 4:52:36 PM	42166
Hexachlorobutadiene	ND	0.50		mg/L	1	12/19/2018 4:52:36 PM	42166
Hexachloroethane	ND	3.0		mg/L	1	12/19/2018 4:52:36 PM	42166
Nitrobenzene	ND	2.0		mg/L	1	12/19/2018 4:52:36 PM	42166
Pentachlorophenol	ND	100		mg/L	1	12/19/2018 4:52:36 PM	42166
Pyridine	ND	5.0		mg/L	1	12/19/2018 4:52:36 PM	42166
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/19/2018 4:52:36 PM	42166

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-1-idw
Project: Kirtland AFB BFF
Collection Date: 12/11/2018 12:35:00 PM
Lab ID: 1812712-001 **Matrix:** SOIL **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/19/2018 4:52:36 PM	42166
Cresols, Total	ND	200		mg/L	1	12/19/2018 4:52:36 PM	42166
Surr: 2-Fluorophenol	33.5	15-102		%Rec	1	12/19/2018 4:52:36 PM	42166
Surr: Phenol-d5	23.4	15-87.7		%Rec	1	12/19/2018 4:52:36 PM	42166
Surr: 2,4,6-Tribromophenol	39.7	39.9-111	S	%Rec	1	12/19/2018 4:52:36 PM	42166
Surr: Nitrobenzene-d5	41.4	35.1-107		%Rec	1	12/19/2018 4:52:36 PM	42166
Surr: 2-Fluorobiphenyl	34.0	36.7-100	S	%Rec	1	12/19/2018 4:52:36 PM	42166
Surr: 4-Terphenyl-d14	43.7	42.6-129		%Rec	1	12/19/2018 4:52:36 PM	42166
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
Benzene	ND	0.025		mg/Kg	1	12/19/2018 5:01:57 PM	42100
Toluene	ND	0.050		mg/Kg	1	12/19/2018 5:01:57 PM	42100
Ethylbenzene	ND	0.050		mg/Kg	1	12/19/2018 5:01:57 PM	42100
Xylenes, Total	ND	0.10		mg/Kg	1	12/19/2018 5:01:57 PM	42100
Surr: Dibromofluoromethane	101	70-130		%Rec	1	12/19/2018 5:01:57 PM	42100
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	1	12/19/2018 5:01:57 PM	42100
Surr: Toluene-d8	102	70-130		%Rec	1	12/19/2018 5:01:57 PM	42100
Surr: 4-Bromofluorobenzene	98.1	70-130		%Rec	1	12/19/2018 5:01:57 PM	42100
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	12/14/2018 4:04:30 PM	42086
2-Butanone	ND	200		mg/L	1	12/14/2018 4:04:30 PM	42086
Carbon Tetrachloride	ND	0.50		mg/L	1	12/14/2018 4:04:30 PM	42086
Chlorobenzene	ND	100		mg/L	1	12/14/2018 4:04:30 PM	42086
Chloroform	ND	6.0		mg/L	1	12/14/2018 4:04:30 PM	42086
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/14/2018 4:04:30 PM	42086
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/14/2018 4:04:30 PM	42086
1,1-Dichloroethene	ND	0.70		mg/L	1	12/14/2018 4:04:30 PM	42086
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/14/2018 4:04:30 PM	42086
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/14/2018 4:04:30 PM	42086
Vinyl chloride	ND	0.20		mg/L	1	12/14/2018 4:04:30 PM	42086
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	12/14/2018 4:04:30 PM	42086
Surr: 4-Bromofluorobenzene	99.9	57.3-148		%Rec	1	12/14/2018 4:04:30 PM	42086
Surr: Dibromofluoromethane	97.7	70-130		%Rec	1	12/14/2018 4:04:30 PM	42086
Surr: Toluene-d8	102	70-130		%Rec	1	12/14/2018 4:04:30 PM	42086

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/17/2018 10:31:24 AM	WG1211849
Fluid	1		12/17/2018 10:31:24 AM	WG1211849
Initial pH	8.98		12/17/2018 10:31:24 AM	WG1211849
Final pH	5.48		12/17/2018 10:31:24 AM	WG1211849

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	12/18/2018 12:19	WG1211989

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	84.4		25.0	1	12/19/2018 13:44	WG1212048

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.05	T8	1	12/15/2018 13:11	WG1211392

Sample Narrative:

L1053160-01 WG1211392: 9.05 at 20.7C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	12/19/2018 14:45	WG1212199

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/19/2018 06:13	WG1212404
2,4-D	ND		0.00200	10	1	12/19/2018 06:13	WG1212404
(S) 2,4-Dichlorophenyl Acetic Acid	*103*		*14.0-158*			*12/19/2018 06:13*	WG1212404

Appendix I

Method Blank (MB)

(MB) R3369139-1 12/18/18 11:52

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1051904-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1051904-03 12/18/18 12:00 • (DUP) R3369139-3 12/18/18 12:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1052751-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1052751-01 12/18/18 12:13 • (DUP) R3369139-6 12/18/18 12:14

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.382	1	42.5	P1	20

Laboratory Control Sample (LCS)

(LCS) R3369139-2 12/18/18 11:53

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	1.84	111	50.0-150	

L1052726-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1052726-01 12/18/18 12:10 • (MS) R3369139-4 12/18/18 12:11 • (MSD) R3369139-5 12/18/18 12:12

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	0.278	1.60	1.58	79.2	77.9	1	75.0-125			1.33	20

L1053674-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053674-01 12/18/18 12:24 • (MS) R3369139-7 12/18/18 12:25 • (MSD) R3369139-8 12/18/18 12:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.40	1.44	83.7	86.4	1	75.0-125			3.11	20

Appendix I

Method Blank (MB)

(MB) R3369603-1 12/19/18 13:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1052304-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1052304-01 12/19/18 13:44 • (DUP) R3369603-3 12/19/18 13:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	78.4	84.4	1	7.41		20

L1053674-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053674-01 12/19/18 13:44 • (DUP) R3369603-4 12/19/18 13:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	84.4	90.5	1	6.90		20

Laboratory Control Sample (LCS)

(LCS) R3369603-2 12/19/18 13:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1053160-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053160-01 12/15/18 13:11 • (DUP) R3368490-2 12/15/18 13:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	9.05	9.14	1	0.990		1

Sample Narrative:

OS: 9.05 at 20.7C

DUP: 9.14 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3368490-1 12/15/18 13:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 19.3C

L1053608-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053608-01 12/19/18 14:45 • (DUP) R3369639-2 12/19/18 14:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369639-1 12/19/18 14:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.8	101	96.0-104	

Appendix I

Method Blank (MB)

(MB) R3369739-1 12/19/18 03:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*102*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3369739-2 12/19/18 03:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0526	105	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0488	97.6	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*107*	*14.0-158*	

L1052066-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1052066-03 12/19/18 03:58 • (MS) R3369739-3 12/19/18 04:12 • (MSD) R3369739-4 12/19/18 04:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	ND	0.0564	0.0497	113	99.4	1	50.0-120			12.6	20
2,4,5-TP (Silvex)	0.0500	ND	0.0526	0.0471	105	94.2	1	50.0-125	P		11.0	20
(S) 2,4-Dichlorophenyl Acetic Acid					*113*	*94.4*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
P	RPD between the primary and confirmatory analysis exceeded 40%.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42114**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**42114**		RunNo:	**56379**				
Prep Date:	**12/14/2018**	Analysis Date:	**12/17/2018**		SeqNo:	**1884998**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.00	0	109	70	130			
Surr: DNOP	4.7		5.000		94.4	50.6	138			

Sample ID	**MB-42114**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**42114**		RunNo:	**56379**				
Prep Date:	**12/14/2018**	Analysis Date:	**12/17/2018**		SeqNo:	**1884999**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42111**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42111**	RunNo: **56530**
Prep Date: **12/14/2018**	Analysis Date: **12/21/2018**	SeqNo: **1890674** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0020		0.002500		81.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.6	40.1	101			

Sample ID **LCS-42111**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42111**	RunNo: **56530**
Prep Date: **12/14/2018**	Analysis Date: **12/21/2018**	SeqNo: **1890675** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00037	0.00010	0.0005000	0	74.4	49.5	127			
gamma-BHC (Lindane)	0.00032	0.00010	0.0005000	0	64.2	49.9	124			
Heptachlor	0.00030	0.00010	0.0005000	0	60.5	41	122			
Heptachlor epoxide	0.00033	0.00010	0.0005000	0	66.5	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.1	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		70.4	58.3	109			
Surr: Tetrachloro-m-xylene	0.0013		0.002500		50.6	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42100**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888583** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	90.3	70	130			
Toluene	0.89	0.050	1.000	0	88.9	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.48		0.5000		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.7	70	130			

Sample ID **mb-42100**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888584** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42086**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **LCSS**	Batch ID: **42086**	RunNo: **56370**							
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884654**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.38	0.30	0.4000	0	94.7	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	94.4	70	130			
1,1-Dichloroethene	0.36	0.30	0.4000	0	90.1	70	130			
Trichloroethene (TCE)	0.34	0.30	0.4000	0	86.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.3	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.20		0.2000		97.8	70	130			

Sample ID **mb-42086**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **PBS**	Batch ID: **42086**	RunNo: **56370**							
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884655**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		97.7	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		105	70	130			
Surr: Toluene-d8	0.20		0.2000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42166**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **42166**	RunNo: **56475**
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888529** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.074	0.0010	0.1000	0	74.3	42.2	104			
3+4-Methylphenol	0.16	0.0010	0.2000	0	79.1	42.3	108			
2,4-Dinitrotoluene	0.064	0.0010	0.1000	0	63.8	45.8	87.8			
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.2	54.5	104			
Hexachlorobutadiene	0.063	0.0010	0.1000	0	62.7	35.2	95.8			
Hexachloroethane	0.058	0.0010	0.1000	0	58.4	32.3	91.8			
Nitrobenzene	0.080	0.0010	0.1000	0	79.9	53.1	98.9			
Pentachlorophenol	0.062	0.0010	0.1000	0	61.7	30.3	104			
Pyridine	0.064	0.0010	0.1000	0	64.0	15	90			
2,4,5-Trichlorophenol	0.071	0.0010	0.1000	0	71.3	42.1	107			
2,4,6-Trichlorophenol	0.080	0.0010	0.1000	0	80.3	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	77.5	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		71.3	15	102			
Surr: Phenol-d5	0.13		0.2000		62.8	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.6	39.9	111			
Surr: Nitrobenzene-d5	0.078		0.1000		78.0	35.1	107			
Surr: 2-Fluorobiphenyl	0.076		0.1000		75.7	36.7	100			
Surr: 4-Terphenyl-d14	0.078		0.1000		78.3	42.6	129			

Sample ID **lcsd-42166**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **42166**	RunNo: **56475**
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888530** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.2	42.2	104	2.81	27.1	
3+4-Methylphenol	0.15	0.0010	0.2000	0	75.4	42.3	108	4.86	29.1	
2,4-Dinitrotoluene	0.062	0.0010	0.1000	0	62.3	45.8	87.8	2.51	30.6	
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.2	54.5	104	0.0262	22.5	
Hexachlorobutadiene	0.051	0.0010	0.1000	0	50.9	35.2	95.8	20.8	27.4	
Hexachloroethane	0.050	0.0010	0.1000	0	49.7	32.3	91.8	16.2	28	
Nitrobenzene	0.074	0.0010	0.1000	0	73.6	53.1	98.9	8.18	26.2	
Pentachlorophenol	0.060	0.0010	0.1000	0	60.2	30.3	104	2.53	21.3	
Pyridine	0.042	0.0010	0.1000	0	42.4	15	90	40.6	20	R
2,4,5-Trichlorophenol	0.068	0.0010	0.1000	0	68.1	42.1	107	4.62	29.3	
2,4,6-Trichlorophenol	0.069	0.0010	0.1000	0	68.6	43.8	110	15.7	27.4	
Cresols, Total	0.22	0.0010	0.3000	0	74.3	44.1	111	4.20	27.4	
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		53.4	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.16		0.2000		77.9	39.9	111	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**lcsd-42166**	SampType:	**LCSD**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**LCSS02**	Batch ID:	**42166**		RunNo:	**56475**				
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888530**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.075		0.1000		74.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.068		0.1000		68.2	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.072		0.1000		72.0	42.6	129	0	20	

Sample ID	**mb-42166**	SampType:	**MBLK**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**PBS**	Batch ID:	**42166**		RunNo:	**56475**				
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888531**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.13		0.2000		63.3	15	102			
Surr: Phenol-d5	0.11		0.2000		55.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		72.9	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		79.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.069		0.1000		69.2	36.7	100			
Surr: 4-Terphenyl-d14	0.076		0.1000		76.2	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42238**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42238**	RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889663**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-42238**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42238**	RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889664**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.8	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42203**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**PBW**	Batch ID:	**42203**	RunNo:	**56498**
Prep Date:	**12/19/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889582** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42203**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**LCSW**	Batch ID:	**42203**	RunNo:	**56498**
Prep Date:	**12/19/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889583** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	111	80	120			
Barium	ND	100	0.5000	0	102	80	120			
Cadmium	ND	1.0	0.5000	0	111	80	120			
Chromium	ND	5.0	0.5000	0	105	80	120			
Lead	ND	5.0	0.5000	0	98.9	80	120			
Selenium	ND	1.0	0.5000	0	121	80	120			S
Silver	ND	5.0	0.1000	0	110	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812712**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**lcs-42100**	SampType:	**LCS**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42100**		RunNo:	**56477**				
Prep Date:	**12/13/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888617**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	102	70	130			
Surr: BFB	480		500.0		96.4	70	130			

Sample ID	**mb-42100**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42100**		RunNo:	**56477**				
Prep Date:	**12/13/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888618**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	500		500.0		99.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812712 RcptNo: 1

Received By: **Erin Melendrez** 12/11/2018 4:00:00 PM

Completed By: **Anne Thorne** 12/12/2018 5:01:59 PM

Reviewed By: ENM 12/13/18

Labeled by: DAD 12/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: DAD 12/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Not Present			

Appendix I

179 of 1539

CHAIN-OF-CUSTODY RECORD

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

[1] COC NUMBER: KAFB-106 S1-1-idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3FF~~ 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eacst.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~16182~~ 16219	Pam Moss/pmoss@eacst.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	Tel 505 ~~345~~ 3975 Fax 505 345 4107	Eric Morse/emorse@eacst.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type	Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106S1-1-idw	Rail Car S1-1	Soil	12-11-18	1235	IV	7		3	X	X	X	X	X	X		PF		Composite	12/12/18	001
2																					
3																					
4																					
5										PF											
6																					
7																					
8																					
9																					
10																					

[24] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferran	FedEx Number: N/A Hand delivered to Hall Lab	Temp: 3.1°C

[32] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Ferran Pete Ferran	12-11-18	1600	Erin Melendrez	12/11/18	1600
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: | | Original - Laboratory (To be returned with Analytical Report); | | Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

10 January 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 4 January 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S1

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S1, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **PT-4380** and **4536**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586 Digitally signed by WHEELOCK.KATRINA.E.1402749586 Date: 2019.01.10 13:49:55 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

January 4, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S1-2 (Bin ID #PT-4380)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S1-2 (Bin ID # PT-4380) contains approximately 2 cubic yards of soil in a 15-yard, hard top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S1, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1812710) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1812710

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
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Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S1-2-idw		
			SAMPLE DATE		11-Dec-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S1-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	60.3	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.82	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	37	--	9.9
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	25	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	0.051	--	0.050
		TOLUENE	mg/kg	50[e]	0.068	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	0.26	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 27, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1812710

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-2-idw
Project: Kirtland AFB BFF
Collection Date: 12/11/2018 1:05:00 PM
Lab ID: 1812710-001 **Matrix:** SOIL **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/20/2018 5:36:41 PM	42238
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/20/2018 11:54:46 AM	42203
Barium	ND	100		mg/L	1	12/20/2018 11:54:46 AM	42203
Cadmium	ND	1.0		mg/L	1	12/20/2018 11:54:46 AM	42203
Chromium	ND	5.0		mg/L	1	12/20/2018 11:54:46 AM	42203
Lead	ND	5.0		mg/L	1	12/20/2018 11:54:46 AM	42203
Selenium	ND	1.0		mg/L	1	12/20/2018 11:54:46 AM	42203
Silver	ND	5.0		mg/L	1	12/20/2018 11:54:46 AM	42203
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **AG**	
Gasoline Range Organics (GRO)	25	5.0		mg/Kg	1	12/19/2018 2:10:23 PM	42100
Surr: BFB	95.9	70-130		%Rec	1	12/19/2018 2:10:23 PM	42100
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/21/2018 10:54:28 AM	42111
Endrin	ND	0.020		mg/L	1	12/21/2018 10:54:28 AM	42111
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/21/2018 10:54:28 AM	42111
Heptachlor	ND	0.0080		mg/L	1	12/21/2018 10:54:28 AM	42111
Heptachlor epoxide	ND	0.0080		mg/L	1	12/21/2018 10:54:28 AM	42111
Methoxychlor	ND	10		mg/L	1	12/21/2018 10:54:28 AM	42111
Toxaphene	ND	0.50		mg/L	1	12/21/2018 10:54:28 AM	42111
Surr: Decachlorobiphenyl	73.5	58.3-109		%Rec	1	12/21/2018 10:54:28 AM	42111
Surr: Tetrachloro-m-xylene	68.0	40.1-101		%Rec	1	12/21/2018 10:54:28 AM	42111
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	37	9.9		mg/Kg	1	12/17/2018 3:04:22 PM	42114
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/17/2018 3:04:22 PM	42114
Surr: DNOP	102	50.6-138		%Rec	1	12/17/2018 3:04:22 PM	42114
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/19/2018 4:23:07 PM	42166
3+4-Methylphenol	ND	200		mg/L	1	12/19/2018 4:23:07 PM	42166
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/19/2018 4:23:07 PM	42166
Hexachlorobenzene	ND	0.13		mg/L	1	12/19/2018 4:23:07 PM	42166
Hexachlorobutadiene	ND	0.50		mg/L	1	12/19/2018 4:23:07 PM	42166
Hexachloroethane	ND	3.0		mg/L	1	12/19/2018 4:23:07 PM	42166
Nitrobenzene	ND	2.0		mg/L	1	12/19/2018 4:23:07 PM	42166
Pentachlorophenol	ND	100		mg/L	1	12/19/2018 4:23:07 PM	42166
Pyridine	ND	5.0		mg/L	1	12/19/2018 4:23:07 PM	42166
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/19/2018 4:23:07 PM	42166

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-2-idw
Project: Kirtland AFB BFF
Collection Date: 12/11/2018 1:05:00 PM
Lab ID: 1812710-001 **Matrix:** SOIL **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/19/2018 4:23:07 PM	42166
Cresols, Total	ND	200		mg/L	1	12/19/2018 4:23:07 PM	42166
Surr: 2-Fluorophenol	48.0	15-102		%Rec	1	12/19/2018 4:23:07 PM	42166
Surr: Phenol-d5	35.9	15-87.7		%Rec	1	12/19/2018 4:23:07 PM	42166
Surr: 2,4,6-Tribromophenol	65.4	39.9-111		%Rec	1	12/19/2018 4:23:07 PM	42166
Surr: Nitrobenzene-d5	65.7	35.1-107		%Rec	1	12/19/2018 4:23:07 PM	42166
Surr: 2-Fluorobiphenyl	57.1	36.7-100		%Rec	1	12/19/2018 4:23:07 PM	42166
Surr: 4-Terphenyl-d14	62.8	42.6-129		%Rec	1	12/19/2018 4:23:07 PM	42166
EPA METHOD 8260B: VOLATILES						Analyst: **AG**	
Benzene	ND	0.025		mg/Kg	1	12/19/2018 2:10:23 PM	42100
Toluene	0.068	0.050		mg/Kg	1	12/19/2018 2:10:23 PM	42100
Ethylbenzene	0.051	0.050		mg/Kg	1	12/19/2018 2:10:23 PM	42100
Xylenes, Total	0.26	0.10		mg/Kg	1	12/19/2018 2:10:23 PM	42100
Surr: Dibromofluoromethane	96.6	70-130		%Rec	1	12/19/2018 2:10:23 PM	42100
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	12/19/2018 2:10:23 PM	42100
Surr: Toluene-d8	97.8	70-130		%Rec	1	12/19/2018 2:10:23 PM	42100
Surr: 4-Bromofluorobenzene	92.6	70-130		%Rec	1	12/19/2018 2:10:23 PM	42100
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	12/14/2018 2:38:38 PM	42086
2-Butanone	ND	200		mg/L	1	12/14/2018 2:38:38 PM	42086
Carbon Tetrachloride	ND	0.50		mg/L	1	12/14/2018 2:38:38 PM	42086
Chlorobenzene	ND	100		mg/L	1	12/14/2018 2:38:38 PM	42086
Chloroform	ND	6.0		mg/L	1	12/14/2018 2:38:38 PM	42086
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/14/2018 2:38:38 PM	42086
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/14/2018 2:38:38 PM	42086
1,1-Dichloroethene	ND	0.70		mg/L	1	12/14/2018 2:38:38 PM	42086
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/14/2018 2:38:38 PM	42086
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/14/2018 2:38:38 PM	42086
Vinyl chloride	ND	0.20		mg/L	1	12/14/2018 2:38:38 PM	42086
Surr: 1,2-Dichloroethane-d4	99.8	70-130		%Rec	1	12/14/2018 2:38:38 PM	42086
Surr: 4-Bromofluorobenzene	97.9	57.3-148		%Rec	1	12/14/2018 2:38:38 PM	42086
Surr: Dibromofluoromethane	97.6	70-130		%Rec	1	12/14/2018 2:38:38 PM	42086
Surr: Toluene-d8	103	70-130		%Rec	1	12/14/2018 2:38:38 PM	42086

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/18/2018 9:59:28 AM	WG1212431
Fluid	1		12/18/2018 9:59:28 AM	WG1212431
Initial pH	6.76		12/18/2018 9:59:28 AM	WG1212431
Final pH	5.03		12/18/2018 9:59:28 AM	WG1212431

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	12/18/2018 12:20	WG1211989

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	60.3		25.0	1	12/19/2018 13:44	WG1212048

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.82	T8	1	12/15/2018 13:11	WG1211392

Sample Narrative:

L1053161-01 WG1211392: 8.82 at 20.5C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	12/19/2018 14:45	WG1212199

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/21/2018 13:17	WG1213726
2,4-D	ND		0.00200	10	1	12/21/2018 13:17	WG1213726
(S) 2,4-Dichlorophenyl Acetic Acid	*78.8*		*14.0-158*			*12/21/2018 13:17*	WG1213726

Method Blank (MB)

(MB) R3369139-1 12/18/18 11:52

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1051904-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1051904-03 12/18/18 12:00 • (DUP) R3369139-3 12/18/18 12:01

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1052751-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1052751-01 12/18/18 12:13 • (DUP) R3369139-6 12/18/18 12:14

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.382	1	42.5	P1	20

Laboratory Control Sample (LCS)

(LCS) R3369139-2 12/18/18 11:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	1.84	111	50.0-150	

L1052726-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1052726-01 12/18/18 12:10 • (MS) R3369139-4 12/18/18 12:11 • (MSD) R3369139-5 12/18/18 12:12

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	11.7	1.94	11.2	11.0	79.2	77.9	1	75.0-125			1.33	20

L1053674-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053674-01 12/18/18 12:24 • (MS) R3369139-7 12/18/18 12:25 • (MSD) R3369139-8 12/18/18 12:26

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.40	1.44	83.7	86.4	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3369603-1 12/19/18 13:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1052304-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1052304-01 12/19/18 13:44 • (DUP) R3369603-3 12/19/18 13:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	78.4	84.4	1	7.41		20

L1053674-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053674-01 12/19/18 13:44 • (DUP) R3369603-4 12/19/18 13:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	84.4	90.5	1	6.90		20

Laboratory Control Sample (LCS)

(LCS) R3369603-2 12/19/18 13:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1053160-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053160-01 12/15/18 13:11 • (DUP) R3368490-2 12/15/18 13:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	9.05	9.14	1	0.990		1

Sample Narrative:

OS: 9.05 at 20.7C

DUP: 9.14 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3368490-1 12/15/18 13:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 19.3C

L1053608-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053608-01 12/19/18 14:45 • (DUP) R3369639-2 12/19/18 14:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369639-1 12/19/18 14:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.8	101	96.0-104	

Method Blank (MB)

(MB) R3370525-1 12/21/18 12:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*75.6*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3370525-2 12/21/18 13:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0340	68.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0385	77.0	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*62.8*	*14.0-158*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42114**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**42114**		RunNo:	**56379**				
Prep Date:	**12/14/2018**	Analysis Date:	**12/17/2018**		SeqNo:	**1884998**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.00	0	109	70	130			
Surr: DNOP	4.7		5.000		94.4	50.6	138			

Sample ID	**MB-42114**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**42114**		RunNo:	**56379**				
Prep Date:	**12/14/2018**	Analysis Date:	**12/17/2018**		SeqNo:	**1884999**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42111**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42111**	RunNo: **56530**
Prep Date: **12/14/2018**	Analysis Date: **12/21/2018**	SeqNo: **1890674** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0020		0.002500		81.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.6	40.1	101			

Sample ID **LCS-42111**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42111**	RunNo: **56530**
Prep Date: **12/14/2018**	Analysis Date: **12/21/2018**	SeqNo: **1890675** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00037	0.00010	0.0005000	0	74.4	49.5	127			
gamma-BHC (Lindane)	0.00032	0.00010	0.0005000	0	64.2	49.9	124			
Heptachlor	0.00030	0.00010	0.0005000	0	60.5	41	122			
Heptachlor epoxide	0.00033	0.00010	0.0005000	0	66.5	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.1	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		70.4	58.3	109			
Surr: Tetrachloro-m-xylene	0.0013		0.002500		50.6	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **1812710-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S1-2-idw**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888571** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.025	1.000	0	88.5	68.9	131			
Toluene	0.94	0.050	1.000	0.06840	87.2	64.3	137			
Surr: Dibromofluoromethane	0.50		0.5000		100	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		103	70	130			
Surr: Toluene-d8	0.49		0.5000		97.1	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		94.4	70	130			

Sample ID **1812710-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S1-2-idw**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888572** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	90.7	68.9	131	2.40	20	
Toluene	0.92	0.050	1.000	0.06840	84.8	64.3	137	2.56	20	
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130	0	0	
Surr: Toluene-d8	0.47		0.5000		94.8	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.48		0.5000		95.7	70	130	0	0	

Sample ID **lcs-42100**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888583** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	90.3	70	130			
Toluene	0.89	0.050	1.000	0	88.9	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.48		0.5000		96.4	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.7	70	130			

Sample ID **mb-42100**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888584** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42100**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **42100**	RunNo: **56477**
Prep Date: **12/13/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888584** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **1812710-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **KAFB-106S1-2-idw**	Batch ID: **42086**	RunNo: **56370**							
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884650**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.30	0.4000	0	92.7	44.5	152			
Chlorobenzene	0.38	0.30	0.4000	0	93.8	70	130			
1,1-Dichloroethene	0.33	0.30	0.4000	0	83.3	79.1	132			
Trichloroethene (TCE)	0.34	0.30	0.4000	0	84.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		103	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		99.6	70	130			
Surr: Toluene-d8	0.19		0.2000		96.8	70	130			

Sample ID **1812710-001amsd**	SampType: **MSD**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **KAFB-106S1-2-idw**	Batch ID: **42086**	RunNo: **56370**							
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884652**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.36	0.30	0.4000	0	88.9	44.5	152	4.13	20	
Chlorobenzene	0.35	0.30	0.4000	0	88.7	70	130	5.62	20	
1,1-Dichloroethene	0.34	0.30	0.4000	0	84.0	79.1	132	0.853	20	
Trichloroethene (TCE)	0.33	0.30	0.4000	0	81.5	70	130	3.30	20	
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		97.7	57.3	148	0	0	
Surr: Dibromofluoromethane	0.20		0.2000		100	70	130	0	0	
Surr: Toluene-d8	0.20		0.2000		97.9	70	130	0	0	

Sample ID **lcs-42086**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **LCSS**	Batch ID: **42086**	RunNo: **56370**							
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884654**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.38	0.30	0.4000	0	94.7	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	94.4	70	130			
1,1-Dichloroethene	0.36	0.30	0.4000	0	90.1	70	130			
Trichloroethene (TCE)	0.34	0.30	0.4000	0	86.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.3	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.20		0.2000		97.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42086**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **42086**	RunNo: **56370**
Prep Date: **12/13/2018**	Analysis Date: **12/14/2018**	SeqNo: **1884655** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		97.7	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		105	70	130			
Surr: Toluene-d8	0.20		0.2000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42166**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **42166**	RunNo: **56475**
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888529** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.074	0.0010	0.1000	0	74.3	42.2	104			
3+4-Methylphenol	0.16	0.0010	0.2000	0	79.1	42.3	108			
2,4-Dinitrotoluene	0.064	0.0010	0.1000	0	63.8	45.8	87.8			
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.2	54.5	104			
Hexachlorobutadiene	0.063	0.0010	0.1000	0	62.7	35.2	95.8			
Hexachloroethane	0.058	0.0010	0.1000	0	58.4	32.3	91.8			
Nitrobenzene	0.080	0.0010	0.1000	0	79.9	53.1	98.9			
Pentachlorophenol	0.062	0.0010	0.1000	0	61.7	30.3	104			
Pyridine	0.064	0.0010	0.1000	0	64.0	15	90			
2,4,5-Trichlorophenol	0.071	0.0010	0.1000	0	71.3	42.1	107			
2,4,6-Trichlorophenol	0.080	0.0010	0.1000	0	80.3	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	77.5	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		71.3	15	102			
Surr: Phenol-d5	0.13		0.2000		62.8	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.6	39.9	111			
Surr: Nitrobenzene-d5	0.078		0.1000		78.0	35.1	107			
Surr: 2-Fluorobiphenyl	0.076		0.1000		75.7	36.7	100			
Surr: 4-Terphenyl-d14	0.078		0.1000		78.3	42.6	129			

Sample ID **lcsd-42166**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **42166**	RunNo: **56475**
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888530** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.2	42.2	104	2.81	27.1	
3+4-Methylphenol	0.15	0.0010	0.2000	0	75.4	42.3	108	4.86	29.1	
2,4-Dinitrotoluene	0.062	0.0010	0.1000	0	62.3	45.8	87.8	2.51	30.6	
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.2	54.5	104	0.0262	22.5	
Hexachlorobutadiene	0.051	0.0010	0.1000	0	50.9	35.2	95.8	20.8	27.4	
Hexachloroethane	0.050	0.0010	0.1000	0	49.7	32.3	91.8	16.2	28	
Nitrobenzene	0.074	0.0010	0.1000	0	73.6	53.1	98.9	8.18	26.2	
Pentachlorophenol	0.060	0.0010	0.1000	0	60.2	30.3	104	2.53	21.3	
Pyridine	0.042	0.0010	0.1000	0	42.4	15	90	40.6	20	R
2,4,5-Trichlorophenol	0.068	0.0010	0.1000	0	68.1	42.1	107	4.62	29.3	
2,4,6-Trichlorophenol	0.069	0.0010	0.1000	0	68.6	43.8	110	15.7	27.4	
Cresols, Total	0.22	0.0010	0.3000	0	74.3	44.1	111	4.20	27.4	
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		53.4	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.16		0.2000		77.9	39.9	111	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**lcsd-42166**	SampType:	**LCSD**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**LCSS02**	Batch ID:	**42166**		RunNo:	**56475**				
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888530**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.075		0.1000		74.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.068		0.1000		68.2	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.072		0.1000		72.0	42.6	129	0	20	

Sample ID	**mb-42166**	SampType:	**MBLK**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**PBS**	Batch ID:	**42166**		RunNo:	**56475**				
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888531**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.13		0.2000		63.3	15	102			
Surr: Phenol-d5	0.11		0.2000		55.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		72.9	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		79.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.069		0.1000		69.2	36.7	100			
Surr: 4-Terphenyl-d14	0.076		0.1000		76.2	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42238**	SampType:	**MBLK**		TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42238**		RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**		SeqNo:	**1889663**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	ND	0.020									

Sample ID	**LCS-42238**	SampType:	**LCS**		TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42238**		RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**		SeqNo:	**1889664**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	ND	0.020	0.005000	0	96.8	80	120				

Sample ID	**1812710-001AMS**	SampType:	**MS**		TestCode:	**MERCURY, TCLP**					
Client ID:	**KAFB-106S1-2-idw**	Batch ID:	**42238**		RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**		SeqNo:	**1889666**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	ND	0.020	0.005000	0	96.2	75	125				

Sample ID	**1812710-001AMSD**	SampType:	**MSD**		TestCode:	**MERCURY, TCLP**					
Client ID:	**KAFB-106S1-2-idw**	Batch ID:	**42238**		RunNo:	**56501**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**		SeqNo:	**1889667**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	ND	0.020	0.005000	0	98.0	75	125	0	20		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42203**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**42203**	RunNo:	**56498**					
Prep Date:	**12/19/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889582**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42203**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**42203**	RunNo:	**56498**					
Prep Date:	**12/19/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1889583**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	111	80	120			
Barium	ND	100	0.5000	0	102	80	120			
Cadmium	ND	1.0	0.5000	0	111	80	120			
Chromium	ND	5.0	0.5000	0	105	80	120			
Lead	ND	5.0	0.5000	0	98.9	80	120			
Selenium	ND	1.0	0.5000	0	121	80	120			S
Silver	ND	5.0	0.1000	0	110	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812710**

27-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**lcs-42100**	SampType:	**LCS**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42100**		RunNo:	**56477**				
Prep Date:	**12/13/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888617**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	102	70	130			
Surr: BFB	480		500.0		96.4	70	130			

Sample ID	**mb-42100**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42100**		RunNo:	**56477**				
Prep Date:	**12/13/2018**	Analysis Date:	**12/19/2018**		SeqNo:	**1888618**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	500		500.0		99.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812710 RcptNo: 1

Received By: Erin Melendrez 12/11/2018 4:00:00 PM

Completed By: Anne Thorne 12/12/2018 4:52:42 PM

Reviewed By: ENM 12/13/18

Labeled by: DAD 12/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: DAD 12/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.8	Good	Not Present			

EA

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-1065I-2-ic

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 62735DM02 1017.08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[3] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF P.O. 116219 PF 12/12/18	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238-4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Number of Bottles	Bottle Type	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)			[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-1065I-2-ic	Roll off 51-7	SOIL	12-11-18	1305	IV	7	3	PF	X	X	X	X	X	X		PF	Composite	012710	001
2																				
3																				
4																				
5																				
6									PF											
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:
FedEx Number:
N/A Hand delivered to Hall Lab

Temp: 3.8°C

[32] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	12-11-18	1600	Printed Name and Signature: Erin Melendrez	12/11/18	1600
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

Approved

Page 27 of 1580

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

6 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (5), dated: 1 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **ACT-2058** and **ACT-2057**; and three 20-cubic-yard open-top roll-offs labeled **104051, 20B-27,** and **5060**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.06 16:57:34 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 1, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S1-3 (Bin ID #ACT 2058)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S1-3 (Bin ID # ACT 2058) contains approximately 13 cubic yards of soil in a 15-yard, hard top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S1, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902470) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902470

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 25, 2019

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1902470

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/11/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:30:00 PM
Lab ID: 1902470-001 **Matrix:** SOIL
Received Date: 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/15/2019 3:09:17 PM	43164
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	2/14/2019 9:50:19 AM	43141
Barium	ND	100		mg/L	1	2/14/2019 9:50:19 AM	43141
Cadmium	ND	1.0		mg/L	1	2/14/2019 9:50:19 AM	43141
Chromium	ND	5.0		mg/L	1	2/14/2019 9:50:19 AM	43141
Lead	ND	5.0		mg/L	1	2/14/2019 10:31:39 AM	43141
Selenium	ND	1.0		mg/L	1	2/14/2019 9:50:19 AM	43141
Silver	ND	5.0		mg/L	1	2/14/2019 9:50:19 AM	43141
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/22/2019 11:17:17 AM	43222
Endrin	ND	0.020		mg/L	1	2/22/2019 11:17:17 AM	43222
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/22/2019 11:17:17 AM	43222
Heptachlor	ND	0.0080		mg/L	1	2/22/2019 11:17:17 AM	43222
Heptachlor epoxide	ND	0.0080		mg/L	1	2/22/2019 11:17:17 AM	43222
Methoxychlor	ND	10		mg/L	1	2/22/2019 11:17:17 AM	43222
Toxaphene	ND	0.50		mg/L	1	2/22/2019 11:17:17 AM	43222
Surr: Decachlorobiphenyl	76.0	42.6-98.5		%Rec	1	2/22/2019 11:17:17 AM	43222
Surr: Tetrachloro-m-xylene	72.1	28.9-96.7		%Rec	1	2/22/2019 11:17:17 AM	43222
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/15/2019 3:24:48 AM	43142
2,4-D	ND	10		mg/L	1	2/15/2019 3:24:48 AM	43142
Surr: 2,4-Dichlorophenylacetic acid	106	70-130		%Rec	1	2/15/2019 3:24:48 AM	43142
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	2/13/2019 4:38:36 PM	43121
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	2/13/2019 4:38:36 PM	43121
Surr: DNOP	108	50.6-138		%Rec	1	2/13/2019 4:38:36 PM	43121
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	2/13/2019 11:57:47 AM	43103
Surr: BFB	101	73.8-119		%Rec	1	2/13/2019 11:57:47 AM	43103
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/14/2019 8:52:28 PM	43128
3+4-Methylphenol	ND	200		mg/L	1	2/14/2019 8:52:28 PM	43128
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/14/2019 8:52:28 PM	43128
Hexachlorobenzene	ND	0.13		mg/L	1	2/14/2019 8:52:28 PM	43128
Hexachlorobutadiene	ND	0.50		mg/L	1	2/14/2019 8:52:28 PM	43128

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:30:00 PM
Lab ID: 1902470-001 **Matrix:** SOIL **Received Date:** 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/14/2019 8:52:28 PM	43128
Nitrobenzene	ND	2.0		mg/L	1	2/14/2019 8:52:28 PM	43128
Pentachlorophenol	ND	100		mg/L	1	2/14/2019 8:52:28 PM	43128
Pyridine	ND	5.0		mg/L	1	2/14/2019 8:52:28 PM	43128
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/14/2019 8:52:28 PM	43128
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/14/2019 8:52:28 PM	43128
Cresols, Total	ND	200		mg/L	1	2/14/2019 8:52:28 PM	43128
Surr: 2-Fluorophenol	36.5	15-102		%Rec	1	2/14/2019 8:52:28 PM	43128
Surr: Phenol-d5	31.5	15-87.7		%Rec	1	2/14/2019 8:52:28 PM	43128
Surr: 2,4,6-Tribromophenol	57.1	39.9-111		%Rec	1	2/14/2019 8:52:28 PM	43128
Surr: Nitrobenzene-d5	51.1	35.1-107		%Rec	1	2/14/2019 8:52:28 PM	43128
Surr: 2-Fluorobiphenyl	47.9	36.7-100		%Rec	1	2/14/2019 8:52:28 PM	43128
Surr: 4-Terphenyl-d14	65.2	42.6-129		%Rec	1	2/14/2019 8:52:28 PM	43128
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	2/13/2019 11:48:47 PM	43103
Toluene	ND	0.049		mg/Kg	1	2/13/2019 11:48:47 PM	43103
Ethylbenzene	ND	0.049		mg/Kg	1	2/13/2019 11:48:47 PM	43103
Xylenes, Total	ND	0.097		mg/Kg	1	2/13/2019 11:48:47 PM	43103
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	1	2/13/2019 11:48:47 PM	43103
Surr: 4-Bromofluorobenzene	98.1	70-130		%Rec	1	2/13/2019 11:48:47 PM	43103
Surr: Dibromofluoromethane	106	70-130		%Rec	1	2/13/2019 11:48:47 PM	43103
Surr: Toluene-d8	97.4	70-130		%Rec	1	2/13/2019 11:48:47 PM	43103
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	2/14/2019 5:26:00 PM	43129
2-Butanone	ND	200		mg/L	1	2/14/2019 5:26:00 PM	43129
Carbon Tetrachloride	ND	0.50		mg/L	1	2/14/2019 5:26:00 PM	43129
Chlorobenzene	ND	100		mg/L	1	2/14/2019 5:26:00 PM	43129
Chloroform	ND	6.0		mg/L	1	2/14/2019 5:26:00 PM	43129
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/14/2019 5:26:00 PM	43129
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/14/2019 5:26:00 PM	43129
1,1-Dichloroethene	ND	0.70		mg/L	1	2/14/2019 5:26:00 PM	43129
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/14/2019 5:26:00 PM	43129
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/14/2019 5:26:00 PM	43129
Vinyl chloride	ND	0.20		mg/L	1	2/14/2019 5:26:00 PM	43129
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	2/14/2019 5:26:00 PM	43129
Surr: 4-Bromofluorobenzene	99.8	57.3-148		%Rec	1	2/14/2019 5:26:00 PM	43129
Surr: Dibromofluoromethane	105	70-130		%Rec	1	2/14/2019 5:26:00 PM	43129
Surr: Toluene-d8	91.8	70-130		%Rec	1	2/14/2019 5:26:00 PM	43129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/14/2019 16:13	WG1236918

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/17/2019 14:46	WG1238312

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.17	T8	1	02/14/2019 15:45	WG1236929

Sample Narrative:

L1069762-01 WG1236929: 9.17 at 19.2C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/20/2019 13:35	WG1239346

Method Blank (MB)

(MB) R3383882-1 02/14/19 15:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1069768-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069768-01 02/14/19 16:16 • (DUP) R3383882-8 02/14/19 16:17

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/14/19 16:19 • (DUP) R3383882-9 02/14/19 16:20

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383882-2 02/14/19 15:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.45	98.2	50.0-150	

L1069273-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069273-01 02/14/19 16:02 • (MS) R3383882-4 02/14/19 16:03 • (MSD) R3383882-5 02/14/19 16:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.60	1.68	96.2	101	1	75.0-125			4.91	20

L1069762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069762-01 02/14/19 16:13 • (MS) R3383882-6 02/14/19 16:14 • (MSD) R3383882-7 02/14/19 16:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.54	1.50	92.7	89.8	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3384436-1 02/17/19 14:46

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1069762-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069762-01 02/17/19 14:46 • (DUP) R3384436-3 02/17/19 14:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3384436-2 02/17/19 14:46

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	87.7	87.7	70.0-130	

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3383902-2 02/14/19 15:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		su		%		%
Corrosivity by pH		8.28	1	0.363		1

Sample Narrative:

DUP: 8.28 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3383902-1 02/14/19 15:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 17.5C

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3385432-1 02/20/19 13:35

Analyte	Spike Amount Deg. F	LCS Result Deg. F	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ignitability	82.0	81.9	99.9	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43121**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929530** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	55	10	50.00	0	111	63.9	124			
Surr: DNOP	4.7		5.000		93.5	50.6	138			

Sample ID: **MB-43121**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929531** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		99.5	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43103**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930637** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	980		1000		97.5	73.8	119			

Sample ID: **LCS-43103**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930638** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	109	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43222**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938472** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00032	0.00010	0.0005000	0	63.7	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00037	0.00010	0.0005000	0	74.4	52.2	121			
Methoxychlor	0.00026	0.00010	0.0005000	0	51.1	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		64.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.7	28.9	96.7			

Sample ID: **LCSD-43222**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	8.66	20	
gamma-BHC (Lindane)	0.00035	0.00010	0.0005000	0	69.1	49.9	124	11.4	20	
Heptachlor	0.00034	0.00010	0.0005000	0	68.0	41	122	7.73	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121	4.72	20	
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134	28.0	20	R
Surr: Decachlorobiphenyl	0.0015		0.002500		61.6	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		48.3	28.9	96.7	0	0	

Sample ID: **MB-43222**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938561** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0011		0.002500		44.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00090		0.002500		35.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43142**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931599** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		103	70	130			

Sample ID: **LCS-43142**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	95.0	70	130			
2,4-D	0.077	0.010	0.07500	0	103	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.075		0.07500		99.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43103**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930715** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: **lcs-43103**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930716** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	109	70	130			
Toluene	0.94	0.050	1.000	0	94.3	70	130			
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		110	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.3	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43105**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930720** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		114	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		93.0	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		99.0	70	130			

Sample ID: **lcs-43105**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930721** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.20		0.2000		98.9	70	130			

Sample ID: **lcs-43129**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43129**	RunNo: **57725**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931653** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.39	0.10	0.4000	0	97.2	70	130			
Chlorobenzene	0.32	0.10	0.4000	0	80.4	70	130			
1,1-Dichloroethene	0.38	0.10	0.4000	0	95.0	70	130			
Trichloroethene (TCE)	0.34	0.10	0.4000	0	86.0	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		105	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.9	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		105	70	130			
Surr: Toluene-d8	0.19		0.2000		93.0	70	130			

Sample ID: **mb-43129**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43129**	RunNo: **57725**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931654** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43129**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43129**	RunNo: **57725**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931654** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		109	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.9	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		107	70	130			
Surr: Toluene-d8	0.19		0.2000		92.7	70	130			

Sample ID: **1902470-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106S1-3-idw**	Batch ID: **43129**	RunNo: **57725**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931658** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.45	0.10	0.4000	0	113	68.3	131			
Chlorobenzene	0.38	0.10	0.4000	0	95.9	80	120			
1,1-Dichloroethene	0.45	0.10	0.4000	0	113	64.3	135			
Trichloroethene (TCE)	0.42	0.10	0.4000	0	106	80	120			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		109	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.8	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.19		0.2000		92.6	70	130			

Sample ID: **1902470-001amsd**	SampType: **MSD**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106S1-3-idw**	Batch ID: **43129**	RunNo: **57725**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931659** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.43	0.10	0.4000	0	108	68.3	131	4.94	20	
Chlorobenzene	0.37	0.10	0.4000	0	91.8	80	120	4.40	20	
1,1-Dichloroethene	0.43	0.10	0.4000	0	108	64.3	135	4.26	20	
Trichloroethene (TCE)	0.41	0.10	0.4000	0	102	80	120	3.76	20	
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.4	57.3	148	0	0	
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		92.8	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43128**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.8	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	76.7	42.3	108			
2,4-Dinitrotoluene	0.055	0.0010	0.1000	0	55.2	45.8	87.8			
Hexachlorobenzene	0.068	0.0010	0.1000	0	67.8	54.5	104			
Hexachlorobutadiene	0.059	0.0010	0.1000	0	59.0	35.2	95.8			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.6	53.1	98.9			
Pentachlorophenol	0.056	0.0010	0.1000	0	56.1	30.3	104			
Pyridine	0.051	0.0010	0.1000	0	50.8	15	90			
2,4,5-Trichlorophenol	0.063	0.0010	0.1000	0	62.7	42.1	107			
2,4,6-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.0	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		72.0	15	102			
Surr: Phenol-d5	0.13		0.2000		62.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.5	39.9	111			
Surr: Nitrobenzene-d5	0.070		0.1000		70.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.059		0.1000		59.2	36.7	100			
Surr: 4-Terphenyl-d14	0.086		0.1000		85.6	42.6	129			

Sample ID: **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.16		0.2000		77.9	15	102			
Surr: Phenol-d5	0.13		0.2000		67.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		73.7	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		88.6	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43164**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932763** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43164**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932764** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	94.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43141**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930953** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43141**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930955** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	107	80	120			
Barium	ND	100	0.5000	0	99.9	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Sample ID: **1902470-001AMS**	SampType: **MS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **KAFB-106S1-3-idw**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930970** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	100	75	125			
Barium	ND	100	0.5000	0.6697	91.3	75	125			
Cadmium	ND	1.0	0.5000	0	96.2	75	125			
Chromium	ND	5.0	0.5000	0	92.4	75	125			
Selenium	ND	1.0	0.5000	0	97.6	75	125			
Silver	ND	5.0	0.1000	0.004857	99.7	75	125			

Sample ID: **1902470-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **KAFB-106S1-3-idw**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930971** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	94.6	75	125	0	20	
Barium	ND	100	0.5000	0.6697	93.8	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902470**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1902470-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: TCLP Metals**

Client ID: **KAFB-106S1-3-idw** Batch ID: **43141** RunNo: **57698**

Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1930971** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	1.0	0.5000	0	96.5	75	125	0	20	
Chromium	ND	5.0	0.5000	0	92.7	75	125	0	20	
Selenium	ND	1.0	0.5000	0	102	75	125	0	20	
Silver	ND	5.0	0.1000	0.004857	101	75	125	0	20	

Sample ID: **1902470-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: TCLP Metals**

Client ID: **KAFB-106S1-3-idw** Batch ID: **43141** RunNo: **57698**

Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1930995** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	95.2	75	125			

Sample ID: **1902470-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: TCLP Metals**

Client ID: **KAFB-106S1-3-idw** Batch ID: **43141** RunNo: **57698**

Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1930996** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	95.7	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902470 RcptNo: 1

Received By: Isaiah Ortiz 2/11/2019 3:08:00 PM I-OK

Completed By: Anne Thorne 2/11/2019 4:39:33 PM Anne Thorne

Reviewed By: DAD 2/12/19

Labeled by: JO 2/12/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2/12/19 (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.1	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106 S1-3-id

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~16193~~ PF 16219	Pam Moss/pmoss@eaest.com
[7] PROJECT CONTACT:	[8] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Number of Bottles	Bottle Type	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106 S1-3-id	Roll 1 of 1 S1-3	Soil	2/11/19	1330	IV	7	3		X	X	X	X	X	X		PF		Composite	HEAL #190240	-01
2																					
3																					
4										PF											
5																					
6																					
7																					
8																					
9																					
10																					

[29] SAMPLER(S) AND COMPANY: (please print)	[31] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferrari	FedEx Number: NA Hand delivered to Hall Lab	2.1°C

[30] RELINQUISHED BY	DATE	TIME	[32] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari / Pete Ferrari	2-11-19	1440	Printed Name and Signature: Joshua Livingston	2/11/19	1440
Printed Name and Signature: Joshua Livingston	2/11/19	1508	Printed Name and Signature: CDO	2/11/19	1508
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [[Original - Laboratory (To be returned with Analytical Report);] [Copy] - Project File]

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S1-3-idw		
			SAMPLE DATE		11-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S1-3		
Parameter	Method	Analyte	Units	Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.17	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.4
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	47
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.9
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.049
		TOLUENE	mg/kg	50[e]	ND	--	0.049
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.097

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

6 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (5), dated: 1 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **ACT-2058** and **ACT-2057**; and three 20-cubic-yard open-top roll-offs labeled **104051, 20B-27,** and **5060**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.06 16:57:34 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 1, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S1-4 (Bin ID #ACT 2057)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S1-4 (Bin ID # ACT 2057) contains approximately 13 cubic yards of soil in a 15-yard, hard top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S1, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902695) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902695

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S1-4-idw		
			SAMPLE DATE		14-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S1-4		
Parameter	Method	Analyte	Units	Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.95	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	40	--	9.8
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 26, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX:

RE: Kirtland AFB BFF OrderNo.: 1902695

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/14/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-4-idw
Project: Kirtland AFB BFF
Collection Date: 2/14/2019 10:30:00 AM
Lab ID: 1902695-001 **Matrix:** SOIL **Received Date:** 2/14/2019 11:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/22/2019 11:00:34 AM	43289
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	2/21/2019 11:52:36 AM	43237
Barium	ND	100		mg/L	1	2/21/2019 11:52:36 AM	43237
Cadmium	ND	1.0		mg/L	1	2/21/2019 11:52:36 AM	43237
Chromium	ND	5.0		mg/L	1	2/21/2019 11:52:36 AM	43237
Lead	ND	5.0		mg/L	1	2/21/2019 2:13:27 PM	43237
Selenium	ND	1.0		mg/L	1	2/21/2019 3:01:34 PM	43237
Silver	ND	5.0		mg/L	1	2/21/2019 11:52:36 AM	43237
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/25/2019 10:01:12 AM	43300
Endrin	ND	0.020		mg/L	1	2/25/2019 10:01:12 AM	43300
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/25/2019 10:01:12 AM	43300
Heptachlor	ND	0.0080		mg/L	1	2/25/2019 10:01:12 AM	43300
Heptachlor epoxide	ND	0.0080		mg/L	1	2/25/2019 10:01:12 AM	43300
Methoxychlor	ND	10		mg/L	1	2/25/2019 10:01:12 AM	43300
Toxaphene	ND	0.50		mg/L	1	2/25/2019 10:01:12 AM	43300
Surr: Decachlorobiphenyl	46.9	42.6-98.5		%Rec	1	2/25/2019 10:01:12 AM	43300
Surr: Tetrachloro-m-xylene	44.0	28.9-96.7		%Rec	1	2/25/2019 10:01:12 AM	43300
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/21/2019 7:45:13 PM	43244
2,4-D	ND	10		mg/L	1	2/21/2019 7:45:13 PM	43244
Surr: 2,4-Dichlorophenylacetic acid	113	70-130		%Rec	1	2/21/2019 7:45:13 PM	43244
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	40	9.8		mg/Kg	1	2/20/2019 1:33:16 PM	43187
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	2/20/2019 1:33:16 PM	43187
Surr: DNOP	89.7	50.6-138		%Rec	1	2/20/2019 1:33:16 PM	43187
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	2/18/2019 5:00:59 PM	43180
Surr: BFB	116	73.8-119		%Rec	1	2/18/2019 5:00:59 PM	43180
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/22/2019 7:02:21 PM	43223
3+4-Methylphenol	ND	200		mg/L	1	2/22/2019 7:02:21 PM	43223
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/22/2019 7:02:21 PM	43223
Hexachlorobenzene	ND	0.13		mg/L	1	2/22/2019 7:02:21 PM	43223
Hexachlorobutadiene	ND	0.50		mg/L	1	2/22/2019 7:02:21 PM	43223

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-4-idw
Project: Kirtland AFB BFF
Collection Date: 2/14/2019 10:30:00 AM
Lab ID: 1902695-001 **Matrix:** SOIL **Received Date:** 2/14/2019 11:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/22/2019 7:02:21 PM	43223
Nitrobenzene	ND	2.0		mg/L	1	2/22/2019 7:02:21 PM	43223
Pentachlorophenol	ND	100		mg/L	1	2/22/2019 7:02:21 PM	43223
Pyridine	ND	5.0		mg/L	1	2/22/2019 7:02:21 PM	43223
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/22/2019 7:02:21 PM	43223
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/22/2019 7:02:21 PM	43223
Cresols, Total	ND	200		mg/L	1	2/22/2019 7:02:21 PM	43223
Surr: 2-Fluorophenol	46.1	15-102		%Rec	1	2/22/2019 7:02:21 PM	43223
Surr: Phenol-d5	37.5	15-87.7		%Rec	1	2/22/2019 7:02:21 PM	43223
Surr: 2,4,6-Tribromophenol	77.3	39.9-111		%Rec	1	2/22/2019 7:02:21 PM	43223
Surr: Nitrobenzene-d5	69.4	35.1-107		%Rec	1	2/22/2019 7:02:21 PM	43223
Surr: 2-Fluorobiphenyl	56.9	36.7-100		%Rec	1	2/22/2019 7:02:21 PM	43223
Surr: 4-Terphenyl-d14	77.8	42.6-129		%Rec	1	2/22/2019 7:02:21 PM	43223
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	ND	0.025		mg/Kg	1	2/18/2019 5:56:21 PM	43180
Toluene	ND	0.050		mg/Kg	1	2/18/2019 5:56:21 PM	43180
Ethylbenzene	ND	0.050		mg/Kg	1	2/18/2019 5:56:21 PM	43180
Xylenes, Total	ND	0.10		mg/Kg	1	2/18/2019 5:56:21 PM	43180
Surr: 1,2-Dichloroethane-d4	113	70-130		%Rec	1	2/18/2019 5:56:21 PM	43180
Surr: 4-Bromofluorobenzene	93.2	70-130		%Rec	1	2/18/2019 5:56:21 PM	43180
Surr: Dibromofluoromethane	119	70-130		%Rec	1	2/18/2019 5:56:21 PM	43180
Surr: Toluene-d8	93.0	70-130		%Rec	1	2/18/2019 5:56:21 PM	43180
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	2/20/2019 11:53:58 PM	43229
2-Butanone	ND	200		mg/L	1	2/20/2019 11:53:58 PM	43229
Carbon Tetrachloride	ND	0.50		mg/L	1	2/20/2019 11:53:58 PM	43229
Chlorobenzene	ND	100		mg/L	1	2/20/2019 11:53:58 PM	43229
Chloroform	ND	6.0		mg/L	1	2/20/2019 11:53:58 PM	43229
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/20/2019 11:53:58 PM	43229
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/20/2019 11:53:58 PM	43229
1,1-Dichloroethene	ND	0.70		mg/L	1	2/20/2019 11:53:58 PM	43229
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/20/2019 11:53:58 PM	43229
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/20/2019 11:53:58 PM	43229
Vinyl chloride	ND	0.20		mg/L	1	2/20/2019 11:53:58 PM	43229
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	2/20/2019 11:53:58 PM	43229
Surr: 4-Bromofluorobenzene	91.6	57.3-148		%Rec	1	2/20/2019 11:53:58 PM	43229
Surr: Dibromofluoromethane	103	70-130		%Rec	1	2/20/2019 11:53:58 PM	43229
Surr: Toluene-d8	96.0	70-130		%Rec	1	2/20/2019 11:53:58 PM	43229

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/21/2019 23:10	WG1240346

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/21/2019 14:44	WG1240047

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.95	T8	1	02/20/2019 11:00	WG1239696

Sample Narrative:

L1071392-01 WG1239696: 8.95 at 23.3C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/21/2019 12:54	WG1239727

Method Blank (MB)

(MB) R3386025-1 02/21/19 23:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1071392-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1071392-01 02/21/19 23:10 • (DUP) R3386025-3 02/21/19 23:11

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3386025-2 02/21/19 23:07

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.35	94.0	50.0-150	

L1072027-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1072027-03 02/21/19 23:13 • (MS) R3386025-4 02/21/19 23:14 • (MSD) R3386025-5 02/21/19 23:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.32	1.40	75.6	80.3	1	75.0-125			5.82	20

Method Blank (MB)

(MB) R3385867-1 02/21/19 14:44

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1070810-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1070810-01 02/21/19 14:44 • (DUP) R3385867-3 02/21/19 14:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3385867-2 02/21/19 14:44

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	93.3	93.3	70.0-130	

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3385364-1 02/20/19 11:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 19C

L1070689-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1070689-02 02/21/19 12:54 • (DUP) R3385797-2 02/21/19 12:54

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1071392-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1071392-01 02/21/19 12:54 • (DUP) R3385797-3 02/21/19 12:54

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3385797-1 02/21/19 12:54

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.5	101	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**
26-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **LCS-43187**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43187**	RunNo: **57759**
Prep Date: **2/15/2019**	Analysis Date: **2/18/2019**	SeqNo: **1933907** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	42	10	50.00	0	84.7	63.9	124			
Surr: DNOP	4.4		5.000		88.5	50.6	138			

Sample ID: **MB-43187**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43187**	RunNo: **57759**
Prep Date: **2/15/2019**	Analysis Date: **2/18/2019**	SeqNo: **1933908** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.0		10.00		90.1	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43180**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43180**	RunNo: **57761**
Prep Date: **2/15/2019**	Analysis Date: **2/18/2019**	SeqNo: **1934019** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		106	73.8	119			

Sample ID: **LCS-43180**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43180**	RunNo: **57761**
Prep Date: **2/15/2019**	Analysis Date: **2/18/2019**	SeqNo: **1934020** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	107	80.1	123			
Surr: BFB	1200		1000		116	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**
26-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **MB-43300** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW** Batch ID: **43300** RunNo: **57920**
Prep Date: **2/22/2019** Analysis Date: **2/25/2019** SeqNo: **1939484** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		69.1	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		61.6	28.9	96.7			

Sample ID: **LCS-43300** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW** Batch ID: **43300** RunNo: **57920**
Prep Date: **2/22/2019** Analysis Date: **2/25/2019** SeqNo: **1939485** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00027	0.00010	0.0005000	0	53.9	49.5	127			
gamma-BHC (Lindane)	0.00027	0.00010	0.0005000	0	54.5	49.9	124			
Heptachlor	0.00026	0.00010	0.0005000	0	52.3	41	122			
Heptachlor epoxide	0.00028	0.00010	0.0005000	0	55.8	52.2	121			
Methoxychlor	0.00027	0.00010	0.0005000	0	53.7	40.2	134			
Surr: Decachlorobiphenyl	0.0013		0.002500		52.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0011		0.002500		44.2	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43244**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43244**	RunNo: **57864**
Prep Date: **2/21/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937217** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.084		0.07500		112	70	130			

Sample ID: **LCS-43244**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43244**	RunNo: **57864**
Prep Date: **2/21/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937218** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	109	70	130			
2,4-D	0.088	0.010	0.07500	0	118	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.083		0.07500		110	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**
26-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **lcs-43180** SampType: **LCS** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS** Batch ID: **43180** RunNo: **57765**
Prep Date: **2/15/2019** Analysis Date: **2/18/2019** SeqNo: **1933734** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	1.000	0	96.2	70	130			
Toluene	0.91	0.050	1.000	0	91.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		98.5	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.47		0.5000		94.0	70	130			

Sample ID: **mb-43180** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **43180** RunNo: **57765**
Prep Date: **2/15/2019** Analysis Date: **2/18/2019** SeqNo: **1933735** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.54		0.5000		109	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		102	70	130			
Surr: Dibromofluoromethane	0.55		0.5000		110	70	130			
Surr: Toluene-d8	0.48		0.5000		96.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43229**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43229**	RunNo: **57829**
Prep Date: **2/19/2019**	Analysis Date: **2/20/2019**	SeqNo: **1936115** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		109	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		92.7	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		108	70	130			
Surr: Toluene-d8	0.20		0.2000		101	70	130			

Sample ID: **lcs-43229**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43229**	RunNo: **57829**
Prep Date: **2/19/2019**	Analysis Date: **2/20/2019**	SeqNo: **1936116** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.30	0.4000	0	92.0	70	130			
Chlorobenzene	0.33	0.30	0.4000	0	81.4	70	130			
1,1-Dichloroethene	0.37	0.30	0.4000	0	92.9	70	130			
Trichloroethene (TCE)	0.33	0.30	0.4000	0	82.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.2	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		107	70	130			
Surr: Toluene-d8	0.20		0.2000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43223** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS** Batch ID: **43223** RunNo: **57913**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1939094** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.068	0.0010	0.1000	0	68.2	42.2	104			
3+4-Methylphenol	0.13	0.0010	0.2000	0	67.0	42.3	108			
2,4-Dinitrotoluene	0.059	0.0010	0.1000	0	59.4	45.8	87.8			
Hexachlorobenzene	0.074	0.0010	0.1000	0	74.4	54.5	104			
Hexachlorobutadiene	0.036	0.0010	0.1000	0	36.5	35.2	95.8			
Hexachloroethane	0.038	0.0010	0.1000	0	37.6	32.3	91.8			
Nitrobenzene	0.069	0.0010	0.1000	0	69.0	53.1	98.9			
Pentachlorophenol	0.058	0.0010	0.1000	0	57.8	30.3	104			
Pyridine	0.031	0.0010	0.1000	0	31.1	15	90			
2,4,5-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	42.1	107			
2,4,6-Trichlorophenol	0.069	0.0010	0.1000	0	68.5	43.8	110			
Cresols, Total	0.20	0.0010	0.3000	0	67.4	44.1	111			
Surr: 2-Fluorophenol	0.088		0.2000		44.0	15	102			
Surr: Phenol-d5	0.065		0.2000		32.4	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.3	39.9	111			
Surr: Nitrobenzene-d5	0.060		0.1000		59.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.050		0.1000		50.2	36.7	100			
Surr: 4-Terphenyl-d14	0.061		0.1000		61.5	42.6	129			

Sample ID: **lcsd-43223** SampType: **LCSD** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS02** Batch ID: **43223** RunNo: **57913**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1939095** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.085	0.0010	0.1000	0	85.2	42.2	104	22.2	27.1	
3+4-Methylphenol	0.17	0.0010	0.2000	0	85.6	42.3	108	24.4	29.1	
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	74.0	45.8	87.8	22.0	30.6	
Hexachlorobenzene	0.083	0.0010	0.1000	0	83.0	54.5	104	10.9	22.5	
Hexachlorobutadiene	0.048	0.0010	0.1000	0	48.1	35.2	95.8	27.4	27.4	
Hexachloroethane	0.048	0.0010	0.1000	0	48.3	32.3	91.8	24.7	28	
Nitrobenzene	0.083	0.0010	0.1000	0	82.9	53.1	98.9	18.4	26.2	
Pentachlorophenol	0.067	0.0010	0.1000	0	67.3	30.3	104	15.2	21.3	
Pyridine	0.042	0.0010	0.1000	0	41.8	15	90	29.5	20	R
2,4,5-Trichlorophenol	0.085	0.0010	0.1000	0	85.4	42.1	107	26.5	29.3	
2,4,6-Trichlorophenol	0.085	0.0010	0.1000	0	84.7	43.8	110	21.1	27.4	
Cresols, Total	0.26	0.0010	0.3000	0	85.5	44.1	111	23.7	27.4	
Surr: 2-Fluorophenol	0.10		0.2000		50.6	15	102	0	20	
Surr: Phenol-d5	0.077		0.2000		38.4	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		66.1	39.9	111	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcsd-43223**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS02**	Batch ID: **43223**	RunNo: **57913**							
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1939095**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.069		0.1000		69.2	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.057		0.1000		57.4	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.066		0.1000		65.8	42.6	129	0	20	

Sample ID: **mb-43223**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **PBS**	Batch ID: **43223**	RunNo: **57913**							
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1939096**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.092		0.2000		46.1	15	102			
Surr: Phenol-d5	0.075		0.2000		37.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		65.7	39.9	111			
Surr: Nitrobenzene-d5	0.058		0.1000		57.7	35.1	107			
Surr: 2-Fluorobiphenyl	0.056		0.1000		55.5	36.7	100			
Surr: 4-Terphenyl-d14	0.056		0.1000		56.3	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43289**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43289**	RunNo: **57880**
Prep Date: **2/21/2019**	Analysis Date: **2/22/2019**	SeqNo: **1937990** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43289**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43289**	RunNo: **57880**
Prep Date: **2/21/2019**	Analysis Date: **2/22/2019**	SeqNo: **1937991** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	97.6	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43237**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937539** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Silver	ND	5.0								

Sample ID: **LCS-43237**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937540** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	98.8	80	120			
Barium	ND	100	0.5000	0	97.3	80	120			
Cadmium	ND	1.0	0.5000	0	99.5	80	120			
Chromium	ND	5.0	0.5000	0	97.6	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Sample ID: **MB-43237**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937610** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0								

Sample ID: **LCS-43237**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937613** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	96.0	80	120			

Sample ID: **MB-43237**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937653** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902695**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43237**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43237**	RunNo: **57869**
Prep Date: **2/19/2019**	Analysis Date: **2/21/2019**	SeqNo: **1937654** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	1.0	0.5000	0	110	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1902695** RcptNo: **1**

Received By: **Victoria Zellar** **2/14/2019 11:30:00 AM** Victoria Zellar

Completed By: **Erin Melendrez** **2/15/2019 9:09:11 AM**

Reviewed By: ENM 2/15/19

LB: DAD 2/15/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: DAD 2/15/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.8	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: HAFB-106S1-4-idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eacst.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PO Vadose Zone Wells		~~15182 FF~~ 162.19	Pam Moss/pmoss@eacst.com
[3] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013 FF~~ 505 238-4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eacst.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	HAFB-106S1-4-idw	Roll-off S1-4	SO	2-14-19	1030	IV	7	3	X	X	X	X	X	X		PF		Composite	1902695	001
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[30] SAMPLER(S) AND COMPANY: (please print)	[32] COURIER AND SHIPPING NUMBER:
Field Sampler/EA Engineering	FedEx Number:
Pete Ferraro	N/A Hand delivered to Hall lab.

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferraro Pete Ferraro	2-14-19	1130	Printed Name and Signature: Victoria Zeller Victoria Zeller	2/14/19	11:30
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

Appendix B
360 of 1539

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

27 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 19 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S4 and KAFB-106S2

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S4 and KAFB-106S2, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open top roll-off containers labeled **20B007/5060** and **20B004**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.27 09:45:21 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 19, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S2-1 (Bin ID #20B007/5060)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S2-1 (Bin ID #20B007/5060) contains approximately 16 cubic yards of soil in a 20-yard, open top, roll off.

In November 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S2, at this location. Well KAFB-106S2 is located on KAFB just east of the Bulk Fuels Facility gate. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1811E72) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1811E72

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
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Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S2-1-idw		
			SAMPLE DATE		29-Nov-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S2-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	60.3	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.02	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.8
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.8
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.048
		TOLUENE	mg/kg	50[e]	ND	--	0.048
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.096

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity characteristic leaching procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 13, 2018

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Vadose Zone Wells OrderNo.: 1811E72

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-1-idw
Project: Vadose Zone Wells
Collection Date: 11/29/2018 12:22:00 PM
Lab ID: 1811E72-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/5/2018 2:30:40 PM	41854
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:06:48 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:06:48 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:06:48 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:06:48 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:06:48 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:06:48 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:06:48 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/5/2018 12:38:12 PM	41865
Surr: BFB	87.7	70-130		%Rec	1	12/5/2018 12:38:12 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 9:36:56 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 9:36:56 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 9:36:56 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 9:36:56 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 9:36:56 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 9:36:56 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 9:36:56 AM	41959
Surr: Decachlorobiphenyl	65.1	58.3-109		%Rec	1	12/11/2018 9:36:56 AM	41959
Surr: Tetrachloro-m-xylene	75.6	40.1-101		%Rec	1	12/11/2018 9:36:56 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	12/5/2018 11:20:15 AM	41878
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/5/2018 11:20:15 AM	41878
Surr: DNOP	101	50.6-138		%Rec	1	12/5/2018 11:20:15 AM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/8/2018 1:45:59 PM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/8/2018 1:45:59 PM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/8/2018 1:45:59 PM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/8/2018 1:45:59 PM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/8/2018 1:45:59 PM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/8/2018 1:45:59 PM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/8/2018 1:45:59 PM	41931
Pentachlorophenol	ND	100		mg/L	1	12/8/2018 1:45:59 PM	41931
Pyridine	ND	5.0		mg/L	1	12/8/2018 1:45:59 PM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/8/2018 1:45:59 PM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-1-idw
Project: Vadose Zone Wells
Collection Date: 11/29/2018 12:22:00 PM
Lab ID: 1811E72-001 **Matrix:** SOIL **Received Date:** 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/8/2018 1:45:59 PM	41931
Cresols, Total	ND	200		mg/L	1	12/8/2018 1:45:59 PM	41931
Surr: 2-Fluorophenol	28.9	15-102		%Rec	1	12/8/2018 1:45:59 PM	41931
Surr: Phenol-d5	23.3	15-87.7		%Rec	1	12/8/2018 1:45:59 PM	41931
Surr: 2,4,6-Tribromophenol	75.6	39.9-111		%Rec	1	12/8/2018 1:45:59 PM	41931
Surr: Nitrobenzene-d5	42.8	35.1-107		%Rec	1	12/8/2018 1:45:59 PM	41931
Surr: 2-Fluorobiphenyl	35.9	36.7-100	S	%Rec	1	12/8/2018 1:45:59 PM	41931
Surr: 4-Terphenyl-d14	56.9	42.6-129		%Rec	1	12/8/2018 1:45:59 PM	41931
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	12/5/2018 1:02:50 AM	41865
Toluene	ND	0.048		mg/Kg	1	12/5/2018 1:02:50 AM	41865
Ethylbenzene	ND	0.048		mg/Kg	1	12/5/2018 1:02:50 AM	41865
Xylenes, Total	ND	0.096		mg/Kg	1	12/5/2018 1:02:50 AM	41865
Surr: Dibromofluoromethane	103	70-130		%Rec	1	12/5/2018 1:02:50 AM	41865
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	12/5/2018 1:02:50 AM	41865
Surr: Toluene-d8	100	70-130		%Rec	1	12/5/2018 1:02:50 AM	41865
Surr: 4-Bromofluorobenzene	95.2	70-130		%Rec	1	12/5/2018 1:02:50 AM	41865
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	12/4/2018 5:23:52 PM	41860
2-Butanone	ND	200		mg/L	1	12/4/2018 5:23:52 PM	41860
Carbon Tetrachloride	ND	0.50		mg/L	1	12/4/2018 5:23:52 PM	41860
Chlorobenzene	ND	100		mg/L	1	12/4/2018 5:23:52 PM	41860
Chloroform	ND	6.0		mg/L	1	12/4/2018 5:23:52 PM	41860
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/4/2018 5:23:52 PM	41860
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/4/2018 5:23:52 PM	41860
1,1-Dichloroethene	ND	0.70		mg/L	1	12/4/2018 5:23:52 PM	41860
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/4/2018 5:23:52 PM	41860
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/4/2018 5:23:52 PM	41860
Vinyl chloride	ND	0.20		mg/L	1	12/4/2018 5:23:52 PM	41860
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	12/4/2018 5:23:52 PM	41860
Surr: 4-Bromofluorobenzene	99.1	57.3-148		%Rec	1	12/4/2018 5:23:52 PM	41860
Surr: Dibromofluoromethane	102	70-130		%Rec	1	12/4/2018 5:23:52 PM	41860
Surr: Toluene-d8	107	70-130		%Rec	1	12/4/2018 5:23:52 PM	41860

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/5/2018 9:44:38 AM	WG1205795
Fluid	1		12/5/2018 9:44:38 AM	WG1205795
Initial pH	9.44		12/5/2018 9:44:38 AM	WG1205795
Final pH	5.42		12/5/2018 9:44:38 AM	WG1205795

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	12/06/2018 15:22	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfice	60.3		25.0	1	12/06/2018 17:36	WG1206380

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	9.02	TG	1	12/06/2018 17:16	WG1206352

Sample Narrative:

L1049485-C1 WG1206352: 9.02 at 22C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/12/2018 14:05	WG1208624
2,4-D	ND		0.00200	10	1	12/12/2018 14:05	WG1208624
(S) 2,4-Dichlorophenyl Acetic Acid	*70.8*		*14.0-158*			*12/12/2018 14:05*	WG1208624

Appendix I

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

Method Blank (MB)

(MB) R3366007-1 12/06/18 17:36

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049321-01 12/06/18 17:36 • (DUP) R3366007-3 12/06/18 17:36

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Reactive Sulfide	84.4	84.4	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3366007-2 12/06/18 17:36

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

WG1206352

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1049485-01

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365997-1 12/06/18 17:16 • (LCSD) R3365997-2 12/06/18 17:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.0997	1

Sample Narrative:

LCS: 10.03 at 17.4C

LCSD: 10.04 at 17.5C

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

WG1208624

Chlorinated Acid Herbicides (GC) by Method 8151A

QUALITY CONTROL SUMMARY

L1049485-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3367617-1 12/12/18 13:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*74.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3367617-2 12/12/18 13:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0425	85.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0375	75.0	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*86.4*	*14.0-158*	

L1049485-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049485-01 12/12/18 14:05 • (MS) R3367617-3 12/12/18 14:19 • (MSD) R3367617-4 12/12/18 14:33

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	ND	0.0399	0.0437	79.8	87.4	1	50.0-120	P		9.09	20
2,4,5-TP (Silvex)	0.0500	ND	0.0413	0.0388	82.6	77.6	1	50.0-125			6.24	20
(S) 2,4-Dichlorophenyl Acetic Acid					*76.4*	*84.8*		*14.0-158*				

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1049485	12/12/18 17:23

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P	RPD between the primary and confirmatory analysis exceeded 40%.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID	**LCS-41878**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873775**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID	**MB-41878**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873776**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005000	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005000	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005000	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872833** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872834** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **1811e72-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S2-1-idw**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872836** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.024	0.9416	0	97.4	68.9	131			
Toluene	0.92	0.047	0.9416	0	97.3	64.3	137			
Surr: Dibromofluoromethane	0.50		0.4708		106	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.4708		99.9	70	130			
Surr: Toluene-d8	0.47		0.4708		101	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.4708		93.6	70	130			

Sample ID **1811e72-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S2-1-idw**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872837** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.024	0.9479	0	98.7	68.9	131	1.96	20	
Toluene	0.94	0.047	0.9479	0	99.3	64.3	137	2.64	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID	**1811e72-001amsd**	SampType:	**MSD**	TestCode:	**EPA Method 8260B: Volatiles**
Client ID:	**KAFB-106S2-1-idw**	Batch ID:	**41865**	RunNo:	**56077**
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**	SeqNo:	**1872837** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.50		0.4739		105	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.48		0.4739		102	70	130	0	0	
Surr: Toluene-d8	0.49		0.4739		103	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.45		0.4739		93.9	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID **lcs-41860**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41860**	RunNo: **56072**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872502** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.39	0.30	0.4000	0	98.5	70	130			
Chlorobenzene	0.39	0.30	0.4000	0	98.7	70	130			
1,1-Dichloroethene	0.40	0.30	0.4000	0	99.2	70	130			
Trichloroethene (TCE)	0.38	0.30	0.4000	0	95.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		111	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		110	70	130			
Surr: Toluene-d8	0.21		0.2000		106	70	130			

Sample ID **mb-41860**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41860**	RunNo: **56072**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872503** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		104	70	130			
Surr: Toluene-d8	0.21		0.2000		107	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID **lcs-41931**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID	**MB-41854**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41854**	RunNo:	**56100**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**	SeqNo:	**1873667**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41854**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41854**	RunNo:	**56100**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**	SeqNo:	**1873668**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID	**MB-41930**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875538**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41930**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875540**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811E72**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Vadose Zone Wells

Sample ID	**mb-41865**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**					
Client ID:	**PBS**	Batch ID:	**41865**		RunNo:	**56112**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874487**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)		ND	5.0								
Surr: BFB		450		500.0		89.8	70	130			

Sample ID	**lcs-41865**	SampType:	**LCS**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**					
Client ID:	**LCSS**	Batch ID:	**41865**		RunNo:	**56112**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874488**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)		23	5.0	25.00	0	93.9	70	130			
Surr: BFB		440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1811E72 | RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:50:00 PM IG

Completed By: Isaiah Ortiz 11/30/2018 8:07:58 AM IG

Reviewed By: ENM 11/30/18

labeled VV2 11/30/18 by

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

VV2 11/30/18

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date:	
By Whom:		Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person	
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.4	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106 S2-1-Idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	62599DM01.1017.3 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 238 4410	505 345 3975 ~~Fax~~ 505 345 4107	Earl Morse/emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106S2-1-Idw	Roll-off S2-1	SO	11-29-18	1222	IV	7	3	X	X	X	X	X	X		PF		Composite		
2									1811E72-001											
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[24] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Fmrail V

[30] COURIER AND SHIPPING NUMBER:
FedEx Number:
N/A Hand delivered to Hall lab

1.4-1.0 (CE) 0.4

[31] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Fmrail Pete Fmrail	11/29/18	1500	EARL Morse Earl Morse	11/29/18	1500
Printed Name and Signature:			Printed Name and Signature:		
Earl Morse Earl Morse	11/29/18	1550	Isaiah Ortiz client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: | Original - Laboratory (To be returned with Analytical Report); | Copy 1 - Project File

5-11

05440

SPECIAL WASTE SHIPMENT RECORD

D226973

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 078951

Mailing Address:	☒ *Physical Address:*	☐ *Physical Address:*
P.O. Box 15700	33rd St. & Northern Blvd.	1600 W. Highway 6
Rio Rancho, NM 87174	Rio Rancho, NM 87144	Los Lunas, NM 87031
505/892-2055	SWM #231402	SWM #013230 (sp)

SOW#189168

Profile # 104434 NM

1. Generator's work site name and address
Kirtland Air Force Base - 2050 Wyoming Blvd SE Bldg 20685, Environmental KAFB NM 87117

2. Generator's name and address
Kirtland Air Force Base
2050 Wyoming Blvd SE Bldg 20685, Environmental
Kirtland Air Force Base, NM 87117

Generator's Telephone no.
505 846 9017

3. Authorized Agent's name and mailing address (if different from #2)
Advanced Chemical Transport Inc (ABQ)
208 Murray Rd SE
Albuquerque, NM 87105

Agent's Telephone no.
505. 445-9400

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3)	(tons)
Non RCRA Non DOT Regulated Material Solid (TPH Soil)			Bin# HTB-1	TON

7. **Special handling instructions:**

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
Scott Clark		1 / 9 / 19

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
Michael Ramirez		1 / 9 / 19

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates
N35 16 733 W106 40 08 55 87

Received By (printed/typed name):	Signature	Month / Day / Year
Cynthia Dalton		1 09 19

White/GEN Yellow/CUSTOMER Pink/LANDFILL

WASTE MANAGEMENT

WM of New Mexico - Rio Rancho Landfill
Northern & 33rd Street
Rio Rancho, NM, 87124

Original
Ticket# 961469

Ph: (505) 892-2055

Customer Name ADVANCEDCHEMICALTRANS Advance Carrier A C T ADVANCED CHEMICAL TRANSPORT
Ticket Date 01/09/2015 Vehicle# T115 Volume
Payment Type Credit Account Container
Manual Ticket# Driver
Route Check#
Hauling Ticket# Billing# 00000361
Destination Grid
PO#

	Time	Scale	Operator	Inbound		
In	01/09/2019 11:29:23	Inbound	C Lopez		Gross	32720 lb*
Out	01/09/2019 11:29:23		C Lopez		Tare	22430 lb*
			* Manual Weight		Net	10290 lb
					Tons	5.15

Comments 104434NM078952 2 BOXES

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	ContSoilPet-Tons-Cont. S	100	5.15	Tons				ALBU
2	EVFt-P-Standard Environm	100		%				ALBU
3	FUEL-T-Fuel Surcharge	100		%				ALBU
4	RCRt-P-Regulatory Cost R	100		%				ALBU
5	WWMt-P-Waste Water Manag	100		%				ALBU

Total Tax
Total Ticket

Driver's Signature

403WM

TAYLOR COMMUNICATIONS
BG762228-AD (06-16)

EZ Profile™

Requested Facility: Rio Rancho Landfill ❑ Unsure Profile Number: 104434NM
❑ Multiple Generator Locations (Attach Locations) ❑ Request Certificate of Disposal ❑ Renewal? Original Profile Number: _____

A. GENERATOR INFORMATION (MATERIAL ORIGIN)

1. Generator Name: KIRTLAND AIR FORCE BASE
2. Site Address: 2050 WYOMING BLVD SE
   (City, State, ZIP) Kirtland AFB NM 87117
3. County: Bernalillo
4. Contact Name: Scott Clark
5. Email: scott.clark@us.af.mil
6. Phone: (505) 846-9017 7. Fax: _____
8. Generator EPA ID: NM9570024423 ❑ N/A
9. State ID: _____ ☑ N/A

B. BILLING INFORMATION ❑ SAME AS GENERATOR

1. Billing Name: Advanced Chemical Transport
2. Billing Address: 967 Mabury Rd
   (City, State, ZIP) San Jose CA 95133
3. Contact Name: Jared Kinsey
4. Email: jkinsey@actenviro.com
5. Phone: (505) 205-3364 6. Fax: _____
7. WM Hauled? ❑ Yes ☑ No
8. P.O. Number: _____
9. Payment Method: ☑ Credit Account ❑ Cash ❑ Credit Card

C. MATERIAL INFORMATION

1. Common Name: TPH Soil
   Describe Process Generating Material: ❑ See Attached
   Contaminated soil, generated during drilling at fuel spill site
2. Material Composition and Contaminants: ❑ See Attached

1. soil	100 %
2. Diesel Range Organics	480 mg/kg
3. Gasoline Range Organics	110 mg/kg
4. Benzene	.098 mg/kg
Total comp. must be equal to or greater than 100%	≥100%

3. State Waste Codes: _____ ☑ N/A
4. Color: Brown
5. Physical State at 70˚F: ☑ Solid ❑ Liquid ❑ Other: _____
6. Free Liquid Range Percentage: _____ to _____ ☑ N/A
7. pH: 5 to 9 ❑ N/A
8. Strong Odor: ❑ Yes ☑ No Describe: _____
9. Flash Point: ❑ <140˚F ❑ 140˚–199˚F ❑ ≥200˚ ☑ N/A

D. REGULATORY INFORMATION

1. EPA Hazardous Waste? ❑ Yes* ☑ No
   Code: _____
2. State Hazardous Waste? ❑ Yes ☑ No
   Code: _____
3. Is this material non-hazardous due to Treatment, Delisting, or an Exclusion? ❑ Yes* ☑ No
4. Contains Underlying Hazardous Constituents? ❑ Yes* ☑ No
5. From an industry regulated under Benzene NESHAP? ❑ Yes* ☑ No
6. Facility remediation subject to 40 CFR 63 GGGGG? ❑ Yes* ☑ No
7. CERCLA or State-mandated clean-up? ❑ Yes* ☑ No
8. NRC or State-regulated radioactive or NORM waste? ❑ Yes* ☑ No

***If Yes, see Addendum (page 2) for additional questions and space.**

9. Contains PCBs? → If Yes, answer a, b and c. ❑ Yes ☑ No
   a. Regulated by 40 CFR 761? ❑ Yes ❑ No
   b. Remediation under 40 CFR 761.61 (a)? ❑ Yes ❑ No
   c. Were PCB imported into the US? ❑ Yes ❑ No
10. Regulated and/or Untreated Medical/Infectious Waste? ❑ Yes ☑ No
11. Contains Asbestos? ❑ Yes ☑ No
    → If Yes: ❑ Non-Friable ❑ Non-Friable – Regulated ❑ Friable

E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION

1. Analytical attached ☑ Yes
   Please identify applicable samples and/or lab reports:
   Lab ID: 1811675-001 Client Sample ID: KAFB-106-S9-2-idw
2. Other information attached (such as MSDS)? ❑ Yes

F. SHIPPING AND DOT INFORMATION

1. ☑ One-Time Event ❑ Repeat Event/Ongoing Business
2. Estimated Quantity/Unit of Measure: 2
   ❑ Tons ☑ Yards ❑ Drums ❑ Gallons ❑ Other: _____
3. Container Type and Size: 20 cubic yard rolloff
4. USDOT Proper Shipping Name: ☑ N/A

G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): _____ Date: _____
Title: _____
Company: _____

Certification Signature

THINK GREEN.®

QUESTIONS? CALL 800 963 4776 FOR ASSISTANCE

Revised June 30, 2015
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EZ Profile™ Addendum

Only complete this Addendum if prompted by responses on EZ Profile™ (page 1) or to provide additional information. Sections and question numbers correspond to EZ Profile™.

Profile Number: 104434NM

C. MATERIAL INFORMATION

Describe Process Generating Material (Continued from page 1): If more space is needed, please attach additional pages.

Material Composition and Contaminants (Continued from page 1): If more space is needed, please attach additional pages.

5. Toluene	1.2 mg/kg
6. Ethylbenzene	.67 mg/kg
7. Xylene	2.7 mg/kg
8.	
9.	
Total composition must be equal to or greater than 100%	≥100%

D. REGULATORY INFORMATION

Only questions with a "Yes" response in Section D on the EZ Profile™ form (page 1) need to be answered here.

1. EPA Hazardous Waste
   a. Please list all USEPA listed and characteristic waste code numbers:
   b. Is the material subject to the Alternative Debris standards (40 CFR 268.45)? ❑ Yes ❑ No
   c. Is the material subject to the Alternative Soil standards (40 CFR 268.49)? → If Yes, complete question 4. ❑ Yes ❑ No
   d. Is the material exempt from Subpart CC Controls (40 CFR 264.1083)? ❑ Yes ❑ No
      → If Yes, please check **one** of the following:
      ❑ Waste meets LDR or treatment exemptions for organics (40 CFR 264.1082(c)(2) or (c)(4))
      ❑ Waste contains VOCs that average <500 ppmw (CFR 264.1082(c)(1)) – will require annual update.
2. State Hazardous Waste → Please list all state waste codes: _____
3. For material that is Treated, Delisted, or Excluded → Please indicate the category, below:
   ❑ Delisted Hazardous Waste ❑ Excluded Waste under 40 CFR 261.4 → Specify Exclusion: _____
   ❑ Treated Hazardous Waste Debris ❑ Treated Characteristic Hazardous Waste → If checked, complete question 4.
4. Underlying Hazardous Constituents → Please list all Underlying Hazardous Constituents:
5. Industries regulated under Benzene NESHAP include petroleum refineries, chemical manufacturing plants, coke by-product recovery plants, and TSDFs.
   a. Are you a TSDF? → If yes, please complete Benzene NESHAP questionnaire. If not, continue. ❑ Yes ❑ No
   b. Does this material contain benzene? ❑ Yes ❑ No
      1. If yes, what is the flow weighted average concentration? _____ ppmw
   c. What is your facility's current total annual benzene quantity in Megagrams? ❑ <1 Mg ❑ 1–9.99 Mg ❑ ≥10 Mg
   d. Is this waste soil from a remediation? ❑ Yes ❑ No
      1. If yes, what is the benzene concentration in remediation waste? _____ ppmw
   e. Does the waste contain >10% water/moisture? ❑ Yes ❑ No
   f. Has material been treated to remove 99% of the benzene or to achieve <10 ppmw? ❑ Yes ❑ No
   g. Is material exempt from controls in accordance with 40 CFR 61.342? ❑ Yes ❑ No
      → If yes, specify exemption: _____
   h. Based on your knowledge of your waste and the BWON regulations, do you believe that this waste stream is subject to treatment and control requirements at an off-site TSDF? ❑ Yes ❑ No
6. 40 CFR 63 GGGGG → Does the material contain <500 ppmw VOHAPs at the point of determination? ❑ Yes ❑ No
7. CERCLA or State-Mandated clean up → Please submit the Record of Decision or other documentation with process information to assist others in the evaluation for proper disposal. A "Determination of Acceptability" may be needed for CERCLA wastes not going to a CERCLA approved facility.
8. NRC or state regulated radioactive or NORM Waste → Please identify Isotopes and pCi/g: _____

Revised June 30, 2015
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10652-2
Soil

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 12, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF

OrderNo.: 1812015

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Kirtland AFB BFF
Lab ID: 1812015-001 **Matrix:** SOIL

Client Sample ID: KAFB-106S2-2-idw
Collection Date: 11/29/2018 2:30:00 PM
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/7/2018 11:17:24 AM	41957
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:18:58 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:18:58 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:18:58 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:18:58 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:18:58 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:18:58 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:18:58 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	41	4.8		mg/Kg	1	12/5/2018 2:06:03 PM	41865
Surr: BFB	95.7	70-130		%Rec	1	12/5/2018 2:06:03 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 10:16:23 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 10:16:23 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 10:16:23 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 10:16:23 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 10:16:23 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 10:16:23 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 10:16:23 AM	41959
Surr: Decachlorobiphenyl	83.4	58.3-109		%Rec	1	12/11/2018 10:16:23 AM	41959
Surr: Tetrachloro-m-xylene	69.8	40.1-101		%Rec	1	12/11/2018 10:16:23 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	76	9.6		mg/Kg	1	12/5/2018 12:26:15 PM	41878
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/5/2018 12:26:15 PM	41878
Surr: DNOP	106	50.6-138		%Rec	1	12/5/2018 12:26:15 PM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/8/2018 2:43:51 PM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/8/2018 2:43:51 PM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/8/2018 2:43:51 PM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/8/2018 2:43:51 PM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/8/2018 2:43:51 PM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/8/2018 2:43:51 PM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/8/2018 2:43:51 PM	41931
Pentachlorophenol	ND	100		mg/L	1	12/8/2018 2:43:51 PM	41931
Pyridine	ND	5.0		mg/L	1	12/8/2018 2:43:51 PM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/8/2018 2:43:51 PM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Kirtland AFB BFF
Lab ID: 1812015-001 **Matrix:** SOIL

Client Sample ID: KAFB-106S2-2-idw
Collection Date: 11/29/2018 2:30:00 PM
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/8/2018 2:43:51 PM	41931
Cresols, Total	ND	200		mg/L	1	12/8/2018 2:43:51 PM	41931
Surr: 2-Fluorophenol	23.4	15-102		%Rec	1	12/8/2018 2:43:51 PM	41931
Surr: Phenol-d5	20.7	15-87.7		%Rec	1	12/8/2018 2:43:51 PM	41931
Surr: 2,4,6-Tribromophenol	37.2	39.9-111	S	%Rec	1	12/8/2018 2:43:51 PM	41931
Surr: Nitrobenzene-d5	60.7	35.1-107		%Rec	1	12/8/2018 2:43:51 PM	41931
Surr: 2-Fluorobiphenyl	43.1	36.7-100		%Rec	1	12/8/2018 2:43:51 PM	41931
Surr: 4-Terphenyl-d14	51.2	42.6-129		%Rec	1	12/8/2018 2:43:51 PM	41931
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	12/5/2018 2:06:03 PM	41865
Toluene	0.056	0.048		mg/Kg	1	12/5/2018 2:06:03 PM	41865
Ethylbenzene	0.061	0.048		mg/Kg	1	12/5/2018 2:06:03 PM	41865
Xylenes, Total	0.28	0.095		mg/Kg	1	12/5/2018 2:06:03 PM	41865
Surr: Dibromofluoromethane	107	70-130		%Rec	1	12/5/2018 2:06:03 PM	41865
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	12/5/2018 2:06:03 PM	41865
Surr: Toluene-d8	103	70-130		%Rec	1	12/5/2018 2:06:03 PM	41865
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	1	12/5/2018 2:06:03 PM	41865
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	12/6/2018 2:28:00 AM	41891
2-Butanone	ND	200		mg/L	1	12/6/2018 2:28:00 AM	41891
Carbon Tetrachloride	ND	0.50		mg/L	1	12/6/2018 2:28:00 AM	41891
Chlorobenzene	ND	100		mg/L	1	12/6/2018 2:28:00 AM	41891
Chloroform	ND	6.0		mg/L	1	12/6/2018 2:28:00 AM	41891
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/6/2018 2:28:00 AM	41891
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/6/2018 2:28:00 AM	41891
1,1-Dichloroethene	ND	0.70		mg/L	1	12/6/2018 2:28:00 AM	41891
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/6/2018 2:28:00 AM	41891
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/6/2018 2:28:00 AM	41891
Vinyl chloride	ND	0.20		mg/L	1	12/6/2018 2:28:00 AM	41891
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	12/6/2018 2:28:00 AM	41891
Surr: 4-Bromofluorobenzene	107	57.3-148		%Rec	1	12/6/2018 2:28:00 AM	41891
Surr: Dibromofluoromethane	104	70-130		%Rec	1	12/6/2018 2:28:00 AM	41891
Surr: Toluene-d8	91.9	70-130		%Rec	1	12/6/2018 2:28:00 AM	41891

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

WO#: **1812015**

Hall Environmental Analysis Laboratory, Inc.

12-Dec-18

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID **LCS-41878**	SampType: **LCS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **LCSS**	Batch ID: **41878**			RunNo: **56105**					
Prep Date: **12/4/2018**	Analysis Date: **12/5/2018**			SeqNo: **1873775**	Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID **MB-41878**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **PBS**	Batch ID: **41878**			RunNo: **56105**					
Prep Date: **12/4/2018**	Analysis Date: **12/5/2018**			SeqNo: **1873776**	Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812015**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005000	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005000	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005000	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872833** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872834** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	lcs-41891	SampType:	LCS	TestCode:	Volatiles by 8260B/1311				
Client ID:	LCSS	Batch ID:	41891	RunNo:	56114				
Prep Date:	12/4/2018	Analysis Date:	12/6/2018	SeqNo:	1874442	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.10	0.4000	0	104	70	130			
Chlorobenzene	0.37	0.10	0.4000	0	92.5	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.9	70	130			
Trichloroethene (TCE)	0.38	0.10	0.4000	0	94.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.22		0.2000		109	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		98.0	70	130			
Surr: Toluene-d8	0.19		0.2000		94.0	70	130			

Sample ID	mb-41891	SampType:	MBLK	TestCode:	Volatiles by 8260B/1311				
Client ID:	PBS	Batch ID:	41891	RunNo:	56114				
Prep Date:	12/4/2018	Analysis Date:	12/6/2018	SeqNo:	1874443	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		106	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.19		0.2000		92.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41931** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS** Batch ID: **41931** RunNo: **56190**

Prep Date: **12/6/2018** Analysis Date: **12/8/2018** SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**

Client ID: **PBS** Batch ID: **41931** RunNo: **56190**

Prep Date: **12/6/2018** Analysis Date: **12/8/2018** SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	mb-41931	SampType:	MBLK	TestCode:	EPA Method 8270C TCLP					
Client ID:	PBS	Batch ID:	41931	RunNo:	56190					
Prep Date:	12/6/2018	Analysis Date:	12/8/2018	SeqNo:	1877045	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	MB-41957	SampType:	MBLK	TestCode:	MERCURY, TCLP					
Client ID:	PBW	Batch ID:	41957	RunNo:	56161					
Prep Date:	12/6/2018	Analysis Date:	12/7/2018	SeqNo:	1876021	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	LCS-41957	SampType:	LCS	TestCode:	MERCURY, TCLP					
Client ID:	LCSW	Batch ID:	41957	RunNo:	56161					
Prep Date:	12/6/2018	Analysis Date:	12/7/2018	SeqNo:	1876022	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1812015

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	MB-41930	SampType:	MBLK	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	PBW	Batch ID:	41930	RunNo:	56150					
Prep Date:	12/5/2018	Analysis Date:	12/6/2018	SeqNo:	1875538	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	LCS-41930	SampType:	LCS	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	LCSW	Batch ID:	41930	RunNo:	56150					
Prep Date:	12/5/2018	Analysis Date:	12/6/2018	SeqNo:	1875540	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812015**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874487** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	450		500.0		89.8	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874488** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	93.9	70	130			
Surr: BFB	440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/4/2018 4:59:42 PM	WG1205530
Fluid	1		12/4/2018 4:59:42 PM	WG1205530
Initial pH	8.89		12/4/2018 4:59:42 PM	WG1205530
Final pH	5.07		12/4/2018 4:59:42 PM	WG1205530

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	12/06/2018 15:20	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	84.4		25.0	1	12/06/2018 17:36	WG1206380

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.46	T8	1	12/05/2018 11:28	WG1205411

Sample Narrative:

L1049321-01 WG1205411: 8.46 at 19.6C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/07/2018 11:24	WG1206311
2,4-D	ND		0.00200	10	1	12/07/2018 11:24	WG1206311
(S) 2,4-Dichlorophenyl Acetic Acid	*69.8*		*14.0-158*			*12/07/2018 11:24*	WG1206311

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

Appendix I

Method Blank (MB)

(MB) R3366007-1 12/06/18 17:36

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049321-01 12/06/18 17:36 • (DUP) R3366007-3 12/06/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	84.4	84.4	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3366007-2 12/06/18 17:36

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

Appendix I

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365383-1 12/05/18 11:28 • (LCSD) R3365383-2 12/05/18 11:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.97	9.97	99.7	99.7	99.0-101			0.000	1

Sample Narrative:

LCS: 9.97 at 17C

LCSD: 9.97 at 17C

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

Appendix I

608 of 1539

Method Blank (MB)

(MB) R3366355-1 12/07/18 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*66.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3366355-2 12/07/18 10:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0350	70.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0359	71.8	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*71.0*	*14.0-158*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1812015 | RcptNo: 1

Received By: **Isaiah Ortiz** 11/29/2018 3:50:00 PM

Completed By: **Anne Thorne** 12/3/2018 9:46:58 AM

Reviewed By: ENM 12/3/18

Labeled by: VVZ 12/3/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐	
2. How was the sample delivered?	Client			

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

VVZ 12/3/18

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.6	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106S2-2-1dr

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[5] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	62599DM01.1017.3 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Padre Zinc Wells		~~76192~~ 16219	Pam Moss/pmoss@eaest.com
[7] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~605-224-9813~~ 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

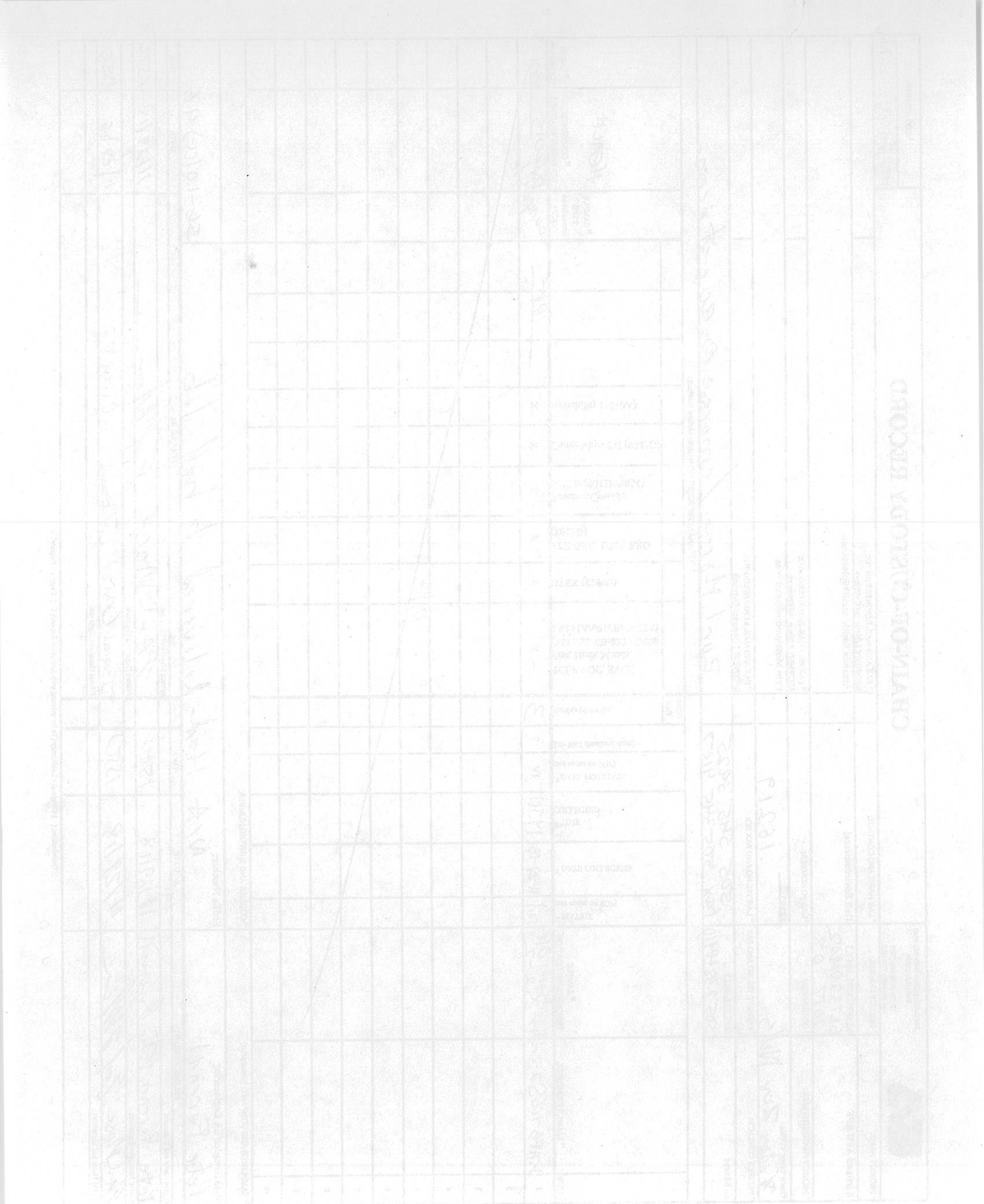
[22] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106S2-2-1dr	Roll Off S2-2	Soil	11-29-18	1430	IV	7	3	X	X	X	X	X	X		PF		comp	HEALH 1812015	001
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[25] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering	FedEx Number:	
Pete Ferrari	N/A Had delivered to hall lab	36-1.0(CF) 46

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Ferrari, Pete Ferrari	11/29/18	1500	Earl Morse Earl Morse	11/29/18	1500
Printed Name and Signature:			Printed Name and Signature:		
Earl Morse Earl Morse	11/29/18	1550	Isaiah Ortiz Client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File



DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

27 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 26 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S2 and KAFB-106S4

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S2 and KAFB-106S4, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in one 20-cubic-yard open top roll-off container labeled **22023** and one 15-cubic-yard hard-top roll-off labeled **HTB-4**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.27 09:59:05 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 26, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S2-3 (Bin ID #22023)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S2-3 (Bin ID #22023) contains approximately 12 cubic yards of soil in a 20-yard, open top, roll off.

In November 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S2, at this location. Well KAFB-106S2 is located on KAFB just east of the Bulk Fuels Facility gate. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1812021) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1812021

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S2-3-idw		
			SAMPLE DATE		29-Nov-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S2-3		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.24	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.8
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.099

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 12, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1812021

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-3-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 12:15:00 PM
Lab ID: 1812021-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/7/2018 11:23:03 AM	41957
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:21:01 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:21:01 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:21:01 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:21:01 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:21:01 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:21:01 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:21:01 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/5/2018 2:35:24 PM	41865
Surr: BFB	88.0	70-130		%Rec	1	12/5/2018 2:35:24 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 10:29:32 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 10:29:32 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 10:29:32 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 10:29:32 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 10:29:32 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 10:29:32 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 10:29:32 AM	41959
Surr: Decachlorobiphenyl	81.4	58.3-109		%Rec	1	12/11/2018 10:29:32 AM	41959
Surr: Tetrachloro-m-xylene	44.6	40.1-101		%Rec	1	12/11/2018 10:29:32 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	12/5/2018 12:48:16 PM	41878
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/5/2018 12:48:16 PM	41878
Surr: DNOP	108	50.6-138		%Rec	1	12/5/2018 12:48:16 PM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/8/2018 3:12:47 PM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/8/2018 3:12:47 PM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/8/2018 3:12:47 PM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/8/2018 3:12:47 PM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/8/2018 3:12:47 PM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/8/2018 3:12:47 PM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/8/2018 3:12:47 PM	41931
Pentachlorophenol	ND	100		mg/L	1	12/8/2018 3:12:47 PM	41931
Pyridine	ND	5.0		mg/L	1	12/8/2018 3:12:47 PM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/8/2018 3:12:47 PM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-3-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 12:15:00 PM
Lab ID: 1812021-001 **Matrix:** SOIL **Received Date:** 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/8/2018 3:12:47 PM	41931
Cresols, Total	ND	200		mg/L	1	12/8/2018 3:12:47 PM	41931
Surr: 2-Fluorophenol	40.5	15-102		%Rec	1	12/8/2018 3:12:47 PM	41931
Surr: Phenol-d5	29.6	15-87.7		%Rec	1	12/8/2018 3:12:47 PM	41931
Surr: 2,4,6-Tribromophenol	73.3	39.9-111		%Rec	1	12/8/2018 3:12:47 PM	41931
Surr: Nitrobenzene-d5	59.0	35.1-107		%Rec	1	12/8/2018 3:12:47 PM	41931
Surr: 2-Fluorobiphenyl	42.7	36.7-100		%Rec	1	12/8/2018 3:12:47 PM	41931
Surr: 4-Terphenyl-d14	53.4	42.6-129		%Rec	1	12/8/2018 3:12:47 PM	41931
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	12/5/2018 3:54:38 AM	41865
Toluene	ND	0.050		mg/Kg	1	12/5/2018 3:54:38 AM	41865
Ethylbenzene	ND	0.050		mg/Kg	1	12/5/2018 3:54:38 AM	41865
Xylenes, Total	ND	0.099		mg/Kg	1	12/5/2018 3:54:38 AM	41865
Surr: Dibromofluoromethane	104	70-130		%Rec	1	12/5/2018 3:54:38 AM	41865
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	12/5/2018 3:54:38 AM	41865
Surr: Toluene-d8	101	70-130		%Rec	1	12/5/2018 3:54:38 AM	41865
Surr: 4-Bromofluorobenzene	95.0	70-130		%Rec	1	12/5/2018 3:54:38 AM	41865
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	12/6/2018 2:51:00 AM	41891
2-Butanone	ND	200		mg/L	1	12/6/2018 2:51:00 AM	41891
Carbon Tetrachloride	ND	0.50		mg/L	1	12/6/2018 2:51:00 AM	41891
Chlorobenzene	ND	100		mg/L	1	12/6/2018 2:51:00 AM	41891
Chloroform	ND	6.0		mg/L	1	12/6/2018 2:51:00 AM	41891
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/6/2018 2:51:00 AM	41891
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/6/2018 2:51:00 AM	41891
1,1-Dichloroethene	ND	0.70		mg/L	1	12/6/2018 2:51:00 AM	41891
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/6/2018 2:51:00 AM	41891
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/6/2018 2:51:00 AM	41891
Vinyl chloride	ND	0.20		mg/L	1	12/6/2018 2:51:00 AM	41891
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	12/6/2018 2:51:00 AM	41891
Surr: 4-Bromofluorobenzene	107	57.3-148		%Rec	1	12/6/2018 2:51:00 AM	41891
Surr: Dibromofluoromethane	101	70-130		%Rec	1	12/6/2018 2:51:00 AM	41891
Surr: Toluene-d8	93.8	70-130		%Rec	1	12/6/2018 2:51:00 AM	41891

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-41878**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873775**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID	**MB-41878**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873776**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005000	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005000	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005000	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872833** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872834** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
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S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41891**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **LCSS**	Batch ID: **41891**	RunNo: **56114**							
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874442**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.10	0.4000	0	104	70	130			
Chlorobenzene	0.37	0.10	0.4000	0	92.5	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.9	70	130			
Trichloroethene (TCE)	0.38	0.10	0.4000	0	94.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.22		0.2000		109	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		98.0	70	130			
Surr: Toluene-d8	0.19		0.2000		94.0	70	130			

Sample ID **mb-41891**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **PBS**	Batch ID: **41891**	RunNo: **56114**							
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874443**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		106	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.19		0.2000		92.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41931** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS** Batch ID: **41931** RunNo: **56190**

Prep Date: **12/6/2018** Analysis Date: **12/8/2018** SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**

Client ID: **PBS** Batch ID: **41931** RunNo: **56190**

Prep Date: **12/6/2018** Analysis Date: **12/8/2018** SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41957**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876021**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41957**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876022**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41930**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875538**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41930**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875540**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812021**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874487** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	450		500.0		89.8	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874488** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	93.9	70	130			
Surr: BFB	440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/4/2018 4:59:42 PM	WG1205530
Fluid	1		12/4/2018 4:59:42 PM	WG1205530
Initial pH	9.11		12/4/2018 4:59:42 PM	WG1205530
Final pH	5.20		12/4/2018 4:59:42 PM	WG1205530

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	12/06/2018 15:14	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	12/05/2018 14:25	WG1205052

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.24	T8	1	12/05/2018 11:28	WG1205411

Sample Narrative:

L1049318-01 WG1205411: 9.24 at 20.1C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/07/2018 10:57	WG1206311
2,4-D	ND		0.00200	10	1	12/07/2018 10:57	WG1206311
(S) 2,4-Dichlorophenyl Acetic Acid	*71.0*		*14.0-158*			*12/07/2018 10:57*	WG1206311

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

Method Blank (MB)

(MB) R3365504-1 12/05/18 14:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049320-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049320-01 12/05/18 14:25 • (DUP) R3365504-4 12/05/18 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	48.3	42.2	1	13.3		20

Laboratory Control Sample (LCS)

(LCS) R3365504-2 12/05/18 14:25

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

Appendix I

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365383-1 12/05/18 11:28 • (LCSD) R3365383-2 12/05/18 11:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.97	9.97	99.7	99.7	99.0-101			0.000	1

Sample Narrative:

LCS: 9.97 at 17C

LCSD: 9.97 at 17C

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

Method Blank (MB)

(MB) R3366355-1 12/07/18 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*66.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3366355-2 12/07/18 10:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0350	70.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0359	71.8	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*71.0*	*14.0-158*	

Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812021 RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:50:00 PM I G

Completed By: Anne Thorne 12/3/2018 9:58:49 AM Anne Thorne

Reviewed By: ENM 12/3/18

Labeled by: VVZ 12/3/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑ VVZ 12/3/18
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.2	Good	Not Present			

CHAIN-OF-CUSTODY RECORD

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

[1] COC NUMBER: KAFB-106 S 2-3-Idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	62599DM01.1017.3 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[1] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9015~~ 505 238 4410	505 345-3975 Fax 505 345 4107	Earl Morse (emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)			[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106 S2-3-Idw	Roll off S2-3	Soil	11-29-18	1215	IV	7	3	X	X	X	X	X	X		PF		Compos	HEAL # 1812021 -001
2																			
3																			
4																			
5						PF													
6																			
7																			
8																			
9																			
10																			

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferraro

[30] COURIER AND SHIPPING NUMBER:

FedEx Number: N/A Hand delivered to hall lab

5.2-1.0(CF) 4.2

[31] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferraro	11-29-18	1515	Printed Name and Signature: Earl Morse	11/29/18	1515
Printed Name and Signature: Earl Morse	11/29/18	1550	Printed Name and Signature: Isaiah Ortiz Client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

Appendix

827 of 1519

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

14 November 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 7 November 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104050, 104056,** and **22023**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either NM license plate WD121651, or NM license plate WD124756. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.11.14 11:44:49 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

13 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 4 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104052, 104054,** and **20B-27**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.13 10:51:18 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 4, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S3-1 (Bin ID #104052)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S3-1 (Bin ID #104052) contains approximately 16 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S2, at this location. Well KAFB-106S2 is located on KAFB just east of the Bulk Fuels Facility gate. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1811316) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1811316

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

				LOCATION CODE	KAFB BFF		
				FIELD SAMPLE ID	KAFB-106S3-1-idw		
				SAMPLE DATE	6-Nov-18		
				SAMPLE PURPOSE	Waste Characterization		
				ROLL-OFF NO.	S3-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	72.4	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	**9.33**	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.9
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	50
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.9
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.049
		TOLUENE	mg/kg	50[e]	ND	--	0.049
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.098

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 21, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1811316

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/6/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S3-1-idw
Project: Kirtland AFB BFF
Collection Date: 11/6/2018 12:45:00 PM
Lab ID: 1811316-001 **Matrix:** SOIL **Received Date:** 11/6/2018 4:10:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	11/16/2018 11:16:43 AM	41569
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	11/10/2018 11:48:49 AM	41436
Barium	ND	100		mg/L	1	11/10/2018 11:48:49 AM	41436
Cadmium	ND	1.0		mg/L	1	11/10/2018 11:48:49 AM	41436
Chromium	ND	5.0		mg/L	1	11/10/2018 11:48:49 AM	41436
Lead	ND	5.0		mg/L	1	11/10/2018 11:48:49 AM	41436
Selenium	ND	1.0		mg/L	1	11/10/2018 11:48:49 AM	41436
Silver	ND	5.0		mg/L	1	11/10/2018 11:48:49 AM	41436
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **TOM**	
Chlordane	ND	0.030		mg/L	1	11/13/2018 10:26:10 AM	41437
Endrin	ND	0.020		mg/L	1	11/13/2018 10:26:10 AM	41437
gamma-BHC (Lindane)	ND	0.40		mg/L	1	11/13/2018 10:26:10 AM	41437
Heptachlor	ND	0.0080		mg/L	1	11/13/2018 10:26:10 AM	41437
Heptachlor epoxide	ND	0.0080		mg/L	1	11/13/2018 10:26:10 AM	41437
Methoxychlor	ND	10		mg/L	1	11/13/2018 10:26:10 AM	41437
Toxaphene	ND	0.50		mg/L	1	11/13/2018 10:26:10 AM	41437
Surr: Decachlorobiphenyl	66.3	58.3-109		%Rec	1	11/13/2018 10:26:10 AM	41437
Surr: Tetrachloro-m-xylene	70.7	40.1-101		%Rec	1	11/13/2018 10:26:10 AM	41437
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	11/9/2018 5:26:20 PM	41421
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/9/2018 5:26:20 PM	41421
Surr: DNOP	95.3	50.6-138		%Rec	1	11/9/2018 5:26:20 PM	41421
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/9/2018 6:38:30 PM	41412
Surr: BFB	88.8	73.8-119		%Rec	1	11/9/2018 6:38:30 PM	41412
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	11/13/2018 12:53:11 PM	41438
3+4-Methylphenol	ND	200		mg/L	1	11/13/2018 12:53:11 PM	41438
2,4-Dinitrotoluene	ND	0.13		mg/L	1	11/13/2018 12:53:11 PM	41438
Hexachlorobenzene	ND	0.13		mg/L	1	11/13/2018 12:53:11 PM	41438
Hexachlorobutadiene	ND	0.50		mg/L	1	11/13/2018 12:53:11 PM	41438
Hexachloroethane	ND	3.0		mg/L	1	11/13/2018 12:53:11 PM	41438
Nitrobenzene	ND	2.0		mg/L	1	11/13/2018 12:53:11 PM	41438
Pentachlorophenol	ND	100		mg/L	1	11/13/2018 12:53:11 PM	41438
Pyridine	ND	5.0		mg/L	1	11/13/2018 12:53:11 PM	41438
2,4,5-Trichlorophenol	ND	400		mg/L	1	11/13/2018 12:53:11 PM	41438

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S3-1-idw
Project: Kirtland AFB BFF
Collection Date: 11/6/2018 12:45:00 PM
Lab ID: 1811316-001 **Matrix:** SOIL **Received Date:** 11/6/2018 4:10:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	11/13/2018 12:53:11 PM	41438
Cresols, Total	ND	200		mg/L	1	11/13/2018 12:53:11 PM	41438
Surr: 2-Fluorophenol	44.9	15-102		%Rec	1	11/13/2018 12:53:11 PM	41438
Surr: Phenol-d5	31.7	15-87.7		%Rec	1	11/13/2018 12:53:11 PM	41438
Surr: 2,4,6-Tribromophenol	72.1	39.9-111		%Rec	1	11/13/2018 12:53:11 PM	41438
Surr: Nitrobenzene-d5	63.2	35.1-107		%Rec	1	11/13/2018 12:53:11 PM	41438
Surr: 2-Fluorobiphenyl	64.3	36.7-100		%Rec	1	11/13/2018 12:53:11 PM	41438
Surr: 4-Terphenyl-d14	95.0	42.6-129		%Rec	1	11/13/2018 12:53:11 PM	41438
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	11/9/2018 1:19:28 AM	41412
Toluene	ND	0.049		mg/Kg	1	11/9/2018 1:19:28 AM	41412
Ethylbenzene	ND	0.049		mg/Kg	1	11/9/2018 1:19:28 AM	41412
Xylenes, Total	ND	0.098		mg/Kg	1	11/9/2018 1:19:28 AM	41412
Surr: Dibromofluoromethane	96.3	70-130		%Rec	1	11/9/2018 1:19:28 AM	41412
Surr: 1,2-Dichloroethane-d4	96.2	70-130		%Rec	1	11/9/2018 1:19:28 AM	41412
Surr: Toluene-d8	95.1	70-130		%Rec	1	11/9/2018 1:19:28 AM	41412
Surr: 4-Bromofluorobenzene	89.2	70-130		%Rec	1	11/9/2018 1:19:28 AM	41412
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	11/13/2018 6:37:13 AM	41432
2-Butanone	ND	200		mg/L	1	11/13/2018 6:37:13 AM	41432
Carbon Tetrachloride	ND	0.50		mg/L	1	11/13/2018 6:37:13 AM	41432
Chlorobenzene	ND	100		mg/L	1	11/13/2018 6:37:13 AM	41432
Chloroform	ND	6.0		mg/L	1	11/13/2018 6:37:13 AM	41432
1,4-Dichlorobenzene	ND	7.5		mg/L	1	11/13/2018 6:37:13 AM	41432
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	11/13/2018 6:37:13 AM	41432
1,1-Dichloroethene	ND	0.70		mg/L	1	11/13/2018 6:37:13 AM	41432
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	11/13/2018 6:37:13 AM	41432
Trichloroethene (TCE)	ND	0.50		mg/L	1	11/13/2018 6:37:13 AM	41432
Vinyl chloride	ND	0.20		mg/L	1	11/13/2018 6:37:13 AM	41432
Surr: 1,2-Dichloroethane-d4	92.5	70-130		%Rec	1	11/13/2018 6:37:13 AM	41432
Surr: 4-Bromofluorobenzene	90.5	57.3-148		%Rec	1	11/13/2018 6:37:13 AM	41432
Surr: Dibromofluoromethane	92.4	70-130		%Rec	1	11/13/2018 6:37:13 AM	41432
Surr: Toluene-d8	91.4	70-130		%Rec	1	11/13/2018 6:37:13 AM	41432

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		11/13/2018 5:06:16 PM	WG1196067
Fluid	1		11/13/2018 5:06:16 PM	WG1196067
Initial pH	8.80		11/13/2018 5:06:16 PM	WG1196067
Final pH	5.25		11/13/2018 5:06:16 PM	WG1196067

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	11/13/2018 17:42	WG1195529

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	72.4		25.0	1	11/15/2018 15:27	WG1196346

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	9.33	T8	1	11/10/2018 14:11	WG1194654

Sample Narrative:

L1043016-01 WG1194654: 9.33 at 17.6C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	11/15/2018 15:17	WG1196914

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	11/20/2018 12:33	WG1198794
2,4-D	ND		0.00200	10	1	11/20/2018 12:33	WG1198794
(S) 2,4-Dichlorophenyl Acetic Acid	*59.4*		*14.0-158*			*11/20/2018 12:33*	WG1198794

Method Blank (MB)

(MB) R3359520-1 11/13/18 17:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1041826-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1041826-02 11/13/18 17:14 • (DUP) R3359520-3 11/13/18 17:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.613	0.611	1	0.266		20

L1042997-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1042997-02 11/13/18 17:40 • (DUP) R3359520-8 11/13/18 17:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.366	0.676	1	59.5	P1	20

Laboratory Control Sample (LCS)

(LCS) R3359520-2 11/13/18 17:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.67	107	50.0-150	

L1042046-22 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1042046-22 11/13/18 17:19 • (MS) R3359520-4 11/13/18 17:22 • (MSD) R3359520-5 11/13/18 17:23

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.70	1.62	98.1	93.1	1	75.0-125			4.99	20

L1042046-23 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1042046-23 11/13/18 17:24 • (MS) R3359520-6 11/13/18 17:25 • (MSD) R3359520-7 11/13/18 17:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.70	1.58	97.1	89.8	1	75.0-125			7.35	20

Method Blank (MB)

(MB) R3360300-1 11/15/18 15:27

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1042821-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1042821-01 11/15/18 15:27 • (DUP) R3360300-3 11/15/18 15:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	30.2	30.2	1	0.000		20

L1043918-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1043918-03 11/15/18 15:27 • (DUP) R3360300-4 11/15/18 15:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3360300-2 11/15/18 15:27

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1043016-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1043016-01 11/10/18 14:11 • (DUP) R3358740-3 11/10/18 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	9.33	9.28	1	0.537		1

Sample Narrative:

OS: 9.33 at 17.6C

DUP: 9.28 at 17.7C

Laboratory Control Sample (LCS)

(LCS) R3358740-1 11/10/18 14:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:

LCS: 9.99 at 16.3C

L1043864-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1043864-01 11/15/18 15:17 • (DUP) R3360277-2 11/15/18 15:17

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1044386-32 Original Sample (OS) • Duplicate (DUP)

(OS) L1044386-32 11/15/18 15:17 • (DUP) R3360277-3 11/15/18 15:17

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3360277-1 11/15/18 15:17

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.6	102	96.0-104	

Method Blank (MB)

(MB) R3361763-1 11/20/18 12:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*62.6*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3361763-2 11/20/18 12:19

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
2,4-D	0.0500	0.0369	73.8	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0350	70.0	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*63.4*	*14.0-158*	

L1043016-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1043016-01 11/20/18 12:33 • (MS) R3361763-3 11/20/18 12:47 • (MSD) R3361763-4 11/20/18 13:01

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0379	0.0365	75.8	73.0	1	50.0-120			3.76	20
2,4,5-TP (Silvex)	0.0500	ND	0.0348	0.0336	69.6	67.2	1	50.0-125			3.51	20
(S) 2,4-Dichlorophenyl Acetic Acid					*62.6*	*60.4*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **LCS-41421**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **41421**	RunNo: **55534**
Prep Date: **11/8/2018**	Analysis Date: **11/9/2018**	SeqNo: **1849540** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	10	50.00	0	88.5	70	130			
Surr: DNOP	3.8		5.000		75.3	50.6	138			

Sample ID **MB-41421**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **41421**	RunNo: **55534**
Prep Date: **11/8/2018**	Analysis Date: **11/9/2018**	SeqNo: **1849541** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.2		10.00		81.5	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41412**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41412**		RunNo:	**55519**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/8/2018**		SeqNo:	**1848374**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	940		1000		94.2	73.8	119			

Sample ID	**LCS-41412**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41412**		RunNo:	**55519**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/8/2018**		SeqNo:	**1848375**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	109	80.1	123			
Surr: BFB	1100		1000		105	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41437**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41437**	RunNo: **55617**
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852177** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.6	58.3	109			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		58.5	40.1	101			

Sample ID **LCS-41437**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41437**	RunNo: **55617**
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852178** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00039	0.00010	0.0005000	0	77.0	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.5	49.9	124			
Heptachlor	0.00029	0.00010	0.0005000	0	58.2	41	122			
Heptachlor epoxide	0.00038	0.00010	0.0005000	0	75.3	52.2	121			
Methoxychlor	0.00039	0.00010	0.0005000	0	77.0	40.2	134			
Surr: Decachlorobiphenyl	0.0017		0.002500		67.7	58.3	109			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		54.3	40.1	101			

Sample ID **LCSD-41437**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **41437**	RunNo: **55617**
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852181** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	10.4	20	
gamma-BHC (Lindane)	0.00032	0.00010	0.0005000	0	64.6	49.9	124	2.92	20	
Heptachlor	0.00029	0.00010	0.0005000	0	57.4	41	122	1.37	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.3	52.2	121	6.88	20	
Methoxychlor	0.00036	0.00010	0.0005000	0	71.0	40.2	134	8.13	20	
Surr: Decachlorobiphenyl	0.0015		0.002500		61.3	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0013		0.002500		52.8	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID	**1811316-001ams**	SampType:	**MS**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**KAFB-106S3-1-idw**	Batch ID:	**41412**		RunNo:	**55505**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/9/2018**		SeqNo:	**1848467**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.024	0.9497	0	103	68.9	131			
Toluene	0.96	0.047	0.9497	0	101	64.3	137			
Surr: Dibromofluoromethane	0.46		0.4748		97.3	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.4748		97.4	70	130			
Surr: Toluene-d8	0.45		0.4748		94.5	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.4748		90.1	70	130			

Sample ID	**1811316-001amsd**	SampType:	**MSD**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**KAFB-106S3-1-idw**	Batch ID:	**41412**		RunNo:	**55505**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/9/2018**		SeqNo:	**1848468**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.023	0.9200	0	101	68.9	131	5.29	20	
Toluene	0.94	0.046	0.9200	0	102	64.3	137	2.04	20	
Surr: Dibromofluoromethane	0.45		0.4600		97.0	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.43		0.4600		94.4	70	130	0	0	
Surr: Toluene-d8	0.43		0.4600		94.4	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.38		0.4600		83.0	70	130	0	0	

Sample ID	**lcs-41412**	SampType:	**LCS**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**LCSS**	Batch ID:	**41412**		RunNo:	**55505**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/9/2018**		SeqNo:	**1848471**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	97.6	70	130			
Toluene	0.96	0.050	1.000	0	96.3	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.0	70	130			
Surr: Toluene-d8	0.46		0.5000		92.3	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		86.8	70	130			

Sample ID	**mb-41412**	SampType:	**MBLK**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**PBS**	Batch ID:	**41412**		RunNo:	**55563**				
Prep Date:	**11/7/2018**	Analysis Date:	**11/9/2018**		SeqNo:	**1850411**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41412**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41412**	RunNo: **55563**
Prep Date: **11/7/2018**	Analysis Date: **11/9/2018**	SeqNo: **1850411** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.47		0.5000		94.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.8	70	130			
Surr: Toluene-d8	0.47		0.5000		93.9	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		88.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID **mb-41432**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41432**	RunNo: **55592**
Prep Date: **11/8/2018**	Analysis Date: **11/13/2018**	SeqNo: **1851198** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		92.0	70	130			
Surr: 4-Bromofluorobenzene	0.18		0.2000		91.0	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		91.7	70	130			
Surr: Toluene-d8	0.18		0.2000		90.8	70	130			

Sample ID **lcs-41432**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41432**	RunNo: **55592**
Prep Date: **11/8/2018**	Analysis Date: **11/13/2018**	SeqNo: **1851199** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.30	0.4000	0	87.8	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	93.9	70	130			
1,1-Dichloroethene	0.35	0.30	0.4000	0	88.5	70	130			
Trichloroethene (TCE)	0.35	0.30	0.4000	0	86.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		90.5	70	130			
Surr: 4-Bromofluorobenzene	0.18		0.2000		91.5	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		92.4	70	130			
Surr: Toluene-d8	0.19		0.2000		92.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41438**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41438**	RunNo: **55619**
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852241** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.5	47.8	99.2			
3+4-Methylphenol	0.15	0.0010	0.2000	0	73.9	41.5	118			
2,4-Dinitrotoluene	0.064	0.0010	0.1000	0	64.4	44.4	81			
Hexachlorobenzene	0.078	0.0010	0.1000	0	77.6	49.5	91.6			
Hexachlorobutadiene	0.048	0.0010	0.1000	0	48.2	38.6	93			
Hexachloroethane	0.050	0.0010	0.1000	0	49.7	39.4	79.9			
Nitrobenzene	0.076	0.0010	0.1000	0	75.7	47.4	96.2			
Pentachlorophenol	0.050	0.0010	0.1000	0	50.2	39.4	79.9			
Pyridine	0.016	0.0010	0.1000	0	16.3	15	79.9			
2,4,5-Trichlorophenol	0.072	0.0010	0.1000	0	71.6	47.4	118			
2,4,6-Trichlorophenol	0.078	0.0010	0.1000	0	78.1	47.4	101			
Cresols, Total	0.22	0.0010	0.3000	0	74.1	44.1	111			
Surr: 2-Fluorophenol	0.11		0.2000		56.6	15	102			
Surr: Phenol-d5	0.076		0.2000		38.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		63.8	39.9	111			
Surr: Nitrobenzene-d5	0.069		0.1000		68.9	35.1	107			
Surr: 2-Fluorobiphenyl	0.067		0.1000		66.9	36.7	100			
Surr: 4-Terphenyl-d14	0.080		0.1000		79.6	42.6	129			

Sample ID **mb-41438**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41438**	RunNo: **55619**
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852242** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		61.0	15	102			
Surr: Phenol-d5	0.081		0.2000		40.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.17		0.2000		82.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41438**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **PBS**	Batch ID: **41438**	RunNo: **55619**							
Prep Date: **11/9/2018**	Analysis Date: **11/13/2018**	SeqNo: **1852242**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.077		0.1000		77.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.073		0.1000		72.6	36.7	100			
Surr: 4-Terphenyl-d14	0.11		0.1000		107	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41569**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41569**	RunNo:	**55703**					
Prep Date:	**11/15/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1856369**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41569**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41569**	RunNo:	**55703**					
Prep Date:	**11/15/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1856370**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	97.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41436**	SampType: **MBLK**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41436**		RunNo: **55551**					
Prep Date:	**11/8/2018**	Analysis Date: **11/10/2018**		SeqNo: **1849905**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41436**	SampType: **LCS**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41436**		RunNo: **55551**					
Prep Date:	**11/8/2018**	Analysis Date: **11/10/2018**		SeqNo: **1849906**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	96.2	80	120			
Barium	ND	100	0.5000	0	86.2	80	120			
Cadmium	ND	1.0	0.5000	0	89.3	80	120			
Chromium	ND	5.0	0.5000	0	92.9	80	120			
Lead	ND	5.0	0.5000	0	90.2	80	120			
Selenium	ND	1.0	0.5000	0	101	80	120			
Silver	ND	5.0	0.1000	0	97.1	80	120			

Sample ID	**1811316-001AMS**	SampType: **MS**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S3-1-idw**	Batch ID: **41436**		RunNo: **55551**					
Prep Date:	**11/8/2018**	Analysis Date: **11/10/2018**		SeqNo: **1849911**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	95.1	75	125			
Barium	ND	100	0.5000	0.6784	83.8	75	125			
Cadmium	ND	1.0	0.5000	0	88.2	75	125			
Chromium	ND	5.0	0.5000	0.004360	91.5	75	125			
Lead	ND	5.0	0.5000	0	89.1	75	125			
Selenium	ND	1.0	0.5000	0	94.6	75	125			
Silver	ND	5.0	0.1000	0.004210	97.1	75	125			

Sample ID	**1811316-001AMSD**	SampType: **MSD**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S3-1-idw**	Batch ID: **41436**		RunNo: **55551**					
Prep Date:	**11/8/2018**	Analysis Date: **11/10/2018**		SeqNo: **1849912**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	93.6	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811316**

21-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**1811316-001AMSD**	SampType:	**MSD**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**KAFB-106S3-1-idw**	Batch ID:	**41436**	RunNo:	**55551**
Prep Date:	**11/8/2018**	Analysis Date:	**11/10/2018**	SeqNo:	**1849912** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0.6784	79.9	75	125	0	20	
Cadmium	ND	1.0	0.5000	0	86.8	75	125	0	20	
Chromium	ND	5.0	0.5000	0.004360	90.2	75	125	0	20	
Lead	ND	5.0	0.5000	0	87.6	75	125	0	20	
Selenium	ND	1.0	0.5000	0	98.0	75	125	0	20	
Silver	ND	5.0	0.1000	0.004210	96.1	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1811316** RcptNo: **1**

Received By: **Erin Melendrez** **11/6/2018 4:10:00 PM**

Completed By: **Ashley Gallegos** **11/7/2018 8:27:12 AM**

Reviewed By: VV2 11/7/18

labeled by: JO 11/7/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preserved added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑ JO
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 11/7/18 (<2 or >12 unless noted)

Adjusted?

Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.4	Good	Not Present			

CHAIN-OF-CUSTODY RECORD

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

[1] PROJECT NAME:	[2] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[3] PROJECT PHASE/SITE/TASK:	[4] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[5] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-234-0013~~ 505 238 4710	505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081 /8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's us
1	~~KAFB-10653-1~~ KAFB-10653-1	roll off	Soil	11-6-18	1245	IV	7	3	X	X	X	X	X	X		PF		Composite	18113116 -001	
2	KAFB-10653-1-ICW																			
3																				
4																				
5																				
6						NF														
7																				
8																				
9																				
10																				

[24] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferrari

[25] COURIER AND SHIPPING NUMBER:

FedEx Number:
N/A Hand delivered to Hall Lab

TEMP: 2.3°C ENM 11/6/18

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	11-06-18	1610	Printed Name and Signature: Erin Melendrez	11/6/18	1611
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: 1 Original - Laboratory (To be returned with Analytical Report) 1 Copy 1 - Project File

Upon receipt 6.5 of 153.0

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

04 January 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letter dated: 3 January 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S3

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S3, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in one 15-cubic-yard hard-top roll-off labeled **HTB-3/515990**. The roll-off will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany the roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.01.04 14:25:48 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

January 3, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S3-2 (Bin ID #HTB-3/515990)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S3-2 (Bin ID # ID #HTB-3/515990) contains approximately 5 cubic yards of soil in a 15-yard, hard top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S3, at this location. Well KAFB-106S3 is located on the north side of Randolph Avenue across from Fuel Drive SE. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1812008) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1812008

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S3-2-idw		
			SAMPLE DATE		29-Nov-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S3-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	48.3	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	**8.92**	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200.0
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	25	--	10
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	50
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.9
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.049
		TOLUENE	mg/kg	50[e]	ND	--	0.049
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.099

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture,

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity Characteristic Leaching Procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 20, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1812008

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S3-2-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 1:03:00 PM
Lab ID: 1812008-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:30:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/7/2018 11:15:32 AM	41957
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:17:06 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:17:06 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:17:06 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:17:06 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:17:06 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:17:06 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:17:06 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/5/2018 1:36:38 PM	41865
Surr: BFB	90.0	70-130		%Rec	1	12/5/2018 1:36:38 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 10:03:14 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 10:03:14 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 10:03:14 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 10:03:14 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 10:03:14 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 10:03:14 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 10:03:14 AM	41959
Surr: Decachlorobiphenyl	84.8	58.3-109		%Rec	1	12/11/2018 10:03:14 AM	41959
Surr: Tetrachloro-m-xylene	75.0	40.1-101		%Rec	1	12/11/2018 10:03:14 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	25	10		mg/Kg	1	12/5/2018 12:04:08 PM	41878
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	12/5/2018 12:04:08 PM	41878
Surr: DNOP	104	50.6-138		%Rec	1	12/5/2018 12:04:08 PM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/10/2018 11:29:55 AM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/10/2018 11:29:55 AM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/10/2018 11:29:55 AM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/10/2018 11:29:55 AM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/10/2018 11:29:55 AM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/10/2018 11:29:55 AM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/10/2018 11:29:55 AM	41931
Pentachlorophenol	ND	100		mg/L	1	12/10/2018 11:29:55 AM	41931
Pyridine	ND	5.0		mg/L	1	12/10/2018 11:29:55 AM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/10/2018 11:29:55 AM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S3-2-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 1:03:00 PM
Lab ID: 1812008-001 **Matrix:** SOIL **Received Date:** 11/29/2018 3:30:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/10/2018 11:29:55 AM	41931
Cresols, Total	ND	200		mg/L	1	12/10/2018 11:29:55 AM	41931
Surr: 2-Fluorophenol	17.1	15-102		%Rec	1	12/10/2018 11:29:55 AM	41931
Surr: Phenol-d5	16.0	15-87.7		%Rec	1	12/10/2018 11:29:55 AM	41931
Surr: 2,4,6-Tribromophenol	77.8	39.9-111		%Rec	1	12/10/2018 11:29:55 AM	41931
Surr: Nitrobenzene-d5	26.8	35.1-107	S	%Rec	1	12/10/2018 11:29:55 AM	41931
Surr: 2-Fluorobiphenyl	35.9	36.7-100	S	%Rec	1	12/10/2018 11:29:55 AM	41931
Surr: 4-Terphenyl-d14	68.4	42.6-129		%Rec	1	12/10/2018 11:29:55 AM	41931
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	12/5/2018 1:36:38 PM	41865
Toluene	ND	0.049		mg/Kg	1	12/5/2018 1:36:38 PM	41865
Ethylbenzene	ND	0.049		mg/Kg	1	12/5/2018 1:36:38 PM	41865
Xylenes, Total	ND	0.099		mg/Kg	1	12/5/2018 1:36:38 PM	41865
Surr: Dibromofluoromethane	107	70-130		%Rec	1	12/5/2018 1:36:38 PM	41865
Surr: 1,2-Dichloroethane-d4	99.9	70-130		%Rec	1	12/5/2018 1:36:38 PM	41865
Surr: Toluene-d8	99.6	70-130		%Rec	1	12/5/2018 1:36:38 PM	41865
Surr: 4-Bromofluorobenzene	97.1	70-130		%Rec	1	12/5/2018 1:36:38 PM	41865
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	12/6/2018 2:04:00 AM	41891
2-Butanone	ND	200		mg/L	1	12/6/2018 2:04:00 AM	41891
Carbon Tetrachloride	ND	0.50		mg/L	1	12/6/2018 2:04:00 AM	41891
Chlorobenzene	ND	100		mg/L	1	12/6/2018 2:04:00 AM	41891
Chloroform	ND	6.0		mg/L	1	12/6/2018 2:04:00 AM	41891
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/6/2018 2:04:00 AM	41891
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/6/2018 2:04:00 AM	41891
1,1-Dichloroethene	ND	0.70		mg/L	1	12/6/2018 2:04:00 AM	41891
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/6/2018 2:04:00 AM	41891
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/6/2018 2:04:00 AM	41891
Vinyl chloride	ND	0.20		mg/L	1	12/6/2018 2:04:00 AM	41891
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	12/6/2018 2:04:00 AM	41891
Surr: 4-Bromofluorobenzene	109	57.3-148		%Rec	1	12/6/2018 2:04:00 AM	41891
Surr: Dibromofluoromethane	106	70-130		%Rec	1	12/6/2018 2:04:00 AM	41891
Surr: Toluene-d8	91.7	70-130		%Rec	1	12/6/2018 2:04:00 AM	41891

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/4/2018 4:59:42 PM	WG1205530
Fluid	1		12/4/2018 4:59:42 PM	WG1205530
Initial pH	8.19		12/4/2018 4:59:42 PM	WG1205530
Final pH	4.71		12/4/2018 4:59:42 PM	WG1205530

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	12/06/2018 15:17	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	48.3		25.0	1	12/05/2018 14:25	WG1205052

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.92	TS	1	12/05/2018 11:28	WG1205411

Sample Narrative:

L1049320-01 WG1205411: 8.92 at 19.9C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/07/2018 11:11	WG1206311
2,4-D	ND		0.00200	10	1	12/07/2018 11:11	WG1206311
(S) 2,4-Dichlorophenyl Acetic Acid	*65.4*		*14.0-158*			*12/07/2018 11:11*	WG1206311

WG1206106

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1049320-01

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

WG1205052

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1049320-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3365504-1 12/05/18 14:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049320-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049320-01 12/05/18 14:25 • (DUP) R3365504-4 12/05/18 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	48.3	42.2	1	13.3		20

Laboratory Control Sample (LCS)

(LCS) R3365504-2 12/05/18 14:25

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1049320	12/11/18 08:53

WG1205411

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1049320-01

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365383-1 12/05/18 11:28 • (LCSD) R3365383-2 12/05/18 11:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.97	9.97	99.7	99.7	99.0-101			0.000	1

Sample Narrative:

LCS: 9.97 at 17C

LCSD: 9.97 at 17C

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1049320	12/11/18 08:53

WG1205658

Wet Chemistry by Method D93/101DA

QUALITY CONTROL SUMMARY

L1049320-01

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

Appendix I

Method Blank (MB)

(MB) R3366355-1 12/07/18 09:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*66.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3366355-2 12/07/18 10:03

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
2,4-D	0.0500	0.0350	70.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0359	71.8	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*71.0*	*14.0-158*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-41878**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873775**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID	**MB-41878**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873776**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005000	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005000	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005000	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872833** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872834** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41891**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41891**	RunNo: **56114**
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874442** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.10	0.4000	0	104	70	130			
Chlorobenzene	0.37	0.10	0.4000	0	92.5	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.9	70	130			
Trichloroethene (TCE)	0.38	0.10	0.4000	0	94.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.22		0.2000		109	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		98.0	70	130			
Surr: Toluene-d8	0.19		0.2000		94.0	70	130			

Sample ID **mb-41891**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41891**	RunNo: **56114**
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874443** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		106	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.19		0.2000		92.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41931**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**							
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Sample ID **lcs-42166**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS**	Batch ID: **42166**	RunNo: **56475**							
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888529**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.14		0.2000		71.3	15	102			
Surr: Phenol-d5	0.13		0.2000		62.8	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.6	39.9	111			
Surr: Nitrobenzene-d5	0.078		0.1000		78.0	35.1	107			
Surr: 2-Fluorobiphenyl	0.076		0.1000		75.7	36.7	100			
Surr: 4-Terphenyl-d14	0.078		0.1000		78.3	42.6	129			

Sample ID **lcsd-42166**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS02**	Batch ID: **42166**	RunNo: **56475**							
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888530**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		53.4	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.16		0.2000		77.9	39.9	111	0	20	
Surr: Nitrobenzene-d5	0.075		0.1000		74.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.068		0.1000		68.2	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.072		0.1000		72.0	42.6	129	0	20	

Sample ID **mb-42166**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **PBS**	Batch ID: **42166**	RunNo: **56475**							
Prep Date: **12/18/2018**	Analysis Date: **12/19/2018**	SeqNo: **1888531**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.13		0.2000		63.3	15	102			
Surr: Phenol-d5	0.11		0.2000		55.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		72.9	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		79.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.069		0.1000		69.2	36.7	100			
Surr: 4-Terphenyl-d14	0.076		0.1000		76.2	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41957**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876021**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41957**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876022**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41930**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875538**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41930**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41930**	RunNo:	**56150**					
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875540**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812008**

20-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**mb-41865**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41865**		RunNo:	**56112**				
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874487**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	450		500.0		89.8	70	130			

Sample ID	**lcs-41865**	SampType:	**LCS**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41865**		RunNo:	**56112**				
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874488**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	93.9	70	130			
Surr: BFB	440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812008 RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:30:00 PM I Ortiz

Completed By: Anne Thorne 12/3/2018 9:01:07 AM Anne Thorne

Reviewed By: ENM 12/3/18

Labeled by: VV2 12/3/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	VV2 12/3/18
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? _____
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person	
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.4	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106S3-2-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[6] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[5] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
Data Gap Wells Vadose Zone Wells		15182 AP 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 345 4410	505 345 3925 Fax 505 345 4107	Earl Morse/ emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106S3-2-idw	Roll off S3-2	Soil	11-29-18	1303	IV	7	3	X	X	X	X	X	X		AP		Composite	181208 HEALH	Dal
2																				
3																				
4																				
5																				
6							PP													
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferran	FedEx Number:	4.4 – 1.0 (CF) 3.4

[31] RELINQUISHED BY Printed Name and Signature:	DATE	TIME	[33] RECEIVED BY Printed Name and Signature:	DATE	TIME
Pete Ferran / Pete Ferran	11/29/18	1500	Earl Morse Earl Morse	11/29/18	1500
Earl Morse Earl Morse	11/29/18	1550	Isaiah Ortiz Isaiah Ortiz Client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

November 6, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S4-1 (Bin ID #104056)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S4-1 (Bin ID #104056) contains approximately 17 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S4, at this location. Well KAFB-106S4 is located on the north side of Randolph Avenue across from the National Guard building. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810A37) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810A37

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S4-1-idw		
			SAMPLE DATE		18-Oct-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S4-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.45	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.9
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	50
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.05
		TOLUENE	mg/kg	50[e]	ND	--	0.05
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 31, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810A37

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/18/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S4-1-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 9:50:00 AM
Lab ID: 1810A37-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	10/26/2018 3:19:26 PM	41196
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	10/26/2018 12:57:21 PM	41160
Barium	ND	100		mg/L	1	10/26/2018 10:40:31 AM	41160
Cadmium	ND	1.0		mg/L	1	10/26/2018 10:40:31 AM	41160
Chromium	ND	5.0		mg/L	1	10/26/2018 10:40:31 AM	41160
Lead	ND	5.0		mg/L	1	10/26/2018 10:40:31 AM	41160
Selenium	ND	1.0		mg/L	1	10/26/2018 10:40:31 AM	41160
Silver	ND	5.0		mg/L	1	10/26/2018 10:40:31 AM	41160
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	10/26/2018 12:03:21 PM	41186
Endrin	ND	0.020		mg/L	1	10/26/2018 12:03:21 PM	41186
gamma-BHC (Lindane)	ND	0.40		mg/L	1	10/26/2018 12:03:21 PM	41186
Heptachlor	ND	0.0080		mg/L	1	10/26/2018 12:03:21 PM	41186
Heptachlor epoxide	ND	0.0080		mg/L	1	10/26/2018 12:03:21 PM	41186
Methoxychlor	ND	10		mg/L	1	10/26/2018 12:03:21 PM	41186
Toxaphene	ND	0.50		mg/L	1	10/26/2018 12:03:21 PM	41186
Surr: Decachlorobiphenyl	77.4	58.3-109		%Rec	1	10/26/2018 12:03:21 PM	41186
Surr: Tetrachloro-m-xylene	72.6	40.1-101		%Rec	1	10/26/2018 12:03:21 PM	41186
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	10/22/2018 9:14:35 PM	41093
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	10/22/2018 9:14:35 PM	41093
Surr: DNOP	106	50.6-138		%Rec	1	10/22/2018 9:14:35 PM	41093
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/22/2018 9:40:51 AM	41104
Surr: BFB	90.8	15-316		%Rec	1	10/22/2018 9:40:51 AM	41104
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	10/30/2018 11:38:51 AM	41184
3+4-Methylphenol	ND	200		mg/L	1	10/30/2018 11:38:51 AM	41184
2,4-Dinitrotoluene	ND	0.13		mg/L	1	10/30/2018 11:38:51 AM	41184
Hexachlorobenzene	ND	0.13		mg/L	1	10/30/2018 11:38:51 AM	41184
Hexachlorobutadiene	ND	0.50		mg/L	1	10/30/2018 11:38:51 AM	41184
Hexachloroethane	ND	3.0		mg/L	1	10/30/2018 11:38:51 AM	41184
Nitrobenzene	ND	2.0		mg/L	1	10/30/2018 11:38:51 AM	41184
Pentachlorophenol	ND	100		mg/L	1	10/30/2018 11:38:51 AM	41184
Pyridine	ND	5.0		mg/L	1	10/30/2018 11:38:51 AM	41184
2,4,5-Trichlorophenol	ND	400		mg/L	1	10/30/2018 11:38:51 AM	41184

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S4-1-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 9:50:00 AM
Lab ID: 1810A37-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	10/30/2018 11:38:51 AM	41184
Cresols, Total	ND	200		mg/L	1	10/30/2018 11:38:51 AM	41184
Surr: 2-Fluorophenol	30.3	15-102		%Rec	1	10/30/2018 11:38:51 AM	41184
Surr: Phenol-d5	25.4	15-87.7		%Rec	1	10/30/2018 11:38:51 AM	41184
Surr: 2,4,6-Tribromophenol	46.5	39.9-111		%Rec	1	10/30/2018 11:38:51 AM	41184
Surr: Nitrobenzene-d5	49.7	35.1-107		%Rec	1	10/30/2018 11:38:51 AM	41184
Surr: 2-Fluorobiphenyl	44.7	36.7-100		%Rec	1	10/30/2018 11:38:51 AM	41184
Surr: 4-Terphenyl-d14	73.3	42.6-129		%Rec	1	10/30/2018 11:38:51 AM	41184
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	10/23/2018 11:58:20 AM	41104
Toluene	ND	0.050		mg/Kg	1	10/23/2018 11:58:20 AM	41104
Ethylbenzene	ND	0.050		mg/Kg	1	10/23/2018 11:58:20 AM	41104
Xylenes, Total	ND	0.10		mg/Kg	1	10/23/2018 11:58:20 AM	41104
Surr: Dibromofluoromethane	102	70-130		%Rec	1	10/23/2018 11:58:20 AM	41104
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	10/23/2018 11:58:20 AM	41104
Surr: Toluene-d8	101	70-130		%Rec	1	10/23/2018 11:58:20 AM	41104
Surr: 4-Bromofluorobenzene	97.5	70-130		%Rec	1	10/23/2018 11:58:20 AM	41104
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	10/23/2018 5:09:35 PM	41121
2-Butanone	ND	200		mg/L	1	10/23/2018 5:09:35 PM	41121
Carbon Tetrachloride	ND	0.50		mg/L	1	10/23/2018 5:09:35 PM	41121
Chlorobenzene	ND	100		mg/L	1	10/23/2018 5:09:35 PM	41121
Chloroform	ND	6.0		mg/L	1	10/23/2018 5:09:35 PM	41121
1,4-Dichlorobenzene	ND	7.5		mg/L	1	10/23/2018 5:09:35 PM	41121
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	10/23/2018 5:09:35 PM	41121
1,1-Dichloroethene	ND	0.70		mg/L	1	10/23/2018 5:09:35 PM	41121
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	10/23/2018 5:09:35 PM	41121
Trichloroethene (TCE)	ND	0.50		mg/L	1	10/23/2018 5:09:35 PM	41121
Vinyl chloride	ND	0.20		mg/L	1	10/23/2018 5:09:35 PM	41121
Surr: 1,2-Dichloroethane-d4	89.2	70-130		%Rec	1	10/23/2018 5:09:35 PM	41121
Surr: 4-Bromofluorobenzene	98.5	57.3-148		%Rec	1	10/23/2018 5:09:35 PM	41121
Surr: Dibromofluoromethane	91.0	70-130		%Rec	1	10/23/2018 5:09:35 PM	41121
Surr: Toluene-d8	96.1	70-130		%Rec	1	10/23/2018 5:09:35 PM	41121

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/24/2018 5:25:58 PM	WG1185977
Fluid	1		10/24/2018 5:25:58 PM	WG1185977
Initial pH	8.42		10/24/2018 5:25:58 PM	WG1185977
Final pH	5.82		10/24/2018 5:25:58 PM	WG1185977

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	10/30/2018 08:32	WG1187945

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	ND		25.0	1	10/30/2018 14:49	WG1187742

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.45	T8	1	10/24/2018 13:21	WG1185597

Sample Narrative:

L1037031-01 WG1185597: 8.45 at 18.9C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	10/26/2018 17:36	WG1186656

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	10/29/2018 16:36	WG1186704
2,4-D	ND		0.00200	10	1	10/29/2018 16:36	WG1186704
(S) 2,4-Dichlorophenyl Acetic Acid	*65.2*		*14.0-158*			*10/29/2018 16:36*	WG1186704

Method Blank (MB)

(MB) R3354973-1 10/30/18 08:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1037031-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037031-01 10/30/18 08:32 • (DUP) R3354973-3 10/30/18 08:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.142	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3354973-2 10/30/18 08:29

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.57	103	50.0-150	

L1037346-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1037346-02 10/30/18 08:40 • (MS) R3354973-4 10/30/18 08:41 • (MSD) R3354973-5 10/30/18 08:42

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.56	1.33	93.9	80.0	1	75.0-125			16.0	20

Method Blank (MB)

(MB) R3355214-1 10/30/18 14:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/30/18 14:49 • (DUP) R3355214-3 10/30/18 14:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	36.2	36.2	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3355214-2 10/30/18 14:49

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/24/18 13:21 • (DUP) R3353550-3 10/24/18 13:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	9.15	9.13	1	0.219		1

Sample Narrative:

OS: 9.15 at 18.5C

DUP: 9.13 at 19.2C

L1037307-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1037307-05 10/24/18 13:21 • (DUP) R3353550-4 10/24/18 13:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.92	8.93	1	0.112		1

Sample Narrative:

OS: 8.92 at 18.6C

DUP: 8.93 at 18.6C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3353550-1 10/24/18 13:21 • (LCSD) R3353550-2 10/24/18 13:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.000	1

Sample Narrative:

LCS: 10.01 at 16.6C

LCSD: 10.01 at 16.6C

L1037652-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037652-01 10/26/18 17:36 • (DUP) R3354393-2 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1037795-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037795-01 10/26/18 17:36 • (DUP) R3354393-3 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3354393-1 10/26/18 17:36

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	85.2	104	96.0-104	

Appendix I

Method Blank (MB)

(MB) R3354871-1 10/29/18 13:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*62.0*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3354871-2 10/29/18 13:53 • (LCSD) R3354871-3 10/29/18 14:06

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	0.0362	0.0363	72.4	72.6	50.0-120			0.276	20
2,4,5-TP (Silvex)	0.0500	0.0326	0.0329	65.2	65.8	50.0-125			0.916	20
(S) 2,4-Dichlorophenyl Acetic Acid				*68.4*	*73.0*	*14.0-158*				

L1036439-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1036439-01 10/29/18 14:34 • (MS) R3354871-4 10/29/18 14:47 • (MSD) R3354871-5 10/29/18 15:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	ND	0.0363	0.0341	72.6	68.2	1	50.0-120			6.25	20
2,4,5-TP (Silvex)	0.0500	ND	0.0339	0.0310	67.8	62.0	1	50.0-125			8.94	20
(S) 2,4-Dichlorophenyl Acetic Acid					*68.2*	*65.6*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41093**	SampType:	**MBLK**	TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**PBS**	Batch ID:	**41093**	RunNo:	**55065**					
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**	SeqNo:	**1830650**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	50.6	138			

Sample ID	**LCS-41093**	SampType:	**LCS**	TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**LCSS**	Batch ID:	**41093**	RunNo:	**55065**					
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**	SeqNo:	**1831222**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	10	50.00	0	80.3	70	130			
Surr: DNOP	4.7		5.000		94.0	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41104**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830809**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	880		1000		87.6	15	316			

Sample ID	**LCS-41104**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830810**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	75.9	131			
Surr: BFB	1000		1000		104	15	316			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41186**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		66.9	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.7	40.1	101			

Sample ID **LCS-41186**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	75.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	76.7	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.3	41	122			
Heptachlor epoxide	0.00038	0.00010	0.0005000	0	76.7	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.8	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		73.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		70.5	40.1	101			

Sample ID **1810A37-001AMS**	SampType: **MS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **KAFB-106S4-1-idw**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835414** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00048	0.00010	0.0005000	0	96.6	34.5	165			
gamma-BHC (Lindane)	0.00048	0.00010	0.0005000	0	96.0	49.2	129			
Heptachlor	0.00047	0.00010	0.0005000	0	94.1	43.1	134			
Heptachlor epoxide	0.00048	0.00010	0.0005000	0	96.6	32.7	162			
Methoxychlor	0.00044	0.00010	0.0005000	0	88.8	45.1	162			
Surr: Decachlorobiphenyl	0.0025		0.002500		102	58.3	109			
Surr: Tetrachloro-m-xylene	0.0024		0.002500		94.5	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810A37-001AMSD** SampType: **MSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **KAFB-106S4-1-idw** Batch ID: **41186** RunNo: **55188**

Prep Date: **10/25/2018** Analysis Date: **10/26/2018** SeqNo: **1835415** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00040	0.00010	0.0005000	0	80.7	34.5	165	17.9	31.1	
gamma-BHC (Lindane)	0.00040	0.00010	0.0005000	0	80.4	49.2	129	17.6	27	
Heptachlor	0.00039	0.00010	0.0005000	0	77.3	43.1	134	19.5	33.7	
Heptachlor epoxide	0.00040	0.00010	0.0005000	0	80.8	32.7	162	17.8	32.4	
Methoxychlor	0.00038	0.00010	0.0005000	0	76.4	45.1	162	15.0	42.2	
Surr: Decachlorobiphenyl	0.0024		0.002500		94.3	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0020		0.002500		79.2	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41104**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831793** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.50		0.5000		99.8	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.3	70	130			

Sample ID **lcs-41104**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831794** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.5	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.6	70	130			

Sample ID **1810a37-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S4-1-idw**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831796** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	0.9970	0	105	51.9	158			
Toluene	1.0	0.050	0.9970	0	105	64.6	132			
Surr: Dibromofluoromethane	0.54		0.4985		108	70	130			
Surr: 1,2-Dichloroethane-d4	0.52		0.4985		104	70	130			
Surr: Toluene-d8	0.48		0.4985		96.8	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.4985		100	70	130			

Sample ID **1810a37-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106S4-1-idw**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831797** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	0.9990	0	110	51.9	158	4.88	20	
Toluene	1.1	0.050	0.9990	0	108	64.6	132	3.04	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810a37-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **KAFB-106S4-1-idw** Batch ID: **41104** RunNo: **55107**

Prep Date: **10/19/2018** Analysis Date: **10/23/2018** SeqNo: **1831797** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.54		0.4995		108	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.52		0.4995		104	70	130	0	0	
Surr: Toluene-d8	0.49		0.4995		97.2	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.48		0.4995		95.6	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810a37-001ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S4-1-idw** Batch ID: **41121** RunNo: **55095**

Prep Date: **10/22/2018** Analysis Date: **10/23/2018** SeqNo: **1831819** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.10	0.4000	0	93.7	44.5	152			
Chlorobenzene	0.40	0.10	0.4000	0	99.2	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	101	79.1	132			
Trichloroethene (TCE)	0.35	0.10	0.4000	0	86.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.0	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		100	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		91.1	70	130			
Surr: Toluene-d8	0.19		0.2000		93.5	70	130			

Sample ID **1810a37-001amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S4-1-idw** Batch ID: **41121** RunNo: **55095**

Prep Date: **10/22/2018** Analysis Date: **10/23/2018** SeqNo: **1831820** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.10	0.4000	0	88.4	44.5	152	5.80	20	
Chlorobenzene	0.39	0.10	0.4000	0	97.1	70	130	2.14	20	
1,1-Dichloroethene	0.36	0.10	0.4000	0	91.1	79.1	132	9.81	20	
Trichloroethene (TCE)	0.33	0.10	0.4000	0	82.5	70	130	4.70	20	
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.5	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148	0	0	
Surr: Dibromofluoromethane	0.18		0.2000		91.1	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		95.3	70	130	0	0	

Sample ID **lcs-41121** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**

Client ID: **LCSS** Batch ID: **41121** RunNo: **55095**

Prep Date: **10/22/2018** Analysis Date: **10/23/2018** SeqNo: **1831823** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.10	0.4000	0	92.5	70	130			
Chlorobenzene	0.39	0.10	0.4000	0	98.0	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.7	70	130			
Trichloroethene (TCE)	0.35	0.10	0.4000	0	87.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		86.3	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.9	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		90.5	70	130			
Surr: Toluene-d8	0.19		0.2000		93.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41121**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41121**	RunNo: **55095**
Prep Date: **10/22/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831824** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		87.1	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.6	70	130			
Surr: Toluene-d8	0.19		0.2000		96.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41184**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836263** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	61.6	47.8	99.2			
3+4-Methylphenol	0.33	0.0010	0.4000	0	81.8	41.5	118			
2,4-Dinitrotoluene	0.13	0.0010	0.2000	0	65.7	44.4	81			
Hexachlorobenzene	0.15	0.0010	0.2000	0	75.5	49.5	91.6			
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.2	38.6	93			
Hexachloroethane	0.093	0.0010	0.2000	0	46.5	39.4	79.9			
Nitrobenzene	0.13	0.0010	0.2000	0	67.3	47.4	96.2			
Pentachlorophenol	0.10	0.0010	0.2000	0	52.3	39.4	79.9			
Pyridine	0.042	0.0010	0.2000	0	20.9	15	79.9			
2,4,5-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	118			
2,4,6-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	101			
Cresols, Total	0.45	0.0010	0.6000	0	75.1	44.1	111			
Surr: 2-Fluorophenol	0.080		0.2000		40.2	15	102			
Surr: Phenol-d5	0.067		0.2000		33.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.9	39.9	111			
Surr: Nitrobenzene-d5	0.068		0.1000		68.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.063		0.1000		63.4	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		77.3	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.060		0.2000		29.8	15	102			
Surr: Phenol-d5	0.047		0.2000		23.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.079		0.2000		39.4	39.9	111			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.044		0.1000		44.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.042		0.1000		41.5	36.7	100			
Surr: 4-Terphenyl-d14	0.063		0.1000		62.7	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55261**
Prep Date: **10/25/2018**	Analysis Date: **10/30/2018**	SeqNo: **1838305** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.4	15	102			
Surr: Phenol-d5	0.046		0.2000		23.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.087		0.2000		43.4	39.9	111			
Surr: Nitrobenzene-d5	0.046		0.1000		46.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.041		0.1000		40.8	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.0	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41196**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41196**	RunNo:	**55202**					
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835538**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41196**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41196**	RunNo:	**55202**					
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835539**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.1	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41160**	SampType: **MBLK**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41160**		RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835465**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41160**	SampType: **LCS**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41160**		RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835467**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	96.8	80	120			
Cadmium	ND	1.0	0.5000	0	98.8	80	120			
Chromium	ND	5.0	0.5000	0	95.5	80	120			
Lead	ND	5.0	0.5000	0	92.8	80	120			
Selenium	ND	1.0	0.5000	0	99.6	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Sample ID	**1810A37-001AMS**	SampType: **MS**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S4-1-idw**	Batch ID: **41160**		RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835477**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	1.245	84.7	75	125			
Cadmium	ND	1.0	0.5000	0	93.5	75	125			
Chromium	ND	5.0	0.5000	0.001010	88.1	75	125			
Lead	ND	5.0	0.5000	0	86.8	75	125			
Selenium	ND	1.0	0.5000	0	93.3	75	125			
Silver	ND	5.0	0.1000	0.009580	101	75	125			

Sample ID	**1810A37-001AMSD**	SampType: **MSD**		TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S4-1-idw**	Batch ID: **41160**		RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835478**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	1.245	83.6	75	125	0	20	
Cadmium	ND	1.0	0.5000	0	95.5	75	125	0	20	
Chromium	ND	5.0	0.5000	0.001010	90.1	75	125	0	20	
Lead	ND	5.0	0.5000	0	88.8	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A37**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**1810A37-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S4-1-idw**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835478**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	1.0	0.5000	0	91.6	75	125	0	20	
Silver	ND	5.0	0.1000	0.009580	105	75	125	0	20	

Sample ID	**MB-41160**	SampType: **MBLK**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835504**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID	**LCS-41160**	SampType: **LCS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835506**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	94.0	80	120			

Sample ID	**1810A37-001AMS**	SampType: **MS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S4-1-idw**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835517**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	90.6	75	125			

Sample ID	**1810A37-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-106S4-1-idw**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835518**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	90.3	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1810A37** RcptNo: **1**

Received By: **Jazzmine Burkhead** **10/18/2018 2:20:00 PM**

Completed By: **Ashley Gallegos** **10/18/2018 2:56:56 PM**

Reviewed By: 10/18/18

Labeled by: ENM 10/18/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

ENM 10/18/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.6	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

COC

Appendix

[1] PROJECT NAME:	[3] PROJECT NUMBER:	[6] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Cirtland AFB BFF	~~62509DM01.1017.3~~ PF 62735DM02, 1017.04	Hall Environmental	Amanda Smith/ asmith@eaest.com
[2] PROJECT PHASE/SITE/TASK:	[4] PO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[5] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 7410	505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	181DA37 KAFB-106S4-1-1dn	Roll-offs S4-1	So.	10-18-18	0950	IV	7	3	X	X	X	X	X	X		PF		compete		
2																				
3																				
4																				
5																				
6					PF															
7																				
8																				
9																				
10																				

718 of 1539

[24] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering

Pete Ferrari

[25] COURIER AND SHIPPING NUMBER:

FedEx Number:

NA Hand delivered to Hall Lab

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari Peter Ferrari	10-18-18	1420	Printed Name and Signature: Lauren Burkhead Lauren Burkhead	Temp: 3.6-1.0(CF) = 2.6 10/18/18	14:2
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

27 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 19 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S4 and KAFB-106S2

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S4 and KAFB-106S2, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open top roll-off containers labeled **20B007/5060** and **20B004**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.27 09:45:21 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 19, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S4-2 (Bin ID #20B004)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S4-2 (Bin ID #20B004) contains approximately 5 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S4, at this location. Well KAFB-106S4 is located on the north side of Randolph Avenue across from the National Guard building. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1812023) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1812023

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S4-2-idw		
			SAMPLE DATE		29-Nov-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S4-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	96.5	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.3	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200.0
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.6
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.6
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.023
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.046
		TOLUENE	mg/kg	50[e]	ND	--	0.046
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.092

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 12, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1812023

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-2-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 12:02:00 PM
Lab ID: 1812023-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	12/7/2018 11:28:50 AM	41957
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:22:54 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:22:54 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:22:54 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:22:54 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:22:54 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:22:54 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:22:54 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	12/5/2018 3:04:37 PM	41865
Surr: BFB	88.8	70-130		%Rec	1	12/5/2018 3:04:37 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 10:42:42 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 10:42:42 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 10:42:42 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 10:42:42 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 10:42:42 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 10:42:42 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 10:42:42 AM	41959
Surr: Decachlorobiphenyl	66.6	58.3-109		%Rec	1	12/11/2018 10:42:42 AM	41959
Surr: Tetrachloro-m-xylene	51.6	40.1-101		%Rec	1	12/11/2018 10:42:42 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/5/2018 1:10:22 PM	41878
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/5/2018 1:10:22 PM	41878
Surr: DNOP	92.3	50.6-138		%Rec	1	12/5/2018 1:10:22 PM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/8/2018 3:41:40 PM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/8/2018 3:41:40 PM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/8/2018 3:41:40 PM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/8/2018 3:41:40 PM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/8/2018 3:41:40 PM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/8/2018 3:41:40 PM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/8/2018 3:41:40 PM	41931
Pentachlorophenol	ND	100		mg/L	1	12/8/2018 3:41:40 PM	41931
Pyridine	ND	5.0		mg/L	1	12/8/2018 3:41:40 PM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/8/2018 3:41:40 PM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-2-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 12:02:00 PM
Lab ID: 1812023-001 **Matrix:** SOIL **Received Date:** 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/8/2018 3:41:40 PM	41931
Cresols, Total	ND	200		mg/L	1	12/8/2018 3:41:40 PM	41931
Surr: 2-Fluorophenol	30.9	15-102		%Rec	1	12/8/2018 3:41:40 PM	41931
Surr: Phenol-d5	26.7	15-87.7		%Rec	1	12/8/2018 3:41:40 PM	41931
Surr: 2,4,6-Tribromophenol	52.8	39.9-111		%Rec	1	12/8/2018 3:41:40 PM	41931
Surr: Nitrobenzene-d5	64.9	35.1-107		%Rec	1	12/8/2018 3:41:40 PM	41931
Surr: 2-Fluorobiphenyl	50.3	36.7-100		%Rec	1	12/8/2018 3:41:40 PM	41931
Surr: 4-Terphenyl-d14	55.3	42.6-129		%Rec	1	12/8/2018 3:41:40 PM	41931
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.023		mg/Kg	1	12/5/2018 4:23:10 AM	41865
Toluene	ND	0.046		mg/Kg	1	12/5/2018 4:23:10 AM	41865
Ethylbenzene	ND	0.046		mg/Kg	1	12/5/2018 4:23:10 AM	41865
Xylenes, Total	ND	0.092		mg/Kg	1	12/5/2018 4:23:10 AM	41865
Surr: Dibromofluoromethane	102	70-130		%Rec	1	12/5/2018 4:23:10 AM	41865
Surr: 1,2-Dichloroethane-d4	98.9	70-130		%Rec	1	12/5/2018 4:23:10 AM	41865
Surr: Toluene-d8	101	70-130		%Rec	1	12/5/2018 4:23:10 AM	41865
Surr: 4-Bromofluorobenzene	92.6	70-130		%Rec	1	12/5/2018 4:23:10 AM	41865
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	12/6/2018 6:38:03 PM	41918
2-Butanone	ND	200		mg/L	1	12/6/2018 6:38:03 PM	41918
Carbon Tetrachloride	ND	0.50		mg/L	1	12/6/2018 6:38:03 PM	41918
Chlorobenzene	ND	100		mg/L	1	12/6/2018 6:38:03 PM	41918
Chloroform	ND	6.0		mg/L	1	12/6/2018 6:38:03 PM	41918
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/6/2018 6:38:03 PM	41918
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/6/2018 6:38:03 PM	41918
1,1-Dichloroethene	ND	0.70		mg/L	1	12/6/2018 6:38:03 PM	41918
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/6/2018 6:38:03 PM	41918
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/6/2018 6:38:03 PM	41918
Vinyl chloride	ND	0.20		mg/L	1	12/6/2018 6:38:03 PM	41918
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	12/6/2018 6:38:03 PM	41918
Surr: 4-Bromofluorobenzene	95.4	57.3-148		%Rec	1	12/6/2018 6:38:03 PM	41918
Surr: Dibromofluoromethane	101	70-130		%Rec	1	12/6/2018 6:38:03 PM	41918
Surr: Toluene-d8	99.5	70-130		%Rec	1	12/6/2018 6:38:03 PM	41918

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-41878**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873775**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID	**MB-41878**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873776**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005000	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005000	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005000	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005000	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872833** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872834** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41918**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **LCSS**	Batch ID: **41918**	RunNo: **56152**							
Prep Date: **12/5/2018**	Analysis Date: **12/6/2018**	SeqNo: **1875748**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.38	0.30	0.4000	0	95.9	70	130			
Chlorobenzene	0.40	0.30	0.4000	0	101	70	130			
1,1-Dichloroethene	0.38	0.30	0.4000	0	94.2	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	92.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		96.1	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		102	70	130			
Surr: Toluene-d8	0.20		0.2000		102	70	130			

Sample ID **mb-41918**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **PBS**	Batch ID: **41918**	RunNo: **56152**							
Prep Date: **12/5/2018**	Analysis Date: **12/6/2018**	SeqNo: **1875749**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		105	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		97.2	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		102	70	130			
Surr: Toluene-d8	0.20		0.2000		100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41931**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**mb-41931**	SampType:	**MBLK**	TestCode:	**EPA Method 8270C TCLP**					
Client ID:	**PBS**	Batch ID:	**41931**	RunNo:	**56190**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/8/2018**	SeqNo:	**1877045**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41957**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876021**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41957**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876022**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41930**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**PBW**	Batch ID:	**41930**	RunNo:	**56150**
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875538** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41930**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**LCSW**	Batch ID:	**41930**	RunNo:	**56150**
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875540** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812023**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874487** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	450		500.0		89.8	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56112**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1874488** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	93.9	70	130			
Surr: BFB	440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/4/2018 4:59:42 PM	WG1205530
Fluid	1		12/4/2018 4:59:42 PM	WG1205530
Initial pH	6.87		12/4/2018 4:59:42 PM	WG1205530
Final pH	5.06		12/4/2018 4:59:42 PM	WG1205530

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	12/06/2018 15:13	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	96.5		25.0	1	12/05/2018 14:25	WG1205052

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	9.30	T8	1	12/05/2018 11:28	WG1205411

Sample Narrative:

L1049317-01 WG1205411: 9.3 at 20C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/07/2018 10:17	WG1206311
2,4-D	ND		0.00200	10	1	12/07/2018 10:17	WG1206311
(S) 2,4-Dichlorophenyl Acetic Acid	*74.6*		*14.0-158*			*12/07/2018 10:17*	WG1206311

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

Method Blank (MB)

(MB) R3365504-1 12/05/18 14:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049320-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049320-01 12/05/18 14:25 • (DUP) R3365504-4 12/05/18 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	48.3	42.2	1	13.3		20

Laboratory Control Sample (LCS)

(LCS) R3365504-2 12/05/18 14:25

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

Appendix I

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365383-1 12/05/18 11:28 • (LCSD) R3365383-2 12/05/18 11:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.97	9.97	99.7	99.7	99.0-101			0.000	1

Sample Narrative:

LCS: 9.97 at 17C

LCSD: 9.97 at 17C

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

Method Blank (MB)

(MB) R3366355-1 12/07/18 09:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*66.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3366355-2 12/07/18 10:03

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
2,4-D	0.0500	0.0350	70.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0359	71.8	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*71.0*	*14.0-158*	

L1049317-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049317-01 12/07/18 10:17 • (MS) R3366355-3 12/07/18 10:30 • (MSD) R3366355-4 12/07/18 10:44

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0348	0.0349	69.6	69.8	1	50.0-120			0.287	20
2,4,5-TP (Silvex)	0.0500	ND	0.0351	0.0354	70.2	70.8	1	50.0-125			0.851	20
(S) 2,4-Dichlorophenyl Acetic Acid					*70.6*	*70.6*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812023 RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:50:00 PM IO

Completed By: Anne Thorne 12/3/2018 10:16:35 AM Anne Thorne

Reviewed By: ENM 12/3/18

Labeled by: VVZ 12/3/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

VVZ 12/3/18

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.0	Good	Not Present			

Appendix

743 of 1589

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: ~~KAFB-1065~~ 4 of 4 KAFB-1065 4-2-idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
Data Gap Wells Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)			[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-1065 4-2-idw	Kirtland AFB 84-2	soil	11-29-18	1202	IV	7	3	X	X	X	X	X	X		PF	~~SOIL~~ COMPOSITE	HEAL # 1812023-001	
2																			
3																			
4																			
5																			
6								OF											
7																			
8																			
9																			
10																			

[29] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferrari	FedEx Number: N/A Hand delivered to hall lab	5.0 - 1.0 (CF) 4.0

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari Pete Ferrari	11/29/18	1500	Printed Name and Signature: EARL MORSE Earl Morse	11/29/18	1500
Printed Name and Signature: Earl Morse Earl Morse	11/29/18	1550	Printed Name and Signature: Isaiah Rios Client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

27 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2) dated: 26 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S2 and KAFB-106S4

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S2 and KAFB-106S4, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in one 20-cubic-yard open top roll-off container labeled **22023** and one 15-cubic-yard hard-top roll-off labeled **HTB-4**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.27 09:59:05 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 26, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S4-3 (Bin ID #HTB-4)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S4-3 (Bin ID #HTB-4) contains approximately 3 cubic yards of soil in a 15-yard, hard top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S4, at this location. Well KAFB-106S4 is located on the north side of Randolph Avenue across from the National Guard building. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1811F05) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1811F05

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S4-3-idw		
			SAMPLE DATE		29-Nov-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S4-3		
Parameter	Method	Analyte	Units	Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	60.3	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.53	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200.0
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.7
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.7
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.047
		TOLUENE	mg/kg	50[e]	ND	--	0.047
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.095

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 12, 2018

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1811F05

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-3-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 2:10:00 PM
Lab ID: 1811F05-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	5	12/7/2018 11:32:42 AM	41957
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	12/6/2018 1:15:10 PM	41930
Barium	ND	100		mg/L	1	12/6/2018 1:15:10 PM	41930
Cadmium	ND	1.0		mg/L	1	12/6/2018 1:15:10 PM	41930
Chromium	ND	5.0		mg/L	1	12/6/2018 1:15:10 PM	41930
Lead	ND	5.0		mg/L	1	12/6/2018 1:15:10 PM	41930
Selenium	ND	1.0		mg/L	1	12/6/2018 1:15:10 PM	41930
Silver	ND	5.0		mg/L	1	12/6/2018 1:15:10 PM	41930
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/5/2018 1:07:30 PM	41865
Surr: BFB	90.6	70-130		%Rec	1	12/5/2018 1:07:30 PM	41865
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	12/11/2018 9:50:02 AM	41959
Endrin	ND	0.020		mg/L	1	12/11/2018 9:50:02 AM	41959
gamma-BHC (Lindane)	ND	0.40		mg/L	1	12/11/2018 9:50:02 AM	41959
Heptachlor	ND	0.0080		mg/L	1	12/11/2018 9:50:02 AM	41959
Heptachlor epoxide	ND	0.0080		mg/L	1	12/11/2018 9:50:02 AM	41959
Methoxychlor	ND	10		mg/L	1	12/11/2018 9:50:02 AM	41959
Toxaphene	ND	0.50		mg/L	1	12/11/2018 9:50:02 AM	41959
Surr: Decachlorobiphenyl	63.7	58.3-109		%Rec	1	12/11/2018 9:50:02 AM	41959
Surr: Tetrachloro-m-xylene	68.4	40.1-101		%Rec	1	12/11/2018 9:50:02 AM	41959
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	12/5/2018 11:42:21 AM	41878
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/5/2018 11:42:21 AM	41878
Surr: DNOP	99.2	50.6-138		%Rec	1	12/5/2018 11:42:21 AM	41878
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	12/8/2018 2:14:57 PM	41931
3+4-Methylphenol	ND	200		mg/L	1	12/8/2018 2:14:57 PM	41931
2,4-Dinitrotoluene	ND	0.13		mg/L	1	12/8/2018 2:14:57 PM	41931
Hexachlorobenzene	ND	0.13		mg/L	1	12/8/2018 2:14:57 PM	41931
Hexachlorobutadiene	ND	0.50		mg/L	1	12/8/2018 2:14:57 PM	41931
Hexachloroethane	ND	3.0		mg/L	1	12/8/2018 2:14:57 PM	41931
Nitrobenzene	ND	2.0		mg/L	1	12/8/2018 2:14:57 PM	41931
Pentachlorophenol	ND	100		mg/L	1	12/8/2018 2:14:57 PM	41931
Pyridine	ND	5.0		mg/L	1	12/8/2018 2:14:57 PM	41931
2,4,5-Trichlorophenol	ND	400		mg/L	1	12/8/2018 2:14:57 PM	41931

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-3-idw
Project: Kirtland AFB BFF
Collection Date: 11/29/2018 2:10:00 PM
Lab ID: 1811F05-001 **Matrix:** SOIL
Received Date: 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	12/8/2018 2:14:57 PM	41931
Cresols, Total	ND	200		mg/L	1	12/8/2018 2:14:57 PM	41931
Surr: 2-Fluorophenol	31.0	15-102		%Rec	1	12/8/2018 2:14:57 PM	41931
Surr: Phenol-d5	24.8	15-87.7		%Rec	1	12/8/2018 2:14:57 PM	41931
Surr: 2,4,6-Tribromophenol	75.2	39.9-111		%Rec	1	12/8/2018 2:14:57 PM	41931
Surr: Nitrobenzene-d5	46.1	35.1-107		%Rec	1	12/8/2018 2:14:57 PM	41931
Surr: 2-Fluorobiphenyl	43.4	36.7-100		%Rec	1	12/8/2018 2:14:57 PM	41931
Surr: 4-Terphenyl-d14	54.6	42.6-129		%Rec	1	12/8/2018 2:14:57 PM	41931
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	12/5/2018 1:07:30 PM	41865
Toluene	ND	0.047		mg/Kg	1	12/5/2018 1:07:30 PM	41865
Ethylbenzene	ND	0.047		mg/Kg	1	12/5/2018 1:07:30 PM	41865
Xylenes, Total	ND	0.095		mg/Kg	1	12/5/2018 1:07:30 PM	41865
Surr: 4-Bromofluorobenzene	96.3	70-130		%Rec	1	12/5/2018 1:07:30 PM	41865
Surr: Toluene-d8	102	70-130		%Rec	1	12/5/2018 1:07:30 PM	41865
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	12/6/2018 12:53:00 AM	41891
2-Butanone	ND	200		mg/L	1	12/6/2018 12:53:00 AM	41891
Carbon Tetrachloride	ND	0.50		mg/L	1	12/6/2018 12:53:00 AM	41891
Chlorobenzene	ND	100		mg/L	1	12/6/2018 12:53:00 AM	41891
Chloroform	ND	6.0		mg/L	1	12/6/2018 12:53:00 AM	41891
1,4-Dichlorobenzene	ND	7.5		mg/L	1	12/6/2018 12:53:00 AM	41891
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	12/6/2018 12:53:00 AM	41891
1,1-Dichloroethene	ND	0.70		mg/L	1	12/6/2018 12:53:00 AM	41891
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	12/6/2018 12:53:00 AM	41891
Trichloroethene (TCE)	ND	0.50		mg/L	1	12/6/2018 12:53:00 AM	41891
Vinyl chloride	ND	0.20		mg/L	1	12/6/2018 12:53:00 AM	41891
Surr: 1,2-Dichloroethane-d4	112	70-130		%Rec	1	12/6/2018 12:53:00 AM	41891
Surr: 4-Bromofluorobenzene	104	57.3-148		%Rec	1	12/6/2018 12:53:00 AM	41891
Surr: Dibromofluoromethane	103	70-130		%Rec	1	12/6/2018 12:53:00 AM	41891
Surr: Toluene-d8	90.6	70-130		%Rec	1	12/6/2018 12:53:00 AM	41891

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		12/4/2018 4:59:42 PM	WG1205530
Fluid	1		12/4/2018 4:59:42 PM	WG1205530
Initial pH	8.97		12/4/2018 4:59:42 PM	WG1205530
Final pH	4.91		12/4/2018 4:59:42 PM	WG1205530

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	12/06/2018 15:21	WG1206106

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	60.3		25.0	1	12/06/2018 17:36	WG1206380

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.53	T8	1	12/06/2018 17:16	WG1206352

Sample Narrative:

L1049322-01 WG1206352: 8.53 at 21.9C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	12/05/2018 17:09	WG1205658

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	12/07/2018 11:38	WG1206311
2,4-D	ND		0.00200	10	1	12/07/2018 11:38	WG1206311
(S) 2,4-Dichlorophenyl Acetic Acid	*64.2*		*14.0-158*			*12/07/2018 11:38*	WG1206311

Method Blank (MB)

(MB) R3365935-1 12/06/18 15:08

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1050121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-01 12/06/18 15:24 • (DUP) R3365935-5 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1050121-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1050121-02 12/06/18 15:33 • (DUP) R3365935-8 12/06/18 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	0.0769	0.000	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3365935-2 12/06/18 15:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.63	105	50.0-150	

L1049318-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049318-01 12/06/18 15:14 • (MS) R3365935-3 12/06/18 15:15 • (MSD) R3365935-4 12/06/18 15:16

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.46	1.48	87.8	88.8	1	75.0-125			1.09	20

L1050121-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1050121-03 12/06/18 15:26 • (MS) R3365935-6 12/06/18 15:27 • (MSD) R3365935-7 12/06/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	0.550	0.748	33.0	44.9	1	75.0-125	J6	J3 J6	30.5	20

Method Blank (MB)

(MB) R3366007-1 12/06/18 17:36

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1049321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049321-01 12/06/18 17:36 • (DUP) R3366007-3 12/06/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	84.4	84.4	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3366007-2 12/06/18 17:36

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

Appendix I

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3365997-1 12/06/18 17:16 • (LCSD) R3365997-2 12/06/18 17:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.0997	1

Sample Narrative:

LCS: 10.03 at 17.4C

LCSD: 10.04 at 17.5C

L1049331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049331-01 12/05/18 17:09 • (DUP) R3365576-2 12/05/18 17:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	90.3	92.3	1	2.19		10

Laboratory Control Sample (LCS)

(LCS) R3365576-1 12/05/18 17:09

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.3	103	96.0-104	

Method Blank (MB)

(MB) R3366355-1 12/07/18 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*66.4*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3366355-2 12/07/18 10:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0350	70.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0359	71.8	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*71.0*	*14.0-158*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-41878**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873775**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	106	70	130			
Surr: DNOP	3.9		5.000		78.2	50.6	138			

Sample ID	**MB-41878**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41878**		RunNo:	**56105**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1873776**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.6		10.00		75.7	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41959**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879370** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		59.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.1	40.1	101			

Sample ID **LCS-41959**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41959**	RunNo: **56247**
Prep Date: **12/7/2018**	Analysis Date: **12/11/2018**	SeqNo: **1879371** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005001	0	67.4	49.5	127			
gamma-BHC (Lindane)	0.00033	0.00010	0.0005001	0	66.3	49.9	124			
Heptachlor	0.00032	0.00010	0.0005001	0	64.1	41	122			
Heptachlor epoxide	0.00034	0.00010	0.0005001	0	68.5	52.2	121			
Methoxychlor	0.00024	0.00010	0.0005001	0	48.7	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		71.1	58.3	109			
Surr: Tetrachloro-m-xylene	0.0017		0.002500		67.2	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41865**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/5/2018**	SeqNo: **1872843** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			

Sample ID **lcs-41865**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **41865**	RunNo: **56077**
Prep Date: **12/3/2018**	Analysis Date: **12/4/2018**	SeqNo: **1872844** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	98.0	70	130			
Toluene	0.99	0.050	1.000	0	98.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.1	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.3	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: Toluene-d8	0.49		0.5000		97.6	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41891**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41891**	RunNo: **56114**
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874442** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.10	0.4000	0	104	70	130			
Chlorobenzene	0.37	0.10	0.4000	0	92.5	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.9	70	130			
Trichloroethene (TCE)	0.38	0.10	0.4000	0	94.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.22		0.2000		109	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		98.0	70	130			
Surr: Toluene-d8	0.19		0.2000		94.0	70	130			

Sample ID **mb-41891**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41891**	RunNo: **56114**
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874443** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		106	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		103	70	130			
Surr: Toluene-d8	0.19		0.2000		92.8	70	130			

Sample ID **1811f05-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106S4-3-idw**	Batch ID: **41891**	RunNo: **56114**
Prep Date: **12/4/2018**	Analysis Date: **12/6/2018**	SeqNo: **1874445** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.39	0.10	0.4000	0	98.7	44.5	152			
Chlorobenzene	0.35	0.10	0.4000	0	87.3	70	130			
1,1-Dichloroethene	0.38	0.10	0.4000	0	95.8	79.1	132			
Trichloroethene (TCE)	0.37	0.10	0.4000	0	93.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**1811f05-001ams**	SampType:	**MS**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**41891**		RunNo:	**56114**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/6/2018**		SeqNo:	**1874445**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.21		0.2000		107	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		101	70	130			
Surr: Toluene-d8	0.18		0.2000		92.4	70	130			

Sample ID	**1811f05-001amsd**	SampType:	**MSD**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**41891**		RunNo:	**56114**				
Prep Date:	**12/4/2018**	Analysis Date:	**12/6/2018**		SeqNo:	**1874446**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.38	0.10	0.4000	0	94.1	44.5	152	4.77	20	
Chlorobenzene	0.35	0.10	0.4000	0	87.8	70	130	0.489	20	
1,1-Dichloroethene	0.37	0.10	0.4000	0	93.7	79.1	132	2.28	20	
Trichloroethene (TCE)	0.36	0.10	0.4000	0	90.0	70	130	3.91	20	
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		105	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.21		0.2000		106	57.3	148	0	0	
Surr: Dibromofluoromethane	0.20		0.2000		99.6	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		92.7	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41931**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.072	0.0010	0.1000	0	72.0	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	72.9	42.3	108			
2,4-Dinitrotoluene	0.074	0.0010	0.1000	0	73.6	45.8	87.8			
Hexachlorobenzene	0.085	0.0010	0.1000	0	84.9	54.5	104			
Hexachlorobutadiene	0.056	0.0010	0.1000	0	56.1	35.2	95.8			
Hexachloroethane	0.051	0.0010	0.1000	0	51.1	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.8	53.1	98.9			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.0	30.3	104			
Pyridine	0.062	0.0010	0.1000	0	61.7	-0.574	90			
2,4,5-Trichlorophenol	0.074	0.0010	0.1000	0	73.6	42.1	107			
2,4,6-Trichlorophenol	0.074	0.0010	0.1000	0	74.5	43.8	110			
Cresols, Total	0.22	0.0010	0.3000	0	72.6	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		64.7	15	102			
Surr: Phenol-d5	0.11		0.2000		56.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		81.8	39.9	111			
Surr: Nitrobenzene-d5	0.074		0.1000		73.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.066		0.1000		65.5	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		76.9	42.6	129			

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.12		0.2000		59.5	15	102			
Surr: Phenol-d5	0.10		0.2000		50.1	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.7	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-41931**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41931**	RunNo: **56190**
Prep Date: **12/6/2018**	Analysis Date: **12/8/2018**	SeqNo: **1877045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		66.8	35.1	107			
Surr: 2-Fluorobiphenyl	0.064		0.1000		63.7	36.7	100			
Surr: 4-Terphenyl-d14	0.074		0.1000		74.3	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41957**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876021**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41957**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41957**	RunNo:	**56161**					
Prep Date:	**12/6/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1876022**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-41930**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**PBW**	Batch ID:	**41930**	RunNo:	**56150**
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875538** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41930**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**LCSW**	Batch ID:	**41930**	RunNo:	**56150**
Prep Date:	**12/5/2018**	Analysis Date:	**12/6/2018**	SeqNo:	**1875540** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	106	80	120			
Barium	ND	100	0.5000	0	95.0	80	120			
Cadmium	ND	1.0	0.5000	0	99.1	80	120			
Chromium	ND	5.0	0.5000	0	96.3	80	120			
Lead	ND	5.0	0.5000	0	93.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F05**

12-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**mb-41865**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**					
Client ID:	**PBS**	Batch ID:	**41865**		RunNo:	**56112**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874487**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)		ND	5.0								
Surr: BFB		450		500.0		89.8	70	130			

Sample ID	**lcs-41865**	SampType:	**LCS**		TestCode:	**EPA Method 8015D Mod: Gasoline Range**					
Client ID:	**LCSS**	Batch ID:	**41865**		RunNo:	**56112**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/5/2018**		SeqNo:	**1874488**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)		23	5.0	25.00	0	93.9	70	130			
Surr: BFB		440		500.0		88.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1811F05 RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:50:00 PM I Ortiz

Completed By: Anne Thorne 11/30/2018 12:37:40 PM Anne Thorne

Reviewed By: ENM 12/3/18

Labeled by: VVZ 12/3/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑

VVZ 12/3/18

11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.2	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106 S4-3-idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62500DM01.1017.3~~ 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[3] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[25] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106 S4-3-idw	Roll Off S4-3	Soil	11-29-18	1410	IV	7	3	X	X	X	X	X	X			PF	Composite	1811E05-001	
2																				
3																				
4																				
5																				
6									PF											
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:
FedEx Number:
N/A

3.2-10 (CF) 2.2

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	11/29/18	1500	Printed Name and Signature: EARL Morse	11/29/18	1500
Printed Name and Signature: Earl Morse	11/29/18	1550	Printed Name and Signature: FED Ex Isaiah Ortiz client	11/29/18	1550
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

30 October 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letter dated: 30 October 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S5

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S5, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in one 20-cubic-yard open top roll-off container labeled **20B-30**. The roll-off will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either NM license plate WD121651, or NM license plate WD124756. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany the roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.10.30 14:51:51 -06'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

October 30, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S5-1 (Bin ID #20B-30)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S5-1 (Bin ID #20B-30) contains approximately 16 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S5, at this location. Well KAFB-106S5 is located in Bullhead Park South of Gibson Blvd SE. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810774) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810774

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

				LOCATION CODE			
				FIELD SAMPLE ID	KAFB-106S5-1-Rolloff		
				SAMPLE DATE	11-Oct-18		
				SAMPLE PURPOSE	Waste Characterization		
				EA ROLL-OFF NO.	S5-1		
				ACT ROLL-OFF NO.	20B-30		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	72.4	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.16	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.7
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.05
		TOLUENE	mg/kg	50[e]	ND	--	0.05
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 24, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810774

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-1-Roll off S5-1
Project: Kirtland AFB BFF
Collection Date: 10/11/2018 3:00:00 PM
Lab ID: 1810774-001 **Matrix:** SOIL **Received Date:** 10/11/2018 4:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	10/16/2018 4:22:45 PM	41031
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	10/17/2018 10:33:37 AM	41044
Barium	ND	100		mg/L	1	10/17/2018 10:33:37 AM	41044
Cadmium	ND	1.0		mg/L	1	10/17/2018 10:33:37 AM	41044
Chromium	ND	5.0		mg/L	1	10/17/2018 10:33:37 AM	41044
Lead	ND	5.0		mg/L	1	10/17/2018 10:33:37 AM	41044
Selenium	ND	1.0		mg/L	1	10/17/2018 10:33:37 AM	41044
Silver	ND	5.0		mg/L	1	10/17/2018 10:33:37 AM	41044
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **TOM**	
Chlordane	ND	0.030		mg/L	1	10/22/2018 12:12:52 PM	41071
Endrin	ND	0.020		mg/L	1	10/22/2018 12:12:52 PM	41071
gamma-BHC (Lindane)	ND	0.40		mg/L	1	10/22/2018 12:12:52 PM	41071
Heptachlor	ND	0.0080		mg/L	1	10/22/2018 12:12:52 PM	41071
Heptachlor epoxide	ND	0.0080		mg/L	1	10/22/2018 12:12:52 PM	41071
Methoxychlor	ND	10		mg/L	1	10/22/2018 12:12:52 PM	41071
Toxaphene	ND	0.50		mg/L	1	10/22/2018 12:12:52 PM	41071
Surr: Decachlorobiphenyl	66.9	58.3-109		%Rec	1	10/22/2018 12:12:52 PM	41071
Surr: Tetrachloro-m-xylene	31.8	40.1-101	S	%Rec	1	10/22/2018 12:12:52 PM	41071
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	10/17/2018 12:40:01 PM	41011
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/17/2018 12:40:01 PM	41011
Surr: DNOP	114	50.6-138		%Rec	1	10/17/2018 12:40:01 PM	41011
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/15/2018 10:03:35 PM	40985
Surr: BFB	89.0	15-316		%Rec	1	10/15/2018 10:03:35 PM	40985
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	10/18/2018 7:26:32 PM	41035
3+4-Methylphenol	ND	200		mg/L	1	10/18/2018 7:26:32 PM	41035
2,4-Dinitrotoluene	ND	0.13		mg/L	1	10/18/2018 7:26:32 PM	41035
Hexachlorobenzene	ND	0.13		mg/L	1	10/18/2018 7:26:32 PM	41035
Hexachlorobutadiene	ND	0.50		mg/L	1	10/18/2018 7:26:32 PM	41035
Hexachloroethane	ND	3.0		mg/L	1	10/18/2018 7:26:32 PM	41035
Nitrobenzene	ND	2.0		mg/L	1	10/18/2018 7:26:32 PM	41035
Pentachlorophenol	ND	100		mg/L	1	10/18/2018 7:26:32 PM	41035
Pyridine	ND	5.0		mg/L	1	10/18/2018 7:26:32 PM	41035
2,4,5-Trichlorophenol	ND	400		mg/L	1	10/18/2018 7:26:32 PM	41035

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-1-Roll off S5-1
Project: Kirtland AFB BFF
Collection Date: 10/11/2018 3:00:00 PM
Lab ID: 1810774-001 **Matrix:** SOIL **Received Date:** 10/11/2018 4:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	10/18/2018 7:26:32 PM	41035
Cresols, Total	ND	200		mg/L	1	10/18/2018 7:26:32 PM	41035
Surr: 2-Fluorophenol	41.2	15-102		%Rec	1	10/18/2018 7:26:32 PM	41035
Surr: Phenol-d5	32.4	15-87.7		%Rec	1	10/18/2018 7:26:32 PM	41035
Surr: 2,4,6-Tribromophenol	58.9	39.9-111		%Rec	1	10/18/2018 7:26:32 PM	41035
Surr: Nitrobenzene-d5	60.9	35.1-107		%Rec	1	10/18/2018 7:26:32 PM	41035
Surr: 2-Fluorobiphenyl	53.8	36.7-100		%Rec	1	10/18/2018 7:26:32 PM	41035
Surr: 4-Terphenyl-d14	62.9	42.6-129		%Rec	1	10/18/2018 7:26:32 PM	41035
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	10/15/2018 1:52:12 PM	40985
Toluene	ND	0.050		mg/Kg	1	10/15/2018 1:52:12 PM	40985
Ethylbenzene	ND	0.050		mg/Kg	1	10/15/2018 1:52:12 PM	40985
Xylenes, Total	ND	0.10		mg/Kg	1	10/15/2018 1:52:12 PM	40985
Surr: Dibromofluoromethane	115	70-130		%Rec	1	10/15/2018 1:52:12 PM	40985
Surr: 1,2-Dichloroethane-d4	110	70-130		%Rec	1	10/15/2018 1:52:12 PM	40985
Surr: Toluene-d8	104	70-130		%Rec	1	10/15/2018 1:52:12 PM	40985
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	10/15/2018 1:52:12 PM	40985
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	10/17/2018 5:25:36 PM	41018
2-Butanone	ND	200		mg/L	1	10/17/2018 5:25:36 PM	41018
Carbon Tetrachloride	ND	0.50		mg/L	1	10/17/2018 5:25:36 PM	41018
Chlorobenzene	ND	100		mg/L	1	10/17/2018 5:25:36 PM	41018
Chloroform	ND	6.0		mg/L	1	10/17/2018 5:25:36 PM	41018
1,4-Dichlorobenzene	ND	7.5		mg/L	1	10/17/2018 5:25:36 PM	41018
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	10/17/2018 5:25:36 PM	41018
1,1-Dichloroethene	ND	0.70		mg/L	1	10/17/2018 5:25:36 PM	41018
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	10/17/2018 5:25:36 PM	41018
Trichloroethene (TCE)	ND	0.50		mg/L	1	10/17/2018 5:25:36 PM	41018
Vinyl chloride	ND	0.20		mg/L	1	10/17/2018 5:25:36 PM	41018
Surr: 1,2-Dichloroethane-d4	91.9	70-130		%Rec	1	10/17/2018 5:25:36 PM	41018
Surr: 4-Bromofluorobenzene	102	57.3-148		%Rec	1	10/17/2018 5:25:36 PM	41018
Surr: Dibromofluoromethane	92.4	70-130		%Rec	1	10/17/2018 5:25:36 PM	41018
Surr: Toluene-d8	97.4	70-130		%Rec	1	10/17/2018 5:25:36 PM	41018

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/18/2018 10:25:36 AM	WG1182773
Fluid	1		10/18/2018 10:25:36 AM	WG1182773
Initial pH	9.66		10/18/2018 10:25:36 AM	WG1182773
Final pH	6.13		10/18/2018 10:25:36 AM	WG1182773

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Cyanide	ND		0.250	1	10/23/2018 13:00	WG1184610

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Sulfide	72.4		25.0	1	10/19/2018 13:33	WG1182953

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	9.16	T8	1	10/16/2018 15:31	WG1181784

Sample Narrative:
L1035052-01 WG1181784: 9.16 at 20.2C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	Deg. F			date / time	
Ignitability	DNI at 170		1	10/21/2018 14:28	WG1184057

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
2,4,5-TP (Silvex)	ND		0.00200	1	1	10/22/2018 20:53	WG1184384
2,4-D	ND		0.00200	10	1	10/22/2018 20:53	WG1184384
(S) 2,4-Dichlorophenyl Acetic Acid	*82.2*		*14.0-158*			*10/22/2018 20:53*	WG1184384

WG1184610

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1035052-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3353110-1 10/23/18 12:43

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1034573-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1034573-04 10/23/18 12:48 • (DUP) R3353110-4 10/23/18 12:49

Analyte	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1034583-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1034583-01 10/23/18 12:57 • (DUP) R3353110-7 10/23/18 12:58

Analyte	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.184	1	200	J P1	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3353110-2 10/23/18 12:44 • (LCSD) R3353110-3 10/23/18 12:45

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Reactive Cyanide	2.50	2.57	2.48	103	99.1	50.0-150			3.49	20

L1034573-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1034573-05 10/23/18 12:50 • (MS) R3353110-5 10/23/18 12:51 • (MSD) R3353110-6 10/23/18 12:52

Analyte	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.71	0.0652	1.51	1.41	84.7	78.5	1	75.0-125			7.20	20

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1035052	10/24/18 15:08

WG1184610

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1035052-01

L1036409-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1036409-01 10/23/18 13:04 • (MS) R3353110-8 10/23/18 13:05 • (MSD) R3353110-9 10/23/18 13:08

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.34	1.47	76.3	83.8	1	75.0-125			8.90	20

WG1182953

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1035052-01

Method Blank (MB)

(MB) R3352221-1 10/19/18 13:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1033950-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1033950-02 10/19/18 13:33 • (DUP) R3352221-4 10/19/18 13:33

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	60.3	60.3	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3352221-2 10/19/18 13:33 • (LCSD) R3352221-3 10/19/18 13:33

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Reactive Sulfide	100	84.4	90.5	84.4	90.5	70.0-130			6.90	20

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1035052	10/24/18 15:08

L1034989-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1034989-01 10/16/18 15:31 • (DUP) R3351165-3 10/16/18 15:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
Corrosivity by pH	8.52	8.51	1	0.117		1

Sample Narrative:
OS: 8.52 at 20.1C
DUP: 8.51 at 20C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3351165-1 10/16/18 15:31 • (LCSD) R3351165-2 10/16/18 15:31

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.96	9.95	99.6	99.5	99.0-101			0.100	1

Sample Narrative:
LCS: 9.96 at 17C
LCSD: 9.95 at 17.2C

WG1184057

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1035052-01

L1036041-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1036041-01 10/21/18 14:28 • (DUP) R3352521-3 10/21/18 14:28

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1036451-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1036451-03 10/21/18 14:28 • (DUP) R3352521-4 10/21/18 14:28

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3352521-1 10/21/18 14:28 • (LCSD) R3352521-2 10/21/18 14:28

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	Deg. F	Deg. F	Deg. F	%	%	%			%	%
Ignitability	82.0	84.3	84.3	103	103	96.0-104			0.000	10

WG1184384

Chlorinated Acid Herbicides (GC) by Method 8151A

QUALITY CONTROL SUMMARY

L1035052-01

Method Blank (MB)

(MB) R3352914-1 10/22/18 17:42

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*61.4*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3352914-2 10/22/18 17:56 • (LCSD) R3352914-3 10/22/18 18:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
2,4-D	0.0500	0.0333	0.0364	66.6	72.8	50.0-120			8.90	20
2,4,5-TP (Silvex)	0.0500	0.0393	0.0384	78.6	76.8	50.0-125			2.32	20
(S) 2,4-Dichlorophenyl Acetic Acid				*83.0*	*65.8*	*14.0-158*				

L1034673-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1034673-01 10/22/18 19:17 • (MS) R3352914-4 10/22/18 19:31 • (MSD) R3352914-5 10/22/18 19:45

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0354	0.0394	70.8	78.8	1	50.0-120			10.7	20
2,4,5-TP (Silvex)	0.0500	ND	0.0390	0.0432	78.0	86.4	1	50.0-125			10.2	20
(S) 2,4-Dichlorophenyl Acetic Acid					*72.4*	*80.0*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**LCS-41021**	SampType: **LCS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID: **41021**			RunNo: **54899**				
Prep Date:	**10/16/2018**	Analysis Date: **10/16/2018**			SeqNo: **1824731**	Units: **%Rec**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	3.2		5.000		64.4	50.6	138			

Sample ID	**MB-41021**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID: **41021**			RunNo: **54899**				
Prep Date:	**10/16/2018**	Analysis Date: **10/16/2018**			SeqNo: **1824732**	Units: **%Rec**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	7.2		10.00		72.4	50.6	138			

Sample ID	**LCS-41011**	SampType: **LCS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID: **41011**			RunNo: **54899**				
Prep Date:	**10/15/2018**	Analysis Date: **10/16/2018**			SeqNo: **1824746**	Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	42	10	50.00	0	83.6	70	130			
Surr: DNOP	3.3		5.000		65.6	50.6	138			

Sample ID	**MB-41011**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID: **41011**			RunNo: **54899**				
Prep Date:	**10/15/2018**	Analysis Date: **10/16/2018**			SeqNo: **1824747**	Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.4		10.00		73.7	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**LCS-40985**	SampType: **LCS**		TestCode: **EPA Method 8015D: Gasoline Range**						
Client ID:	**LCSS**	Batch ID: **40985**		RunNo: **54862**						
Prep Date:	**10/12/2018**	Analysis Date: **10/15/2018**		SeqNo: **1823039**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	89.4	75.9	131			
Surr: BFB	1000		1000		102	15	316			

Sample ID	**MB-40985**	SampType: **MBLK**		TestCode: **EPA Method 8015D: Gasoline Range**						
Client ID:	**PBS**	Batch ID: **40985**		RunNo: **54862**						
Prep Date:	**10/12/2018**	Analysis Date: **10/15/2018**		SeqNo: **1823040**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	870		1000		87.3	15	316			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41071**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41071**	RunNo: **55061**
Prep Date: **10/18/2018**	Analysis Date: **10/22/2018**	SeqNo: **1830630** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.00010								
Endrin	ND	0.00010								
gamma-BHC (Lindane)	ND	0.00010								
Heptachlor	ND	0.00010								
Heptachlor epoxide	ND	0.00010								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		67.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.00096		0.002500		38.2	40.1	101			S

Sample ID **LCS-41071**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41071**	RunNo: **55061**
Prep Date: **10/18/2018**	Analysis Date: **10/22/2018**	SeqNo: **1830631** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00034	0.00010	0.0005000	0	68.4	49.5	127			
gamma-BHC (Lindane)	0.00028	0.00010	0.0005000	0	56.4	49.9	124			
Heptachlor	0.00023	0.00010	0.0005000	0	46.5	41	122			
Heptachlor epoxide	0.00033	0.00010	0.0005000	0	65.8	52.2	121			
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134			
Surr: Decachlorobiphenyl	0.0015		0.002500		59.6	58.3	109			
Surr: Tetrachloro-m-xylene	0.00079		0.002500		31.5	40.1	101			S

Sample ID **LCSD-41071**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **41071**	RunNo: **55061**
Prep Date: **10/18/2018**	Analysis Date: **10/22/2018**	SeqNo: **1830632** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00037	0.00010	0.0005000	0	73.9	49.5	127	7.63	20	
gamma-BHC (Lindane)	0.00029	0.00010	0.0005000	0	57.6	49.9	124	2.10	20	
Heptachlor	0.00025	0.00010	0.0005000	0	50.3	41	122	7.89	20	
Heptachlor epoxide	0.00033	0.00010	0.0005000	0	66.8	52.2	121	1.55	20	
Methoxychlor	0.00042	0.00010	0.0005000	0	83.8	40.2	134	21.2	20	R
Surr: Decachlorobiphenyl	0.0017		0.002500		68.8	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0011		0.002500		42.1	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-40985**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **40985**	RunNo: **54877**
Prep Date: **10/12/2018**	Analysis Date: **10/15/2018**	SeqNo: **1824014** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.55		0.5000		111	70	130			
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		98.5	70	130			

Sample ID **lcs-40985**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **40985**	RunNo: **54877**
Prep Date: **10/12/2018**	Analysis Date: **10/15/2018**	SeqNo: **1824015** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.025	1.000	0	120	70	130			
Toluene	1.2	0.050	1.000	0	121	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		111	70	130			
Surr: 1,2-Dichloroethane-d4	0.53		0.5000		107	70	130			
Surr: Toluene-d8	0.52		0.5000		105	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41018**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41018**	RunNo: **54939**
Prep Date: **10/16/2018**	Analysis Date: **10/17/2018**	SeqNo: **1826270** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.10	0.4000	0	92.9	70	130			
Chlorobenzene	0.42	0.10	0.4000	0	104	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	101	70	130			
Trichloroethene (TCE)	0.34	0.10	0.4000	0	86.0	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		89.9	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.0	70	130			
Surr: Toluene-d8	0.20		0.2000		99.1	70	130			

Sample ID **mb-41018**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41018**	RunNo: **54939**
Prep Date: **10/16/2018**	Analysis Date: **10/17/2018**	SeqNo: **1826271** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		91.9	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		94.5	70	130			
Surr: Toluene-d8	0.20		0.2000		99.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41035**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41035**	RunNo: **54987**
Prep Date: **10/16/2018**	Analysis Date: **10/18/2018**	SeqNo: **1827966** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.062	0.0010	0.1000	0	61.6	47.8	99.2			
3+4-Methylphenol	0.13	0.0010	0.2000	0	63.3	41.5	118			
2,4-Dinitrotoluene	0.068	0.0010	0.1000	0	67.9	44.4	81			
Hexachlorobenzene	0.079	0.0010	0.1000	0	78.5	49.5	91.6			
Hexachlorobutadiene	0.055	0.0010	0.1000	0	54.6	38.6	93			
Hexachloroethane	0.050	0.0010	0.1000	0	49.5	39.4	79.9			
Nitrobenzene	0.064	0.0010	0.1000	0	64.3	47.4	96.2			
Pentachlorophenol	0.072	0.0010	0.1000	0	71.9	39.4	79.9			
Pyridine	0.043	0.0010	0.1000	0	43.2	15	79.9			
2,4,5-Trichlorophenol	0.070	0.0010	0.1000	0	70.0	47.4	118			
2,4,6-Trichlorophenol	0.075	0.0010	0.1000	0	74.9	47.4	101			
Cresols, Total	0.19	0.0010	0.3000	0	62.8	44.1	111			
Surr: 2-Fluorophenol	0.12		0.2000		57.9	15	102			
Surr: Phenol-d5	0.11		0.2000		53.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		80.9	39.9	111			
Surr: Nitrobenzene-d5	0.073		0.1000		72.7	35.1	107			
Surr: 2-Fluorobiphenyl	0.067		0.1000		67.3	36.7	100			
Surr: 4-Terphenyl-d14	0.070		0.1000		69.6	42.6	129			

Sample ID **mb-41035**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41035**	RunNo: **54987**
Prep Date: **10/16/2018**	Analysis Date: **10/18/2018**	SeqNo: **1827967** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.10		0.2000		50.1	15	102			
Surr: Phenol-d5	0.092		0.2000		45.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		74.9	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41035**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41035**	RunNo: **54987**
Prep Date: **10/16/2018**	Analysis Date: **10/18/2018**	SeqNo: **1827967** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.057		0.1000		57.0	35.1	107			
Surr: 2-Fluorobiphenyl	0.054		0.1000		54.4	36.7	100			
Surr: 4-Terphenyl-d14	0.084		0.1000		84.1	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41031**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41031**	RunNo:	**54906**					
Prep Date:	**10/16/2018**	Analysis Date:	**10/16/2018**	SeqNo:	**1824871**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41031**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41031**	RunNo:	**54906**					
Prep Date:	**10/16/2018**	Analysis Date:	**10/16/2018**	SeqNo:	**1824872**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810774**

24-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41044**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41044**	RunNo:	**54921**					
Prep Date:	**10/16/2018**	Analysis Date:	**10/17/2018**	SeqNo:	**1825692**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41044**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41044**	RunNo:	**54921**					
Prep Date:	**10/16/2018**	Analysis Date:	**10/17/2018**	SeqNo:	**1825693**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			
Barium	ND	100	0.5000	0	95.9	80	120			
Cadmium	ND	1.0	0.5000	0	98.0	80	120			
Chromium	ND	5.0	0.5000	0	100	80	120			
Lead	ND	5.0	0.5000	0	98.9	80	120			
Selenium	ND	1.0	0.5000	0	110	80	120			
Silver	ND	5.0	0.1000	0	104	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1810774 | RcptNo: 1

Received By: Erin Melendrez 10/11/2018 4:15:00 PM

Completed By: Ashley Gallegos 10/12/2018 1:55:00 PM

Reviewed By: VV2 10/12/18

labelled by: IO 10/12/2018

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

IO

# of preserved bottles checked for pH: 10/12/2018 (<2 or >12 unless noted)

Adjusted?

Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.1	Good	Not Present			

225 Schilling Circle Suite 402 Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: COC KAFB-10655

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~627590M01.1017.3~~ PF 627350H02.1017.04	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone wells		~~15182~~ PF 16219	Pam Mossipmoss@eaest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-214-9013~~ PF 505-238-4460	505 345 3975 Fax 505 345-4107	Earl Morse/emorse@eaest.com

[14] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA FRG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[24] SAMPLE TYPE (see codes on SOP)	[25] COMMENTS/ SCREENING READINGS	[26] LAB ID (for lab's use)
1	~~KAFB-10655-1~~ KAFB-10655-1	~~Roll off 55-1~~ Roll off 55-1	Soil	10-11-18	1500	IV	7	3	X	X	X	X	X	X			PF	Composite	1810774 001	
2	KAFB-10655-1																			
3																				
4									PF											
5																				
6																				
7																				
8																				
9																				
10																				

[15] SAMPLER(S) AND COMPANY: (please print)	[16] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering	FedEx Number: NA Hand delivered to Hall Lab	Level II PF Temp 10/11/18
Pete Ferrari		Temp: 5.1-1.0(CF)=4.1

[27] RELINQUISHED BY	DATE	TIME	[28] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Ferrari Pete Ferrari	10-11-18	1615	Erin Melendrez Erin Melendrez	10/11/18	1615
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

14 November 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 7 November 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104050, 104056,** and **22023**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either NM license plate WD121651, or NM license plate WD124756. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.11.14 11:44:49 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

November 6, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S5-2 (Bin ID #104050)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S5-2 (Bin ID #104050) contains approximately 10 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S5, at this location. Well KAFB-106S5 is located in Bullhead Park South of Gibson Blvd SE. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810A40) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810A40

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
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Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

				LOCATION CODE			
				FIELD SAMPLE ID	KAFB-106S5-2-idw		
				SAMPLE DATE	18-Oct-18		
				SAMPLE PURPOSE	Waste Characterization		
				ROLL-OFF NO.	S5-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.6	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200.0
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.6
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity Characteristic Leaching Procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 31, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810A40

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/18/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-2-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 10:25:00 AM
Lab ID: 1810A40-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	10/26/2018 3:14:20 PM	41196
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	10/26/2018 1:06:33 PM	41160
Barium	ND	100		mg/L	1	10/26/2018 10:51:55 AM	41160
Cadmium	ND	1.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Chromium	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Lead	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Selenium	ND	1.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Silver	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	10/26/2018 12:42:52 PM	41186
Endrin	ND	0.020		mg/L	1	10/26/2018 12:42:52 PM	41186
gamma-BHC (Lindane)	ND	0.40		mg/L	1	10/26/2018 12:42:52 PM	41186
Heptachlor	ND	0.0080		mg/L	1	10/26/2018 12:42:52 PM	41186
Heptachlor epoxide	ND	0.0080		mg/L	1	10/26/2018 12:42:52 PM	41186
Methoxychlor	ND	10		mg/L	1	10/26/2018 12:42:52 PM	41186
Toxaphene	ND	0.50		mg/L	1	10/26/2018 12:42:52 PM	41186
Surr: Decachlorobiphenyl	79.2	58.3-109		%Rec	1	10/26/2018 12:42:52 PM	41186
Surr: Tetrachloro-m-xylene	69.0	40.1-101		%Rec	1	10/26/2018 12:42:52 PM	41186
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	10/22/2018 9:36:42 PM	41093
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/22/2018 9:36:42 PM	41093
Surr: DNOP	100	50.6-138		%Rec	1	10/22/2018 9:36:42 PM	41093
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/22/2018 10:04:16 AM	41104
Surr: BFB	89.0	15-316		%Rec	1	10/22/2018 10:04:16 AM	41104
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
3+4-Methylphenol	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
2,4-Dinitrotoluene	ND	0.13		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachlorobenzene	ND	0.13		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachlorobutadiene	ND	0.50		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachloroethane	ND	3.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Nitrobenzene	ND	2.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Pentachlorophenol	ND	100		mg/L	1	10/26/2018 1:52:46 PM	41184
Pyridine	ND	5.0		mg/L	1	10/26/2018 1:52:46 PM	41184
2,4,5-Trichlorophenol	ND	400		mg/L	1	10/26/2018 1:52:46 PM	41184

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-2-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 10:25:00 AM
Lab ID: 1810A40-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Cresols, Total	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
Surr: 2-Fluorophenol	60.5	15-102		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: Phenol-d5	44.9	15-87.7		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 2,4,6-Tribromophenol	72.3	39.9-111		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: Nitrobenzene-d5	88.3	35.1-107		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 2-Fluorobiphenyl	77.2	36.7-100		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 4-Terphenyl-d14	95.7	42.6-129		%Rec	1	10/26/2018 1:52:46 PM	41184
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Toluene	ND	0.050		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Ethylbenzene	ND	0.050		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Xylenes, Total	ND	0.10		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Surr: Dibromofluoromethane	102	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: Toluene-d8	97.0	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
2-Butanone	ND	200		mg/L	1	10/23/2018 6:35:25 PM	41121
Carbon Tetrachloride	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
Chlorobenzene	ND	100		mg/L	1	10/23/2018 6:35:25 PM	41121
Chloroform	ND	6.0		mg/L	1	10/23/2018 6:35:25 PM	41121
1,4-Dichlorobenzene	ND	7.5		mg/L	1	10/23/2018 6:35:25 PM	41121
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
1,1-Dichloroethene	ND	0.70		mg/L	1	10/23/2018 6:35:25 PM	41121
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	10/23/2018 6:35:25 PM	41121
Trichloroethene (TCE)	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
Vinyl chloride	ND	0.20		mg/L	1	10/23/2018 6:35:25 PM	41121
Surr: 1,2-Dichloroethane-d4	87.0	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: 4-Bromofluorobenzene	101	57.3-148		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: Dibromofluoromethane	90.4	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: Toluene-d8	98.9	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/24/2018 5:25:58 PM	WG1185977
Fluid	1		10/24/2018 5:25:58 PM	WG1185977
Initial pH	6.70		10/24/2018 5:25:58 PM	WG1185977
Final pH	4.92		10/24/2018 5:25:58 PM	WG1185977

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	10/30/2018 08:36	WG1187945

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	ND		25.0	1	10/30/2018 14:49	WG1187742

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.60	T8	1	10/24/2018 13:21	WG1185597

Sample Narrative:

L1037035-01 WG1185597: 8.6 at 19C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	10/26/2018 17:36	WG1186656

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	10/29/2018 16:50	WG1186704
2,4-D	ND		0.00200	10	1	10/29/2018 16:50	WG1186704
(S) 2,4-Dichlorophenyl Acetic Acid	*64.4*		*14.0-158*			*10/29/2018 16:50*	WG1186704

Method Blank (MB)

(MB) R3354973-1 10/30/18 08:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1037031-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037031-01 10/30/18 08:32 • (DUP) R3354973-3 10/30/18 08:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.142	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3354973-2 10/30/18 08:29

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.57	103	50.0-150	

L1037346-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1037346-02 10/30/18 08:40 • (MS) R3354973-4 10/30/18 08:41 • (MSD) R3354973-5 10/30/18 08:42

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.56	1.33	93.9	80.0	1	75.0-125			16.0	20

Method Blank (MB)

(MB) R3355214-1 10/30/18 14:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/30/18 14:49 • (DUP) R3355214-3 10/30/18 14:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	36.2	36.2	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3355214-2 10/30/18 14:49

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/24/18 13:21 • (DUP) R3353550-3 10/24/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
Corrosivity by pH	9.15	9.13	1	0.219		1

Sample Narrative:

OS: 9.15 at 18.5C

DUP: 9.13 at 19.2C

L1037307-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1037307-05 10/24/18 13:21 • (DUP) R3353550-4 10/24/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
Corrosivity by pH	8.92	8.93	1	0.112		1

Sample Narrative:

OS: 8.92 at 18.6C

DUP: 8.93 at 18.6C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3353550-1 10/24/18 13:21 • (LCSD) R3353550-2 10/24/18 13:21

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.000	1

Sample Narrative:

LCS: 10.01 at 16.6C

LCSD: 10.01 at 16.6C

L1037652-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037652-01 10/26/18 17:36 • (DUP) R3354393-2 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1037795-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037795-01 10/26/18 17:36 • (DUP) R3354393-3 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3354393-1 10/26/18 17:36

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	85.2	104	96.0-104	

Method Blank (MB)

(MB) R3354871-1 10/29/18 13:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*62.0*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3354871-2 10/29/18 13:53 • (LCSD) R3354871-3 10/29/18 14:06

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
2,4-D	0.0500	0.0362	0.0363	72.4	72.6	50.0-120			0.276	20
2,4,5-TP (Silvex)	0.0500	0.0326	0.0329	65.2	65.8	50.0-125			0.916	20
(S) 2,4-Dichlorophenyl Acetic Acid				*68.4*	*73.0*	*14.0-158*				

L1036439-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1036439-01 10/29/18 14:34 • (MS) R3354871-4 10/29/18 14:47 • (MSD) R3354871-5 10/29/18 15:01

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0363	0.0341	72.6	68.2	1	50.0-120			6.25	20
2,4,5-TP (Silvex)	0.0500	ND	0.0339	0.0310	67.8	62.0	1	50.0-125			8.94	20
(S) 2,4-Dichlorophenyl Acetic Acid					*68.2*	*65.6*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41093**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41093**		RunNo:	**55065**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830650**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	50.6	138			

Sample ID	**LCS-41093**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41093**		RunNo:	**55065**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1831222**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	10	50.00	0	80.3	70	130			
Surr: DNOP	4.7		5.000		94.0	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41104**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830809**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	880		1000		87.6	15	316			

Sample ID	**LCS-41104**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830810**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	75.9	131			
Surr: BFB	1000		1000		104	15	316			

Sample ID	**1810A40-001AMS**	SampType:	**MS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**KAFB-106S5-2-idw**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830815**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	24.88	0	107	77.8	128			
Surr: BFB	1000		995.0		102	15	316			

Sample ID	**1810A40-001AMSD**	SampType:	**MSD**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**KAFB-106S5-2-idw**	Batch ID:	**41104**		RunNo:	**55058**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830816**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	24.88	0	103	77.8	128	3.72	20	
Surr: BFB	1000		995.0		100	15	316	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41186**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		66.9	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.7	40.1	101			

Sample ID **LCS-41186**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	75.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	76.7	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.3	41	122			
Heptachlor epoxide	0.00038	0.00010	0.0005000	0	76.7	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.8	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		73.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		70.5	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41104**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831793** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.50		0.5000		99.8	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.3	70	130			

Sample ID **lcs-41104**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831794** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.5	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.6	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41121**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41121**	RunNo: **55095**
Prep Date: **10/22/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831823** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.10	0.4000	0	92.5	70	130			
Chlorobenzene	0.39	0.10	0.4000	0	98.0	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.7	70	130			
Trichloroethene (TCE)	0.35	0.10	0.4000	0	87.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		86.3	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.9	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		90.5	70	130			
Surr: Toluene-d8	0.19		0.2000		93.8	70	130			

Sample ID **mb-41121**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41121**	RunNo: **55095**
Prep Date: **10/22/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831824** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		87.1	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.6	70	130			
Surr: Toluene-d8	0.19		0.2000		96.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810a40-001ams** SampType: **MS** TestCode: **EPA Method 8270C TCLP**

Client ID: **KAFB-106S5-2-idw** Batch ID: **41184** RunNo: **55218**

Prep Date: **10/25/2018** Analysis Date: **10/26/2018** SeqNo: **1836259** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.082	0.0010	0.2000	0	40.9	43.1	114			S
3+4-Methylphenol	0.18	0.0010	0.4000	0	46.0	37.8	128			
2,4-Dinitrotoluene	0.092	0.0010	0.2000	0	45.9	36.5	125			
Hexachlorobenzene	0.11	0.0010	0.2000	0	56.0	41.4	108			
Hexachlorobutadiene	0.081	0.0010	0.2000	0	40.4	30.4	101			
Hexachloroethane	0.067	0.0010	0.2000	0	33.3	37.3	115			S
Nitrobenzene	0.099	0.0010	0.2000	0	49.5	40.2	132			
Pentachlorophenol	0.077	0.0010	0.2000	0	38.7	8.72	103			
Pyridine	0.067	0.0010	0.2000	0	33.3	9.36	106			
2,4,5-Trichlorophenol	0.096	0.0010	0.2000	0	48.0	16.5	123			
2,4,6-Trichlorophenol	0.097	0.0010	0.2000	0	48.4	11.3	117			
Cresols, Total	0.27	0.0010	0.6000	0	44.3	23.2	151			
Surr: 2-Fluorophenol	0.063		0.2000		31.4	15	102			
Surr: Phenol-d5	0.048		0.2000		23.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.10		0.2000		51.6	39.9	111			
Surr: Nitrobenzene-d5	0.053		0.1000		52.9	35.1	107			
Surr: 2-Fluorobiphenyl	0.047		0.1000		47.2	36.7	100			
Surr: 4-Terphenyl-d14	0.065		0.1000		64.5	42.6	129			

Sample ID **1810a40-001amsd** SampType: **MSD** TestCode: **EPA Method 8270C TCLP**

Client ID: **KAFB-106S5-2-idw** Batch ID: **41184** RunNo: **55218**

Prep Date: **10/25/2018** Analysis Date: **10/26/2018** SeqNo: **1836260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	59.0	43.1	114	36.2	28.4	R
3+4-Methylphenol	0.32	0.0010	0.4000	0	79.8	37.8	128	53.6	29.4	R
2,4-Dinitrotoluene	0.11	0.0010	0.2000	0	53.4	36.5	125	15.1	24.7	
Hexachlorobenzene	0.14	0.0010	0.2000	0	68.7	41.4	108	20.5	20	R
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.5	30.4	101	27.8	29	
Hexachloroethane	0.094	0.0010	0.2000	0	47.1	37.3	115	34.4	25.2	R
Nitrobenzene	0.14	0.0010	0.2000	0	69.6	40.2	132	33.7	26.9	R
Pentachlorophenol	0.099	0.0010	0.2000	0	49.4	8.72	103	24.1	59.2	
Pyridine	0.095	0.0010	0.2000	0	47.5	9.36	106	35.2	48	
2,4,5-Trichlorophenol	0.12	0.0010	0.2000	0	58.8	16.5	123	20.4	70.8	
2,4,6-Trichlorophenol	0.12	0.0010	0.2000	0	60.3	11.3	117	21.9	78	
Cresols, Total	0.44	0.0010	0.6000	0	72.8	23.2	151	48.7	30.8	R
Surr: 2-Fluorophenol	0.089		0.2000		44.6	15	102	0	0	
Surr: Phenol-d5	0.070		0.2000		35.1	15	87.7	0	0	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		65.1	39.9	111	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810a40-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **KAFB-106S5-2-idw**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		67.5	35.1	107	0	0	
Surr: 2-Fluorobiphenyl	0.062		0.1000		62.3	36.7	100	0	0	
Surr: 4-Terphenyl-d14	0.082		0.1000		81.5	42.6	129	0	0	

Sample ID **lcs-41184**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836263** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	61.6	47.8	99.2			
3+4-Methylphenol	0.33	0.0010	0.4000	0	81.8	41.5	118			
2,4-Dinitrotoluene	0.13	0.0010	0.2000	0	65.7	44.4	81			
Hexachlorobenzene	0.15	0.0010	0.2000	0	75.5	49.5	91.6			
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.2	38.6	93			
Hexachloroethane	0.093	0.0010	0.2000	0	46.5	39.4	79.9			
Nitrobenzene	0.13	0.0010	0.2000	0	67.3	47.4	96.2			
Pentachlorophenol	0.10	0.0010	0.2000	0	52.3	39.4	79.9			
Pyridine	0.042	0.0010	0.2000	0	20.9	15	79.9			
2,4,5-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	118			
2,4,6-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	101			
Cresols, Total	0.45	0.0010	0.6000	0	75.1	44.1	111			
Surr: 2-Fluorophenol	0.080		0.2000		40.2	15	102			
Surr: Phenol-d5	0.067		0.2000		33.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.9	39.9	111			
Surr: Nitrobenzene-d5	0.068		0.1000		68.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.063		0.1000		63.4	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		77.3	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.060		0.2000		29.8	15	102			
Surr: Phenol-d5	0.047		0.2000		23.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.079		0.2000		39.4	39.9	111			S
Surr: Nitrobenzene-d5	0.044		0.1000		44.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.042		0.1000		41.5	36.7	100			
Surr: 4-Terphenyl-d14	0.063		0.1000		62.7	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55261**
Prep Date: **10/25/2018**	Analysis Date: **10/30/2018**	SeqNo: **1838305** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.4	15	102			
Surr: Phenol-d5	0.046		0.2000		23.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.087		0.2000		43.4	39.9	111			
Surr: Nitrobenzene-d5	0.046		0.1000		46.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.041		0.1000		40.8	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.0	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41196**	SampType: **MBLK**			TestCode: **MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835538**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41196**	SampType: **LCS**			TestCode: **MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835539**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.1	80	120			

Sample ID	**1810A40-001AMS**	SampType: **MS**			TestCode: **MERCURY, TCLP**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835541**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.5	75	125			

Sample ID	**1810A40-001AMSD**	SampType: **MSD**			TestCode: **MERCURY, TCLP**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835542**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41160**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41160**	RunNo:	**55199**					
Prep Date:	**10/23/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835465**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41160**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41160**	RunNo:	**55199**					
Prep Date:	**10/23/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835467**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	96.8	80	120			
Cadmium	ND	1.0	0.5000	0	98.8	80	120			
Chromium	ND	5.0	0.5000	0	95.5	80	120			
Lead	ND	5.0	0.5000	0	92.8	80	120			
Selenium	ND	1.0	0.5000	0	99.6	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Sample ID	**MB-41160**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**41160**	RunNo:	**55199**					
Prep Date:	**10/23/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835504**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID	**LCS-41160**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**41160**	RunNo:	**55199**					
Prep Date:	**10/23/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835506**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	94.0	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1810A40** RcptNo: **1**

Received By: **Jazzmine Burkhead** **10/18/2018 2:20:00 PM**

Completed By: **Ashley Gallegos** **10/18/2018 3:00:44 PM**

Reviewed By: 10/18/18 labeled by: ENM 10/18/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

ENM 10/18/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.6	Good	Not Present			

Appendix

831 of 1530

CHAIN-OF-CUSTODY RECORD

COC

[1] COC NUMBER: KAFB-1065-2

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[9] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 62735DM02.1017.04	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[25] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use
1	1810A40 KAFB-1065-2-[illegible]	Roll off 9.5-2	Soil	10-15-18	1025	IV	7	3	X	X	X	X	X	X		PF		composite		
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:

FedEx Number:
NA Hand delivered to Hall Lab

[31] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	10-18-18	1420	Printed Name and Signature: Jazmine Burkhead	10/18/18	14:2
Printed Name and Signature:			Printed Name and Signature: Temp - 3.9-1.0 (IR) = 2.9		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: 1 - Original - Laboratory (To be returned with Analytical Report) 2 - Copy 3 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

14 November 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 7 November 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104050, 104056,** and **22023**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either NM license plate WD121651, or NM license plate WD124756. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.11.14 11:44:49 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

November 6, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S5-2 (Bin ID #104050)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S5-2 (Bin ID #104050) contains approximately 10 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S5, at this location. Well KAFB-106S5 is located in Bullhead Park South of Gibson Blvd SE. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810A40) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810A40

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S5-2-idw		
			SAMPLE DATE		18-Oct-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S5-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.6	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200.0
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.6
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity Characteristic Leaching Procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 31, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810A40

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/18/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-2-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 10:25:00 AM
Lab ID: 1810A40-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	10/26/2018 3:14:20 PM	41196
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	10/26/2018 1:06:33 PM	41160
Barium	ND	100		mg/L	1	10/26/2018 10:51:55 AM	41160
Cadmium	ND	1.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Chromium	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Lead	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Selenium	ND	1.0		mg/L	1	10/26/2018 10:51:55 AM	41160
Silver	ND	5.0		mg/L	1	10/26/2018 10:51:55 AM	41160
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	10/26/2018 12:42:52 PM	41186
Endrin	ND	0.020		mg/L	1	10/26/2018 12:42:52 PM	41186
gamma-BHC (Lindane)	ND	0.40		mg/L	1	10/26/2018 12:42:52 PM	41186
Heptachlor	ND	0.0080		mg/L	1	10/26/2018 12:42:52 PM	41186
Heptachlor epoxide	ND	0.0080		mg/L	1	10/26/2018 12:42:52 PM	41186
Methoxychlor	ND	10		mg/L	1	10/26/2018 12:42:52 PM	41186
Toxaphene	ND	0.50		mg/L	1	10/26/2018 12:42:52 PM	41186
Surr: Decachlorobiphenyl	79.2	58.3-109		%Rec	1	10/26/2018 12:42:52 PM	41186
Surr: Tetrachloro-m-xylene	69.0	40.1-101		%Rec	1	10/26/2018 12:42:52 PM	41186
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	10/22/2018 9:36:42 PM	41093
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/22/2018 9:36:42 PM	41093
Surr: DNOP	100	50.6-138		%Rec	1	10/22/2018 9:36:42 PM	41093
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/22/2018 10:04:16 AM	41104
Surr: BFB	89.0	15-316		%Rec	1	10/22/2018 10:04:16 AM	41104
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
3+4-Methylphenol	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
2,4-Dinitrotoluene	ND	0.13		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachlorobenzene	ND	0.13		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachlorobutadiene	ND	0.50		mg/L	1	10/26/2018 1:52:46 PM	41184
Hexachloroethane	ND	3.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Nitrobenzene	ND	2.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Pentachlorophenol	ND	100		mg/L	1	10/26/2018 1:52:46 PM	41184
Pyridine	ND	5.0		mg/L	1	10/26/2018 1:52:46 PM	41184
2,4,5-Trichlorophenol	ND	400		mg/L	1	10/26/2018 1:52:46 PM	41184

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-2-idw
Project: Kirtland AFB BFF
Collection Date: 10/18/2018 10:25:00 AM
Lab ID: 1810A40-001 **Matrix:** SOIL **Received Date:** 10/18/2018 2:20:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	10/26/2018 1:52:46 PM	41184
Cresols, Total	ND	200		mg/L	1	10/26/2018 1:52:46 PM	41184
Surr: 2-Fluorophenol	60.5	15-102		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: Phenol-d5	44.9	15-87.7		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 2,4,6-Tribromophenol	72.3	39.9-111		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: Nitrobenzene-d5	88.3	35.1-107		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 2-Fluorobiphenyl	77.2	36.7-100		%Rec	1	10/26/2018 1:52:46 PM	41184
Surr: 4-Terphenyl-d14	95.7	42.6-129		%Rec	1	10/26/2018 1:52:46 PM	41184
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Toluene	ND	0.050		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Ethylbenzene	ND	0.050		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Xylenes, Total	ND	0.10		mg/Kg	1	10/23/2018 12:27:19 PM	41104
Surr: Dibromofluoromethane	102	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: Toluene-d8	97.0	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	10/23/2018 12:27:19 PM	41104
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
2-Butanone	ND	200		mg/L	1	10/23/2018 6:35:25 PM	41121
Carbon Tetrachloride	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
Chlorobenzene	ND	100		mg/L	1	10/23/2018 6:35:25 PM	41121
Chloroform	ND	6.0		mg/L	1	10/23/2018 6:35:25 PM	41121
1,4-Dichlorobenzene	ND	7.5		mg/L	1	10/23/2018 6:35:25 PM	41121
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
1,1-Dichloroethene	ND	0.70		mg/L	1	10/23/2018 6:35:25 PM	41121
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	10/23/2018 6:35:25 PM	41121
Trichloroethene (TCE)	ND	0.50		mg/L	1	10/23/2018 6:35:25 PM	41121
Vinyl chloride	ND	0.20		mg/L	1	10/23/2018 6:35:25 PM	41121
Surr: 1,2-Dichloroethane-d4	87.0	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: 4-Bromofluorobenzene	101	57.3-148		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: Dibromofluoromethane	90.4	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121
Surr: Toluene-d8	98.9	70-130		%Rec	1	10/23/2018 6:35:25 PM	41121

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/24/2018 5:25:58 PM	WG1185977
Fluid	1		10/24/2018 5:25:58 PM	WG1185977
Initial pH	6.70		10/24/2018 5:25:58 PM	WG1185977
Final pH	4.92		10/24/2018 5:25:58 PM	WG1185977

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	10/30/2018 08:36	WG1187945

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	ND		25.0	1	10/30/2018 14:49	WG1187742

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.60	T8	1	10/24/2018 13:21	WG1185597

Sample Narrative:

L1037035-01 WG1185597: 8.6 at 19C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	10/26/2018 17:36	WG1186656

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	10/29/2018 16:50	WG1186704
2,4-D	ND		0.00200	10	1	10/29/2018 16:50	WG1186704
(S) 2,4-Dichlorophenyl Acetic Acid	*64.4*		*14.0-158*			*10/29/2018 16:50*	WG1186704

Method Blank (MB)

(MB) R3354973-1 10/30/18 08:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1037031-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037031-01 10/30/18 08:32 • (DUP) R3354973-3 10/30/18 08:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.142	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3354973-2 10/30/18 08:29

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.57	103	50.0-150	

L1037346-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1037346-02 10/30/18 08:40 • (MS) R3354973-4 10/30/18 08:41 • (MSD) R3354973-5 10/30/18 08:42

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.56	1.33	93.9	80.0	1	75.0-125			16.0	20

Method Blank (MB)

(MB) R3355214-1 10/30/18 14:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/30/18 14:49 • (DUP) R3355214-3 10/30/18 14:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	36.2	36.2	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3355214-2 10/30/18 14:49

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1037121-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037121-01 10/24/18 13:21 • (DUP) R3353550-3 10/24/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
Corrosivity by pH	9.15	9.13	1	0.219		1

Sample Narrative:

OS: 9.15 at 18.5C

DUP: 9.13 at 19.2C

L1037307-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1037307-05 10/24/18 13:21 • (DUP) R3353550-4 10/24/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
Corrosivity by pH	8.92	8.93	1	0.112		1

Sample Narrative:

OS: 8.92 at 18.6C

DUP: 8.93 at 18.6C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3353550-1 10/24/18 13:21 • (LCSD) R3353550-2 10/24/18 13:21

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.000	1

Sample Narrative:

LCS: 10.01 at 16.6C

LCSD: 10.01 at 16.6C

L1037652-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037652-01 10/26/18 17:36 • (DUP) R3354393-2 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1037795-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037795-01 10/26/18 17:36 • (DUP) R3354393-3 10/26/18 17:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3354393-1 10/26/18 17:36

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	85.2	104	96.0-104	

Method Blank (MB)

(MB) R3354871-1 10/29/18 13:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*62.0*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3354871-2 10/29/18 13:53 • (LCSD) R3354871-3 10/29/18 14:06

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
2,4-D	0.0500	0.0362	0.0363	72.4	72.6	50.0-120			0.276	20
2,4,5-TP (Silvex)	0.0500	0.0326	0.0329	65.2	65.8	50.0-125			0.916	20
(S) 2,4-Dichlorophenyl Acetic Acid				*68.4*	*73.0*	*14.0-158*				

L1036439-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1036439-01 10/29/18 14:34 • (MS) R3354871-4 10/29/18 14:47 • (MSD) R3354871-5 10/29/18 15:01

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0363	0.0341	72.6	68.2	1	50.0-120			6.25	20
2,4,5-TP (Silvex)	0.0500	ND	0.0339	0.0310	67.8	62.0	1	50.0-125			8.94	20
(S) 2,4-Dichlorophenyl Acetic Acid					*68.2*	*65.6*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41093**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41093**		RunNo:	**55065**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1830650**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	50.6	138			

Sample ID	**LCS-41093**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41093**		RunNo:	**55065**				
Prep Date:	**10/19/2018**	Analysis Date:	**10/22/2018**		SeqNo:	**1831222**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	10	50.00	0	80.3	70	130			
Surr: DNOP	4.7		5.000		94.0	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID	**MB-41104**	SampType: **MBLK**			TestCode: **EPA Method 8015D: Gasoline Range**					
Client ID:	**PBS**	Batch ID: **41104**			RunNo: **55058**					
Prep Date:	**10/19/2018**	Analysis Date: **10/22/2018**			SeqNo: **1830809**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	880		1000		87.6	15	316			

Sample ID	**LCS-41104**	SampType: **LCS**			TestCode: **EPA Method 8015D: Gasoline Range**					
Client ID:	**LCSS**	Batch ID: **41104**			RunNo: **55058**					
Prep Date:	**10/19/2018**	Analysis Date: **10/22/2018**			SeqNo: **1830810**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	75.9	131			
Surr: BFB	1000		1000		104	15	316			

Sample ID	**1810A40-001AMS**	SampType: **MS**			TestCode: **EPA Method 8015D: Gasoline Range**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41104**			RunNo: **55058**					
Prep Date:	**10/19/2018**	Analysis Date: **10/22/2018**			SeqNo: **1830815**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	24.88	0	107	77.8	128			
Surr: BFB	1000		995.0		102	15	316			

Sample ID	**1810A40-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 8015D: Gasoline Range**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41104**			RunNo: **55058**					
Prep Date:	**10/19/2018**	Analysis Date: **10/22/2018**			SeqNo: **1830816**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	24.88	0	103	77.8	128	3.72	20	
Surr: BFB	1000		995.0		100	15	316	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41186**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		66.9	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.7	40.1	101			

Sample ID **LCS-41186**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	75.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	76.7	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.3	41	122			
Heptachlor epoxide	0.00038	0.00010	0.0005000	0	76.7	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.8	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		73.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		70.5	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41104**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831793** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.50		0.5000		99.8	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.3	70	130			

Sample ID **lcs-41104**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41104**	RunNo: **55107**
Prep Date: **10/19/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831794** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.5	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.6	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41121**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41121**	RunNo: **55095**
Prep Date: **10/22/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831823** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.37	0.10	0.4000	0	92.5	70	130			
Chlorobenzene	0.39	0.10	0.4000	0	98.0	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	99.7	70	130			
Trichloroethene (TCE)	0.35	0.10	0.4000	0	87.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		86.3	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.9	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		90.5	70	130			
Surr: Toluene-d8	0.19		0.2000		93.8	70	130			

Sample ID **mb-41121**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41121**	RunNo: **55095**
Prep Date: **10/22/2018**	Analysis Date: **10/23/2018**	SeqNo: **1831824** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		87.1	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		102	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.6	70	130			
Surr: Toluene-d8	0.19		0.2000		96.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810a40-001ams** SampType: **MS** TestCode: **EPA Method 8270C TCLP**

Client ID: **KAFB-106S5-2-idw** Batch ID: **41184** RunNo: **55218**

Prep Date: **10/25/2018** Analysis Date: **10/26/2018** SeqNo: **1836259** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.082	0.0010	0.2000	0	40.9	43.1	114			S
3+4-Methylphenol	0.18	0.0010	0.4000	0	46.0	37.8	128			
2,4-Dinitrotoluene	0.092	0.0010	0.2000	0	45.9	36.5	125			
Hexachlorobenzene	0.11	0.0010	0.2000	0	56.0	41.4	108			
Hexachlorobutadiene	0.081	0.0010	0.2000	0	40.4	30.4	101			
Hexachloroethane	0.067	0.0010	0.2000	0	33.3	37.3	115			S
Nitrobenzene	0.099	0.0010	0.2000	0	49.5	40.2	132			
Pentachlorophenol	0.077	0.0010	0.2000	0	38.7	8.72	103			
Pyridine	0.067	0.0010	0.2000	0	33.3	9.36	106			
2,4,5-Trichlorophenol	0.096	0.0010	0.2000	0	48.0	16.5	123			
2,4,6-Trichlorophenol	0.097	0.0010	0.2000	0	48.4	11.3	117			
Cresols, Total	0.27	0.0010	0.6000	0	44.3	23.2	151			
Surr: 2-Fluorophenol	0.063		0.2000		31.4	15	102			
Surr: Phenol-d5	0.048		0.2000		23.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.10		0.2000		51.6	39.9	111			
Surr: Nitrobenzene-d5	0.053		0.1000		52.9	35.1	107			
Surr: 2-Fluorobiphenyl	0.047		0.1000		47.2	36.7	100			
Surr: 4-Terphenyl-d14	0.065		0.1000		64.5	42.6	129			

Sample ID **1810a40-001amsd** SampType: **MSD** TestCode: **EPA Method 8270C TCLP**

Client ID: **KAFB-106S5-2-idw** Batch ID: **41184** RunNo: **55218**

Prep Date: **10/25/2018** Analysis Date: **10/26/2018** SeqNo: **1836260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	59.0	43.1	114	36.2	28.4	R
3+4-Methylphenol	0.32	0.0010	0.4000	0	79.8	37.8	128	53.6	29.4	R
2,4-Dinitrotoluene	0.11	0.0010	0.2000	0	53.4	36.5	125	15.1	24.7	
Hexachlorobenzene	0.14	0.0010	0.2000	0	68.7	41.4	108	20.5	20	R
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.5	30.4	101	27.8	29	
Hexachloroethane	0.094	0.0010	0.2000	0	47.1	37.3	115	34.4	25.2	R
Nitrobenzene	0.14	0.0010	0.2000	0	69.6	40.2	132	33.7	26.9	R
Pentachlorophenol	0.099	0.0010	0.2000	0	49.4	8.72	103	24.1	59.2	
Pyridine	0.095	0.0010	0.2000	0	47.5	9.36	106	35.2	48	
2,4,5-Trichlorophenol	0.12	0.0010	0.2000	0	58.8	16.5	123	20.4	70.8	
2,4,6-Trichlorophenol	0.12	0.0010	0.2000	0	60.3	11.3	117	21.9	78	
Cresols, Total	0.44	0.0010	0.6000	0	72.8	23.2	151	48.7	30.8	R
Surr: 2-Fluorophenol	0.089		0.2000		44.6	15	102	0	0	
Surr: Phenol-d5	0.070		0.2000		35.1	15	87.7	0	0	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		65.1	39.9	111	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID **1810a40-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **KAFB-106S5-2-idw**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.067		0.1000		67.5	35.1	107	0	0	
Surr: 2-Fluorobiphenyl	0.062		0.1000		62.3	36.7	100	0	0	
Surr: 4-Terphenyl-d14	0.082		0.1000		81.5	42.6	129	0	0	

Sample ID **lcs-41184**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836263** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	61.6	47.8	99.2			
3+4-Methylphenol	0.33	0.0010	0.4000	0	81.8	41.5	118			
2,4-Dinitrotoluene	0.13	0.0010	0.2000	0	65.7	44.4	81			
Hexachlorobenzene	0.15	0.0010	0.2000	0	75.5	49.5	91.6			
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.2	38.6	93			
Hexachloroethane	0.093	0.0010	0.2000	0	46.5	39.4	79.9			
Nitrobenzene	0.13	0.0010	0.2000	0	67.3	47.4	96.2			
Pentachlorophenol	0.10	0.0010	0.2000	0	52.3	39.4	79.9			
Pyridine	0.042	0.0010	0.2000	0	20.9	15	79.9			
2,4,5-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	118			
2,4,6-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	101			
Cresols, Total	0.45	0.0010	0.6000	0	75.1	44.1	111			
Surr: 2-Fluorophenol	0.080		0.2000		40.2	15	102			
Surr: Phenol-d5	0.067		0.2000		33.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.9	39.9	111			
Surr: Nitrobenzene-d5	0.068		0.1000		68.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.063		0.1000		63.4	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		77.3	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.060		0.2000		29.8	15	102			
Surr: Phenol-d5	0.047		0.2000		23.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.079		0.2000		39.4	39.9	111			S
Surr: Nitrobenzene-d5	0.044		0.1000		44.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.042		0.1000		41.5	36.7	100			
Surr: 4-Terphenyl-d14	0.063		0.1000		62.7	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55261**
Prep Date: **10/25/2018**	Analysis Date: **10/30/2018**	SeqNo: **1838305** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.4	15	102			
Surr: Phenol-d5	0.046		0.2000		23.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.087		0.2000		43.4	39.9	111			
Surr: Nitrobenzene-d5	0.046		0.1000		46.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.041		0.1000		40.8	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.0	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41196**	SampType: **MBLK**			TestCode: **MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835538**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41196**	SampType: **LCS**			TestCode: **MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835539**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.1	80	120			

Sample ID	**1810A40-001AMS**	SampType: **MS**			TestCode: **MERCURY, TCLP**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835541**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.5	75	125			

Sample ID	**1810A40-001AMSD**	SampType: **MSD**			TestCode: **MERCURY, TCLP**					
Client ID:	**KAFB-106S5-2-idw**	Batch ID: **41196**			RunNo: **55202**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835542**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810A40**

31-Oct-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41160**	SampType: **MBLK**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835465**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41160**	SampType: **LCS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835467**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	96.8	80	120			
Cadmium	ND	1.0	0.5000	0	98.8	80	120			
Chromium	ND	5.0	0.5000	0	95.5	80	120			
Lead	ND	5.0	0.5000	0	92.8	80	120			
Selenium	ND	1.0	0.5000	0	99.6	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Sample ID	**MB-41160**	SampType: **MBLK**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835504**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID	**LCS-41160**	SampType: **LCS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41160**			RunNo: **55199**					
Prep Date:	**10/23/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835506**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	94.0	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1810A40** RcptNo: **1**

Received By: **Jazzmine Burkhead** **10/18/2018 2:20:00 PM**

Completed By: **Ashley Gallegos** **10/18/2018 3:00:44 PM**

Reviewed By: 10/18/18 labeled by: ENM 10/18/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

ENM 10/18/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.6	Good	Not Present			

EA

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

COC

[1] COC NUMBER: KAFB-106S5-2

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[9] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~61599DM01.1017.3~~ PF 62735DM02. 1017.04	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[25] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use
1	KAFB-106S5-2-1810A40	Roll off 9.5-2	Soil	10-15-18	1025	IV	7	3	X	X	X	X	X	X		PF		composite		
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

8 of 1530

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering

Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:

FedEx Number:

NA Hand delivered to Hall Lab

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	10-18-18	1420	Printed Name and Signature: Jazmine Burkhead Temp - 3.9-1.0 (IR) = 2.9	10/18/18	14:2
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: 1 - Original - Laboratory (To be returned with Analytical Report) 2 - Copy 3 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

13 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 4 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104052, 104054,** and **20B-27**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.13 10:51:18 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 4, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S5-3 (Bin ID #104054)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S5-3 (Bin ID #104054) contains approximately 2 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S5, at this location. Well KAFB-106S5 is located in Bullhead Park South of Gibson Blvd SE. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810E87) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810E87

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE	KAFB BFF			
			FIELD SAMPLE ID	KAFB-106S5-3-idw			
			SAMPLE DATE	30-Oct-18			
			SAMPLE PURPOSE	Waste Characterization			
			ROLL-OFF NO.	S5-3			
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	30.2	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	**9.00**	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	J	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	J	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.4
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	47
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	30	--	4.7
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	0.20	--	0.047
		TOLUENE	mg/kg	50[e]	0.22	--	0.047
		XYLENES, TOTAL	mg/kg	50[e]	0.53	--	0.094

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity Characteristic Leaching Procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 13, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810E87

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/30/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-3-idw
Project: Kirtland AFB BFF
Collection Date: 10/30/2018 1:05:00 PM
Lab ID: 1810E87-001 **Matrix:** SOIL **Received Date:** 10/30/2018 3:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	11/6/2018 4:06:44 PM	41359
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	11/7/2018 12:14:14 PM	41394
Barium	ND	100		mg/L	1	11/7/2018 12:14:14 PM	41394
Cadmium	ND	1.0		mg/L	1	11/7/2018 12:14:14 PM	41394
Chromium	ND	5.0		mg/L	1	11/7/2018 12:14:14 PM	41394
Lead	ND	5.0		mg/L	1	11/7/2018 12:14:14 PM	41394
Selenium	ND	1.0		mg/L	1	11/7/2018 12:14:14 PM	41394
Silver	ND	5.0		mg/L	1	11/7/2018 12:14:14 PM	41394
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **TOM**	
Chlordane	ND	0.030		mg/L	1	11/6/2018 10:55:57 AM	41327
Endrin	ND	0.020		mg/L	1	11/6/2018 10:55:57 AM	41327
gamma-BHC (Lindane)	ND	0.40		mg/L	1	11/6/2018 10:55:57 AM	41327
Heptachlor	ND	0.0080		mg/L	1	11/6/2018 10:55:57 AM	41327
Heptachlor epoxide	ND	0.0080		mg/L	1	11/6/2018 10:55:57 AM	41327
Methoxychlor	ND	10		mg/L	1	11/6/2018 10:55:57 AM	41327
Toxaphene	ND	0.50		mg/L	1	11/6/2018 10:55:57 AM	41327
Surr: Decachlorobiphenyl	67.3	58.3-109		%Rec	1	11/6/2018 10:55:57 AM	41327
Surr: Tetrachloro-m-xylene	51.5	40.1-101		%Rec	1	11/6/2018 10:55:57 AM	41327
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	11/6/2018 4:32:34 PM	41368
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/6/2018 4:32:34 PM	41368
Surr: DNOP	101	50.6-138		%Rec	1	11/6/2018 4:32:34 PM	41368
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	30	4.7		mg/Kg	1	11/1/2018 7:37:08 PM	41298
Surr: BFB	217	73.8-119	S	%Rec	1	11/1/2018 7:37:08 PM	41298
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	11/5/2018 5:06:45 PM	41326
3+4-Methylphenol	ND	200		mg/L	1	11/5/2018 5:06:45 PM	41326
2,4-Dinitrotoluene	ND	0.13		mg/L	1	11/5/2018 5:06:45 PM	41326
Hexachlorobenzene	ND	0.13		mg/L	1	11/5/2018 5:06:45 PM	41326
Hexachlorobutadiene	ND	0.50		mg/L	1	11/5/2018 5:06:45 PM	41326
Hexachloroethane	ND	3.0		mg/L	1	11/5/2018 5:06:45 PM	41326
Nitrobenzene	ND	2.0		mg/L	1	11/5/2018 5:06:45 PM	41326
Pentachlorophenol	ND	100		mg/L	1	11/5/2018 5:06:45 PM	41326
Pyridine	ND	5.0		mg/L	1	11/5/2018 5:06:45 PM	41326
2,4,5-Trichlorophenol	ND	400		mg/L	1	11/5/2018 5:06:45 PM	41326

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-3-idw
Project: Kirtland AFB BFF
Collection Date: 10/30/2018 1:05:00 PM
Lab ID: 1810E87-001 **Matrix:** SOIL **Received Date:** 10/30/2018 3:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	11/5/2018 5:06:45 PM	41326
Cresols, Total	ND	200		mg/L	1	11/5/2018 5:06:45 PM	41326
Surr: 2-Fluorophenol	57.2	15-102		%Rec	1	11/5/2018 5:06:45 PM	41326
Surr: Phenol-d5	41.7	15-87.7		%Rec	1	11/5/2018 5:06:45 PM	41326
Surr: 2,4,6-Tribromophenol	73.5	39.9-111		%Rec	1	11/5/2018 5:06:45 PM	41326
Surr: Nitrobenzene-d5	82.0	35.1-107		%Rec	1	11/5/2018 5:06:45 PM	41326
Surr: 2-Fluorobiphenyl	72.2	36.7-100		%Rec	1	11/5/2018 5:06:45 PM	41326
Surr: 4-Terphenyl-d14	58.1	42.6-129		%Rec	1	11/5/2018 5:06:45 PM	41326
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	11/1/2018 12:20:15 PM	41298
Toluene	0.22	0.047		mg/Kg	1	11/1/2018 12:20:15 PM	41298
Ethylbenzene	0.20	0.047		mg/Kg	1	11/1/2018 12:20:15 PM	41298
Xylenes, Total	0.53	0.094		mg/Kg	1	11/1/2018 12:20:15 PM	41298
Surr: Dibromofluoromethane	103	70-130		%Rec	1	11/1/2018 12:20:15 PM	41298
Surr: 1,2-Dichloroethane-d4	111	70-130		%Rec	1	11/1/2018 12:20:15 PM	41298
Surr: Toluene-d8	99.6	70-130		%Rec	1	11/1/2018 12:20:15 PM	41298
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	11/1/2018 12:20:15 PM	41298
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	11/1/2018 5:47:36 PM	41293
2-Butanone	ND	200		mg/L	1	11/1/2018 5:47:36 PM	41293
Carbon Tetrachloride	ND	0.50		mg/L	1	11/1/2018 5:47:36 PM	41293
Chlorobenzene	ND	100		mg/L	1	11/1/2018 5:47:36 PM	41293
Chloroform	ND	6.0		mg/L	1	11/1/2018 5:47:36 PM	41293
1,4-Dichlorobenzene	ND	7.5		mg/L	1	11/1/2018 5:47:36 PM	41293
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	11/1/2018 5:47:36 PM	41293
1,1-Dichloroethene	ND	0.70		mg/L	1	11/1/2018 5:47:36 PM	41293
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	11/1/2018 5:47:36 PM	41293
Trichloroethene (TCE)	ND	0.50		mg/L	1	11/1/2018 5:47:36 PM	41293
Vinyl chloride	ND	0.20		mg/L	1	11/1/2018 5:47:36 PM	41293
Surr: 1,2-Dichloroethane-d4	85.7	70-130		%Rec	1	11/1/2018 5:47:36 PM	41293
Surr: 4-Bromofluorobenzene	105	57.3-148		%Rec	1	11/1/2018 5:47:36 PM	41293
Surr: Dibromofluoromethane	88.8	70-130		%Rec	1	11/1/2018 5:47:36 PM	41293
Surr: Toluene-d8	92.9	70-130		%Rec	1	11/1/2018 5:47:36 PM	41293

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		11/6/2018 11:23:59 AM	WG1192029
Fluid	1		11/6/2018 11:23:59 AM	WG1192029
Initial pH	9.30		11/6/2018 11:23:59 AM	WG1192029
Final pH	5.08		11/6/2018 11:23:59 AM	WG1192029

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	11/03/2018 13:47	WG1190235

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	30.2		25.0	1	11/08/2018 14:34	WG1192861

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.00	T8	1	11/06/2018 11:28	WG1191861

Sample Narrative:

L1040147-01 WG1191861: 9 at 17.7C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	11/03/2018 13:00	WG1190220

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND	J3 J6	0.00200	1	1	11/12/2018 17:58	WG1194141
2,4-D	ND	J3 J6	0.00200	10	1	11/12/2018 17:58	WG1194141
(S) 2,4-Dichlorophenyl Acetic Acid	*69.4*		*14.0-158*			*11/12/2018 17:58*	WG1194141

Method Blank (MB)

(MB) R3356605-1 11/03/18 13:15

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1039759-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1039759-02 11/03/18 13:20 • (DUP) R3356605-3 11/03/18 13:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		mg/kg		%		%
Reactive Cyanide		0.0798	1	200	J P1	20

L1039759-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1039759-12 11/03/18 13:36 • (DUP) R3356605-6 11/03/18 13:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		mg/kg		%		%
Reactive Cyanide		0.0418	1	200	J P1	20

Laboratory Control Sample (LCS)

(LCS) R3356605-2 11/03/18 13:16

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.59	104	50.0-150	

L1039759-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1039759-03 11/03/18 13:23 • (MS) R3356605-4 11/03/18 13:24 • (MSD) R3356605-5 11/03/18 13:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg		mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	2.00		1.48	1.44	84.1	81.4	1	75.0-125			3.01	20

L1039795-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1039795-01 11/03/18 13:40 • (MS) R3356605-7 11/03/18 13:41 • (MSD) R3356605-8 11/03/18 13:42

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg		mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67		1.45	1.31	86.8	78.6	1	75.0-125			9.84	20

Method Blank (MB)

(MB) R3358204-1 11/08/18 14:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1040073-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1040073-01 11/08/18 14:34 • (DUP) R3358204-3 11/08/18 14:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

L1041203-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1041203-01 11/08/18 14:34 • (DUP) R3358204-4 11/08/18 14:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000	J	20

Laboratory Control Sample (LCS)

(LCS) R3358204-2 11/08/18 14:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3357269-1 11/06/18 11:28

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:

LCS: 9.99 at 17.5C

L1039306-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1039306-03 11/03/18 13:00 • (DUP) R3356807-2 11/03/18 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	155	156	1	0.645		10

L1039800-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1039800-03 11/03/18 13:00 • (DUP) R3356807-3 11/03/18 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	96.6	95.6	1	1.04		10

Laboratory Control Sample (LCS)

(LCS) R3356807-1 11/03/18 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.6	102	96.0-104	

Method Blank (MB)

(MB) R3359174-1 11/12/18 16:47

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*33.8*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3359174-4 11/12/18 20:05

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
2,4-D	0.0500	0.0258	51.6	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0272	54.4	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*44.2*	*14.0-158*	

L1040147-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1040147-01 11/12/18 17:58 • (MS) R3359174-2 11/12/18 18:12 • (MSD) R3359174-3 11/12/18 18:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0157	0.0120	31.4	24.0	1	50.0-120	J6	J3 J6	26.7	20
2,4,5-TP (Silvex)	0.0500	ND	0.0165	0.0124	33.0	24.8	1	50.0-125	J6	J3 J6	28.4	20
(S) 2,4-Dichlorophenyl Acetic Acid					*27.8*	*22.2*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**LCS-41368**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41368**		RunNo:	**55425**				
Prep Date:	**11/5/2018**	Analysis Date:	**11/6/2018**		SeqNo:	**1844297**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	10	50.00	0	95.6	70	130			
Surr: DNOP	4.2		5.000		84.1	50.6	138			

Sample ID	**MB-41368**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41368**		RunNo:	**55425**				
Prep Date:	**11/5/2018**	Analysis Date:	**11/6/2018**		SeqNo:	**1844298**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		105	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41298**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41298**		RunNo:	**55334**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/1/2018**		SeqNo:	**1841193**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	910		1000		91.2	73.8	119			

Sample ID	**LCS-41298**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41298**		RunNo:	**55334**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/1/2018**		SeqNo:	**1841194**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	106	80.1	123			
Surr: BFB	1000		1000		101	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41327**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		61.8	58.3	109			
Surr: Tetrachloro-m-xylene	0.0012		0.002500		49.9	40.1	101			

Sample ID **LCS-41327**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00040	0.00010	0.0005000	0	80.9	49.5	127			
gamma-BHC (Lindane)	0.00037	0.00010	0.0005000	0	74.5	49.9	124			
Heptachlor	0.00031	0.00010	0.0005000	0	61.9	41	122			
Heptachlor epoxide	0.00040	0.00010	0.0005000	0	79.3	52.2	121			
Methoxychlor	0.00039	0.00010	0.0005000	0	78.5	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		70.4	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.6	40.1	101			

Sample ID **LCSD-41327**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844413** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00043	0.00010	0.0005000	0	85.3	49.5	127	5.29	20	
gamma-BHC (Lindane)	0.00041	0.00010	0.0005000	0	82.5	49.9	124	10.2	20	
Heptachlor	0.00036	0.00010	0.0005000	0	71.8	41	122	14.8	20	
Heptachlor epoxide	0.00042	0.00010	0.0005000	0	84.8	52.2	121	6.72	20	
Methoxychlor	0.00042	0.00010	0.0005000	0	83.8	40.2	134	6.50	20	
Surr: Decachlorobiphenyl	0.0018		0.002500		73.7	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0019		0.002500		76.4	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering
Project: Kirtland AFB BFF

Sample ID	**mb-41274**	SampType:	**MBLK**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**PBS**	Batch ID:	**41274**		RunNo:	**55343**				
Prep Date:	**10/30/2018**	Analysis Date:	**11/1/2018**		SeqNo:	**1841277**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.53		0.5000		106	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		101	70	130			
Surr: Toluene-d8	0.50		0.5000		99.4	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.4	70	130			

Sample ID	**lcs-41274**	SampType:	**LCS**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**LCSS**	Batch ID:	**41274**		RunNo:	**55343**				
Prep Date:	**10/30/2018**	Analysis Date:	**11/1/2018**		SeqNo:	**1841278**	Units:	**%Rec**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.53		0.5000		107	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		103	70	130			
Surr: Toluene-d8	0.52		0.5000		103	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.3	70	130			

Sample ID	**mb-41298**	SampType:	**MBLK**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**PBS**	Batch ID:	**41298**		RunNo:	**55343**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/2/2018**		SeqNo:	**1841282**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.52		0.5000		105	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.51		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.8	70	130			

Sample ID	**lcs-41298**	SampType:	**LCS**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**LCSS**	Batch ID:	**41298**		RunNo:	**55343**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/2/2018**		SeqNo:	**1841283**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	102	70	130			
Toluene	0.99	0.050	1.000	0	99.4	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.50		0.5000		99.9	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**1810e87-001ams**	SampType:	**MS**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41298**		RunNo:	**55343**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/2/2018**		SeqNo:	**1841285**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	0.9970	0.01499	107	68.9	131			
Toluene	1.3	0.050	0.9970	0.2243	105	64.3	137			
Surr: Dibromofluoromethane	0.52		0.4985		104	70	130			
Surr: 1,2-Dichloroethane-d4	0.52		0.4985		105	70	130			
Surr: Toluene-d8	0.49		0.4985		98.4	70	130			
Surr: 4-Bromofluorobenzene	0.53		0.4985		106	70	130			

Sample ID	**1810e87-001amsd**	SampType:	**MSD**		TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41298**		RunNo:	**55343**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/2/2018**		SeqNo:	**1841286**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.024	0.9671	0.01499	108	68.9	131	2.63	20	
Toluene	1.2	0.048	0.9671	0.2243	98.6	64.3	137	7.73	20	
Surr: Dibromofluoromethane	0.51		0.4836		105	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.52		0.4836		108	70	130	0	0	
Surr: Toluene-d8	0.49		0.4836		101	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.49		0.4836		102	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41293**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41293**	RunNo: **55351**
Prep Date: **10/31/2018**	Analysis Date: **11/1/2018**	SeqNo: **1842244** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.30	0.4000	0	102	70	130			
Chlorobenzene	0.41	0.30	0.4000	0	103	70	130			
1,1-Dichloroethene	0.44	0.30	0.4000	0	111	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		86.5	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.5	70	130			
Surr: Toluene-d8	0.19		0.2000		94.1	70	130			

Sample ID **mb-41293**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41293**	RunNo: **55351**
Prep Date: **10/31/2018**	Analysis Date: **11/1/2018**	SeqNo: **1842245** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.6	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.9	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		92.9	70	130			
Surr: Toluene-d8	0.18		0.2000		91.6	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41326**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41326**	RunNo: **55409**
Prep Date: **11/2/2018**	Analysis Date: **11/5/2018**	SeqNo: **1843734** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.074	0.0010	0.1000	0	74.5	47.8	99.2			
3+4-Methylphenol	0.15	0.0010	0.2000	0	73.8	41.5	118			
2,4-Dinitrotoluene	0.065	0.0010	0.1000	0	64.6	44.4	81			
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.4	49.5	91.6			
Hexachlorobutadiene	0.053	0.0010	0.1000	0	53.1	38.6	93			
Hexachloroethane	0.050	0.0010	0.1000	0	50.0	39.4	79.9			
Nitrobenzene	0.082	0.0010	0.1000	0	81.8	47.4	96.2			
Pentachlorophenol	0.042	0.0010	0.1000	0	42.2	39.4	79.9			
Pyridine	0.044	0.0010	0.1000	0	44.3	15	79.9			
2,4,5-Trichlorophenol	0.066	0.0010	0.1000	0	66.1	47.4	118			
2,4,6-Trichlorophenol	0.063	0.0010	0.1000	0	62.9	47.4	101			
Cresols, Total	0.22	0.0010	0.3000	0	74.0	44.1	111			
Surr: 2-Fluorophenol	0.12		0.2000		59.1	15	102			
Surr: Phenol-d5	0.10		0.2000		50.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		68.0	39.9	111			
Surr: Nitrobenzene-d5	0.077		0.1000		77.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.067		0.1000		66.5	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.1	42.6	129			

Sample ID **lcsd-41326**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **41326**	RunNo: **55409**
Prep Date: **11/2/2018**	Analysis Date: **11/5/2018**	SeqNo: **1843735** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.071	0.0010	0.1000	0	71.2	47.8	99.2	4.50	20	
3+4-Methylphenol	0.15	0.0010	0.2000	0	73.9	41.5	118	0.135	20	
2,4-Dinitrotoluene	0.059	0.0010	0.1000	0	58.8	44.4	81	9.50	20	
Hexachlorobenzene	0.071	0.0010	0.1000	0	71.4	49.5	91.6	6.79	20	
Hexachlorobutadiene	0.063	0.0010	0.1000	0	63.2	38.6	93	17.3	20	
Hexachloroethane	0.058	0.0010	0.1000	0	58.2	39.4	79.9	15.2	20	
Nitrobenzene	0.081	0.0010	0.1000	0	81.0	47.4	96.2	0.983	20	
Pentachlorophenol	0.042	0.0010	0.1000	0	41.9	39.4	79.9	0.714	20	
Pyridine	0.056	0.0010	0.1000	0	56.2	15	79.9	23.8	20	R
2,4,5-Trichlorophenol	0.060	0.0010	0.1000	0	60.4	47.4	118	8.89	20	
2,4,6-Trichlorophenol	0.067	0.0010	0.1000	0	66.7	47.4	101	5.86	20	
Cresols, Total	0.22	0.0010	0.3000	0	73.0	44.1	111	1.40	20	
Surr: 2-Fluorophenol	0.14		0.2000		68.0	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		57.0	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.4	39.9	111	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**lcsd-41326**	SampType:	**LCSD**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**LCSS02**	Batch ID:	**41326**		RunNo:	**55409**				
Prep Date:	**11/2/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843735**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.075		0.1000		74.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.065		0.1000		65.2	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.056		0.1000		55.6	42.6	129	0	20	

Sample ID	**mb-41326**	SampType:	**MBLK**		TestCode:	**EPA Method 8270C TCLP**				
Client ID:	**PBS**	Batch ID:	**41326**		RunNo:	**55409**				
Prep Date:	**11/2/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843736**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.13		0.2000		63.7	15	102			
Surr: Phenol-d5	0.095		0.2000		47.4	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		74.9	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		80.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.072		0.1000		72.0	36.7	100			
Surr: 4-Terphenyl-d14	0.058		0.1000		58.1	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41359**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41359**	RunNo:	**55440**					
Prep Date:	**11/5/2018**	Analysis Date:	**11/6/2018**	SeqNo:	**1844905**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41359**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41359**	RunNo:	**55440**					
Prep Date:	**11/5/2018**	Analysis Date:	**11/6/2018**	SeqNo:	**1844906**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	95.6	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E87**

13-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41394**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**PBW**	Batch ID:	**41394**	RunNo:	**55462**
Prep Date:	**11/6/2018**	Analysis Date:	**11/7/2018**	SeqNo:	**1846509** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41394**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**LCSW**	Batch ID:	**41394**	RunNo:	**55462**
Prep Date:	**11/6/2018**	Analysis Date:	**11/7/2018**	SeqNo:	**1846510** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	100	80	120			
Barium	ND	100	0.5000	0	97.6	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	97.9	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	97.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1810E87** RcptNo: **1**

Received By: **Jazzmine Burkhead** **10/30/2018 3:45:00 PM**

Completed By: **Ashley Gallegos** **10/30/2018 4:31:31 PM**

Reviewed By: ENM 10/31/18 labeled by: JO 10/31/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

JO 10/31/18

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person	
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.1	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106S5-3-id

[3] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599BM01.1017.3FF~~ 627350M02 1017.08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[4] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9018~~ PF 505 238 4910	505 345 3975 Fax 505 345-4107	Earl Morse / emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB I (for lab's u
1	KAFB-106S5-3-idw	RoM- aff S5-3	Soil	10/30/18	1305	IV	7	3	X	X	X	X	X	X			PF	composite	181DE87 -001	
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:

FedEx Number:
N/A Hand delivered to Hall Lab

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	10-30-2018	1545	Printed Name and Signature: Jazemine Burkhead Temp= 4.1	10/30/18	15:4
Printed Name and Signature:			Printed Name and Signature: Client		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: 1 - Original - Laboratory (To be returned with Analytical Report) 1 - Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

13 February 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2), dated: 12 February 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S7

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S7, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open-top roll-offs labeled **22023** and **20B004**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586 Digitally signed by WHEELOCK.KATRINA.E.1402749586 Date: 2019.02.13 11:03:04 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

February 12, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-106S7-1 (Bin ID #20B004)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S7-1 (Bin ID #20B004) contains approximately 12 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S7, off of Kirtland AFB on City of Albuquerque property at Bullhead Park. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1901826) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1901826

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S7-1-idw		
			SAMPLE DATE		22-Jan-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S7-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.79	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.3
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	46
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 08, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1901826

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/22/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-1-idw
Project: Kirtland AFB BFF
Collection Date: 1/22/2019 11:30:00 AM
Lab ID: 1901826-001 **Matrix:**
Received Date: 1/22/2019 12:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	1/28/2019 7:14:52 PM	42847
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	1/25/2019 1:00:16 PM	42808
Barium	ND	100		mg/L	1	1/25/2019 1:00:16 PM	42808
Cadmium	ND	1.0		mg/L	1	1/25/2019 1:00:16 PM	42808
Chromium	ND	5.0		mg/L	1	1/25/2019 1:00:16 PM	42808
Lead	ND	5.0		mg/L	1	1/25/2019 1:00:16 PM	42808
Selenium	ND	1.0		mg/L	1	1/25/2019 1:00:16 PM	42808
Silver	ND	5.0		mg/L	1	1/25/2019 1:00:16 PM	42808
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	1/30/2019 5:07:45 PM	42831
Endrin	ND	0.020		mg/L	1	1/30/2019 5:07:45 PM	42831
gamma-BHC (Lindane)	ND	0.40		mg/L	1	1/30/2019 5:07:45 PM	42831
Heptachlor	ND	0.0080		mg/L	1	1/30/2019 5:07:45 PM	42831
Heptachlor epoxide	ND	0.0080		mg/L	1	1/30/2019 5:07:45 PM	42831
Methoxychlor	ND	10		mg/L	1	1/30/2019 5:07:45 PM	42831
Toxaphene	ND	0.50		mg/L	1	1/30/2019 5:07:45 PM	42831
Surr: Decachlorobiphenyl	79.1	42.6-98.5		%Rec	1	1/30/2019 5:07:45 PM	42831
Surr: Tetrachloro-m-xylene	77.7	28.9-96.7		%Rec	1	1/30/2019 5:07:45 PM	42831
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	1/29/2019 12:22:47 PM	42829
2,4-D	ND	10		mg/L	1	1/29/2019 12:22:47 PM	42829
Surr: 2,4-Dichlorophenylacetic acid	118	70-130		%Rec	1	1/29/2019 12:22:47 PM	42829
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	1/25/2019 7:42:25 PM	42785
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	1/25/2019 7:42:25 PM	42785
Surr: DNOP	102	50.6-138		%Rec	1	1/25/2019 7:42:25 PM	42785
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	1/23/2019 4:43:59 PM	42749
Surr: BFB	109	73.8-119		%Rec	1	1/23/2019 4:43:59 PM	42749
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/6/2019 6:13:17 PM	42882
3+4-Methylphenol	ND	200		mg/L	1	2/6/2019 6:13:17 PM	42882
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/6/2019 6:13:17 PM	42882
Hexachlorobenzene	ND	0.13		mg/L	1	2/6/2019 6:13:17 PM	42882
Hexachlorobutadiene	ND	0.50		mg/L	1	2/6/2019 6:13:17 PM	42882

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-1-idw
Project: Kirtland AFB BFF
Collection Date: 1/22/2019 11:30:00 AM
Lab ID: 1901826-001 **Matrix:**
Received Date: 1/22/2019 12:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/6/2019 6:13:17 PM	42882
Nitrobenzene	ND	2.0		mg/L	1	2/6/2019 6:13:17 PM	42882
Pentachlorophenol	ND	100		mg/L	1	2/6/2019 6:13:17 PM	42882
Pyridine	ND	5.0		mg/L	1	2/6/2019 6:13:17 PM	42882
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/6/2019 6:13:17 PM	42882
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/6/2019 6:13:17 PM	42882
Cresols, Total	ND	200		mg/L	1	2/6/2019 6:13:17 PM	42882
Surr: 2-Fluorophenol	40.2	15-102		%Rec	1	2/6/2019 6:13:17 PM	42882
Surr: Phenol-d5	32.4	15-87.7		%Rec	1	2/6/2019 6:13:17 PM	42882
Surr: 2,4,6-Tribromophenol	59.4	39.9-111		%Rec	1	2/6/2019 6:13:17 PM	42882
Surr: Nitrobenzene-d5	60.5	35.1-107		%Rec	1	2/6/2019 6:13:17 PM	42882
Surr: 2-Fluorobiphenyl	59.8	36.7-100		%Rec	1	2/6/2019 6:13:17 PM	42882
Surr: 4-Terphenyl-d14	51.2	42.6-129		%Rec	1	2/6/2019 6:13:17 PM	42882
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		µg/L	1	1/24/2019 12:20:56 PM	42749
Toluene	ND	0.050		µg/L	1	1/24/2019 12:20:56 PM	42749
Ethylbenzene	ND	0.050		µg/L	1	1/24/2019 12:20:56 PM	42749
Xylenes, Total	ND	0.10		µg/L	1	1/24/2019 12:20:56 PM	42749
Surr: 1,2-Dichloroethane-d4	90.4	70-130		%Rec	1	1/24/2019 12:20:56 PM	42749
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	1/24/2019 12:20:56 PM	42749
Surr: Dibromofluoromethane	87.9	70-130		%Rec	1	1/24/2019 12:20:56 PM	42749
Surr: Toluene-d8	110	70-130		%Rec	1	1/24/2019 12:20:56 PM	42749
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	1/24/2019 5:33:09 PM	42765
2-Butanone	ND	200		mg/L	1	1/24/2019 5:33:09 PM	42765
Carbon Tetrachloride	ND	0.50		mg/L	1	1/24/2019 5:33:09 PM	42765
Chlorobenzene	ND	100		mg/L	1	1/24/2019 5:33:09 PM	42765
Chloroform	ND	6.0		mg/L	1	1/24/2019 5:33:09 PM	42765
1,4-Dichlorobenzene	ND	7.5		mg/L	1	1/24/2019 5:33:09 PM	42765
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	1/24/2019 5:33:09 PM	42765
1,1-Dichloroethene	ND	0.70		mg/L	1	1/24/2019 5:33:09 PM	42765
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	1/24/2019 5:33:09 PM	42765
Trichloroethene (TCE)	ND	0.50		mg/L	1	1/24/2019 5:33:09 PM	42765
Vinyl chloride	ND	0.20		mg/L	1	1/24/2019 5:33:09 PM	42765
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	1/24/2019 5:33:09 PM	42765
Surr: 4-Bromofluorobenzene	107	57.3-148		%Rec	1	1/24/2019 5:33:09 PM	42765
Surr: Dibromofluoromethane	109	70-130		%Rec	1	1/24/2019 5:33:09 PM	42765
Surr: Toluene-d8	101	70-130		%Rec	1	1/24/2019 5:33:09 PM	42765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
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PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	01/28/2019 17:22	WG1228732

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	01/27/2019 18:00	WG1228733

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.79	T8	1	01/25/2019 10:03	WG1228045

Sample Narrative:
L1063430-01 WG1228045: 8.79 at 20.7C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	01/26/2019 13:52	WG1226815

WG1228732

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1063430-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3379239-1 01/28/19 16:54

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

Laboratory Control Sample (LCS)

(LCS) R3379239-2 01/28/19 16:55

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.75	110	50.0-150	

L1063430-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1063430-01 01/28/19 17:22 • (MS) R3379239-5 01/28/19 17:23 • (MSD) R3379239-6 01/28/19 17:24

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.59	1.63	95.5	97.9	1	75.0-125			2.47	20

L1063444-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1063444-01 01/28/19 17:33 • (MS) R3379239-7 01/28/19 17:34 • (MSD) R3379239-8 01/28/19 17:35

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.62	1.59	97.3	95.2	1	75.0-125			2.18	20

WG1228733

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1063430-01

Method Blank (MB)

(MB) R3378969-1 01/27/19 18:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1064244-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1064244-02 01/27/19 18:00 • (DUP) R3378969-4 01/27/19 18:00

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	U	ND	1	28.6	J PI	20

Laboratory Control Sample (LCS)

(LCS) R3378969-2 01/27/19 18:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	85.0	85.0	70.0-130	

WG1228045

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1063430-01

L1063430-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1063430-01 01/25/19 10:03 • (DUP) R3378610-2 01/25/19 10:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.79	8.78	1	0.114		1

Sample Narrative:

OS: 8.79 at 20.7C

DUP: 8.78 at 19.8C

Laboratory Control Sample (LCS)

(LCS) R3378610-1 01/25/19 10:03

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 18.3C

WG1228815

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1063430-01

ONE LAB. NATIONWIDE.

L1063430-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1063430-01 01/26/19 13:52 • (DUP) R3378888-2 01/26/19 13:52

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3378888-1 01/26/19 13:52

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.4	101	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42785**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**42785**		RunNo:	**57248**				
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**		SeqNo:	**1915016**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	100	63.9	124			
Surr: DNOP	4.0		5.000		80.6	50.6	138			

Sample ID	**MB-42785**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**42785**		RunNo:	**57248**				
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**		SeqNo:	**1915017**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	12		10.00		117	50.6	138			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42749**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42749**		RunNo:	**57204**				
Prep Date:	**1/22/2019**	Analysis Date:	**1/23/2019**		SeqNo:	**1913354**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		112	73.8	119			

Sample ID	**LCS-42749**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42749**		RunNo:	**57204**				
Prep Date:	**1/22/2019**	Analysis Date:	**1/23/2019**		SeqNo:	**1913355**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	110	80.1	123			
Surr: BFB	1200		1000		124	73.8	119			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42831**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42831**	RunNo: **57375**
Prep Date: **1/28/2019**	Analysis Date: **1/30/2019**	SeqNo: **1919885** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0016		0.002500		65.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		57.0	28.9	96.7			

Sample ID **LCS-42831**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42831**	RunNo: **57375**
Prep Date: **1/28/2019**	Analysis Date: **1/30/2019**	SeqNo: **1919886** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00048	0.00010	0.0005000	0	95.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	75.9	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.6	41	122			
Heptachlor epoxide	0.00041	0.00010	0.0005000	0	81.9	52.2	121			
Methoxychlor	0.00038	0.00010	0.0005000	0	75.7	40.2	134			
Surr: Decachlorobiphenyl	0.0019		0.002500		74.5	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.2	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42829**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **42829**	RunNo: **57334**
Prep Date: **1/28/2019**	Analysis Date: **1/29/2019**	SeqNo: **1918107** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130			

Sample ID **LCS-42829**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **42829**	RunNo: **57334**
Prep Date: **1/28/2019**	Analysis Date: **1/29/2019**	SeqNo: **1918108** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	110	70	130			
2,4-D	ND	10	0.07500	0	120	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.090		0.07500		120	70	130			

Sample ID **TOM 42829 IDOC-1**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **42829**	RunNo: **57343**
Prep Date: **1/28/2019**	Analysis Date: **1/29/2019**	SeqNo: **1918586** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	103	70	130			
2,4-D	ND	10	0.07500	0	112	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		114	70	130			

Sample ID **TOM 42829 IDOC-2**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **42829**	RunNo: **57343**
Prep Date: **1/28/2019**	Analysis Date: **1/29/2019**	SeqNo: **1918588** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	102	70	130			
2,4-D	ND	10	0.07500	0	110	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		104	70	130			

Sample ID **TOM 42829 IDOC-3**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **42829**	RunNo: **57343**
Prep Date: **1/28/2019**	Analysis Date: **1/29/2019**	SeqNo: **1918590** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	107	70	130			
2,4-D	ND	10	0.07500	0	115	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**TOM 42829 IDOC-4**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57343**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918591**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	103	70	130				
2,4-D	ND	10	0.07500	0	112	70	130				
Surr: 2,4-Dichlorophenylacetic aci	0.083		0.07500		110	70	130				

Sample ID	**MB-42829**	SampType:	**MBLK**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**PBW**	Batch ID:	**42829**		RunNo:	**57343**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918592**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0									
2,4-D	ND	10									
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130				

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42749**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **42749**	RunNo: **57208**
Prep Date: **1/22/2019**	Analysis Date: **1/23/2019**	SeqNo: **1913609** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		88.2	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.8	70	130			
Surr: Dibromofluoromethane	0.44		0.5000		88.4	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Sample ID **lcs-42749**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **42749**	RunNo: **57208**
Prep Date: **1/22/2019**	Analysis Date: **1/23/2019**	SeqNo: **1913610** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.025	1.000	0	88.9	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		87.7	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		103	70	130			
Surr: Dibromofluoromethane	0.44		0.5000		87.6	70	130			
Surr: Toluene-d8	0.52		0.5000		104	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**lcs-42765**	SampType:	**LCS**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**LCSS**	Batch ID:	**42765**		RunNo:	**57241**				
Prep Date:	**1/23/2019**	Analysis Date:	**1/24/2019**		SeqNo:	**1914651**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.41	0.30	0.4000	0	101	70	130			
1,1-Dichloroethene	0.42	0.30	0.4000	0	104	70	130			
Trichloroethene (TCE)	0.38	0.30	0.4000	0	95.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		107	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		111	70	130			
Surr: Toluene-d8	0.19		0.2000		97.1	70	130			

Sample ID	**mb-42765**	SampType:	**MBLK**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**PBS**	Batch ID:	**42765**		RunNo:	**57241**				
Prep Date:	**1/23/2019**	Analysis Date:	**1/24/2019**		SeqNo:	**1914652**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		105	57.3	148			
Surr: Dibromofluoromethane	0.23		0.2000		114	70	130			
Surr: Toluene-d8	0.20		0.2000		99.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42882**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS**	Batch ID: **42882**	RunNo: **57511**							
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924418**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.099	0.0010	0.1000	0	99.1	42.2	104			
3+4-Methylphenol	0.23	0.0010	0.2000	0	113	42.3	108			S
2,4-Dinitrotoluene	0.090	0.0010	0.1000	0	90.3	45.8	87.8			S
Hexachlorobenzene	0.11	0.0010	0.1000	0	106	54.5	104			S
Hexachlorobutadiene	0.087	0.0010	0.1000	0	87.5	35.2	95.8			
Hexachloroethane	0.081	0.0010	0.1000	0	80.7	32.3	91.8			
Nitrobenzene	0.10	0.0010	0.1000	0	102	53.1	98.9			S
Pentachlorophenol	0.086	0.0010	0.1000	0	86.1	30.3	104			
Pyridine	0.040	0.0010	0.1000	0	39.5	15	90			
2,4,5-Trichlorophenol	0.090	0.0010	0.1000	0	89.7	42.1	107			
2,4,6-Trichlorophenol	0.099	0.0010	0.1000	0	98.9	43.8	110			
Cresols, Total	0.32	0.0010	0.3000	0	108	44.1	111			
Surr: 2-Fluorophenol	0.17		0.2000		84.3	15	102			
Surr: Phenol-d5	0.13		0.2000		66.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.21		0.2000		107	39.9	111			
Surr: Nitrobenzene-d5	0.11		0.1000		109	35.1	107			S
Surr: 2-Fluorobiphenyl	0.10		0.1000		103	36.7	100			S
Surr: 4-Terphenyl-d14	0.079		0.1000		78.5	42.6	129			

Sample ID **lcs-42966**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS**	Batch ID: **42966**	RunNo: **57511**							
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924419**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.15		0.2000		73.7	15	102			
Surr: Phenol-d5	0.13		0.2000		65.0	15	87.7			
Surr: 2,4,6-Tribromophenol	0.17		0.2000		82.8	39.9	111			
Surr: Nitrobenzene-d5	0.095		0.1000		94.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.082		0.1000		82.3	36.7	100			
Surr: 4-Terphenyl-d14	0.061		0.1000		61.4	42.6	129			

Sample ID **lcsd-42882**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS02**	Batch ID: **42882**	RunNo: **57511**							
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924420**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.061	0.0010	0.1000	0	61.1	42.2	104	47.5	27.1	R
3+4-Methylphenol	0.12	0.0010	0.2000	0	59.8	42.3	108	61.3	29.1	R
2,4-Dinitrotoluene	0.048	0.0010	0.1000	0	48.0	45.8	87.8	61.2	30.6	R
Hexachlorobenzene	0.057	0.0010	0.1000	0	56.8	54.5	104	60.2	22.5	R

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcsd-42882**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **42882**	RunNo: **57511**
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924420** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachlorobutadiene	0.051	0.0010	0.1000	0	50.8	35.2	95.8	53.1	27.4	R
Hexachloroethane	0.050	0.0010	0.1000	0	50.1	32.3	91.8	46.8	28	R
Nitrobenzene	0.061	0.0010	0.1000	0	61.2	53.1	98.9	49.6	26.2	R
Pentachlorophenol	0.044	0.0010	0.1000	0	43.5	30.3	104	65.7	21.3	R
Pyridine	0.028	0.0010	0.1000	0	28.3	15	90	33.0	20	R
2,4,5-Trichlorophenol	0.051	0.0010	0.1000	0	51.0	42.1	107	55.1	29.3	R
2,4,6-Trichlorophenol	0.058	0.0010	0.1000	0	58.1	43.8	110	52.1	27.4	R
Cresols, Total	0.18	0.0010	0.3000	0	60.3	44.1	111	56.9	27.4	R
Surr: 2-Fluorophenol	0.098		0.2000		49.1	15	102	0	20	
Surr: Phenol-d5	0.083		0.2000		41.3	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.11		0.2000		56.5	39.9	111	0	20	
Surr: Nitrobenzene-d5	0.062		0.1000		61.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.058		0.1000		58.1	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.048		0.1000		48.0	42.6	129	0	20	

Sample ID **mb-42882**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42882**	RunNo: **57511**
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924421** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.6	15	102			
Surr: Phenol-d5	0.087		0.2000		43.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.080		0.2000		40.1	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		80.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.082		0.1000		82.1	36.7	100			
Surr: 4-Terphenyl-d14	0.068		0.1000		67.5	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42966**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42966**	RunNo: **57511**
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924422** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.11		0.2000		54.6	15	102			
Surr: Phenol-d5	0.091		0.2000		45.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		70.2	39.9	111			
Surr: Nitrobenzene-d5	0.077		0.1000		77.1	35.1	107			
Surr: 2-Fluorobiphenyl	0.070		0.1000		70.1	36.7	100			
Surr: 4-Terphenyl-d14	0.056		0.1000		55.8	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42847**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42847**	RunNo:	**57309**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/28/2019**	SeqNo:	**1917121**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-42847**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42847**	RunNo:	**57309**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/28/2019**	SeqNo:	**1917122**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901826**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42808**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**42808**	RunNo:	**57271**					
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**	SeqNo:	**1915492**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42808**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**42808**	RunNo:	**57271**					
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**	SeqNo:	**1915493**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	108	80	120			
Barium	ND	100	0.5000	0	96.8	80	120			
Cadmium	ND	1.0	0.5000	0	103	80	120			
Chromium	ND	5.0	0.5000	0	98.3	80	120			
Lead	ND	5.0	0.5000	0	99.1	80	120			
Selenium	ND	1.0	0.5000	0	111	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1901826 RcptNo: 1

Received By: Victoria Zellar 1/22/2019 12:55:00 PM Victoria Zellar

Completed By: Desiree Dominguez 1/22/2019 1:50:33 PM DD

Reviewed By: IO 1/22/19

LB: VVZ 1/22/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	VVZ 1/22/19
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.9	Good	Yes			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106S7-1-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62500DM01.1017.3~~ PF 627351M02 1017.08	Hall Environmental	Amanda Smith/ asmith@eacst.com
[5] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@enest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505 224 9013~~ 505 238 4410	Tel 505 345-3975 Fax 505 345-4107	Earl Morse/emorse@enest.com

[14] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[24] SAMPLE TYPE (see codes on SOP)	[25] COMMENTS/ SCREENING READINGS	[26] LAB ID (for lab's use)
1	KAFB-106S7-1-idw	Roll-off S7-1	Soil	1-22-19	1130	IV	7	3	X	X	X	X	X	X		PF		Composite	1901826	-001
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[27] SAMPLER(S) AND COMPANY: (please print)	[28] COURIER AND SHIPPING NUMBER:
Field Sampler/EA Engineering Pete Ferrari	FedEx Number: N/A Hand delivered to Hall lab

[29] RELINQUISHED BY	DATE	TIME	[30] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari Peter Ferrari	1-22-19	1255	Printed Name and Signature: Victoria Mellon Temp: -3.6 NOT FROZEN	1/22/19	1255
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

13 February 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2), dated: 12 February 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S7

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S7, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open-top roll-offs labeled **22023** and **20B004**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586 Digitally signed by WHEELOCK.KATRINA.E.1402749586 Date: 2019.02.13 11:03:04 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

February 12, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-106S7-2 (Bin ID #22023)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S7-2 (Bin ID #22023) contains approximately 13 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S7, off of Kirtland AFB on City of Albuquerque property at Bullhead Park. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1901B83) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1901B83

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S7-2-idw		
			SAMPLE DATE		31-Jan-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S7-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.13	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.4
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	47
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity characteristic leaching procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 12, 2019

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1901B83

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/31/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-2-idw
Project: Kirtland AFB BFF
Collection Date: 1/31/2019 11:40:00 AM
Lab ID: 1901B83-001 **Matrix:** SOIL
Received Date: 1/31/2019 1:10:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/6/2019 10:22:54 AM	42996
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	2/6/2019 2:28:26 PM	42986
Barium	ND	100		mg/L	1	2/6/2019 2:28:26 PM	42986
Cadmium	ND	1.0		mg/L	1	2/6/2019 2:28:26 PM	42986
Chromium	ND	5.0		mg/L	1	2/6/2019 2:28:26 PM	42986
Lead	ND	5.0		mg/L	1	2/6/2019 2:28:26 PM	42986
Selenium	ND	1.0		mg/L	1	2/6/2019 2:28:26 PM	42986
Silver	ND	5.0		mg/L	1	2/6/2019 2:28:26 PM	42986
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/7/2019 10:38:46 AM	43000
Endrin	ND	0.020		mg/L	1	2/7/2019 10:38:46 AM	43000
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/7/2019 10:38:46 AM	43000
Heptachlor	ND	0.0080		mg/L	1	2/7/2019 10:38:46 AM	43000
Heptachlor epoxide	ND	0.0080		mg/L	1	2/7/2019 10:38:46 AM	43000
Methoxychlor	ND	10		mg/L	1	2/7/2019 10:38:46 AM	43000
Toxaphene	ND	0.50		mg/L	1	2/7/2019 10:38:46 AM	43000
Surr: Decachlorobiphenyl	58.5	42.6-98.5		%Rec	1	2/7/2019 10:38:46 AM	43000
Surr: Tetrachloro-m-xylene	50.2	28.9-96.7		%Rec	1	2/7/2019 10:38:46 AM	43000
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/7/2019 12:44:20 AM	42972
2,4-D	ND	10		mg/L	1	2/7/2019 12:44:20 AM	42972
Surr: 2,4-Dichlorophenylacetic acid	111	70-130		%Rec	1	2/7/2019 12:44:20 AM	42972
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	2/4/2019 8:50:20 AM	42920
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	2/4/2019 8:50:20 AM	42920
Surr: DNOP	102	50.6-138		%Rec	1	2/4/2019 8:50:20 AM	42920
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	2/1/2019 11:12:48 AM	42912
Surr: BFB	97.3	73.8-119		%Rec	1	2/1/2019 11:12:48 AM	42912
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/6/2019 2:49:00 PM	42966
3+4-Methylphenol	ND	200		mg/L	1	2/6/2019 2:49:00 PM	42966
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/6/2019 2:49:00 PM	42966
Hexachlorobenzene	ND	0.13		mg/L	1	2/6/2019 2:49:00 PM	42966
Hexachlorobutadiene	ND	0.50		mg/L	1	2/6/2019 2:49:00 PM	42966

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-2-idw
Project: Kirtland AFB BFF
Collection Date: 1/31/2019 11:40:00 AM
Lab ID: 1901B83-001 **Matrix:** SOIL
Received Date: 1/31/2019 1:10:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/6/2019 2:49:00 PM	42966
Nitrobenzene	ND	2.0		mg/L	1	2/6/2019 2:49:00 PM	42966
Pentachlorophenol	ND	100		mg/L	1	2/6/2019 2:49:00 PM	42966
Pyridine	ND	5.0		mg/L	1	2/6/2019 2:49:00 PM	42966
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/6/2019 2:49:00 PM	42966
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/6/2019 2:49:00 PM	42966
Cresols, Total	ND	200		mg/L	1	2/6/2019 2:49:00 PM	42966
Surr: 2-Fluorophenol	39.7	15-102		%Rec	1	2/6/2019 2:49:00 PM	42966
Surr: Phenol-d5	34.3	15-87.7		%Rec	1	2/6/2019 2:49:00 PM	42966
Surr: 2,4,6-Tribromophenol	53.2	39.9-111		%Rec	1	2/6/2019 2:49:00 PM	42966
Surr: Nitrobenzene-d5	47.2	35.1-107		%Rec	1	2/6/2019 2:49:00 PM	42966
Surr: 2-Fluorobiphenyl	41.3	36.7-100		%Rec	1	2/6/2019 2:49:00 PM	42966
Surr: 4-Terphenyl-d14	52.0	42.6-129		%Rec	1	2/6/2019 2:49:00 PM	42966
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	2/1/2019 2:06:28 PM	42912
Toluene	ND	0.050		mg/Kg	1	2/1/2019 2:06:28 PM	42912
Ethylbenzene	ND	0.050		mg/Kg	1	2/1/2019 2:06:28 PM	42912
Xylenes, Total	ND	0.10		mg/Kg	1	2/1/2019 2:06:28 PM	42912
Surr: 1,2-Dichloroethane-d4	97.5	70-130		%Rec	1	2/1/2019 2:06:28 PM	42912
Surr: 4-Bromofluorobenzene	98.3	70-130		%Rec	1	2/1/2019 2:06:28 PM	42912
Surr: Dibromofluoromethane	98.1	70-130		%Rec	1	2/1/2019 2:06:28 PM	42912
Surr: Toluene-d8	102	70-130		%Rec	1	2/1/2019 2:06:28 PM	42912
VOLATILES BY 8260B/1311						Analyst: **RAA**	
Benzene	ND	0.50		mg/L	1	2/8/2019 5:44:00 PM	42956
2-Butanone	ND	200		mg/L	1	2/8/2019 5:44:00 PM	42956
Carbon Tetrachloride	ND	0.50		mg/L	1	2/8/2019 5:44:00 PM	42956
Chlorobenzene	ND	100		mg/L	1	2/8/2019 5:44:00 PM	42956
Chloroform	ND	6.0		mg/L	1	2/8/2019 5:44:00 PM	42956
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/8/2019 5:44:00 PM	42956
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/8/2019 5:44:00 PM	42956
1,1-Dichloroethene	ND	0.70		mg/L	1	2/8/2019 5:44:00 PM	42956
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/8/2019 5:44:00 PM	42956
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/8/2019 5:44:00 PM	42956
Vinyl chloride	ND	0.20		mg/L	1	2/8/2019 5:44:00 PM	42956
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	2/8/2019 5:44:00 PM	42956
Surr: 4-Bromofluorobenzene	99.8	57.3-148		%Rec	1	2/8/2019 5:44:00 PM	42956
Surr: Dibromofluoromethane	101	70-130		%Rec	1	2/8/2019 5:44:00 PM	42956
Surr: Toluene-d8	94.4	70-130		%Rec	1	2/8/2019 5:44:00 PM	42956

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/08/2019 12:12	WG1233974

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/08/2019 17:16	WG1234151

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.13	T8	1	02/06/2019 11:00	WG1232829

Sample Narrative:

L1066340-01 WG1232829: 9.13 at 19.3C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/07/2019 09:26	WG1231930

2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Appendix I

Method Blank (MB)

(MB) R3382248-1 02/08/19 11:39

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1065630-26 Original Sample (OS) • Duplicate (DUP)

(OS) L1065630-26 02/08/19 11:43 • (DUP) R3382248-3 02/08/19 11:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1065795-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1065795-01 02/08/19 12:01 • (DUP) R3382248-6 02/08/19 12:04

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3382248-2 02/08/19 11:40

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.47	98.6	50.0-150	

L1065630-38 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1065630-38 02/08/19 11:48 • (MS) R3382248-4 02/08/19 11:51 • (MSD) R3382248-5 02/08/19 11:52

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.40	1.22	83.8	73.2	1	75.0-125		J6	13.6	20

L1065795-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1065795-02 02/08/19 12:05 • (MS) R3382248-7 02/08/19 12:06 • (MSD) R3382248-8 02/08/19 12:07

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	U	1.32	1.42	79.5	82.1	1	75.0-125			6.72	20

Method Blank (MB)

(MB) R3382355-1 02/08/19 17:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1066340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1066340-01 02/08/19 17:16 • (DUP) R3382355-3 02/08/19 17:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3382355-2 02/08/19 17:16

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	75.1	75.1	70.0-130	

WG1232829

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1066340-01

Laboratory Control Sample (LCS)

(LCS) R3381548-1 02/06/19 11:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 19.6C

L1065818-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1065818-01 02/07/19 09:26 • (DUP) R3381850-2 02/07/19 09:26

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1066340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1066340-01 02/07/19 09:26 • (DUP) R3381850-3 02/07/19 09:26

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3381850-1 02/07/19 09:26

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.8	101	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42920**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**LCSS**	Batch ID:	**42920**		RunNo:	**57413**					
Prep Date:	**1/31/2019**	Analysis Date:	**2/1/2019**		SeqNo:	**1921491**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		60	10	50.00	0	120	63.9	124			
Surr: DNOP		5.4		5.000		107	50.6	138			

Sample ID	**MB-42920**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**PBS**	Batch ID:	**42920**		RunNo:	**57413**					
Prep Date:	**1/31/2019**	Analysis Date:	**2/1/2019**		SeqNo:	**1921492**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		ND	10								
Motor Oil Range Organics (MRO)		ND	50								
Surr: DNOP		12		10.00		121	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42912**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42912**		RunNo:	**57419**				
Prep Date:	**1/31/2019**	Analysis Date:	**2/1/2019**		SeqNo:	**1921196**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	960		1000		95.7	73.8	119			

Sample ID	**LCS-42912**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42912**		RunNo:	**57419**				
Prep Date:	**1/31/2019**	Analysis Date:	**2/1/2019**		SeqNo:	**1921197**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	110	80.1	123			
Surr: BFB	1100		1000		114	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-43000**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43000**	RunNo: **57535**
Prep Date: **2/6/2019**	Analysis Date: **2/7/2019**	SeqNo: **1924911** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		68.5	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		63.4	28.9	96.7			

Sample ID **LCS-43000**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43000**	RunNo: **57535**
Prep Date: **2/6/2019**	Analysis Date: **2/7/2019**	SeqNo: **1924912** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	76.2	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00039	0.00010	0.0005000	0	78.4	52.2	121			
Methoxychlor	0.00032	0.00010	0.0005000	0	64.9	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		65.6	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		63.3	28.9	96.7			

Sample ID **LCSD-43000**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **43000**	RunNo: **57535**
Prep Date: **2/6/2019**	Analysis Date: **2/7/2019**	SeqNo: **1924913** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00043	0.00010	0.0005000	0	86.2	49.5	127	12.3	20	
gamma-BHC (Lindane)	0.00042	0.00010	0.0005000	0	83.3	49.9	124	7.45	20	
Heptachlor	0.00043	0.00010	0.0005000	0	85.1	41	122	14.7	20	
Heptachlor epoxide	0.00043	0.00010	0.0005000	0	85.8	52.2	121	9.02	20	
Methoxychlor	0.00042	0.00010	0.0005000	0	83.9	40.2	134	25.5	20	R
Surr: Decachlorobiphenyl	0.0018		0.002500		72.8	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0018		0.002500		70.1	28.9	96.7	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42972**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **42972**	RunNo: **57520**
Prep Date: **2/6/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924471** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.085		0.07500		113	70	130			

Sample ID **LCS-42972**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **42972**	RunNo: **57520**
Prep Date: **2/6/2019**	Analysis Date: **2/7/2019**	SeqNo: **1924473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	114	70	130			
2,4-D	0.092	0.010	0.07500	0	122	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.087		0.07500		116	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42912**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **42912**	RunNo: **57424**
Prep Date: **1/31/2019**	Analysis Date: **2/1/2019**	SeqNo: **1921303** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.6	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.0	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.6	70	130			
Surr: Toluene-d8	0.49		0.5000		98.2	70	130			

Sample ID **lcs-42912**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **42912**	RunNo: **57424**
Prep Date: **1/31/2019**	Analysis Date: **2/1/2019**	SeqNo: **1921304** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.3	70	130			
Toluene	0.92	0.050	1.000	0	92.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		97.7	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.9	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		97.7	70	130			
Surr: Toluene-d8	0.47		0.5000		93.3	70	130			

Sample ID **1901b83-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S7-2-idw**	Batch ID: **42912**	RunNo: **57424**
Prep Date: **1/31/2019**	Analysis Date: **2/1/2019**	SeqNo: **1921306** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	0.9960	0	99.5	68.9	131			
Toluene	0.98	0.050	0.9960	0.01241	97.1	64.3	137			
Surr: 1,2-Dichloroethane-d4	0.47		0.4980		95.0	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.4980		98.2	70	130			
Surr: Dibromofluoromethane	0.48		0.4980		96.1	70	130			
Surr: Toluene-d8	0.49		0.4980		97.6	70	130			

Sample ID **1901b83-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S7-2-idw**	Batch ID: **42912**	RunNo: **57424**
Prep Date: **1/31/2019**	Analysis Date: **2/1/2019**	SeqNo: **1921307** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	0.9980	0	99.4	68.9	131	0.0626	20	
Toluene	0.95	0.050	0.9980	0.01241	94.2	64.3	137	2.84	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**
12-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID **1901b83-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S7-2-idw** Batch ID: **42912** RunNo: **57424**
Prep Date: **1/31/2019** Analysis Date: **2/1/2019** SeqNo: **1921307** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.47		0.4990		94.6	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.49		0.4990		97.7	70	130	0	0	
Surr: Dibromofluoromethane	0.49		0.4990		98.3	70	130	0	0	
Surr: Toluene-d8	0.47		0.4990		93.6	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42956**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **LCSS**	Batch ID: **42956**	RunNo: **57586**							
Prep Date: **2/4/2019**	Analysis Date: **2/8/2019**	SeqNo: **1927135**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.10	0.4000	0	110	70	130			
Chlorobenzene	0.39	0.10	0.4000	0	97.4	70	130			
1,1-Dichloroethene	0.45	0.10	0.4000	0	112	70	130			
Trichloroethene (TCE)	0.41	0.10	0.4000	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		102	70	130			
Surr: Toluene-d8	0.19		0.2000		93.6	70	130			

Sample ID **mb-42956**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **PBS**	Batch ID: **42956**	RunNo: **57586**							
Prep Date: **2/4/2019**	Analysis Date: **2/8/2019**	SeqNo: **1927136**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		102	70	130			
Surr: Toluene-d8	0.19		0.2000		96.1	70	130			

Sample ID **1901b83-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**							
Client ID: **KAFB-106S7-2-idw**	Batch ID: **42956**	RunNo: **57586**							
Prep Date: **2/4/2019**	Analysis Date: **2/8/2019**	SeqNo: **1927160**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.42	0.10	0.4000	0	105	68.3	131			
Chlorobenzene	0.36	0.10	0.4000	0	89.3	70	130			
1,1-Dichloroethene	0.40	0.10	0.4000	0	101	64.3	135			
Trichloroethene (TCE)	0.40	0.10	0.4000	0	99.0	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**1901b83-001ams**	SampType:	**MS**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**KAFB-106S7-2-idw**	Batch ID:	**42956**		RunNo:	**57586**				
Prep Date:	**2/4/2019**	Analysis Date:	**2/8/2019**		SeqNo:	**1927160**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		105	70	130			
Surr: Toluene-d8	0.19		0.2000		94.1	70	130			

Sample ID	**1901b83-001amsd**	SampType:	**MSD**		TestCode:	**Volatiles by 8260B/1311**				
Client ID:	**KAFB-106S7-2-idw**	Batch ID:	**42956**		RunNo:	**57586**				
Prep Date:	**2/4/2019**	Analysis Date:	**2/8/2019**		SeqNo:	**1927161**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.40	0.10	0.4000	0	100	68.3	131	4.26	20	
Chlorobenzene	0.35	0.10	0.4000	0	86.7	70	130	2.99	20	
1,1-Dichloroethene	0.39	0.10	0.4000	0	97.5	64.3	135	3.58	20	
Trichloroethene (TCE)	0.38	0.10	0.4000	0	94.3	70	130	4.85	20	
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		106	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.3	57.3	148	0	0	
Surr: Dibromofluoromethane	0.20		0.2000		102	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		94.1	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42966**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **42966**	RunNo: **57511**
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924419** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.083	0.0010	0.1000	0	83.1	42.2	104			
3+4-Methylphenol	0.18	0.0010	0.2000	0	88.9	42.3	108			
2,4-Dinitrotoluene	0.072	0.0010	0.1000	0	72.0	45.8	87.8			
Hexachlorobenzene	0.083	0.0010	0.1000	0	82.8	54.5	104			
Hexachlorobutadiene	0.078	0.0010	0.1000	0	78.3	35.2	95.8			
Hexachloroethane	0.074	0.0010	0.1000	0	74.1	32.3	91.8			
Nitrobenzene	0.088	0.0010	0.1000	0	87.8	53.1	98.9			
Pentachlorophenol	0.064	0.0010	0.1000	0	63.5	30.3	104			
Pyridine	0.074	0.0010	0.1000	0	73.7	15	90			
2,4,5-Trichlorophenol	0.075	0.0010	0.1000	0	75.1	42.1	107			
2,4,6-Trichlorophenol	0.080	0.0010	0.1000	0	79.7	43.8	110			
Cresols, Total	0.26	0.0010	0.3000	0	87.0	44.1	111			
Surr: 2-Fluorophenol	0.15		0.2000		73.7	15	102			
Surr: Phenol-d5	0.13		0.2000		65.0	15	87.7			
Surr: 2,4,6-Tribromophenol	0.17		0.2000		82.8	39.9	111			
Surr: Nitrobenzene-d5	0.095		0.1000		94.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.082		0.1000		82.3	36.7	100			
Surr: 4-Terphenyl-d14	0.061		0.1000		61.4	42.6	129			

Sample ID **mb-42966**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42966**	RunNo: **57511**
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924422** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.11		0.2000		54.6	15	102			
Surr: Phenol-d5	0.091		0.2000		45.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		70.2	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**
12-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID **mb-42966**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42966**	RunNo: **57511**
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924422** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.077		0.1000		77.1	35.1	107			
Surr: 2-Fluorobiphenyl	0.070		0.1000		70.1	36.7	100			
Surr: 4-Terphenyl-d14	0.056		0.1000		55.8	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42996**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42996**	RunNo:	**57495**					
Prep Date:	**2/5/2019**	Analysis Date:	**2/6/2019**	SeqNo:	**1923731**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-42996**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42996**	RunNo:	**57495**					
Prep Date:	**2/5/2019**	Analysis Date:	**2/6/2019**	SeqNo:	**1923746**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	93.7	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901B83**

12-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42986**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**PBW**	Batch ID:	**42986**	RunNo:	**57529**
Prep Date:	**2/5/2019**	Analysis Date:	**2/6/2019**	SeqNo:	**1924737** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42986**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**
Client ID:	**LCSW**	Batch ID:	**42986**	RunNo:	**57529**
Prep Date:	**2/5/2019**	Analysis Date:	**2/6/2019**	SeqNo:	**1924740** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	114	80	120			
Barium	ND	100	0.5000	0	100	80	120			
Cadmium	ND	1.0	0.5000	0	106	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	97.8	80	120			
Selenium	ND	1.0	0.5000	0	115	80	120			
Silver	ND	5.0	0.1000	0	108	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1901B83 | RcptNo: 1

Received By: **Leah Baca** 1/31/2019 1:10:00 PM Leah Baca

Completed By: **Leah Baca** 1/31/2019 1:33:20 PM Leah Baca

Reviewed By: ENM 1/31/19

Labeled by IO 1/31/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑ IO
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 1/31/19 (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.6	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-116 S7-2-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 62735DM02 1017.08	Hall Environmental	Amanda Smith/ asmith@enest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@enest.com
[7] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 5052384470	Tel. 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@enest.com

[14] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[16] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081B/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-116 S7-2-idw	Roll off S7-2	Soil	1-31-19	1140	IV	7	3	X	X	X	X	X	X		PF		Composite	1901B88-001	
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[25] SAMPLER(S) AND COMPANY: (please print)	[18] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering	FedEx Number:	
Pete Ferrari	N/A Hand delivered to hall lab	26C

[32] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Ferrari Pete Ferrari	1-31-19	1230	Joshua Livingston	01/31/19	1230
Printed Name and Signature:			Printed Name and Signature:		
Joshua Livingston	01/31/19	1310		1/31/19	1310
Printed Name and Signature:			Printed Name and Signature:		

Distribution: | Original - Laboratory (To be returned with Analytical Report); | Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

6 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (5), dated: 1 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **ACT-2058** and **ACT-2057**; and three 20-cubic-yard open-top roll-offs labeled **104051, 20B-27,** and **5060**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.06 16:57:34 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 1, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S7-3 (Bin ID #5060)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S7-3 (Bin ID #5060) contains approximately 6 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S7, off of Kirtland AFB on City of Albuquerque property at Bullhead Park. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902464) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; (505) 846-9017.

If you have any questions, please do not hesitate to contact me at (505) 266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902464

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S7-3-idw		
			SAMPLE DATE		11-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S7-3		
Parameter	Method	Analyte	Units	Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.97	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	25	--	10
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	50
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.9
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.049
		TOLUENE	mg/kg	50[e]	ND	--	0.049
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.098

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009) .*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 25, 2019

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1902464

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/11/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:46:00 PM
Lab ID: 1902464-001 **Matrix:** SOIL
Received Date: 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/15/2019 3:05:26 PM	43164
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	2/14/2019 9:47:16 AM	43141
Barium	ND	100		mg/L	1	2/14/2019 9:47:16 AM	43141
Cadmium	ND	1.0		mg/L	1	2/14/2019 9:47:16 AM	43141
Chromium	ND	5.0		mg/L	1	2/14/2019 9:47:16 AM	43141
Lead	ND	5.0		mg/L	1	2/14/2019 10:30:21 AM	43141
Selenium	ND	1.0		mg/L	1	2/14/2019 9:47:16 AM	43141
Silver	ND	5.0		mg/L	1	2/14/2019 9:47:16 AM	43141
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/22/2019 10:50:43 AM	43222
Endrin	ND	0.020		mg/L	1	2/22/2019 10:50:43 AM	43222
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/22/2019 10:50:43 AM	43222
Heptachlor	ND	0.0080		mg/L	1	2/22/2019 10:50:43 AM	43222
Heptachlor epoxide	ND	0.0080		mg/L	1	2/22/2019 10:50:43 AM	43222
Methoxychlor	ND	10		mg/L	1	2/22/2019 10:50:43 AM	43222
Toxaphene	ND	0.50		mg/L	1	2/22/2019 10:50:43 AM	43222
Surr: Decachlorobiphenyl	56.2	42.6-98.5		%Rec	1	2/22/2019 10:50:43 AM	43222
Surr: Tetrachloro-m-xylene	55.6	28.9-96.7		%Rec	1	2/22/2019 10:50:43 AM	43222
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/15/2019 2:07:05 AM	43142
2,4-D	ND	10		mg/L	1	2/15/2019 2:07:05 AM	43142
Surr: 2,4-Dichlorophenylacetic acid	113	70-130		%Rec	1	2/15/2019 2:07:05 AM	43142
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	25	10		mg/Kg	1	2/13/2019 3:54:34 PM	43121
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	2/13/2019 3:54:34 PM	43121
Surr: DNOP	110	50.6-138		%Rec	1	2/13/2019 3:54:34 PM	43121
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	2/13/2019 1:08:02 PM	43103
Surr: BFB	107	73.8-119		%Rec	1	2/13/2019 1:08:02 PM	43103
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/14/2019 7:54:35 PM	43128
3+4-Methylphenol	ND	200		mg/L	1	2/14/2019 7:54:35 PM	43128
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/14/2019 7:54:35 PM	43128
Hexachlorobenzene	ND	0.13		mg/L	1	2/14/2019 7:54:35 PM	43128
Hexachlorobutadiene	ND	0.50		mg/L	1	2/14/2019 7:54:35 PM	43128

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:46:00 PM
Lab ID: 1902464-001 **Matrix:** SOIL **Received Date:** 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/14/2019 7:54:35 PM	43128
Nitrobenzene	ND	2.0		mg/L	1	2/14/2019 7:54:35 PM	43128
Pentachlorophenol	ND	100		mg/L	1	2/14/2019 7:54:35 PM	43128
Pyridine	ND	5.0		mg/L	1	2/14/2019 7:54:35 PM	43128
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/14/2019 7:54:35 PM	43128
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/14/2019 7:54:35 PM	43128
Cresols, Total	ND	200		mg/L	1	2/14/2019 7:54:35 PM	43128
Surr: 2-Fluorophenol	24.2	15-102		%Rec	1	2/14/2019 7:54:35 PM	43128
Surr: Phenol-d5	22.8	15-87.7		%Rec	1	2/14/2019 7:54:35 PM	43128
Surr: 2,4,6-Tribromophenol	66.1	39.9-111		%Rec	1	2/14/2019 7:54:35 PM	43128
Surr: Nitrobenzene-d5	36.7	35.1-107		%Rec	1	2/14/2019 7:54:35 PM	43128
Surr: 2-Fluorobiphenyl	36.1	36.7-100	S	%Rec	1	2/14/2019 7:54:35 PM	43128
Surr: 4-Terphenyl-d14	74.3	42.6-129		%Rec	1	2/14/2019 7:54:35 PM	43128
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	2/13/2019 10:49:59 PM	43103
Toluene	ND	0.049		mg/Kg	1	2/13/2019 10:49:59 PM	43103
Ethylbenzene	ND	0.049		mg/Kg	1	2/13/2019 10:49:59 PM	43103
Xylenes, Total	ND	0.098		mg/Kg	1	2/13/2019 10:49:59 PM	43103
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	1	2/13/2019 10:49:59 PM	43103
Surr: 4-Bromofluorobenzene	96.5	70-130		%Rec	1	2/13/2019 10:49:59 PM	43103
Surr: Dibromofluoromethane	109	70-130		%Rec	1	2/13/2019 10:49:59 PM	43103
Surr: Toluene-d8	97.3	70-130		%Rec	1	2/13/2019 10:49:59 PM	43103
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	2/13/2019 5:27:20 PM	43105
2-Butanone	ND	200		mg/L	1	2/13/2019 5:27:20 PM	43105
Carbon Tetrachloride	ND	0.50		mg/L	1	2/13/2019 5:27:20 PM	43105
Chlorobenzene	ND	100		mg/L	1	2/13/2019 5:27:20 PM	43105
Chloroform	ND	6.0		mg/L	1	2/13/2019 5:27:20 PM	43105
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/13/2019 5:27:20 PM	43105
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/13/2019 5:27:20 PM	43105
1,1-Dichloroethene	ND	0.70		mg/L	1	2/13/2019 5:27:20 PM	43105
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/13/2019 5:27:20 PM	43105
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/13/2019 5:27:20 PM	43105
Vinyl chloride	ND	0.20		mg/L	1	2/13/2019 5:27:20 PM	43105
Surr: 1,2-Dichloroethane-d4	113	70-130		%Rec	1	2/13/2019 5:27:20 PM	43105
Surr: 4-Bromofluorobenzene	102	57.3-148		%Rec	1	2/13/2019 5:27:20 PM	43105
Surr: Dibromofluoromethane	109	70-130		%Rec	1	2/13/2019 5:27:20 PM	43105
Surr: Toluene-d8	99.5	70-130		%Rec	1	2/13/2019 5:27:20 PM	43105

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/14/2019 16:18	WG1236918

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/17/2019 14:46	WG1238312

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.97	TS	1	02/14/2019 15:45	WG1236929

Sample Narrative:

L1069772-01 WG1236929: 8.97 at 18.9C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/20/2019 13:35	WG1239346

Method Blank (MB)

(MB) R3383882-1 02/14/19 15:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1069768-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069768-01 02/14/19 16:16 • (DUP) R3383882-8 02/14/19 16:17

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/14/19 16:19 • (DUP) R3383882-9 02/14/19 16:20

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383882-2 02/14/19 15:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.45	98.2	50.0-150	

L1069273-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069273-01 02/14/19 16:02 • (MS) R3383882-4 02/14/19 16:03 • (MSD) R3383882-5 02/14/19 16:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.60	1.68	96.2	101	1	75.0-125			4.91	20

L1069762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069762-01 02/14/19 16:13 • (MS) R3383882-6 02/14/19 16:14 • (MSD) R3383882-7 02/14/19 16:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.54	1.50	92.7	89.8	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3384436-1 02/17/19 14:46

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1069762-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069762-01 02/17/19 14:46 • (DUP) R3384436-3 02/17/19 14:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3384436-2 02/17/19 14:46

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	87.7	87.7	70.0-130	

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3383902-2 02/14/19 15:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		su		%		%
Corrosivity by pH		8.28	1	0.363		1

Sample Narrative:

DUP: 8.28 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3383902-1 02/14/19 15:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 17.5C

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3385432-1 02/20/19 13:35

Analyte	Spike Amount Deg. F	LCS Result Deg. F	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ignitability	82.0	81.9	99.9	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43121**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929530** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	55	10	50.00	0	111	63.9	124			
Surr: DNOP	4.7		5.000		93.5	50.6	138			

Sample ID: **MB-43121**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929531** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		99.5	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43103**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930637** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	980		1000		97.5	73.8	119			

Sample ID: **LCS-43103**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930638** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	109	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Sample ID: **1902464-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **KAFB-106S7-3-idw**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930641** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	4.9	24.39	0	110	69.1	142			
Surr: BFB	1200		975.6		122	73.8	119			S

Sample ID: **1902464-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **KAFB-106S7-3-idw**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930642** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	4.7	23.70	0	116	69.1	142	1.94	20	
Surr: BFB	1200		947.9		124	73.8	119	0	0	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43222**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938472** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00032	0.00010	0.0005000	0	63.7	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00037	0.00010	0.0005000	0	74.4	52.2	121			
Methoxychlor	0.00026	0.00010	0.0005000	0	51.1	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		64.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.7	28.9	96.7			

Sample ID: **LCSD-43222**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	8.66	20	
gamma-BHC (Lindane)	0.00035	0.00010	0.0005000	0	69.1	49.9	124	11.4	20	
Heptachlor	0.00034	0.00010	0.0005000	0	68.0	41	122	7.73	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121	4.72	20	
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134	28.0	20	R
Surr: Decachlorobiphenyl	0.0015		0.002500		61.6	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		48.3	28.9	96.7	0	0	

Sample ID: **MB-43222**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938561** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0011		0.002500		44.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00090		0.002500		35.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43142**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931599** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		103	70	130			

Sample ID: **LCS-43142**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	95.0	70	130			
2,4-D	0.077	0.010	0.07500	0	103	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.075		0.07500		99.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43103**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930715** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: **lcs-43103**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930716** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	109	70	130			
Toluene	0.94	0.050	1.000	0	94.3	70	130			
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		110	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.3	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43105**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930720** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		114	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		93.0	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		99.0	70	130			

Sample ID: **lcs-43105**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930721** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	95.6	70	130			
1,1-Dichloroethene	0.43	0.30	0.4000	0	108	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.20		0.2000		98.9	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
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H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**
25-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **lcs-43128** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS** Batch ID: **43128** RunNo: **57722**
Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1933128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.8	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	76.7	42.3	108			
2,4-Dinitrotoluene	0.055	0.0010	0.1000	0	55.2	45.8	87.8			
Hexachlorobenzene	0.068	0.0010	0.1000	0	67.8	54.5	104			
Hexachlorobutadiene	0.059	0.0010	0.1000	0	59.0	35.2	95.8			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.6	53.1	98.9			
Pentachlorophenol	0.056	0.0010	0.1000	0	56.1	30.3	104			
Pyridine	0.051	0.0010	0.1000	0	50.8	15	90			
2,4,5-Trichlorophenol	0.063	0.0010	0.1000	0	62.7	42.1	107			
2,4,6-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.0	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		72.0	15	102			
Surr: Phenol-d5	0.13		0.2000		62.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.5	39.9	111			
Surr: Nitrobenzene-d5	0.070		0.1000		70.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.059		0.1000		59.2	36.7	100			
Surr: 4-Terphenyl-d14	0.086		0.1000		85.6	42.6	129			

Sample ID: **mb-43128** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS** Batch ID: **43128** RunNo: **57722**
Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.16		0.2000		77.9	15	102			
Surr: Phenol-d5	0.13		0.2000		67.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		73.7	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		88.6	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43164**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932763** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43164**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932764** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	94.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902464**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43141**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930953** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43141**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930955** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	107	80	120			
Barium	ND	100	0.5000	0	99.9	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902464 RcptNo: 1

Received By: Isaiah Ortiz 2/11/2019 3:08:00 PM I-OK

Completed By: Anne Thorne 2/11/2019 4:00:36 PM Anne Thorne

Reviewed By: DAD 2/12/19

labeled by: IO 2/12/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	IO
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 2/12/19 (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
q	1.1	Good	Not Present			

EA
225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: ~~KAFB-106S7-3-idw~~

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01 1017.3~~ PF 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@enest.com
[4] PROJECT PHASE/SITE/TASK:	[5] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@enest.com
[6] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505 224 9013~~ PF 505 238 4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@enest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081B/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
																			HEAL # 1902464	
1	KAFB-106S7-3-idw	Roll-over S7-3	Soil	2/11/19	1346	IV	7	3	X	X	X	X	X	X		PF		Composite		001
2																				
3																				
4									PF											
5																				
6																				
7																				
8																				
9																				
10																				

[24] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Ferrari

[29] COURIER AND SHIPPING NUMBER:
FedEx Number: N/A Hand delivered to hall lab

LL

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari Pete Ferrari	2-11-19	1440	Printed Name and Signature: Joshua Livingston Joshua Livingston	2/11/19	1440
Printed Name and Signature: Joshua Livingston	2/11/19	1508	Printed Name and Signature: I-O CDO	2/11/19	1508
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

6 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (5), dated: 1 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **ACT-2058** and **ACT-2057**; and three 20-cubic-yard open-top roll-offs labeled **104051, 20B-27,** and **5060**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.06 16:57:34 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 1, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S8-1 (Bin ID # 20B-27)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S8-1 (Bin ID # 20B-27) contains approximately 9 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S8, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902434) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; (505) 846-9017.

If you have any questions, please do not hesitate to contact me at (505) 266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902434

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S8-1-idw		
			SAMPLE DATE		8-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S8-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.95	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.7
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity characteristic leaching procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 26, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX:

RE: Kirtland AFB BFF OrderNo.: 1902434

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/8/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-1-idw
Project: Kirtland AFB BFF
Collection Date: 2/8/2019 12:05:00 PM
Lab ID: 1902434-001 **Matrix:** SOIL
Received Date: 2/8/2019 1:23:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**
Chlordane	ND	0.030		mg/L	1	2/22/2019 10:37:18 AM
Endrin	ND	0.020		mg/L	1	2/22/2019 10:37:18 AM
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/22/2019 10:37:18 AM
Heptachlor	ND	0.0080		mg/L	1	2/22/2019 10:37:18 AM
Heptachlor epoxide	ND	0.0080		mg/L	1	2/22/2019 10:37:18 AM
Methoxychlor	ND	10		mg/L	1	2/22/2019 10:37:18 AM
Toxaphene	ND	0.50		mg/L	1	2/22/2019 10:37:18 AM
Surr: Decachlorobiphenyl	68.3	42.6-98.5		%Rec	1	2/22/2019 10:37:18 AM
Surr: Tetrachloro-m-xylene	62.3	28.9-96.7		%Rec	1	2/22/2019 10:37:18 AM
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/15/2019 1:41:11 AM
2,4-D	ND	10		mg/L	1	2/15/2019 1:41:11 AM
Surr: 2,4-Dichlorophenylacetic acid	110	70-130		%Rec	1	2/15/2019 1:41:11 AM
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	2/12/2019 8:17:52 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	2/12/2019 8:17:52 PM
Surr: DNOP	98.8	50.6-138		%Rec	1	2/12/2019 8:17:52 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	2/12/2019 4:21:49 PM
Surr: BFB	107	73.8-119		%Rec	1	2/12/2019 4:21:49 PM
MERCURY, TCLP						Analyst: **pmf**
Mercury	ND	0.020		mg/L	1	2/22/2019 11:02:28 AM
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**
Arsenic	ND	5.0		mg/L	1	2/14/2019 9:44:09 AM
Barium	ND	100		mg/L	1	2/14/2019 9:44:09 AM
Cadmium	ND	1.0		mg/L	1	2/14/2019 9:44:09 AM
Chromium	ND	5.0		mg/L	1	2/14/2019 9:44:09 AM
Lead	ND	5.0		mg/L	1	2/14/2019 10:27:21 AM
Selenium	ND	1.0		mg/L	1	2/14/2019 9:44:09 AM
Silver	ND	5.0		mg/L	1	2/14/2019 9:44:09 AM
EPA METHOD 8270C TCLP						Analyst: **DAM**
2-Methylphenol	ND	200		mg/L	1	2/14/2019 7:25:37 PM
3+4-Methylphenol	ND	200		mg/L	1	2/14/2019 7:25:37 PM
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/14/2019 7:25:37 PM
Hexachlorobenzene	ND	0.13		mg/L	1	2/14/2019 7:25:37 PM
Hexachlorobutadiene	ND	0.50		mg/L	1	2/14/2019 7:25:37 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-1-idw
Project: Kirtland AFB BFF
Collection Date: 2/8/2019 12:05:00 PM
Lab ID: 1902434-001 **Matrix:** SOIL
Received Date: 2/8/2019 1:23:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C TCLP						Analyst: **DAM**
Hexachloroethane	ND	3.0		mg/L	1	2/14/2019 7:25:37 PM
Nitrobenzene	ND	2.0		mg/L	1	2/14/2019 7:25:37 PM
Pentachlorophenol	ND	100		mg/L	1	2/14/2019 7:25:37 PM
Pyridine	ND	5.0		mg/L	1	2/14/2019 7:25:37 PM
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/14/2019 7:25:37 PM
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/14/2019 7:25:37 PM
Cresols, Total	ND	200		mg/L	1	2/14/2019 7:25:37 PM
Surr: 2-Fluorophenol	71.3	15-102		%Rec	1	2/14/2019 7:25:37 PM
Surr: Phenol-d5	53.4	15-87.7		%Rec	1	2/14/2019 7:25:37 PM
Surr: 2,4,6-Tribromophenol	97.9	39.9-111		%Rec	1	2/14/2019 7:25:37 PM
Surr: Nitrobenzene-d5	102	35.1-107		%Rec	1	2/14/2019 7:25:37 PM
Surr: 2-Fluorobiphenyl	82.9	36.7-100		%Rec	1	2/14/2019 7:25:37 PM
Surr: 4-Terphenyl-d14	102	42.6-129		%Rec	1	2/14/2019 7:25:37 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	2/12/2019 6:39:40 PM
Toluene	ND	0.050		mg/Kg	1	2/12/2019 6:39:40 PM
Ethylbenzene	ND	0.050		mg/Kg	1	2/12/2019 6:39:40 PM
Xylenes, Total	ND	0.10		mg/Kg	1	2/12/2019 6:39:40 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	2/12/2019 6:39:40 PM
Surr: 4-Bromofluorobenzene	94.8	70-130		%Rec	1	2/12/2019 6:39:40 PM
Surr: Dibromofluoromethane	101	70-130		%Rec	1	2/12/2019 6:39:40 PM
Surr: Toluene-d8	98.0	70-130		%Rec	1	2/12/2019 6:39:40 PM
VOLATILES BY 8260B/1311						Analyst: **DJF**
Benzene	ND	0.50		mg/L	1	2/13/2019 4:58:28 PM
2-Butanone	ND	200		mg/L	1	2/13/2019 4:58:28 PM
Carbon Tetrachloride	ND	0.50		mg/L	1	2/13/2019 4:58:28 PM
Chlorobenzene	ND	100		mg/L	1	2/13/2019 4:58:28 PM
Chloroform	ND	6.0		mg/L	1	2/13/2019 4:58:28 PM
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/13/2019 4:58:28 PM
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/13/2019 4:58:28 PM
1,1-Dichloroethene	ND	0.70		mg/L	1	2/13/2019 4:58:28 PM
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/13/2019 4:58:28 PM
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/13/2019 4:58:28 PM
Vinyl chloride	ND	0.20		mg/L	1	2/13/2019 4:58:28 PM
Surr: 1,2-Dichloroethane-d4	111	70-130		%Rec	1	2/13/2019 4:58:28 PM
Surr: 4-Bromofluorobenzene	95.2	57.3-148		%Rec	1	2/13/2019 4:58:28 PM
Surr: Dibromofluoromethane	107	70-130		%Rec	1	2/13/2019 4:58:28 PM
Surr: Toluene-d8	99.1	70-130		%Rec	1	2/13/2019 4:58:28 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/14/2019 16:02	WG1236918

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/13/2019 17:12	WG1235966

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.95	T8	1	02/14/2019 09:55	WG1236637

Sample Narrative:

L1069273-01 WG1236637: 8.95 at 20.6C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/19/2019 15:03	WG1238897

Method Blank (MB)

(MB) R3383882-1 02/14/19 15:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1069768-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069768-01 02/14/19 16:16 • (DUP) R3383882-8 02/14/19 16:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/14/19 16:19 • (DUP) R3383882-9 02/14/19 16:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383882-2 02/14/19 15:38

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.45	98.2	50.0-150	

L1069273-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069273-01 02/14/19 16:02 • (MS) R3383882-4 02/14/19 16:03 • (MSD) R3383882-5 02/14/19 16:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.60	1.68	96.2	101	1	75.0-125			4.91	20

L1069762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069762-01 02/14/19 16:13 • (MS) R3383882-6 02/14/19 16:14 • (MSD) R3383882-7 02/14/19 16:15

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.54	1.50	92.7	89.8	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3383539-1 02/13/19 17:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/13/19 17:12 • (DUP) R3383539-3 02/13/19 17:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383539-2 02/13/19 17:12

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	75.1	75.1	70.0-130	

L1069276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069276-01 02/14/19 09:55 • (DUP) R3383690-3 02/14/19 09:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.93	8.94	1	0.112		1

Sample Narrative:

OS: 8.93 at 20.5C

DUP: 8.94 at 20.4C

Laboratory Control Sample (LCS)

(LCS) R3383690-1 02/14/19 09:55

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.02 at 18C

L1068614-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1068614-01 02/19/19 15:03 • (DUP) R3385034-2 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	80.9	82.9	1	2.44		10

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/19/19 15:03 • (DUP) R3385034-3 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1069653-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069653-01 02/19/19 15:03 • (DUP) R3385034-4 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	124	126	1	1.60		10

L1070555-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-01 02/19/19 15:03 • (DUP) R3385034-5 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1070555-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-02 02/19/19 15:03 • (DUP) R3385034-6 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	106	105	1	0.949		10

L1070555-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-03 02/19/19 15:03 • (DUP) R3385034-7 02/19/19 15:03

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	105	103	1	1.93		10

Laboratory Control Sample (LCS)

(LCS) R3385034-1 02/19/19 15:03

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	81.9	99.8	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43090**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929614** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	50.6	138			

Sample ID: **LCS-43090**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929615** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	49	10	50.00	0	97.8	63.9	124			
Surr: DNOP	4.9		5.000		98.7	50.6	138			

Sample ID: **1902434-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **KAFB-106S8-1-idw**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929655** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	9.6	47.98	9.246	93.3	53.5	126			
Surr: DNOP	4.8		4.798		99.4	50.6	138			

Sample ID: **1902434-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **KAFB-106S8-1-idw**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929656** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	9.7	48.54	9.246	91.7	53.5	126	0.454	21.7	
Surr: DNOP	4.7		4.854		97.7	50.6	138	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43071**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43071**	RunNo: **57650**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929282** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		107	73.8	119			

Sample ID: **LCS-43071**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43071**	RunNo: **57650**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929283** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	105	80.1	123			
Surr: BFB	1200		1000		121	73.8	119			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43222** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSW** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938472** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00032	0.00010	0.0005000	0	63.7	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00037	0.00010	0.0005000	0	74.4	52.2	121			
Methoxychlor	0.00026	0.00010	0.0005000	0	51.1	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		64.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.7	28.9	96.7			

Sample ID: **LCSD-43222** SampType: **LCSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSS02** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	8.66	20	
gamma-BHC (Lindane)	0.00035	0.00010	0.0005000	0	69.1	49.9	124	11.4	20	
Heptachlor	0.00034	0.00010	0.0005000	0	68.0	41	122	7.73	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121	4.72	20	
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134	28.0	20	R
Surr: Decachlorobiphenyl	0.0015		0.002500		61.6	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		48.3	28.9	96.7	0	0	

Sample ID: **MB-43222** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **PBW** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938561** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0011		0.002500		44.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00090		0.002500		35.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43142**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931599** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		103	70	130			

Sample ID: **LCS-43142**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	95.0	70	130			
2,4-D	0.077	0.010	0.07500	0	103	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.075		0.07500		99.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**
26-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **mb-43071**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43071**	RunNo: **57661**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929702** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.9	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: **lcs-43071**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43071**	RunNo: **57661**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929703** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.3	70	130			
Toluene	0.91	0.050	1.000	0	91.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.1	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.4	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: Toluene-d8	0.49		0.5000		98.9	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43105**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930720** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		114	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		93.0	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		99.0	70	130			

Sample ID: **lcs-43105**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930721** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	95.6	70	130			
1,1-Dichloroethene	0.43	0.30	0.4000	0	108	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.20		0.2000		98.9	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43128** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS** Batch ID: **43128** RunNo: **57722**

Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1933128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.8	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	76.7	42.3	108			
2,4-Dinitrotoluene	0.055	0.0010	0.1000	0	55.2	45.8	87.8			
Hexachlorobenzene	0.068	0.0010	0.1000	0	67.8	54.5	104			
Hexachlorobutadiene	0.059	0.0010	0.1000	0	59.0	35.2	95.8			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.6	53.1	98.9			
Pentachlorophenol	0.056	0.0010	0.1000	0	56.1	30.3	104			
Pyridine	0.051	0.0010	0.1000	0	50.8	15	90			
2,4,5-Trichlorophenol	0.063	0.0010	0.1000	0	62.7	42.1	107			
2,4,6-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.0	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		72.0	15	102			
Surr: Phenol-d5	0.13		0.2000		62.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.5	39.9	111			
Surr: Nitrobenzene-d5	0.070		0.1000		70.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.059		0.1000		59.2	36.7	100			
Surr: 4-Terphenyl-d14	0.086		0.1000		85.6	42.6	129			

Sample ID: **mb-43128** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**

Client ID: **PBS** Batch ID: **43128** RunNo: **57722**

Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.16		0.2000		77.9	15	102			
Surr: Phenol-d5	0.13		0.2000		67.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**
26-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **mb-43128** SampType: **MBLK** TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS** Batch ID: **43128** RunNo: **57722**
Prep Date: **2/13/2019** Analysis Date: **2/14/2019** SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		73.7	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		88.6	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43289**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43289**	RunNo: **57880**
Prep Date: **2/21/2019**	Analysis Date: **2/22/2019**	SeqNo: **1937990** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43289**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43289**	RunNo: **57880**
Prep Date: **2/21/2019**	Analysis Date: **2/22/2019**	SeqNo: **1937991** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	97.6	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902434**

26-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43141**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930953** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43141**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930955** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	107	80	120			
Barium	ND	100	0.5000	0	99.9	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902434 RcptNo: 1

Received By: **Anne Thorne** 2/8/2019 1:23:00 PM Anne Thorne

Completed By: **Anne Thorne** 2/11/2019 12:55:41 PM Anne Thorne

Reviewed By: JO 2/11/19

Labeled by: AT 02/11/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.0	Good	Not Present			

Appendix I

978 of 1439

EA

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-10658-1-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 62735DM01 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[8] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4910	Tel 505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Number of Bottles	Bottle Type	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
																				HEAL # 1902434	
1	KAFB-10658-1-idw	Kodl-10 Hole 58-1	Soil	2-8-19	1205	IV	7	3		X	X	X	X	X	X		PF		Composite		001
2																					
3																					
4																					
5																					
6										PK											
7																					
8																					
9																					
10																					

[24] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering

Pete Ferraro

[31] COURIER AND SHIPPING NUMBER:

FedEx Number: N/A Hand delivered to Hall lab

2.0

[29] RELINQUISHED BY	DATE	TIME	[30] RECEIVED BY	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Pete Ferraro Pete Ferraro	2-8-19	1221	Joshua Livingston	2/8/19	1221
Printed Name and Signature:			Printed Name and Signature:		
Joshua Livingston	2/8/19	1323	Anne Thum	02/08/19	~~1224~~ 1323
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

AT 02/08/19

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

11 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2), dated: 11 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S8

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S8, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open-top roll-offs labeled **104058/ACT2045,** and **20B-26**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.11 15:35:58 -06'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 11, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S8-2 (Bin ID # 104058/ACT2045)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S8-2 (Bin ID # 104058/ACT2045) contains approximately 15 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S8, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902A26) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; (505) 846-9017.

If you have any questions, please do not hesitate to contact me at (505) 266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Lane Andress

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902A26

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Amanda Smith, asmith@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S8-2-idw		
			SAMPLE DATE		21-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S8-2		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	36.4	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.88	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.6
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.8
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.048
		TOLUENE	mg/kg	50[e]	ND	--	0.048
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.096

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity characteristic leaching procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 05, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX:

RE: Kirtland AFB BFF OrderNo.: 1902A26

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/21/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-2-idw
Project: Kirtland AFB BFF
Collection Date: 2/21/2019 12:45:00 PM
Lab ID: 1902A26-001 **Matrix:** SOIL
Received Date: 2/21/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**
Chlordane	ND	0.030		mg/L	1	2/27/2019 3:28:25 PM
Endrin	ND	0.020		mg/L	1	2/27/2019 3:28:25 PM
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/27/2019 3:28:25 PM
Heptachlor	ND	0.0080		mg/L	1	2/27/2019 3:28:25 PM
Heptachlor epoxide	ND	0.0080		mg/L	1	2/27/2019 3:28:25 PM
Methoxychlor	ND	10		mg/L	1	2/27/2019 3:28:25 PM
Toxaphene	ND	0.50		mg/L	1	2/27/2019 3:28:25 PM
Surr: Decachlorobiphenyl	74.0	42.6-98.5		%Rec	1	2/27/2019 3:28:25 PM
Surr: Tetrachloro-m-xylene	47.3	28.9-96.7		%Rec	1	2/27/2019 3:28:25 PM
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/27/2019 5:11:11 PM
2,4-D	ND	10		mg/L	1	2/27/2019 5:11:11 PM
Surr: 2,4-Dichlorophenylacetic acid	102	70-130		%Rec	1	2/27/2019 5:11:11 PM
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	2/26/2019 10:28:45 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	2/26/2019 10:28:45 AM
Surr: DNOP	107	70-130		%Rec	1	2/26/2019 10:28:45 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	2/26/2019 2:24:51 PM
Surr: BFB	109	73.8-119		%Rec	1	2/26/2019 2:24:51 PM
MERCURY, TCLP						Analyst: **pmf**
Mercury	ND	0.020		mg/L	1	2/27/2019 1:47:47 PM
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**
Arsenic	ND	5.0		mg/L	1	2/27/2019 5:55:41 PM
Barium	ND	100		mg/L	1	2/27/2019 3:54:56 PM
Cadmium	ND	1.0		mg/L	1	2/27/2019 3:54:56 PM
Chromium	ND	5.0		mg/L	1	2/27/2019 3:54:56 PM
Lead	ND	5.0		mg/L	1	2/27/2019 3:54:56 PM
Selenium	ND	1.0		mg/L	1	2/27/2019 3:54:56 PM
Silver	ND	5.0		mg/L	1	2/27/2019 3:54:56 PM
EPA METHOD 8270C TCLP						Analyst: **DAM**
2-Methylphenol	ND	200		mg/L	1	2/27/2019 5:39:48 PM
3+4-Methylphenol	ND	200		mg/L	1	2/27/2019 5:39:48 PM
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/27/2019 5:39:48 PM
Hexachlorobenzene	ND	0.13		mg/L	1	2/27/2019 5:39:48 PM
Hexachlorobutadiene	ND	0.50		mg/L	1	2/27/2019 5:39:48 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-2-idw
Project: Kirtland AFB BFF
Collection Date: 2/21/2019 12:45:00 PM
Lab ID: 1902A26-001 **Matrix:** SOIL
Received Date: 2/21/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C TCLP						Analyst: **DAM**
Hexachloroethane	ND	3.0		mg/L	1	2/27/2019 5:39:48 PM
Nitrobenzene	ND	2.0		mg/L	1	2/27/2019 5:39:48 PM
Pentachlorophenol	ND	100		mg/L	1	2/27/2019 5:39:48 PM
Pyridine	ND	5.0		mg/L	1	2/27/2019 5:39:48 PM
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/27/2019 5:39:48 PM
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/27/2019 5:39:48 PM
Cresols, Total	ND	200		mg/L	1	2/27/2019 5:39:48 PM
Surr: 2-Fluorophenol	40.8	22.2-88.7		%Rec	1	2/27/2019 5:39:48 PM
Surr: Phenol-d5	28.7	16.4-74.1		%Rec	1	2/27/2019 5:39:48 PM
Surr: 2,4,6-Tribromophenol	59.1	28.1-108		%Rec	1	2/27/2019 5:39:48 PM
Surr: Nitrobenzene-d5	52.9	20.1-112		%Rec	1	2/27/2019 5:39:48 PM
Surr: 2-Fluorobiphenyl	39.6	19.1-97.5		%Rec	1	2/27/2019 5:39:48 PM
Surr: 4-Terphenyl-d14	56.6	31.1-114		%Rec	1	2/27/2019 5:39:48 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.024		mg/Kg	1	2/26/2019 10:44:17 AM
Toluene	ND	0.048		mg/Kg	1	2/26/2019 10:44:17 AM
Ethylbenzene	ND	0.048		mg/Kg	1	2/26/2019 10:44:17 AM
Xylenes, Total	ND	0.096		mg/Kg	1	2/26/2019 10:44:17 AM
Surr: 1,2-Dichloroethane-d4	111	70-130		%Rec	1	2/26/2019 10:44:17 AM
Surr: 4-Bromofluorobenzene	94.8	70-130		%Rec	1	2/26/2019 10:44:17 AM
Surr: Dibromofluoromethane	114	70-130		%Rec	1	2/26/2019 10:44:17 AM
Surr: Toluene-d8	96.6	70-130		%Rec	1	2/26/2019 10:44:17 AM
VOLATILES BY 8260B/1311						Analyst: **DJF**
Benzene	ND	0.50		mg/L	1	2/26/2019 8:17:36 PM
2-Butanone	ND	200		mg/L	1	2/26/2019 8:17:36 PM
Carbon Tetrachloride	ND	0.50		mg/L	1	2/26/2019 8:17:36 PM
Chlorobenzene	ND	100		mg/L	1	2/26/2019 8:17:36 PM
Chloroform	ND	6.0		mg/L	1	2/26/2019 8:17:36 PM
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/26/2019 8:17:36 PM
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/26/2019 8:17:36 PM
1,1-Dichloroethene	ND	0.70		mg/L	1	2/26/2019 8:17:36 PM
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/26/2019 8:17:36 PM
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/26/2019 8:17:36 PM
Vinyl chloride	ND	0.20		mg/L	1	2/26/2019 8:17:36 PM
Surr: 1,2-Dichloroethane-d4	110	70-130		%Rec	1	2/26/2019 8:17:36 PM
Surr: 4-Bromofluorobenzene	92.4	57.3-148		%Rec	1	2/26/2019 8:17:36 PM
Surr: Dibromofluoromethane	112	70-130		%Rec	1	2/26/2019 8:17:36 PM
Surr: Toluene-d8	90.7	70-130		%Rec	1	2/26/2019 8:17:36 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	03/01/2019 12:32	WG1243573

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	36.4		25.0	1	03/02/2019 14:25	WG1243462

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.88	T8	1	02/27/2019 15:20	WG1242757

Sample Narrative:
L1073318-01 WG1242757: 8.88 at 18.8C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	03/03/2019 14:55	WG1244534

WG1243570

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1073318-01

Method Blank (MB)

(MB) R3387970-1 03/01/19 12:25

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

Laboratory Control Sample (LCS)

(LCS) R3387970-2 03/01/19 12:27

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.47	98.8	50.0-150	

L1073321-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1073321-01 03/01/19 12:33 • (MS) R3387970-4 03/01/19 12:34 • (MSD) R3387970-5 03/01/19 12:35

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.58	1.51	94.6	90.9	1	75.0-125			4.02	20

WG1243462

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1073318-01

Method Blank (MB)

(MB) R3388170-1 03/02/19 14:25

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3388170-4 03/02/19 14:25

Analyte	Original Result	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide		ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3388170-2 03/02/19 14:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	72.9	72.9	70.0-130	

WG1242757

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1073318-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3387459-1 02/27/19 15:20

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.04 at 17.8C

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

WG1244534

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1073318-01

ONE LAB. NATIONWIDE.

L1073321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1073321-01 03/03/19 14:55 • (DUP) R3388273-2 03/03/19 14:55

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3388273-1 03/03/19 14:55

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.8	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43309**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43309**	RunNo: **57917**
Prep Date: **2/22/2019**	Analysis Date: **2/25/2019**	SeqNo: **1940344** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.0		5.000		79.3	70	130			

Sample ID: **MB-43309**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43309**	RunNo: **57917**
Prep Date: **2/22/2019**	Analysis Date: **2/25/2019**	SeqNo: **1940345** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.3		10.00		93.3	70	130			

Sample ID: **LCS-43329**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43329**	RunNo: **57917**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940538** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	103	63.9	124			
Surr: DNOP	4.7		5.000		94.1	70	130			

Sample ID: **MB-43329**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43329**	RunNo: **57917**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940539** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		96.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43319**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940605** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		99.3	73.8	119			

Sample ID: **LCS-43319**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940606** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	104	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43347** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **PBW** Batch ID: **43347** RunNo: **57982**

Prep Date: **2/26/2019** Analysis Date: **2/27/2019** SeqNo: **1942070** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0013		0.002500		53.2	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0011		0.002500		43.0	28.9	96.7			

Sample ID: **LCS-43347** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSW** Batch ID: **43347** RunNo: **57982**

Prep Date: **2/26/2019** Analysis Date: **2/27/2019** SeqNo: **1942071** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00029	0.00010	0.0005000	0	57.4	49.5	127			
gamma-BHC (Lindane)	0.00027	0.00010	0.0005000	0	53.3	49.9	124			
Heptachlor	0.00024	0.00010	0.0005000	0	48.5	41	122			
Heptachlor epoxide	0.00028	0.00010	0.0005000	0	55.0	52.2	121			
Methoxychlor	0.00029	0.00010	0.0005000	0	58.3	40.2	134			
Surr: Decachlorobiphenyl	0.0014		0.002500		55.5	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0010		0.002500		40.2	28.9	96.7			

Sample ID: **LCSD-43347** SampType: **LCSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSS02** Batch ID: **43347** RunNo: **57982**

Prep Date: **2/26/2019** Analysis Date: **2/27/2019** SeqNo: **1942072** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00033	0.00010	0.0005000	0	65.5	49.5	127	13.1	20	
gamma-BHC (Lindane)	0.00031	0.00010	0.0005000	0	62.3	49.9	124	15.6	20	
Heptachlor	0.00031	0.00010	0.0005000	0	61.9	41	122	24.1	20	R
Heptachlor epoxide	0.00032	0.00010	0.0005000	0	63.4	52.2	121	14.1	20	
Methoxychlor	0.00027	0.00010	0.0005000	0	53.8	40.2	134	8.06	20	
Surr: Decachlorobiphenyl	0.0015		0.002500		59.0	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		47.2	28.9	96.7	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43333**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941980** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.081		0.07500		108	70	130			

Sample ID: **LCS-43333**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941981** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	105	70	130			
2,4-D	0.084	0.010	0.07500	0	113	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.088		0.07500		117	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43319**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940923** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		111	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		93.0	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		112	70	130			
Surr: Toluene-d8	0.47		0.5000		94.5	70	130			

Sample ID: **lcs-43319**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940925** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.025	1.000	0	120	70	130			
Toluene	0.93	0.050	1.000	0	92.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.54		0.5000		108	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		91.0	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.45		0.5000		89.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43318** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**

Client ID: **LCSS** Batch ID: **43318** RunNo: **57958**

Prep Date: **2/25/2019** Analysis Date: **2/26/2019** SeqNo: **1940940** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.49	0.30	0.4000	0	121	70	130			
Chlorobenzene	0.37	0.30	0.4000	0	91.7	70	130			
1,1-Dichloroethene	0.50	0.30	0.4000	0	125	70	130			
Trichloroethene (TCE)	0.42	0.30	0.4000	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		115	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		92.9	57.3	148			
Surr: Dibromofluoromethane	0.23		0.2000		116	70	130			
Surr: Toluene-d8	0.18		0.2000		91.3	70	130			

Sample ID: **mb-43318** SampType: **MBLK** TestCode: **Volatiles by 8260B/1311**

Client ID: **PBS** Batch ID: **43318** RunNo: **58050**

Prep Date: **2/25/2019** Analysis Date: **3/1/2019** SeqNo: **1945732** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		112	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		110	70	130			
Surr: Toluene-d8	0.22		0.2000		108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43348**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942104** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200	0.1000	0	71.4	42.2	104			
3+4-Methylphenol	ND	200	0.2000	0	71.4	42.3	108			
2,4-Dinitrotoluene	ND	0.13	0.1000	0	69.5	45.8	87.8			
Hexachlorobenzene	ND	0.13	0.1000	0	80.5	54.5	104			
Hexachlorobutadiene	ND	0.50	0.1000	0	37.3	35.2	95.8			
Hexachloroethane	ND	3.0	0.1000	0	36.3	32.3	91.8			
Nitrobenzene	ND	2.0	0.1000	0	66.2	53.1	98.9			
Pentachlorophenol	ND	100	0.1000	0	64.3	30.3	104			
Pyridine	ND	5.0	0.1000	0	48.6	15	90			
2,4,5-Trichlorophenol	ND	400	0.1000	0	74.0	42.1	107			
2,4,6-Trichlorophenol	ND	2.0	0.1000	0	74.2	43.8	110			
Cresols, Total	ND	200	0.3000	0	71.4	44.1	111			
Surr: 2-Fluorophenol	0.091		0.2000		45.3	22.2	88.7			
Surr: Phenol-d5	0.067		0.2000		33.6	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		71.7	28.1	108			
Surr: Nitrobenzene-d5	0.063		0.1000		63.1	20.1	112			
Surr: 2-Fluorobiphenyl	0.049		0.1000		48.9	19.1	97.5			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.4	31.1	114			

Sample ID: **lcsd-43348**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200	0.1000	0	88.5	42.2	104	0	27.1	
3+4-Methylphenol	ND	200	0.2000	0	87.4	42.3	108	0	29.1	
2,4-Dinitrotoluene	ND	0.13	0.1000	0	80.5	45.8	87.8	0	30.6	
Hexachlorobenzene	ND	0.13	0.1000	0	91.7	54.5	104	0	22.5	
Hexachlorobutadiene	ND	0.50	0.1000	0	49.7	35.2	95.8	0	27.4	R
Hexachloroethane	ND	3.0	0.1000	0	48.1	32.3	91.8	0	28	
Nitrobenzene	ND	2.0	0.1000	0	88.4	53.1	98.9	0	26.2	R
Pentachlorophenol	ND	100	0.1000	0	71.4	30.3	104	0	21.3	
Pyridine	ND	5.0	0.1000	0	66.9	15	90	0	20	R
2,4,5-Trichlorophenol	ND	400	0.1000	0	82.0	42.1	107	0	29.3	
2,4,6-Trichlorophenol	ND	2.0	0.1000	0	86.8	43.8	110	0	27.4	
Cresols, Total	ND	200	0.3000	0	87.7	44.1	111	0	27.4	
Surr: 2-Fluorophenol	0.12		0.2000		60.2	22.2	88.7	0	20	
Surr: Phenol-d5	0.085		0.2000		42.4	16.4	74.1	0	20	
Surr: 2,4,6-Tribromophenol	0.17		0.2000		83.2	28.1	108	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcsd-43348**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.085		0.1000		85.2	20.1	112	0	20	
Surr: 2-Fluorobiphenyl	0.063		0.1000		62.7	19.1	97.5	0	20	
Surr: 4-Terphenyl-d14	0.060		0.1000		60.2	31.1	114	0	20	

Sample ID: **mb-43348**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.097		0.2000		48.6	22.2	88.7			
Surr: Phenol-d5	0.068		0.2000		34.1	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		69.0	28.1	108			
Surr: Nitrobenzene-d5	0.067		0.1000		67.0	20.1	112			
Surr: 2-Fluorobiphenyl	0.049		0.1000		49.1	19.1	97.5			
Surr: 4-Terphenyl-d14	0.050		0.1000		50.3	31.1	114			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43355**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43355**	RunNo: **57987**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941649** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43355**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43355**	RunNo: **57987**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941650** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A26**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43364**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43364**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942130** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	97.1	80	120			
Cadmium	ND	1.0	0.5000	0	100	80	120			
Chromium	ND	5.0	0.5000	0	97.7	80	120			
Lead	ND	5.0	0.5000	0	97.7	80	120			
Selenium	ND	1.0	0.5000	0	106	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Sample ID: **MB-43364**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942190** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID: **LCS-43364**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942191** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	98.8	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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Albuquerque, NM 87109
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Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902A26 RcptNo: 1

Received By: Isaiah Ortiz 2/21/2019 3:00:00 PM I-OK

Completed By: Anne Thorne 2/25/2019 8:52:56 AM Anne Thorne

Reviewed By: VVZ 2/25/19

Labeled by: YG 2/25/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: YG 2/25/19 (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.6	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106S8-2-idw

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[3] PROJECT PHASE/SITE/TASK:	[5] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505 224 9013~~ PF 505 238 4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	ICLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081B/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106S8-2-idw	roll-off S8-2	Soil	2-21-19	1245	IV	7	3	X	X	X	X	X	X		PF		Composite	HEALD 1902A216	-001
2																				
3																				
4																				
5								PF												
6																				
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:
FedEx Number: N/A Hand delivered to Hall Lab.

Temp: 0.6°C

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	2-21-19	1322	Printed Name and Signature: Joshua Livingston	2/21/19	13 22
Printed Name and Signature: Joshua Livingston	2/21/19	1500	Printed Name and Signature: Isaiah Ortiz CDO	2/21/19	1500
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

11 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (2), dated: 11 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring well KAFB-106S8

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring well KAFB-106S8, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 20-cubic-yard open-top roll-offs labeled **104058/ACT2045,** and **20B-26**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.11 15:35:58 -06'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 11, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S8-3 (Bin ID # 20B-26)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S8-3 (Bin ID # 20B-26) contains approximately 8 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106S8, located in the central portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902A19) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; (505) 846-9017.

If you have any questions, please do not hesitate to contact me at (505) 266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Lane Andress

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902A19

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Amanda Smith, asmith@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S8-3-idw		
			SAMPLE DATE		21-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S8-3		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.75	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.6
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.099

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity characteristic leaching procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 05, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX:

RE: Kirtland AFB BFF OrderNo.: 1902A19

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/21/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/21/2019 1:02:00 PM
Lab ID: 1902A19-001 **Matrix:** SOIL
Received Date: 2/21/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**
Chlordane	ND	0.030		mg/L	1	2/27/2019 3:15:03 PM
Endrin	ND	0.020		mg/L	1	2/27/2019 3:15:03 PM
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/27/2019 3:15:03 PM
Heptachlor	ND	0.0080		mg/L	1	2/27/2019 3:15:03 PM
Heptachlor epoxide	ND	0.0080		mg/L	1	2/27/2019 3:15:03 PM
Methoxychlor	ND	10		mg/L	1	2/27/2019 3:15:03 PM
Toxaphene	ND	0.50		mg/L	1	2/27/2019 3:15:03 PM
Surr: Decachlorobiphenyl	71.7	42.6-98.5		%Rec	1	2/27/2019 3:15:03 PM
Surr: Tetrachloro-m-xylene	52.3	28.9-96.7		%Rec	1	2/27/2019 3:15:03 PM
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/27/2019 3:53:02 PM
2,4-D	ND	10		mg/L	1	2/27/2019 3:53:02 PM
Surr: 2,4-Dichlorophenylacetic acid	103	70-130		%Rec	1	2/27/2019 3:53:02 PM
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	2/26/2019 4:06:34 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	2/26/2019 4:06:34 PM
Surr: DNOP	86.2	70-130		%Rec	1	2/26/2019 4:06:34 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	2/26/2019 10:50:39 AM
Surr: BFB	99.6	73.8-119		%Rec	1	2/26/2019 10:50:39 AM
MERCURY, TCLP						Analyst: **pmf**
Mercury	ND	0.020		mg/L	1	2/27/2019 1:32:37 PM
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**
Arsenic	ND	5.0		mg/L	1	2/27/2019 5:54:04 PM
Barium	ND	100		mg/L	1	2/27/2019 3:53:12 PM
Cadmium	ND	1.0		mg/L	1	2/27/2019 3:53:12 PM
Chromium	ND	5.0		mg/L	1	2/27/2019 3:53:12 PM
Lead	ND	5.0		mg/L	1	2/27/2019 3:53:12 PM
Selenium	ND	1.0		mg/L	1	2/27/2019 3:53:12 PM
Silver	ND	5.0		mg/L	1	2/27/2019 3:53:12 PM
EPA METHOD 8270C TCLP						Analyst: **DAM**
2-Methylphenol	ND	200		mg/L	1	2/27/2019 5:10:13 PM
3+4-Methylphenol	ND	200		mg/L	1	2/27/2019 5:10:13 PM
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/27/2019 5:10:13 PM
Hexachlorobenzene	ND	0.13		mg/L	1	2/27/2019 5:10:13 PM
Hexachlorobutadiene	ND	0.50		mg/L	1	2/27/2019 5:10:13 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/21/2019 1:02:00 PM
Lab ID: 1902A19-001 **Matrix:** SOIL
Received Date: 2/21/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C TCLP						Analyst: **DAM**
Hexachloroethane	ND	3.0		mg/L	1	2/27/2019 5:10:13 PM
Nitrobenzene	ND	2.0		mg/L	1	2/27/2019 5:10:13 PM
Pentachlorophenol	ND	100		mg/L	1	2/27/2019 5:10:13 PM
Pyridine	ND	5.0		mg/L	1	2/27/2019 5:10:13 PM
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/27/2019 5:10:13 PM
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/27/2019 5:10:13 PM
Cresols, Total	ND	200		mg/L	1	2/27/2019 5:10:13 PM
Surr: 2-Fluorophenol	46.4	22.2-88.7		%Rec	1	2/27/2019 5:10:13 PM
Surr: Phenol-d5	32.4	16.4-74.1		%Rec	1	2/27/2019 5:10:13 PM
Surr: 2,4,6-Tribromophenol	61.1	28.1-108		%Rec	1	2/27/2019 5:10:13 PM
Surr: Nitrobenzene-d5	61.0	20.1-112		%Rec	1	2/27/2019 5:10:13 PM
Surr: 2-Fluorobiphenyl	46.2	19.1-97.5		%Rec	1	2/27/2019 5:10:13 PM
Surr: 4-Terphenyl-d14	59.5	31.1-114		%Rec	1	2/27/2019 5:10:13 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	2/26/2019 11:14:00 AM
Toluene	ND	0.050		mg/Kg	1	2/26/2019 11:14:00 AM
Ethylbenzene	ND	0.050		mg/Kg	1	2/26/2019 11:14:00 AM
Xylenes, Total	ND	0.099		mg/Kg	1	2/26/2019 11:14:00 AM
Surr: 1,2-Dichloroethane-d4	111	70-130		%Rec	1	2/26/2019 11:14:00 AM
Surr: 4-Bromofluorobenzene	94.8	70-130		%Rec	1	2/26/2019 11:14:00 AM
Surr: Dibromofluoromethane	113	70-130		%Rec	1	2/26/2019 11:14:00 AM
Surr: Toluene-d8	95.8	70-130		%Rec	1	2/26/2019 11:14:00 AM
VOLATILES BY 8260B/1311						Analyst: **DJF**
Benzene	ND	0.50		mg/L	1	2/26/2019 6:47:55 PM
2-Butanone	ND	200		mg/L	1	2/26/2019 6:47:55 PM
Carbon Tetrachloride	ND	0.50		mg/L	1	2/26/2019 6:47:55 PM
Chlorobenzene	ND	100		mg/L	1	2/26/2019 6:47:55 PM
Chloroform	ND	6.0		mg/L	1	2/26/2019 6:47:55 PM
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/26/2019 6:47:55 PM
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/26/2019 6:47:55 PM
1,1-Dichloroethene	ND	0.70		mg/L	1	2/26/2019 6:47:55 PM
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/26/2019 6:47:55 PM
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/26/2019 6:47:55 PM
Vinyl chloride	ND	0.20		mg/L	1	2/26/2019 6:47:55 PM
Surr: 1,2-Dichloroethane-d4	112	70-130		%Rec	1	2/26/2019 6:47:55 PM
Surr: 4-Bromofluorobenzene	91.0	57.3-148		%Rec	1	2/26/2019 6:47:55 PM
Surr: Dibromofluoromethane	107	70-130		%Rec	1	2/26/2019 6:47:55 PM
Surr: Toluene-d8	91.2	70-130		%Rec	1	2/26/2019 6:47:55 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Cyanide	ND		0.250	1	03/01/2019 12:33	WG1243570

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Sulfide	ND		25.0	1	03/02/2019 14:25	WG1243462

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	8.75	T6	1	02/27/2019 15:20	WG1242757

Sample Narrative:
L1073321-01 WG1242757: 8.75 at 19.9C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	Deg. F			date / time	
Ignitability	DNI at 170		1	03/03/2019 14:55	WG1244534

WG1243570

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1073321-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3387970-1 03/01/19 12:26

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

Laboratory Control Sample (LCS)

(LCS) R3387970-2 03/01/19 12:27

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.47	98.8	50.0-150	

L1073321-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1073321-01 03/01/19 12:33 • (MS) R3387970-4 03/01/19 12:34 • (MSD) R3387970-5 03/01/19 12:35

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.58	1.51	94.5	90.9	1	75.0-125			4.02	20

WG1243462

Wet Chemistry by Method 9034-90308

QUALITY CONTROL SUMMARY

L1073321-01

Method Blank (MB)

(MB) R3388170-1 03/02/19 14:25

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1073321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1073321-01 03/02/19 14:25 • (DUP) R3388170-4 03/02/19 14:25

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3388170-2 03/02/19 14:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	72.9	72.9	70.0-130	

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

WG1242757

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1073321-01

ONE LAB. NATIONWIDE

Laboratory Control Sample (LCS)

(LCS) R3387459-1 02/27/19 15:20

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.04 at 17.8C

WG1244534

Wet Chemistry by Method DS3/1010A

QUALITY CONTROL SUMMARY

L1073321-01

L1073321-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1073321-01 03/03/19 14:55 • (DUP) R3388273-2 03/03/19 14:55

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3388273-1 03/03/19 14:55

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.8	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43309**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43309**	RunNo: **57917**
Prep Date: **2/22/2019**	Analysis Date: **2/25/2019**	SeqNo: **1940344** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.0		5.000		79.3	70	130			

Sample ID: **MB-43309**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43309**	RunNo: **57917**
Prep Date: **2/22/2019**	Analysis Date: **2/25/2019**	SeqNo: **1940345** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.3		10.00		93.3	70	130			

Sample ID: **LCS-43329**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43329**	RunNo: **57917**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940538** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	103	63.9	124			
Surr: DNOP	4.7		5.000		94.1	70	130			

Sample ID: **MB-43329**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43329**	RunNo: **57917**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940539** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		96.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43319**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940605** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		99.3	73.8	119			

Sample ID: **LCS-43319**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940606** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	104	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43347**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43347**	RunNo: **57982**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942070** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0013		0.002500		53.2	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0011		0.002500		43.0	28.9	96.7			

Sample ID: **LCS-43347**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43347**	RunNo: **57982**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942071** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00029	0.00010	0.0005000	0	57.4	49.5	127			
gamma-BHC (Lindane)	0.00027	0.00010	0.0005000	0	53.3	49.9	124			
Heptachlor	0.00024	0.00010	0.0005000	0	48.5	41	122			
Heptachlor epoxide	0.00028	0.00010	0.0005000	0	55.0	52.2	121			
Methoxychlor	0.00029	0.00010	0.0005000	0	58.3	40.2	134			
Surr: Decachlorobiphenyl	0.0014		0.002500		55.5	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0010		0.002500		40.2	28.9	96.7			

Sample ID: **LCSD-43347**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **43347**	RunNo: **57982**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942072** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00033	0.00010	0.0005000	0	65.5	49.5	127	13.1	20	
gamma-BHC (Lindane)	0.00031	0.00010	0.0005000	0	62.3	49.9	124	15.6	20	
Heptachlor	0.00031	0.00010	0.0005000	0	61.9	41	122	24.1	20	R
Heptachlor epoxide	0.00032	0.00010	0.0005000	0	63.4	52.2	121	14.1	20	
Methoxychlor	0.00027	0.00010	0.0005000	0	53.8	40.2	134	8.06	20	
Surr: Decachlorobiphenyl	0.0015		0.002500		59.0	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		47.2	28.9	96.7	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43333**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941980** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.081		0.07500		108	70	130			

Sample ID: **LCS-43333**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941981** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	105	70	130			
2,4-D	0.084	0.010	0.07500	0	113	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.088		0.07500		117	70	130			

Sample ID: **1902A19-001AMS**	SampType: **MS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **KAFB-106S8-3-idw**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941988** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	105	70	130			
2,4-D	0.084	0.010	0.07500	0	112	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.080		0.07500		107	70	130			

Sample ID: **1902A19-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **KAFB-106S8-3-idw**	Batch ID: **43333**	RunNo: **57984**
Prep Date: **2/27/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941989** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	117	70	130	0	20	
2,4-D	0.092	0.010	0.07500	0	122	70	130	9.02	20	
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43319**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940923** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		111	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		93.0	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		112	70	130			
Surr: Toluene-d8	0.47		0.5000		94.5	70	130			

Sample ID: **lcs-43319**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940925** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.025	1.000	0	120	70	130			
Toluene	0.93	0.050	1.000	0	92.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.54		0.5000		108	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		91.0	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.45		0.5000		89.8	70	130			

Sample ID: **1902a19-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S8-3-idw**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940929** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.024	0.9625	0	124	68.9	131			
Toluene	0.93	0.048	0.9625	0	96.7	64.3	137			
Surr: 1,2-Dichloroethane-d4	0.53		0.4812		110	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.4812		89.8	70	130			
Surr: Dibromofluoromethane	0.53		0.4812		111	70	130			
Surr: Toluene-d8	0.44		0.4812		92.3	70	130			

Sample ID: **1902a19-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S8-3-idw**	Batch ID: **43319**	RunNo: **57958**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940930** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.024	0.9524	0	126	68.9	131	0.292	20	
Toluene	0.93	0.048	0.9524	0	98.1	64.3	137	0.372	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**
05-Mar-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **1902a19-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106S8-3-idw** Batch ID: **43319** RunNo: **57958**
Prep Date: **2/25/2019** Analysis Date: **2/26/2019** SeqNo: **1940930** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.54		0.4762		113	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.44		0.4762		91.8	70	130	0	0	
Surr: Dibromofluoromethane	0.53		0.4762		112	70	130	0	0	
Surr: Toluene-d8	0.43		0.4762		91.0	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43318** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**

Client ID: **LCSS** Batch ID: **43318** RunNo: **57958**

Prep Date: **2/25/2019** Analysis Date: **2/26/2019** SeqNo: **1940940** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.49	0.30	0.4000	0	121	70	130			
Chlorobenzene	0.37	0.30	0.4000	0	91.7	70	130			
1,1-Dichloroethene	0.50	0.30	0.4000	0	125	70	130			
Trichloroethene (TCE)	0.42	0.30	0.4000	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		115	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		92.9	57.3	148			
Surr: Dibromofluoromethane	0.23		0.2000		116	70	130			
Surr: Toluene-d8	0.18		0.2000		91.3	70	130			

Sample ID: **1902a19-001ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S8-3-idw** Batch ID: **43318** RunNo: **57958**

Prep Date: **2/25/2019** Analysis Date: **2/26/2019** SeqNo: **1940942** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.48	0.30	0.4000	0	119	68.3	131			
Chlorobenzene	0.37	0.30	0.4000	0	93.0	80	120			
1,1-Dichloroethene	0.49	0.30	0.4000	0	123	64.3	135			
Trichloroethene (TCE)	0.41	0.30	0.4000	0	103	80	120			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		112	70	130			
Surr: 4-Bromofluorobenzene	0.18		0.2000		89.5	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		112	70	130			
Surr: Toluene-d8	0.19		0.2000		93.1	70	130			

Sample ID: **1902a19-001amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S8-3-idw** Batch ID: **43318** RunNo: **57958**

Prep Date: **2/25/2019** Analysis Date: **2/26/2019** SeqNo: **1940943** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.45	0.30	0.4000	0	112	68.3	131	5.93	20	
Chlorobenzene	0.34	0.30	0.4000	0	85.8	80	120	8.11	20	
1,1-Dichloroethene	0.45	0.30	0.4000	0	112	64.3	135	9.11	20	
Trichloroethene (TCE)	0.39	0.30	0.4000	0	96.8	80	120	6.60	20	
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.18		0.2000		91.2	57.3	148	0	0	
Surr: Dibromofluoromethane	0.22		0.2000		111	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		93.5	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**
05-Mar-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID: **mb-43318**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43318**	RunNo: **58050**
Prep Date: **2/25/2019**	Analysis Date: **3/1/2019**	SeqNo: **1945732** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		112	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		110	70	130			
Surr: Toluene-d8	0.22		0.2000		108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43348** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS** Batch ID: **43348** RunNo: **58001**

Prep Date: **2/26/2019** Analysis Date: **2/27/2019** SeqNo: **1942104** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200	0.1000	0	71.4	42.2	104			
3+4-Methylphenol	ND	200	0.2000	0	71.4	42.3	108			
2,4-Dinitrotoluene	ND	0.13	0.1000	0	69.5	45.8	87.8			
Hexachlorobenzene	ND	0.13	0.1000	0	80.5	54.5	104			
Hexachlorobutadiene	ND	0.50	0.1000	0	37.3	35.2	95.8			
Hexachloroethane	ND	3.0	0.1000	0	36.3	32.3	91.8			
Nitrobenzene	ND	2.0	0.1000	0	66.2	53.1	98.9			
Pentachlorophenol	ND	100	0.1000	0	64.3	30.3	104			
Pyridine	ND	5.0	0.1000	0	48.6	15	90			
2,4,5-Trichlorophenol	ND	400	0.1000	0	74.0	42.1	107			
2,4,6-Trichlorophenol	ND	2.0	0.1000	0	74.2	43.8	110			
Cresols, Total	ND	200	0.3000	0	71.4	44.1	111			
Surr: 2-Fluorophenol	0.091		0.2000		45.3	22.2	88.7			
Surr: Phenol-d5	0.067		0.2000		33.6	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		71.7	28.1	108			
Surr: Nitrobenzene-d5	0.063		0.1000		63.1	20.1	112			
Surr: 2-Fluorobiphenyl	0.049		0.1000		48.9	19.1	97.5			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.4	31.1	114			

Sample ID: **lcsd-43348** SampType: **LCSD** TestCode: **EPA Method 8270C TCLP**

Client ID: **LCSS02** Batch ID: **43348** RunNo: **58001**

Prep Date: **2/26/2019** Analysis Date: **2/27/2019** SeqNo: **1942105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200	0.1000	0	88.5	42.2	104	0	27.1	
3+4-Methylphenol	ND	200	0.2000	0	87.4	42.3	108	0	29.1	
2,4-Dinitrotoluene	ND	0.13	0.1000	0	80.5	45.8	87.8	0	30.6	
Hexachlorobenzene	ND	0.13	0.1000	0	91.7	54.5	104	0	22.5	
Hexachlorobutadiene	ND	0.50	0.1000	0	49.7	35.2	95.8	0	27.4	R
Hexachloroethane	ND	3.0	0.1000	0	48.1	32.3	91.8	0	28	
Nitrobenzene	ND	2.0	0.1000	0	88.4	53.1	98.9	0	26.2	R
Pentachlorophenol	ND	100	0.1000	0	71.4	30.3	104	0	21.3	
Pyridine	ND	5.0	0.1000	0	66.9	15	90	0	20	R
2,4,5-Trichlorophenol	ND	400	0.1000	0	82.0	42.1	107	0	29.3	
2,4,6-Trichlorophenol	ND	2.0	0.1000	0	86.8	43.8	110	0	27.4	
Cresols, Total	ND	200	0.3000	0	87.7	44.1	111	0	27.4	
Surr: 2-Fluorophenol	0.12		0.2000		60.2	22.2	88.7	0	20	
Surr: Phenol-d5	0.085		0.2000		42.4	16.4	74.1	0	20	
Surr: 2,4,6-Tribromophenol	0.17		0.2000		83.2	28.1	108	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcsd-43348**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.085		0.1000		85.2	20.1	112	0	20	
Surr: 2-Fluorobiphenyl	0.063		0.1000		62.7	19.1	97.5	0	20	
Surr: 4-Terphenyl-d14	0.060		0.1000		60.2	31.1	114	0	20	

Sample ID: **mb-43348**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43348**	RunNo: **58001**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.097		0.2000		48.6	22.2	88.7			
Surr: Phenol-d5	0.068		0.2000		34.1	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		69.0	28.1	108			
Surr: Nitrobenzene-d5	0.067		0.1000		67.0	20.1	112			
Surr: 2-Fluorobiphenyl	0.049		0.1000		49.1	19.1	97.5			
Surr: 4-Terphenyl-d14	0.050		0.1000		50.3	31.1	114			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43355**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43355**	RunNo: **57987**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941649** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43355**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43355**	RunNo: **57987**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941650** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A19**

05-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43364**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43364**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942130** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	97.1	80	120			
Cadmium	ND	1.0	0.5000	0	100	80	120			
Chromium	ND	5.0	0.5000	0	97.7	80	120			
Lead	ND	5.0	0.5000	0	97.7	80	120			
Selenium	ND	1.0	0.5000	0	106	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Sample ID: **MB-43364**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942190** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID: **LCS-43364**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43364**	RunNo: **58003**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1942191** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	98.8	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902A19 RcptNo: 1

Received By: Isaiah Ortiz 2/21/2019 3:00:00 PM I-Ox

Completed By: Anne Thorne 2/22/2019 3:42:55 PM Anne Thorne

Reviewed By: VV2 2/25/19

Labeled by: YG 2/25/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: YG 2/25/19 (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.6	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3 PF~~ 62735DM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[3] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells PF~~ Vadose Zone Wells		~~15182 PF~~ 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013 PF~~ 505 238 7410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)			[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
																PF		HEX #	
1	~~FTF~~ B-106S8-3-1dw	0.1 - 0.5 S8-3	Soil	2-21-19	1302	IV	7	3	X	X	X	X	X	X			comps	CL 1902-AH-01	
2																			
3																			
4																			
5																			
6									PF										
7																			
8																			
9																			
10																			

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:

FedEx Number: N/A Hand delivered to Hall Lab.

Temp: 0.6 °C

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	2-21-19	1322	Printed Name and Signature: Joshua Livingston	2/21/19	1322
Printed Name and Signature: Joshua Livingston	2/21/19	1500	Printed Name and Signature: Isaiah Ortiz COC	2/21/19	1500
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

14 November 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 7 November 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S5, KAFB-106S4, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104050, 104056,** and **22023**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either NM license plate WD121651, or NM license plate WD124756. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.11.14 11:44:49 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

November 6, 2018 **DRAFT**

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S9-1 (Bin ID #22023)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of S9-1 (Bin ID #22023) contains approximately 16 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S9, at this location. Well KAFB-106S9 is located immediately west of the Bulk Fuels Facility access gate off Randolph Ave. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810B86) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810B86

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S9-1-idw		
			SAMPLE DATE		23-Oct-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S9-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.25	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.5
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	48
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	4.8
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.024
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.048
		TOLUENE	mg/kg	50[e]	ND	--	0.048
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.097

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 06, 2018

Earl Morse
EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland AFB BFF OrderNo.: 1810B86

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/23/2018 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued Novwmber 05, 2018.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-S9-1-idw
Project: Kirtland AFB BFF
Collection Date: 10/23/2018 9:40:00 AM
Lab ID: 1810B86-001 **Matrix:** SOIL **Received Date:** 10/23/2018 10:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	10/26/2018 3:21:08 PM	41196
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	10/26/2018 1:08:04 PM	41204
Barium	ND	100		mg/L	1	10/26/2018 10:53:52 AM	41204
Cadmium	ND	1.0		mg/L	1	10/26/2018 10:53:52 AM	41204
Chromium	ND	5.0		mg/L	1	10/26/2018 10:53:52 AM	41204
Lead	ND	5.0		mg/L	1	10/26/2018 10:53:52 AM	41204
Selenium	ND	1.0		mg/L	1	10/26/2018 10:53:52 AM	41204
Silver	ND	5.0		mg/L	1	10/26/2018 10:53:52 AM	41204
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	10/26/2018 12:56:05 PM	41186
Endrin	ND	0.020		mg/L	1	10/26/2018 12:56:05 PM	41186
gamma-BHC (Lindane)	ND	0.40		mg/L	1	10/26/2018 12:56:05 PM	41186
Heptachlor	ND	0.0080		mg/L	1	10/26/2018 12:56:05 PM	41186
Heptachlor epoxide	ND	0.0080		mg/L	1	10/26/2018 12:56:05 PM	41186
Methoxychlor	ND	10		mg/L	1	10/26/2018 12:56:05 PM	41186
Toxaphene	ND	0.50		mg/L	1	10/26/2018 12:56:05 PM	41186
Surr: Decachlorobiphenyl	80.2	58.3-109		%Rec	1	10/26/2018 12:56:05 PM	41186
Surr: Tetrachloro-m-xylene	67.2	40.1-101		%Rec	1	10/26/2018 12:56:05 PM	41186
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	10/26/2018 10:46:22 PM	41199
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/26/2018 10:46:22 PM	41199
Surr: DNOP	94.4	50.6-138		%Rec	1	10/26/2018 10:46:22 PM	41199
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	10/26/2018 11:31:08 AM	41173
Surr: BFB	91.7	15-316		%Rec	1	10/26/2018 11:31:08 AM	41173
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	10/26/2018 3:21:54 PM	41184
3+4-Methylphenol	ND	200		mg/L	1	10/26/2018 3:21:54 PM	41184
2,4-Dinitrotoluene	ND	0.13		mg/L	1	10/26/2018 3:21:54 PM	41184
Hexachlorobenzene	ND	0.13		mg/L	1	10/26/2018 3:21:54 PM	41184
Hexachlorobutadiene	ND	0.50		mg/L	1	10/26/2018 3:21:54 PM	41184
Hexachloroethane	ND	3.0		mg/L	1	10/26/2018 3:21:54 PM	41184
Nitrobenzene	ND	2.0		mg/L	1	10/26/2018 3:21:54 PM	41184
Pentachlorophenol	ND	100		mg/L	1	10/26/2018 3:21:54 PM	41184
Pyridine	ND	5.0		mg/L	1	10/26/2018 3:21:54 PM	41184
2,4,5-Trichlorophenol	ND	400		mg/L	1	10/26/2018 3:21:54 PM	41184

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-S9-1-idw
Project: Kirtland AFB BFF
Collection Date: 10/23/2018 9:40:00 AM
Lab ID: 1810B86-001 **Matrix:** SOIL **Received Date:** 10/23/2018 10:30:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	10/26/2018 3:21:54 PM	41184
Cresols, Total	ND	200		mg/L	1	10/26/2018 3:21:54 PM	41184
Surr: 2-Fluorophenol	46.6	15-102		%Rec	1	10/26/2018 3:21:54 PM	41184
Surr: Phenol-d5	34.8	15-87.7		%Rec	1	10/26/2018 3:21:54 PM	41184
Surr: 2,4,6-Tribromophenol	54.2	39.9-111		%Rec	1	10/26/2018 3:21:54 PM	41184
Surr: Nitrobenzene-d5	64.2	35.1-107		%Rec	1	10/26/2018 3:21:54 PM	41184
Surr: 2-Fluorobiphenyl	54.2	36.7-100		%Rec	1	10/26/2018 3:21:54 PM	41184
Surr: 4-Terphenyl-d14	71.4	42.6-129		%Rec	1	10/26/2018 3:21:54 PM	41184
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.024		mg/Kg	1	10/25/2018 11:30:08 AM	41173
Toluene	ND	0.048		mg/Kg	1	10/25/2018 11:30:08 AM	41173
Ethylbenzene	ND	0.048		mg/Kg	1	10/25/2018 11:30:08 AM	41173
Xylenes, Total	ND	0.097		mg/Kg	1	10/25/2018 11:30:08 AM	41173
Surr: Dibromofluoromethane	103	70-130		%Rec	1	10/25/2018 11:30:08 AM	41173
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	10/25/2018 11:30:08 AM	41173
Surr: Toluene-d8	103	70-130		%Rec	1	10/25/2018 11:30:08 AM	41173
Surr: 4-Bromofluorobenzene	96.2	70-130		%Rec	1	10/25/2018 11:30:08 AM	41173
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	10/25/2018 4:24:28 PM	41170
2-Butanone	ND	200		mg/L	1	10/25/2018 4:24:28 PM	41170
Carbon Tetrachloride	ND	0.50		mg/L	1	10/25/2018 4:24:28 PM	41170
Chlorobenzene	ND	100		mg/L	1	10/25/2018 4:24:28 PM	41170
Chloroform	ND	6.0		mg/L	1	10/25/2018 4:24:28 PM	41170
1,4-Dichlorobenzene	ND	7.5		mg/L	1	10/25/2018 4:24:28 PM	41170
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	10/25/2018 4:24:28 PM	41170
1,1-Dichloroethene	ND	0.70		mg/L	1	10/25/2018 4:24:28 PM	41170
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	10/25/2018 4:24:28 PM	41170
Trichloroethene (TCE)	ND	0.50		mg/L	1	10/25/2018 4:24:28 PM	41170
Vinyl chloride	ND	0.20		mg/L	1	10/25/2018 4:24:28 PM	41170
Surr: 1,2-Dichloroethane-d4	87.9	70-130		%Rec	1	10/25/2018 4:24:28 PM	41170
Surr: 4-Bromofluorobenzene	102	57.3-148		%Rec	1	10/25/2018 4:24:28 PM	41170
Surr: Dibromofluoromethane	88.5	70-130		%Rec	1	10/25/2018 4:24:28 PM	41170
Surr: Toluene-d8	95.8	70-130		%Rec	1	10/25/2018 4:24:28 PM	41170

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		10/25/2018 10:21:16 AM	WG1186274
Fluid	1		10/25/2018 10:21:16 AM	WG1186274
Initial pH	8.91		10/25/2018 10:21:16 AM	WG1186274
Final pH	4.82		10/25/2018 10:21:16 AM	WG1186274

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	10/30/2018 15:25	WG1188160

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	10/31/2018 13:20	WG1189175

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.25	T8	1	10/25/2018 12:06	WG1186183

Sample Narrative:

L1037501-01 WG1186183: 9.25 at 18.5C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	10/27/2018 19:20	WG1187390

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	11/03/2018 04:42	WG1189133
2,4-D	ND		0.00200	10	1	11/03/2018 04:42	WG1189133
(S) 2,4-Dichlorophenyl Acetic Acid	*85.0*		*14.0-158*			*11/03/2018 04:42*	WG1189133

Method Blank (MB)

(MB) R3355254-1 10/30/18 15:20

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1037501-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037501-01 10/30/18 15:25 • (DUP) R3355254-3 10/30/18 15:26

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1038504-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1038504-01 10/30/18 15:39 • (DUP) R3355254-6 10/30/18 15:40

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3355254-2 10/30/18 15:21

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.68	107	50.0-150	

L1037725-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1037725-01 10/30/18 15:32 • (MS) R3355254-4 10/30/18 15:33 • (MSD) R3355254-5 10/30/18 15:34

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.62	1.56	97.1	93.7	1	75.0-125			3.60	20

L1038504-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1038504-03 10/30/18 15:44 • (MS) R3355254-7 10/30/18 15:45 • (MSD) R3355254-8 10/30/18 15:46

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.58	1.54	94.7	92.2	1	75.0-125			2.77	20

Method Blank (MB)

(MB) R3355595-1 10/31/18 13:20

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1037686-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037686-01 10/31/18 13:20 • (DUP) R3355595-3 10/31/18 13:20

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	42.2	42.2	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3355595-2 10/31/18 13:20

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	84.4	84.4	70.0-130	

L1037531-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037531-01 10/25/18 12:06 • (DUP) R3353812-2 10/25/18 12:06

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.75	8.71	1	0.458		1

Sample Narrative:

OS: 8.75 at 18.8C

DUP: 8.71 at 18.2C

Laboratory Control Sample (LCS)

(LCS) R3353812-1 10/25/18 12:06

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10 at 16.1C

L1037686-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1037686-01 10/27/18 19:20 • (DUP) R3354954-2 10/27/18 19:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3354954-1 10/27/18 19:20

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	81.8	99.8	96.0-104	

Method Blank (MB)

(MB) R3356160-1 11/01/18 19:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*61.6*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3356160-2 11/01/18 19:14 • (LCSD) R3356160-3 11/01/18 19:27

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
2,4-D	0.0500	0.0334	0.0369	66.8	73.8	50.0-120			9.96	20
2,4,5-TP (Silvex)	0.0500	0.0265	0.0305	53.0	61.0	50.0-125			14.0	20
(S) 2,4-Dichlorophenyl Acetic Acid				*59.4*	*63.8*	*14.0-158*				

L1038473-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1038473-01 11/02/18 21:55 • (MS) R3356486-1 11/02/18 22:08 • (MSD) R3356486-2 11/02/18 22:22

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0268	0.0237	53.6	47.4	1	50.0-120		J6	12.3	20
2,4,5-TP (Silvex)	0.0500	ND	0.0339	0.0382	67.8	76.4	1	50.0-125			11.9	20
(S) 2,4-Dichlorophenyl Acetic Acid					*72.0*	*87.0*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41199**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**41199**		RunNo:	**55190**				
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**		SeqNo:	**1835508**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.4		10.00		84.2	50.6	138			

Sample ID	**LCS-41199**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**41199**		RunNo:	**55190**				
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**		SeqNo:	**1835526**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	41	10	50.00	0	82.3	70	130			
Surr: DNOP	4.1		5.000		81.3	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41173**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**41173**		RunNo:	**55171**				
Prep Date:	**10/24/2018**	Analysis Date:	**10/25/2018**		SeqNo:	**1834199**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	900		1000		90.4	15	316			

Sample ID	**LCS-41173**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**41173**		RunNo:	**55171**				
Prep Date:	**10/24/2018**	Analysis Date:	**10/25/2018**		SeqNo:	**1834200**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	75.9	131			
Surr: BFB	1000		1000		104	15	316			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **MB-41186**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0017		0.002500		66.9	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.7	40.1	101			

Sample ID **LCS-41186**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41186**	RunNo: **55188**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1835412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	75.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	76.7	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.3	41	122			
Heptachlor epoxide	0.00038	0.00010	0.0005000	0	76.7	52.2	121			
Methoxychlor	0.00035	0.00010	0.0005000	0	70.8	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		73.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		70.5	40.1	101			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41173**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **41173**	RunNo: **55175**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834327** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		98.6	70	130			

Sample ID **lcs-41173**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **41173**	RunNo: **55175**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834331** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	103	70	130			
Toluene	1.1	0.050	1.000	0	105	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		106	70	130			
Surr: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.4	70	130			

Sample ID **1810b86-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-S9-1-idw**	Batch ID: **41173**	RunNo: **55175**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834335** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	0.9881	0	99.5	68.9	131			
Toluene	1.0	0.049	0.9881	0	102	64.3	137			
Surr: Dibromofluoromethane	0.51		0.4941		103	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.4941		97.9	70	130			
Surr: Toluene-d8	0.51		0.4941		102	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.4941		100	70	130			

Sample ID **1810b86-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-S9-1-idw**	Batch ID: **41173**	RunNo: **55175**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834342** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.024	0.9671	0	101	68.9	131	0.840	20	
Toluene	1.0	0.048	0.9671	0	106	64.3	137	1.14	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**1810b86-001amsd**	SampType:	**MSD**	TestCode:	**EPA Method 8260B: Volatiles**				
Client ID:	**KAFB-S9-1-idw**	Batch ID:	**41173**	RunNo:	**55175**				
Prep Date:	**10/24/2018**	Analysis Date:	**10/25/2018**	SeqNo:	**1834342**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.50		0.4836		103	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.49		0.4836		101	70	130	0	0	
Surr: Toluene-d8	0.49		0.4836		101	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.48		0.4836		98.9	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **1810b86-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-S9-1-idw**	Batch ID: **41170**	RunNo: **55173**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834387** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.36	0.30	0.4000	0	89.1	44.5	152			
Chlorobenzene	0.39	0.30	0.4000	0	97.3	70	130			
1,1-Dichloroethene	0.34	0.30	0.4000	0	85.3	79.1	132			
Trichloroethene (TCE)	0.33	0.30	0.4000	0	82.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		89.8	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		91.3	70	130			
Surr: Toluene-d8	0.19		0.2000		95.7	70	130			

Sample ID **1810b86-001amsd**	SampType: **MSD**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-S9-1-idw**	Batch ID: **41170**	RunNo: **55173**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834388** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.34	0.30	0.4000	0	84.4	44.5	152	5.41	20	
Chlorobenzene	0.37	0.30	0.4000	0	92.8	70	130	4.75	20	
1,1-Dichloroethene	0.31	0.30	0.4000	0	76.9	79.1	132	10.4	20	S
Trichloroethene (TCE)	0.31	0.30	0.4000	0	76.5	70	130	7.54	20	
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.8	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.21		0.2000		104	57.3	148	0	0	
Surr: Dibromofluoromethane	0.18		0.2000		91.1	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		95.5	70	130	0	0	

Sample ID **lcs-41170**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41170**	RunNo: **55173**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834389** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.30	0.4000	0	87.2	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	96.2	70	130			
1,1-Dichloroethene	0.34	0.30	0.4000	0	85.3	70	130			
Trichloroethene (TCE)	0.32	0.30	0.4000	0	81.0	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		85.9	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.7	70	130			
Surr: Toluene-d8	0.19		0.2000		96.0	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41170**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41170**	RunNo: **55173**
Prep Date: **10/24/2018**	Analysis Date: **10/25/2018**	SeqNo: **1834390** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.5	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		105	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		90.6	70	130			
Surr: Toluene-d8	0.19		0.2000		97.4	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **lcs-41184**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836263** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.12	0.0010	0.2000	0	61.6	47.8	99.2			
3+4-Methylphenol	0.33	0.0010	0.4000	0	81.8	41.5	118			
2,4-Dinitrotoluene	0.13	0.0010	0.2000	0	65.7	44.4	81			
Hexachlorobenzene	0.15	0.0010	0.2000	0	75.5	49.5	91.6			
Hexachlorobutadiene	0.11	0.0010	0.2000	0	53.2	38.6	93			
Hexachloroethane	0.093	0.0010	0.2000	0	46.5	39.4	79.9			
Nitrobenzene	0.13	0.0010	0.2000	0	67.3	47.4	96.2			
Pentachlorophenol	0.10	0.0010	0.2000	0	52.3	39.4	79.9			
Pyridine	0.042	0.0010	0.2000	0	20.9	15	79.9			
2,4,5-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	118			
2,4,6-Trichlorophenol	0.13	0.0010	0.2000	0	64.0	47.4	101			
Cresols, Total	0.45	0.0010	0.6000	0	75.1	44.1	111			
Surr: 2-Fluorophenol	0.080		0.2000		40.2	15	102			
Surr: Phenol-d5	0.067		0.2000		33.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.9	39.9	111			
Surr: Nitrobenzene-d5	0.068		0.1000		68.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.063		0.1000		63.4	36.7	100			
Surr: 4-Terphenyl-d14	0.077		0.1000		77.3	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.060		0.2000		29.8	15	102			
Surr: Phenol-d5	0.047		0.2000		23.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.079		0.2000		39.4	39.9	111			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55218**
Prep Date: **10/25/2018**	Analysis Date: **10/26/2018**	SeqNo: **1836264** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.044		0.1000		44.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.042		0.1000		41.5	36.7	100			
Surr: 4-Terphenyl-d14	0.063		0.1000		62.7	42.6	129			

Sample ID **mb-41184**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **41184**	RunNo: **55261**
Prep Date: **10/25/2018**	Analysis Date: **10/30/2018**	SeqNo: **1838305** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.4	15	102			
Surr: Phenol-d5	0.046		0.2000		23.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.087		0.2000		43.4	39.9	111			
Surr: Nitrobenzene-d5	0.046		0.1000		46.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.041		0.1000		40.8	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.0	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41196**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**41196**	RunNo:	**55202**					
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835538**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-41196**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**41196**	RunNo:	**55202**					
Prep Date:	**10/25/2018**	Analysis Date:	**10/26/2018**	SeqNo:	**1835539**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.1	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**MB-41204**	SampType: **MBLK**		TestCode: **EPA Method 6010B: TCLP Metals**						
Client ID:	**PBW**	Batch ID: **41204**		RunNo: **55199**						
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835468**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-41204**	SampType: **LCS**		TestCode: **EPA Method 6010B: TCLP Metals**						
Client ID:	**LCSW**	Batch ID: **41204**		RunNo: **55199**						
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835470**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	104	80	120			
Cadmium	ND	1.0	0.5000	0	106	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	99.9	80	120			
Selenium	ND	1.0	0.5000	0	107	80	120			
Silver	ND	5.0	0.1000	0	113	80	120			

Sample ID	**1810B86-001AMS**	SampType: **MS**		TestCode: **EPA Method 6010B: TCLP Metals**						
Client ID:	**KAFB-S9-1-idw**	Batch ID: **41204**		RunNo: **55199**						
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835481**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0.7139	87.8	75	125			
Cadmium	ND	1.0	0.5000	0	98.2	75	125			
Chromium	ND	5.0	0.5000	0.002480	94.5	75	125			
Lead	ND	5.0	0.5000	0	92.9	75	125			
Selenium	ND	1.0	0.5000	0	94.8	75	125			
Silver	ND	5.0	0.1000	0.002170	105	75	125			

Sample ID	**1810B86-001AMSD**	SampType: **MSD**		TestCode: **EPA Method 6010B: TCLP Metals**						
Client ID:	**KAFB-S9-1-idw**	Batch ID: **41204**		RunNo: **55199**						
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**		SeqNo: **1835482**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0.7139	87.1	75	125	0	20	
Cadmium	ND	1.0	0.5000	0	97.5	75	125	0	20	
Chromium	ND	5.0	0.5000	0.002480	93.2	75	125	0	20	
Lead	ND	5.0	0.5000	0	90.8	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B86**

06-Nov-18

Client: EA Engineering

Project: Kirtland AFB BFF

Sample ID	**1810B86-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-S9-1-idw**	Batch ID: **41204**			RunNo: **55199**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835482**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	1.0	0.5000	0	98.9	75	125	0	20	
Silver	ND	5.0	0.1000	0.002170	104	75	125	0	20	

Sample ID	**MB-41204**	SampType: **MBLK**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID: **41204**			RunNo: **55199**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835507**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								

Sample ID	**LCS-41204**	SampType: **LCS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID: **41204**			RunNo: **55199**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835510**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			

Sample ID	**1810B86-001AMS**	SampType: **MS**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-S9-1-idw**	Batch ID: **41204**			RunNo: **55199**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835521**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	92.6	75	125			

Sample ID	**1810B86-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: TCLP Metals**					
Client ID:	**KAFB-S9-1-idw**	Batch ID: **41204**			RunNo: **55199**					
Prep Date:	**10/25/2018**	Analysis Date: **10/26/2018**			SeqNo: **1835522**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	93.5	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1810B86 RcptNo: 1

Received By: Andy Freeman 10/23/2018 10:30:00 AM

Completed By: Ashley Gallegos 10/23/2018 11:26:25 AM

Reviewed By: 10/23/18 labeled by: TO 10/23/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: TO 10/23/18 (<2 or >12 unless noted)

Adjusted?

Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.5	Good	Not Present			

CHAIN-OF-CUSTODY RECORD

COC

| EA | 225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625 | | |

TLS

6540
D226914

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 078952

SW#189169

Profile # 104434NM

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

☒ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

☐ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

1. Generator's work site name and address
Kirtland Air Force Base 2050 Wyoming Blvd SE Bldg 20685 Environmental KAFB, NM 87117

2. Generator's name and address Kirtland Air Force Base
2050 Wyoming Blvd SE 20685, Environmental
KAFB, NM 87117

Generator's Telephone no.
505 846 9017

3. Authorized Agent's name and mailing address (if different from #2)
Advanced Chemical Transport Inc (ACT)
208 Murray Rd SE
Alb, NM 87105

Agent's Telephone no.
505 445 9400

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3)	(tons)
			Bin# 104051	
NON RCRA NON DOT Regulated Material Solid (TPH Soil)				1 ON

7. **Special handling instructions:**

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
Scott Clark		1 / 9 / 19

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
Michael Ramirez		1 / 9 / 19

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates
NAD 27 E: 333 W 106°40.080 5587

Received By (printed/typed name):	Signature	Month / Day / Year
Cynthia Dalton		01/9/2019

Appendix

White/GEN Yellow/CUSTOMER Pink/LANDFILL

WASTE MANAGEMENT

NM of New Mexico - Eco Re-Use Landfill
Jernigan & Dow Street
Hobbs, NM, 88240

Original
Ticket Date: 01/09/2019
Ticket Type: Inbound
Ticket Status: Closed
Ticket Void: No

Customer Name: ROOSEVELT/CHAVES Advance Carrier: Gilbreath Transport
Ticket Date: 01/09/2019 Vehicle: 7512 Driver
Payment Type: Credit Account Customer
Manual Ticket Origin
Route Check#
Hauling Ticket Billing#: 4017572
Destination Grid
Age

	Time	Scale	Operator	Inbound	Gross	72726 lb
In	01/09/2019 11:27:54	Inbound	C Lopez		Tare	62630 lbs
Out	01/09/2019 11:27:57		C Lopez		Net	10096 lb
			* Manual Weight		Tons	5.05

Comments: 18443WMI 078971 R 900X50

	Product	LOX	Qty	UOM	Rate	Tax	Amount	Weight
1	ContSoil-Pet-Tons-Cont. C	100	5.05	Tons				0.00
2	EWFD-E-Standard Environme	100	1	Each				0.00
3	FUEL-T-Fuel Surcharge -	100	1	%				0.00
4	RCRA-P-Regulatory Cost R	100	1	%				0.00
5	WMI-S-Waste Water Manag	100	1	%				0.00

Total Tax
Total Ticket

Driver's Signature

EZ Profile™

Requested Facility: Rio Rancho Landfill ❑ Unsure Profile Number: 104434NM
❑ Multiple Generator Locations (Attach Locations) ❑ Request Certificate of Disposal ❑ Renewal? Original Profile Number: _____

A. GENERATOR INFORMATION (MATERIAL ORIGIN)

1. Generator Name: KIRTLAND AIR FORCE BASE
2. Site Address: 2050 WYOMING BLVD SE
   (City, State, ZIP) Kirtland AFB NM 87117
3. County: Bernalillo
4. Contact Name: Scott Clark
5. Email: scott.clark@us.af.mil
6. Phone: (505) 846-9017 7. Fax: _____
8. Generator EPA ID: NM9570024423 ❑ N/A
9. State ID: _____ ☑ N/A

B. BILLING INFORMATION ❑ SAME AS GENERATOR

1. Billing Name: Advanced Chemical Transport
2. Billing Address: 967 Mabury Rd
   (City, State, ZIP) San Jose CA 95133
3. Contact Name: Jared Kinsey
4. Email: jkinsey@actenviro.com
5. Phone: (505) 205-3364 6. Fax: _____
7. WM Hauled? ❑ Yes ☑ No
8. P.O. Number: _____
9. Payment Method: ☑ Credit Account ❑ Cash ❑ Credit Card

C. MATERIAL INFORMATION

1. Common Name: TPH Soil
   Describe Process Generating Material: ❑ See Attached
   Contaminated soil, generated during drilling at fuel spill site
2. Material Composition and Contaminants: ❑ See Attached

1. soil	100 %
2. Diesel Range Organics	480 mg/kg
3. Gasoline Range Organics	110 mg/kg
4. Benzene	.098 mg/kg
Total comp. must be equal to or greater than 100%	≥100%

3. State Waste Codes: _____ ☑ N/A
4. Color: Brown
5. Physical State at 70˚F: ☑ Solid ❑ Liquid ❑ Other: _____
6. Free Liquid Range Percentage: _____ to _____ ☑ N/A
7. pH: 5 to 9 ❑ N/A
8. Strong Odor: ❑ Yes ☑ No Describe: _____
9. Flash Point: ❑ <140˚F ❑ 140˚–199˚F ❑ ≥200˚ ☑ N/A

D. REGULATORY INFORMATION

1. EPA Hazardous Waste? ❑ Yes* ☑ No
   Code: _____
2. State Hazardous Waste? ❑ Yes ☑ No
   Code: _____
3. Is this material non-hazardous due to Treatment, Delisting, or an Exclusion? ❑ Yes* ☑ No
4. Contains Underlying Hazardous Constituents? ❑ Yes* ☑ No
5. From an industry regulated under Benzene NESHAP? ❑ Yes* ☑ No
6. Facility remediation subject to 40 CFR 63 GGGGG? ❑ Yes* ☑ No
7. CERCLA or State-mandated clean-up? ❑ Yes* ☑ No
8. NRC or State-regulated radioactive or NORM waste? ❑ Yes* ☑ No

***If Yes, see Addendum (page 2) for additional questions and space.**

9. Contains PCBs? → If Yes, answer a, b and c. ❑ Yes ☑ No
   a. Regulated by 40 CFR 761? ❑ Yes ❑ No
   b. Remediation under 40 CFR 761.61 (a)? ❑ Yes ❑ No
   c. Were PCB imported into the US? ❑ Yes ❑ No
10. Regulated and/or Untreated Medical/Infectious Waste? ❑ Yes ☑ No
11. Contains Asbestos? ❑ Yes ☑ No
    → If Yes: ❑ Non-Friable ❑ Non-Friable – Regulated ❑ Friable

E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION

1. Analytical attached ☑ Yes
   Please identify applicable samples and/or lab reports:
   Lab ID: 1811675-001 Client Sample ID: KAFB-106-S9-2-idw
2. Other information attached (such as MSDS)? ❑ Yes

F. SHIPPING AND DOT INFORMATION

1. ☑ One-Time Event ❑ Repeat Event/Ongoing Business
2. Estimated Quantity/Unit of Measure: 2
   ❑ Tons ☑ Yards ❑ Drums ❑ Gallons ❑ Other: _____
3. Container Type and Size: 20 cubic yard rolloff
4. USDOT Proper Shipping Name: ☑ N/A

G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): _____ Date: _____
Title: _____
Company: _____

Certification Signature

THINK GREEN.®

QUESTIONS? CALL 800 963 4776 FOR ASSISTANCE

Revised June 30, 2015
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EZ Profile™ Addendum

Only complete this Addendum if prompted by responses on EZ Profile™ (page 1) or to provide additional information. Sections and question numbers correspond to EZ Profile™.

Profile Number: 104434NM

C. MATERIAL INFORMATION

Describe Process Generating Material (Continued from page 1): If more space is needed, please attach additional pages.

Material Composition and Contaminants (Continued from page 1): If more space is needed, please attach additional pages.

5. Toluene	1.2 mg/kg
6. Ethylbenzene	.67 mg/kg
7. Xylene	2.7 mg/kg
8.	
9.	
Total composition must be equal to or greater than 100%	≥100%

D. REGULATORY INFORMATION

Only questions with a "Yes" response in Section D on the EZ Profile™ form (page 1) need to be answered here.

1. EPA Hazardous Waste
   a. Please list all USEPA listed and characteristic waste code numbers:
   b. Is the material subject to the Alternative Debris standards (40 CFR 268.45)? ❑ Yes ❑ No
   c. Is the material subject to the Alternative Soil standards (40 CFR 268.49)? → If Yes, complete question 4. ❑ Yes ❑ No
   d. Is the material exempt from Subpart CC Controls (40 CFR 264.1083)? ❑ Yes ❑ No
      → If Yes, please check **one** of the following:
      ❑ Waste meets LDR or treatment exemptions for organics (40 CFR 264.1082(c)(2) or (c)(4))
      ❑ Waste contains VOCs that average <500 ppmw (CFR 264.1082(c)(1)) – will require annual update.
2. State Hazardous Waste → Please list all state waste codes: _____
3. For material that is Treated, Delisted, or Excluded → Please indicate the category, below:
   ❑ Delisted Hazardous Waste ❑ Excluded Waste under 40 CFR 261.4 → Specify Exclusion: _____
   ❑ Treated Hazardous Waste Debris ❑ Treated Characteristic Hazardous Waste → If checked, complete question 4.
4. Underlying Hazardous Constituents → Please list all Underlying Hazardous Constituents:
5. Industries regulated under Benzene NESHAP include petroleum refineries, chemical manufacturing plants, coke by-product recovery plants, and TSDFs.
   a. Are you a TSDF? → If yes, please complete Benzene NESHAP questionnaire. If not, continue. ❑ Yes ❑ No
   b. Does this material contain benzene? ❑ Yes ❑ No
      1. If yes, what is the flow weighted average concentration? _____ ppmw
   c. What is your facility's current total annual benzene quantity in Megagrams? ❑ <1 Mg ❑ 1–9.99 Mg ❑ ≥10 Mg
   d. Is this waste soil from a remediation? ❑ Yes ❑ No
      1. If yes, what is the benzene concentration in remediation waste? _____ ppmw
   e. Does the waste contain >10% water/moisture? ❑ Yes ❑ No
   f. Has material been treated to remove 99% of the benzene or to achieve <10 ppmw? ❑ Yes ❑ No
   g. Is material exempt from controls in accordance with 40 CFR 61.342? ❑ Yes ❑ No
      → If yes, specify exemption: _____
   h. Based on your knowledge of your waste and the BWON regulations, do you believe that this waste stream is subject to treatment and control requirements at an off-site TSDF? ❑ Yes ❑ No
6. 40 CFR 63 GGGGG → Does the material contain <500 ppmw VOHAPs at the point of determination? ❑ Yes ❑ No
7. CERCLA or State-Mandated clean up → Please submit the Record of Decision or other documentation with process information to assist others in the evaluation for proper disposal. A "Determination of Acceptability" may be needed for CERCLA wastes not going to a CERCLA approved facility.
8. NRC or state regulated radioactive or NORM Waste → Please identify Isotopes and pCi/g: _____

Revised June 30, 2015
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10659-2
Soil

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 28, 2018

Earl Morse
EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Vandose Zone Wells

OrderNo.: 1811675

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/13/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1811675**
Date Reported: **11/28/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Vandose Zone Wells
Lab ID: 1811675-001 **Matrix:** SOIL

Client Sample ID: KAFB-106-S9-2-idw
Collection Date: 11/13/2018 11:25:00 AM
Received Date: 11/13/2018 12:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	11/21/2018 4:07:16 PM	41678
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	11/26/2018 8:34:42 AM	41675
Barium	ND	100		mg/L	1	11/26/2018 8:34:42 AM	41675
Cadmium	ND	1.0		mg/L	1	11/26/2018 8:34:42 AM	41675
Chromium	ND	5.0		mg/L	1	11/26/2018 8:34:42 AM	41675
Lead	ND	5.0		mg/L	1	11/26/2018 8:34:42 AM	41675
Selenium	ND	1.0		mg/L	1	11/26/2018 8:34:42 AM	41675
Silver	ND	5.0		mg/L	1	11/26/2018 8:34:42 AM	41675
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **TOM**	
Chlordane	ND	0.030		mg/L	1	11/27/2018 9:17:59 AM	41692
Endrin	ND	0.020		mg/L	1	11/27/2018 9:17:59 AM	41692
gamma-BHC (Lindane)	ND	0.40		mg/L	1	11/27/2018 9:17:59 AM	41692
Heptachlor	ND	0.0080		mg/L	1	11/27/2018 9:17:59 AM	41692
Heptachlor epoxide	ND	0.0080		mg/L	1	11/27/2018 9:17:59 AM	41692
Methoxychlor	ND	10		mg/L	1	11/27/2018 9:17:59 AM	41692
Toxaphene	ND	0.50		mg/L	1	11/27/2018 9:17:59 AM	41692
Surr: Decachlorobiphenyl	72.2	58.3-109		%Rec	1	11/27/2018 9:17:59 AM	41692
Surr: Tetrachloro-m-xylene	71.4	40.1-101		%Rec	1	11/27/2018 9:17:59 AM	41692
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	480	9.6		mg/Kg	1	11/19/2018 6:15:39 PM	41594
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/19/2018 6:15:39 PM	41594
Surr: DNOP	117	50.6-138		%Rec	1	11/19/2018 6:15:39 PM	41594
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	110	4.9		mg/Kg	1	11/19/2018 3:52:08 PM	41588
Surr: BFB	515	73.8-119	S	%Rec	1	11/19/2018 3:52:08 PM	41588
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	11/27/2018 3:53:30 PM	41670
3+4-Methylphenol	ND	200		mg/L	1	11/27/2018 3:53:30 PM	41670
2,4-Dinitrotoluene	ND	0.13		mg/L	1	11/27/2018 3:53:30 PM	41670
Hexachlorobenzene	ND	0.13		mg/L	1	11/27/2018 3:53:30 PM	41670
Hexachlorobutadiene	ND	0.50		mg/L	1	11/27/2018 3:53:30 PM	41670
Hexachloroethane	ND	3.0		mg/L	1	11/27/2018 3:53:30 PM	41670
Nitrobenzene	ND	2.0		mg/L	1	11/27/2018 3:53:30 PM	41670
Pentachlorophenol	ND	100		mg/L	1	11/27/2018 3:53:30 PM	41670
Pyridine	ND	5.0		mg/L	1	11/27/2018 3:53:30 PM	41670
2,4,5-Trichlorophenol	ND	400		mg/L	1	11/27/2018 3:53:30 PM	41670

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Vandose Zone Wells
Lab ID: 1811675-001 **Matrix:** SOIL

Client Sample ID: KAFB-106-S9-2-idw
Collection Date: 11/13/2018 11:25:00 AM
Received Date: 11/13/2018 12:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	11/27/2018 3:53:30 PM	41670
Cresols, Total	ND	200		mg/L	1	11/27/2018 3:53:30 PM	41670
Surr: 2-Fluorophenol	35.9	15-102		%Rec	1	11/27/2018 3:53:30 PM	41670
Surr: Phenol-d5	26.8	15-87.7		%Rec	1	11/27/2018 3:53:30 PM	41670
Surr: 2,4,6-Tribromophenol	61.9	39.9-111		%Rec	1	11/27/2018 3:53:30 PM	41670
Surr: Nitrobenzene-d5	55.8	35.1-107		%Rec	1	11/27/2018 3:53:30 PM	41670
Surr: 2-Fluorobiphenyl	47.5	36.7-100		%Rec	1	11/27/2018 3:53:30 PM	41670
Surr: 4-Terphenyl-d14	41.4	42.6-129	S	%Rec	1	11/27/2018 3:53:30 PM	41670
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	0.098	0.025		mg/Kg	1	11/19/2018 11:49:51 PM	41588
Toluene	1.2	0.049		mg/Kg	1	11/19/2018 11:49:51 PM	41588
Ethylbenzene	0.67	0.049		mg/Kg	1	11/19/2018 11:49:51 PM	41588
Xylenes, Total	2.7	0.098		mg/Kg	1	11/19/2018 11:49:51 PM	41588
Surr: Dibromofluoromethane	99.8	70-130		%Rec	1	11/19/2018 11:49:51 PM	41588
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	11/19/2018 11:49:51 PM	41588
Surr: Toluene-d8	91.9	70-130		%Rec	1	11/19/2018 11:49:51 PM	41588
Surr: 4-Bromofluorobenzene	114	70-130		%Rec	1	11/19/2018 11:49:51 PM	41588
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	11/25/2018 12:45:21 AM	41620
2-Butanone	ND	200		mg/L	1	11/25/2018 12:45:21 AM	41620
Carbon Tetrachloride	ND	0.50		mg/L	1	11/25/2018 12:45:21 AM	41620
Chlorobenzene	ND	100		mg/L	1	11/25/2018 12:45:21 AM	41620
Chloroform	ND	6.0		mg/L	1	11/25/2018 12:45:21 AM	41620
1,4-Dichlorobenzene	ND	7.5		mg/L	1	11/25/2018 12:45:21 AM	41620
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	11/25/2018 12:45:21 AM	41620
1,1-Dichloroethene	ND	0.70		mg/L	1	11/25/2018 12:45:21 AM	41620
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	11/25/2018 12:45:21 AM	41620
Trichloroethene (TCE)	ND	0.50		mg/L	1	11/25/2018 12:45:21 AM	41620
Vinyl chloride	ND	0.20		mg/L	1	11/25/2018 12:45:21 AM	41620
Surr: 1,2-Dichloroethane-d4	91.7	70-130		%Rec	1	11/25/2018 12:45:21 AM	41620
Surr: 4-Bromofluorobenzene	90.0	57.3-148		%Rec	1	11/25/2018 12:45:21 AM	41620
Surr: Dibromofluoromethane	94.7	70-130		%Rec	1	11/25/2018 12:45:21 AM	41620
Surr: Toluene-d8	87.7	70-130		%Rec	1	11/25/2018 12:45:21 AM	41620

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		11/20/2018 12:02:07 PM	WG1199475
Fluid	1		11/20/2018 12:02:07 PM	WG1199475
Initial pH	8.99		11/20/2018 12:02:07 PM	WG1199475
Final pH	5.27		11/20/2018 12:02:07 PM	WG1199475

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND	J6	0.250	1	11/26/2018 09:22	WG1198578

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	60.3		25.0	1	11/23/2018 15:44	WG1198579

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SU				
Corrosivity by pH	8.86	T8	1	11/20/2018 14:16	WG1199274

Sample Narrative:
L1045134-01 WG1199274: 8.86 at 16.8C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	ONI at 170		1	11/17/2018 15:00	WG1198479

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	11/26/2018 16:29	WG1200467
2,4-D	ND		0.00200	10	1	11/26/2018 16:29	WG1200467
(S) 2,4-Dichlorophenyl Acetic Acid	*81.8*		*M 0-158*			*11/26/2018 16:29*	WG1200467

WG1198578

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1045134-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3362818-1 11/26/18 09:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1045253-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1045253-01 11/26/18 09:25 • (DUP) R3362818-5 11/26/18 09:26

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.124	1	0.000		20

L1045426-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1045426-06 11/26/18 09:31 • (DUP) R3362818-8 11/26/18 09:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3362818-2 11/26/18 09:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.20	88.0	50.0-150	

L1045134-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045134-01 11/26/18 09:22 • (MS) R3362818-3 11/26/18 09:23 • (MSD) R3362818-4 11/26/18 09:24

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.19	1.10	70.5	66.3	1	75.0-125	J6	J6	6.23	20

L1045370-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045370-01 11/26/18 09:27 • (MS) R3362818-6 11/26/18 09:28 • (MSD) R3362818-7 11/26/18 09:29

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg		mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.17		0.761	0.894	45.7	53.7	1	75.0-125	J6	J6	16.0	20

WG1198579

Wet Chemistry by Method 9034-90308

QUALITY CONTROL SUMMARY

L1045134-01

Method Blank (MB)

(MB) R3362496-1 11/23/18 15:44

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1045053-70 Original Sample (OS) • Duplicate (DUP)

(OS) L1045053-70 11/23/18 15:44 • (DUP) R3362496-3 11/23/18 15:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

L1045426-22 Original Sample (OS) • Duplicate (DUP)

(OS) L1045426-22 11/23/18 15:44 • (DUP) R3362496-4 11/23/18 15:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Reactive Sulfide	48.3	48.3	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3362496-2 11/23/18 15:44

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	84.4	84.4	70.0-130	

WG1199274

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1045134-01

ONE LAB. NATIONWIDE

Laboratory Control Sample (LCS)

(LCS) R3361617-1 11/20/18 14:16

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 16.2C

WG1198419

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1045134-01

L1045053-42 Original Sample (OS) • Duplicate (DUP)

(OS) L1045053-42 11/17/18 15:00 • (DUP) R3360903-2 11/17/18 15:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1045246-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1045246-02 11/17/18 15:00 • (DUP) R3360903-3 11/17/18 15:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	115	120	1	4.24		10

Laboratory Control Sample (LCS)

(LCS) R3360903-1 11/17/18 15:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	85.4	104	96.0-104	

WG1200487

Chlorinated Acid Herbicides (GC) by Method 8151A

QUALITY CONTROL SUMMARY

L1045134-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3363042-1 11/26/18 14:26

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*85.8*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3363042-2 11/26/18 15:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0417	83.4	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0405	81.0	50.0-125	P
(S) 2,4-Dichlorophenyl Acetic Acid			*85.8*	*14.0-158*	

L1045134-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045134-01 11/26/18 16:29 • (MS) R3363042-3 11/26/18 17:24 • (MSD) R3363042-4 11/26/18 17:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	ND	0.0465	0.0427	93.0	85.4	1	50.0-120			8.52	20
2,4,5-TP (Silvex)	0.0500	ND	0.0438	0.0395	87.6	79.0	1	50.0-125	P		10.3	20
(S) 2,4-Dichlorophenyl Acetic Acid					*91.0*	*83.0*		*14.0-158*				

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P	RPD between the primary and confirmatory analysis exceeded 40%.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811675**

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	**LCS-41594**	SampType: **LCS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**LCSS**	Batch ID: **41594**			RunNo: **55739**					
Prep Date:	**11/16/2018**	Analysis Date: **11/19/2018**			SeqNo: **1857784**		Units: **mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		51	10	50.00	0	102	70	130			
Surr: DNOP		5.0		5.000		99.8	50.6	138			

Sample ID	**MB-41594**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**PBS**	Batch ID: **41594**			RunNo: **55739**					
Prep Date:	**11/16/2018**	Analysis Date: **11/19/2018**			SeqNo: **1857785**		Units: **mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		ND	10								
Motor Oil Range Organics (MRO)		ND	50								
Surr: DNOP		10		10.00		103	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	MB-41588	SampType:	MBLK	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	PBS	Batch ID:	41588	RunNo:	55743					
Prep Date:	11/16/2018	Analysis Date:	11/19/2018	SeqNo:	1857951	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	920		1000		92.0	73.8	119			

Sample ID	LCS-41588	SampType:	LCS	TestCode:	EPA Method 8015D: Gasoline Range					
Client ID:	LCSS	Batch ID:	41588	RunNo:	55743					
Prep Date:	11/16/2018	Analysis Date:	11/19/2018	SeqNo:	1857952	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	90.7	80.1	123			
Surr: BFB	1000		1000		105	73.8	119			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	MB-41692	SampType:	MBLK	TestCode:	EPA Method 8081: Pesticides TCLP					
Client ID:	PBW	Batch ID:	41692	RunNo:	55882					
Prep Date:	11/22/2018	Analysis Date:	11/27/2018	SeqNo:	1864400	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0016		0.002500		64.3	58.3	109			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.9	40.1	101			

Sample ID	LCS-41692	SampType:	LCS	TestCode:	EPA Method 8081: Pesticides TCLP					
Client ID:	LCSW	Batch ID:	41692	RunNo:	55882					
Prep Date:	11/22/2018	Analysis Date:	11/27/2018	SeqNo:	1864401	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00038	0.00010	0.0005000	0	75.2	49.5	127			
gamma-BHC (Lindane)	0.00032	0.00010	0.0005000	0	65.0	49.9	124			
Heptachlor	0.00029	0.00010	0.0005000	0	58.5	41	122			
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121			
Methoxychlor	0.00039	0.00010	0.0005000	0	77.2	40.2	134			
Surr: Decachlorobiphenyl	0.0017		0.002500		67.7	58.3	109			
Surr: Tetrachloro-m-xylene	0.0011		0.002500		43.2	40.1	101			

Sample ID	LCSD-41692	SampType:	LCSD	TestCode:	EPA Method 8081: Pesticides TCLP					
Client ID:	LCSS02	Batch ID:	41692	RunNo:	55882					
Prep Date:	11/22/2018	Analysis Date:	11/27/2018	SeqNo:	1864402	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00039	0.00010	0.0005000	0	77.7	49.5	127	3.39	20	
gamma-BHC (Lindane)	0.00031	0.00010	0.0005000	0	62.3	49.9	124	4.17	20	
Heptachlor	0.00027	0.00010	0.0005000	0	54.7	41	122	6.72	20	
Heptachlor epoxide	0.00036	0.00010	0.0005000	0	71.6	52.2	121	0.977	20	
Methoxychlor	0.00037	0.00010	0.0005000	0	73.7	40.2	134	4.67	20	
Surr: Decachlorobiphenyl	0.0017		0.002500		67.8	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0011		0.002500		43.4	40.1	101	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID **mb-41588** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS** Batch ID: **41588** RunNo: **55740**
Prep Date: **11/16/2018** Analysis Date: **11/19/2018** SeqNo: **1858227** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.50		0.5000		99.9	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		95.2	70	130			
Surr: Toluene-d8	0.47		0.5000		93.0	70	130			
Surr: 4-Bromofluorobenzene	0.42		0.5000		84.8	70	130			

Sample ID **lcs-41588** SampType: **LCS** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS** Batch ID: **41588** RunNo: **55740**
Prep Date: **11/16/2018** Analysis Date: **11/19/2018** SeqNo: **1858228** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	105	70	130			
Toluene	0.98	0.050	1.000	0	97.9	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		100	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		96.9	70	130			
Surr: Toluene-d8	0.46		0.5000		92.0	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.3	70	130			

Sample ID **1811675-001ams** SampType: **MS** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106-S9-2-idw** Batch ID: **41588** RunNo: **55740**
Prep Date: **11/16/2018** Analysis Date: **11/20/2018** SeqNo: **1858230** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.024	0.9488	0.09754	101	68.9	131			
Toluene	2.1	0.047	0.9488	1.168	96.4	64.3	137			
Surr: Dibromofluoromethane	0.48		0.4744		101	70	130			
Surr: 1,2-Dichloroethane-d4	0.48		0.4744		101	70	130			
Surr: Toluene-d8	0.43		0.4744		90.4	70	130			
Surr: 4-Bromofluorobenzene	0.66		0.4744		139	70	130			S

Sample ID **1811675-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106-S9-2-idw** Batch ID: **41588** RunNo: **55740**
Prep Date: **11/16/2018** Analysis Date: **11/20/2018** SeqNo: **1858231** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9434	0.09754	95.9	68.9	131	5.10	20	
Toluene	2.0	0.047	0.9434	1.168	89.0	64.3	137	3.66	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID **1811675-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **KAFB-106-S9-2-idw** Batch ID: **41588** RunNo: **55740**

Prep Date: **11/16/2018** Analysis Date: **11/20/2018** SeqNo: **1858231** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.48		0.4717		102	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	0.47		0.4717		99.2	70	130	0	0	
Surr: Toluene-d8	0.44		0.4717		92.4	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.57		0.4717		121	70	130	0	0	

Sample ID **rb** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **PBS** Batch ID: **A55824** RunNo: **55824**

Prep Date: Analysis Date: **11/23/2018** SeqNo: **1862096** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.47		0.5000		93.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.43		0.5000		86.0	70	130			
Surr: Toluene-d8	0.44		0.5000		88.9	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		86.5	70	130			

Sample ID **100ng lcs** SampType: **LCS** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **LCSS** Batch ID: **A55824** RunNo: **55824**

Prep Date: Analysis Date: **11/23/2018** SeqNo: **1862097** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.47		0.5000		93.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		87.9	70	130			
Surr: Toluene-d8	0.44		0.5000		88.5	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		91.5	70	130			

Sample ID **rb1** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **PBS** Batch ID: **B55824** RunNo: **55824**

Prep Date: Analysis Date: **11/24/2018** SeqNo: **1862115** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.48		0.5000		95.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		90.5	70	130			
Surr: Toluene-d8	0.43		0.5000		86.2	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.3	70	130			

Sample ID **100ng lcs2** SampType: **LCS** TestCode: **EPA Method 8260B: Volatiles**

Client ID: **LCSS** Batch ID: **B55824** RunNo: **55824**

Prep Date: Analysis Date: **11/24/2018** SeqNo: **1862116** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	100ng lcs2	SampType: LCS	TestCode: EPA Method 8260B: Volatiles		
Client ID:	LCSS	Batch ID: B55824	RunNo: 55824		
Prep Date:		Analysis Date: 11/24/2018	SeqNo: 1862116	Units: %Rec	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	0.49		0.5000		97.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		91.8	70	130			
Surr: Toluene-d8	0.42		0.5000		83.5	70	130			
Surr: 4-Bromofluorobenzene	0.44		0.5000		87.8	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811675**

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID **mb-41620**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **41620**	RunNo: **55824**
Prep Date: **11/19/2018**	Analysis Date: **11/25/2018**	SeqNo: **1861725** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.0	70	130			
Surr: 4-Bromofluorobenzene	0.17		0.2000		87.5	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		91.8	70	130			
Surr: Toluene-d8	0.17		0.2000		86.7	70	130			

Sample ID **lcs-41620**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **41620**	RunNo: **55824**
Prep Date: **11/19/2018**	Analysis Date: **11/25/2018**	SeqNo: **1861728** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.30	0.4000	0	102	70	130			
Chlorobenzene	0.36	0.30	0.4000	0	90.0	70	130			
1,1-Dichloroethene	0.45	0.30	0.4000	0	113	70	130			
Trichloroethene (TCE)	0.41	0.30	0.4000	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.8	70	130			
Surr: 4-Bromofluorobenzene	0.18		0.2000		90.9	57.3	148			
Surr: Dibromofluoromethane	0.20		0.2000		98.3	70	130			
Surr: Toluene-d8	0.16		0.2000		81.6	70	130			

Sample ID **1811675-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106-S9-2-idw**	Batch ID: **41620**	RunNo: **55824**
Prep Date: **11/19/2018**	Analysis Date: **11/25/2018**	SeqNo: **1861733** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.42	0.30	0.4000	0	105	44.5	152			
Chlorobenzene	0.36	0.30	0.4000	0	90.7	70	130			
1,1-Dichloroethene	0.44	0.30	0.4000	0	110	79.1	132			
Trichloroethene (TCE)	0.41	0.30	0.4000	0	104	70	130			
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID **1811675-001ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106-S9-2-idw** Batch ID: **41620** RunNo: **55824**

Prep Date: **11/19/2018** Analysis Date: **11/25/2018** SeqNo: **1861733** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.18		0.2000		90.3	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		95.5	70	130			
Surr: Toluene-d8	0.17		0.2000		83.1	70	130			

Sample ID **1811675-001amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106-S9-2-idw** Batch ID: **41620** RunNo: **55824**

Prep Date: **11/19/2018** Analysis Date: **11/25/2018** SeqNo: **1861735** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.39	0.30	0.4000	0	96.6	44.5	152	8.23	20	
Chlorobenzene	0.34	0.30	0.4000	0	85.9	70	130	5.44	20	
1,1-Dichloroethene	0.41	0.30	0.4000	0	102	79.1	132	8.07	20	
Trichloroethene (TCE)	0.38	0.30	0.4000	0	94.7	70	130	8.90	20	
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		87.7	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.18		0.2000		88.6	57.3	148	0	0	
Surr: Dibromofluoromethane	0.18		0.2000		91.9	70	130	0	0	
Surr: Toluene-d8	0.16		0.2000		81.9	70	130	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811675**

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	lcs-41670	SampType:	LCS	TestCode:	EPA Method 8270C TCLP					
Client ID:	LCSS	Batch ID:	41670	RunNo:	55903					
Prep Date:	11/21/2018	Analysis Date:	11/27/2018	SeqNo:	1864944	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.069	0.0010	0.1000	0	69.5	47.8	99.2			
3+4-Methylphenol	0.15	0.0010	0.2000	0	77.3	41.5	118			
2,4-Dinitrotoluene	0.071	0.0010	0.1000	0	71.3	44.4	81			
Hexachlorobenzene	0.078	0.0010	0.1000	0	77.7	49.5	91.6			
Hexachlorobutadiene	0.068	0.0010	0.1000	0	67.8	38.6	93			
Hexachloroethane	0.061	0.0010	0.1000	0	61.2	39.4	79.9			
Nitrobenzene	0.076	0.0010	0.1000	0	76.2	47.4	96.2			
Pentachlorophenol	0.057	0.0010	0.1000	0	57.1	39.4	79.9			
Pyridine	0.054	0.0010	0.1000	0	53.9	15	79.9			
2,4,5-Trichlorophenol	0.073	0.0010	0.1000	0	73.4	47.4	118			
2,4,6-Trichlorophenol	0.079	0.0010	0.1000	0	78.6	47.4	101			
Cresols, Total	0.22	0.0010	0.3000	0	74.7	44.1	111			
Surr: 2-Fluorophenol	0.13		0.2000		62.8	15	102			
Surr: Phenol-d5	0.11		0.2000		54.8	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		75.0	39.9	111			
Surr: Nitrobenzene-d5	0.079		0.1000		78.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.068		0.1000		68.1	36.7	100			
Surr: 4-Terphenyl-d14	0.061		0.1000		61.4	42.6	129			

Sample ID	lcsd-41670	SampType:	LCSD	TestCode:	EPA Method 8270C TCLP					
Client ID:	LCSS02	Batch ID:	41670	RunNo:	55903					
Prep Date:	11/21/2018	Analysis Date:	11/27/2018	SeqNo:	1864945	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.078	0.0010	0.1000	0	78.4	47.8	99.2	12.1	20	
3+4-Methylphenol	0.18	0.0010	0.2000	0	89.0	41.5	118	14.1	20	
2,4-Dinitrotoluene	0.076	0.0010	0.1000	0	75.9	44.4	81	6.20	20	
Hexachlorobenzene	0.086	0.0010	0.1000	0	85.6	49.5	91.6	9.73	20	
Hexachlorobutadiene	0.073	0.0010	0.1000	0	72.9	38.6	93	7.19	20	
Hexachloroethane	0.068	0.0010	0.1000	0	67.9	39.4	79.9	10.5	20	
Nitrobenzene	0.082	0.0010	0.1000	0	82.0	47.4	96.2	7.35	20	
Pentachlorophenol	0.059	0.0010	0.1000	0	58.8	39.4	79.9	3.04	20	
Pyridine	0.061	0.0010	0.1000	0	61.3	15	79.9	12.7	20	
2,4,5-Trichlorophenol	0.080	0.0010	0.1000	0	79.6	47.4	118	8.13	20	
2,4,6-Trichlorophenol	0.083	0.0010	0.1000	0	83.0	47.4	101	5.47	20	
Cresols, Total	0.26	0.0010	0.3000	0	85.5	44.1	111	13.5	20	
Surr: 2-Fluorophenol	0.14		0.2000		68.0	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		57.0	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.16		0.2000		80.0	39.9	111	0	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID lcsd-41670	SampType: LCSD	TestCode: EPA Method 8270C TCLP							
Client ID: LCSS02	Batch ID: 41670	RunNo: 55903							
Prep Date: 11/21/2018	Analysis Date: 11/27/2018	SeqNo: 1864945	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.083		0.1000		82.6	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.078		0.1000		77.6	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.065		0.1000		65.0	42.6	129	0	20	

Sample ID mb-41670	SampType: MBLK	TestCode: EPA Method 8270C TCLP							
Client ID: PBS	Batch ID: 41670	RunNo: 55903							
Prep Date: 11/21/2018	Analysis Date: 11/27/2018	SeqNo: 1864946	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.082		0.2000		40.8	15	102			
Surr: Phenol-d5	0.065		0.2000		32.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.2	39.9	111			
Surr: Nitrobenzene-d5	0.057		0.1000		56.6	35.1	107			
Surr: 2-Fluorobiphenyl	0.050		0.1000		50.5	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		89.0	42.6	129			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811675**

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	MB-41678	SampType:	MBLK		TestCode:	MERCURY, TCLP				
Client ID:	PBW	Batch ID:	41678		RunNo:	55818				
Prep Date:	11/21/2018	Analysis Date:	11/21/2018		SeqNo:	1861210	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	LCS-41678	SampType:	LCS		TestCode:	MERCURY, TCLP				
Client ID:	LCSW	Batch ID:	41678		RunNo:	55818				
Prep Date:	11/21/2018	Analysis Date:	11/21/2018		SeqNo:	1861211	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	92.8	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1811675

28-Nov-18

Client: EA Engineering Science & Technology

Project: Vandose Zone Wells

Sample ID	MB-41675	SampType:	MBLK	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	PBW	Batch ID:	41675	RunNo:	55832					
Prep Date:	11/21/2018	Analysis Date:	11/26/2018	SeqNo:	1862370	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	LCS-41675	SampType:	LCS	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	LCSW	Batch ID:	41675	RunNo:	55832					
Prep Date:	11/21/2018	Analysis Date:	11/26/2018	SeqNo:	1862376	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	109	80	120			
Barium	ND	100	0.5000	0	96.1	80	120			
Cadmium	ND	1.0	0.5000	0	101	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	95.3	80	120			
Selenium	ND	1.0	0.5000	0	107	80	120			
Silver	ND	5.0	0.1000	0	108	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1811675 | RcptNo: 1

Received By: Victoria Zellar 11/13/2018 12:45:00 PM Victoria Zellar

Completed By: Ashley Gallegos 11/13/2018 3:15:30 PM

Reviewed By: ENM 11/13/18 Labeled by JAB 11/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted) 11/13/18
Adjusted? _____
Checked by: JAB

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.1	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] PROJECT NAME:	[2] PROJECT NUMBER:	[3] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.31~~ PF 62735DM02 1017.08	Hall Environmental	Amanda Smith/ asmith@caest.com
[4] PROJECT PHASE/SITE/TASK:	[5] DO NUMBER:	[6] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@caest.com
[7] PROJECT CONTACT:	[8] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse/emorse@caest.com

[22] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	ignitability (1010A)				[24] SAMPLE TYPE (see codes on SOP)	[25] COMMENTS/ SCREENING READINGS	[26] LAB ID (for lab's use)
1	SWMU-106 S9-2-idw	Roll off bin S9-2	SOIL	11-13-18	1125	IV	7	3	X	X	X	X	X	X			PF	composite	181107S 001	
2																				
3																				
4																				
5																				
6							PF													
7																				
8																				
9																				
10																				

[27] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:
Field Sampler/EA Engineering Pete Ferran	FedEx Number: N/A Hand delivered to Hall Lab

[31] RELINQUISHED BY	DATE	TIME	[32] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferran Pete Ferran	11-13-18	1245	Printed Name and Signature: Victoria V Zeller Victoria V Zeller 5.1°	11/13/18	12:45
Printed Name and Signature:			Printed Name and Signature: Victoria VVZ 11/13/18		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

13 December 2018

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (3) dated: 4 December 2018
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S3, KAFB-106S5, and KAFB-106S9, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in three 20-cubic-yard open top roll-off containers labeled **104052, 104054,** and **20B-27**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2018.12.13 10:51:18 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

December 4, 2018

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-S9-3 (Bin ID #20B-27)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

EA identification of S9-3 (Bin ID #20B-27) contains approximately 14 cubic yards of soil in a 20-yard, open top, roll off.

In October 2018 EA performed drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project and will install a groundwater monitoring well, KAFB-106S9, at this location. Well KAFB-106S9 is located immediately west of the Bulk Fuels Facility access gate off Randolph Ave. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1810E19) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Ms. Jeanne Dye-Porto (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; 505-846-9017.

If you have any questions, please do not hesitate to contact me at 505-266-2225, or via e-mail at landress@eaest.com.

Sincerely,

Lane Andress, PG

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1810E19

cc: Jeanne Dye-Porto, jeanne.dye-porto@us.af.mil
Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106S9-3-idw		
			SAMPLE DATE		26-Oct-18		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		S9-3		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	30.2	--	25
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	9.36	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	0.002
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	0.002
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	9.8
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	49
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Setion 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)*.

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than

BTEX - benzene, toluene, ethylbenzene, total xylenes

°F - degrees farenheit

J - Analyte detected below quantitation limit or estimated value

mg/L - milligram per liter

mg/kg - milligram per kilogram

NE - not established

ND - not detected above the PQL

PQL - practical quantitation limit

QUAL - laboratory data qualifier

Shade- analyte detected above the detection limit

Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.

SVOCs - semivolatile organic compounds

S.U. - Standard units

TCLP - Toxicity Characteristic Leaching Procedure

TPH - total petroleum hydrocarbons

VOCs - volatile organic compounds

10659-3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 12, 2018

Amanda Smith
EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1810E19

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/26/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Kirtland AFB BFF
Lab ID: 1810E19-001 **Matrix:** SOIL

Client Sample ID: KAFB-106S9-3-IDW
Collection Date: 10/26/2018 7:50:00 AM
Received Date: 10/26/2018 3:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **rde**	
Mercury	ND	0.020		mg/L	1	11/6/2018 4:01:10 PM	41359
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	11/7/2018 12:12:35 PM	41394
Barium	ND	100		mg/L	1	11/7/2018 12:12:35 PM	41394
Cadmium	ND	1.0		mg/L	1	11/7/2018 12:12:35 PM	41394
Chromium	ND	5.0		mg/L	1	11/7/2018 12:12:35 PM	41394
Lead	ND	5.0		mg/L	1	11/7/2018 12:12:35 PM	41394
Selenium	ND	1.0		mg/L	1	11/7/2018 12:12:35 PM	41394
Silver	ND	5.0		mg/L	1	11/7/2018 12:12:35 PM	41394
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2018 1:22:25 PM	41230
Surr: BFB	98.9	70-130		%Rec	1	10/30/2018 1:22:25 PM	41230
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **TOM**	
Chlordane	ND	0.030		mg/L	1	11/6/2018 10:42:44 AM	41327
Endrin	ND	0.020		mg/L	1	11/6/2018 10:42:44 AM	41327
gamma-BHC (Lindane)	ND	0.40		mg/L	1	11/6/2018 10:42:44 AM	41327
Heptachlor	ND	0.0080		mg/L	1	11/6/2018 10:42:44 AM	41327
Heptachlor epoxide	ND	0.0080		mg/L	1	11/6/2018 10:42:44 AM	41327
Methoxychlor	ND	10		mg/L	1	11/6/2018 10:42:44 AM	41327
Toxaphene	ND	0.50		mg/L	1	11/6/2018 10:42:44 AM	41327
Surr: Decachlorobiphenyl	69.2	58.3-109		%Rec	1	11/6/2018 10:42:44 AM	41327
Surr: Tetrachloro-m-xylene	53.7	40.1-101		%Rec	1	11/6/2018 10:42:44 AM	41327
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	10/31/2018 3:53:30 PM	41261
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/31/2018 3:53:30 PM	41261
Surr: DNOP	93.3	50.6-138		%Rec	1	10/31/2018 3:53:30 PM	41261
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	11/5/2018 4:37:27 PM	41326
3+4-Methylphenol	ND	200		mg/L	1	11/5/2018 4:37:27 PM	41326
2,4-Dinitrotoluene	ND	0.13		mg/L	1	11/5/2018 4:37:27 PM	41326
Hexachlorobenzene	ND	0.13		mg/L	1	11/5/2018 4:37:27 PM	41326
Hexachlorobutadiene	ND	0.50		mg/L	1	11/5/2018 4:37:27 PM	41326
Hexachloroethane	ND	3.0		mg/L	1	11/5/2018 4:37:27 PM	41326
Nitrobenzene	ND	2.0		mg/L	1	11/5/2018 4:37:27 PM	41326
Pentachlorophenol	ND	100		mg/L	1	11/5/2018 4:37:27 PM	41326
Pyridine	ND	5.0		mg/L	1	11/5/2018 4:37:27 PM	41326
2,4,5-Trichlorophenol	ND	400		mg/L	1	11/5/2018 4:37:27 PM	41326

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Project: Kirtland AFB BFF
Lab ID: 1810E19-001 **Matrix:** SOIL

Client Sample ID: KAFB-106S9-3-IDW
Collection Date: 10/26/2018 7:50:00 AM
Received Date: 10/26/2018 3:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	11/5/2018 4:37:27 PM	41326
Cresols, Total	ND	200		mg/L	1	11/5/2018 4:37:27 PM	41326
Surr: 2-Fluorophenol	40.0	15-102		%Rec	1	11/5/2018 4:37:27 PM	41326
Surr: Phenol-d5	29.2	15-87.7		%Rec	1	11/5/2018 4:37:27 PM	41326
Surr: 2,4,6-Tribromophenol	48.0	39.9-111		%Rec	1	11/5/2018 4:37:27 PM	41326
Surr: Nitrobenzene-d5	59.2	35.1-107		%Rec	1	11/5/2018 4:37:27 PM	41326
Surr: 2-Fluorobiphenyl	48.3	36.7-100		%Rec	1	11/5/2018 4:37:27 PM	41326
Surr: 4-Terphenyl-d14	41.2	42.6-129	S	%Rec	1	11/5/2018 4:37:27 PM	41326
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **AG**	
Benzene	ND	0.025		mg/Kg	1	10/30/2018 1:22:25 PM	41230
Toluene	ND	0.050		mg/Kg	1	10/30/2018 1:22:25 PM	41230
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2018 1:22:25 PM	41230
Xylenes, Total	ND	0.10		mg/Kg	1	10/30/2018 1:22:25 PM	41230
Surr: 4-Bromofluorobenzene	94.8	70-130		%Rec	1	10/30/2018 1:22:25 PM	41230
Surr: Toluene-d8	94.9	70-130		%Rec	1	10/30/2018 1:22:25 PM	41230
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	11/1/2018 4:21:52 PM	41293
2-Butanone	ND	200		mg/L	1	11/1/2018 4:21:52 PM	41293
Carbon Tetrachloride	ND	0.50		mg/L	1	11/1/2018 4:21:52 PM	41293
Chlorobenzene	ND	100		mg/L	1	11/1/2018 4:21:52 PM	41293
Chloroform	ND	6.0		mg/L	1	11/1/2018 4:21:52 PM	41293
1,4-Dichlorobenzene	ND	7.5		mg/L	1	11/1/2018 4:21:52 PM	41293
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	11/1/2018 4:21:52 PM	41293
1,1-Dichloroethene	ND	0.70		mg/L	1	11/1/2018 4:21:52 PM	41293
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	11/1/2018 4:21:52 PM	41293
Trichloroethene (TCE)	ND	0.50		mg/L	1	11/1/2018 4:21:52 PM	41293
Vinyl chloride	ND	0.20		mg/L	1	11/1/2018 4:21:52 PM	41293
Surr: 1,2-Dichloroethane-d4	87.3	70-130		%Rec	1	11/1/2018 4:21:52 PM	41293
Surr: 4-Bromofluorobenzene	101	57.3-148		%Rec	1	11/1/2018 4:21:52 PM	41293
Surr: Dibromofluoromethane	90.0	70-130		%Rec	1	11/1/2018 4:21:52 PM	41293
Surr: Toluene-d8	91.6	70-130		%Rec	1	11/1/2018 4:21:52 PM	41293

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		11/5/2018 9:54:43 AM	WG1191459
Fluid	1		11/5/2018 9:54:43 AM	WG1191459
Initial pH	8.74		11/5/2018 9:54:43 AM	WG1191459
Final pH	5.19		11/5/2018 9:54:43 AM	WG1191459

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	11/03/2018 13:45	WG1190235

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	30.2		25.0	1	11/07/2018 15:54	WG1191857

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	9.36	TS	1	11/02/2018 09:48	WG1190221

Sample Narrative:
L1039998-01 WG1190221: 9.36 at 18.7C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	11/03/2018 13:00	WG1190220

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	11/10/2018 13:47	WG1192492
2,4-D	ND		0.00200	10	1	11/10/2018 13:47	WG1192492
(S) 2,4-Dichlorophenyl Acetic Acid	*61.6*		*14.0-158*			*11/10/2018 13:47*	WG1192492

WG1190235

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1039998-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3356605-1 11/03/18 13:15

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1039759-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1039759-02 11/03/18 13:20 • (DUP) R3356605-3 11/03/18 13:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte		mg/kg		%		%
Reactive Cyanide		0.0798	1	200	J P1	20

L1039759-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1039759-12 11/03/18 13:36 • (DUP) R3356605-6 11/03/18 13:39

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte		mg/kg		%		%
Reactive Cyanide		0.0418	1	200	J P1	20

Laboratory Control Sample (LCS)

(LCS) R3356605-2 11/03/18 13:16

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.59	104	50.0-150	

L1039759-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1039759-03 11/03/18 13:23 • (MS) R3356605-4 11/03/18 13:24 • (MSD) R3356605-5 11/03/18 13:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg		mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	2.00		1.48	1.44	84.1	81.4	1	75.0-125			3.01	20

L1039795-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1039795-01 11/03/18 13:40 • (MS) R3356605-7 11/03/18 13:41 • (MSD) R3356605-8 11/03/18 13:42

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg		mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67		1.45	1.31	86.8	78.6	1	75.0-125			9.84	20

WG1191857

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1039998-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3357830-1 11/07/18 15:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1038569-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1038569-02 11/07/18 15:54 • (DUP) R3357830-3 11/07/18 15:54

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3357830-2 11/07/18 15:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	84.4	84.4	70.0-130	

WG1190221

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1039998-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3356243-1 11/02/18 09:48

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.95	99.6	99.0-101	

Sample Narrative:

LCS: 9.90 at 16.2C

WG1190220

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1039998-01

ONE LAB. NATIONWIDE.

L1039306-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1039306-03 11/03/18 13:00 • (DUP) R3356807-2 11/03/18 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	155	156	1	0.645		10

L1039800-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1039800-03 11/03/18 13:00 • (DUP) R3356807-3 11/03/18 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	96.6	95.6	1	1.04		10

Laboratory Control Sample (LCS)

(LCS) R3356807-1 11/03/18 13:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.6	102	96.0-104	

WG1192492

Chlorinated Acid Herbicides (GC) by Method 8151A

QUALITY CONTROL SUMMARY

L1039998-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3358793-1 11/10/18 09:00

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*61.8*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3358793-2 11/10/18 09:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2,4-D	0.0500	0.0355	71.0	50.0-120	
2,4,5-TP (Silvex)	0.0500	0.0327	65.4	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*64.6*	*14.0-158*	

L1040332-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1040332-05 11/10/18 14:01 • (MS) R3358793-3 11/10/18 14:15 • (MSD) R3358793-4 11/10/18 14:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
2,4-D	0.0500	ND	0.0357	0.0358	71.4	71.6	1	50.0-120			0.230	20
2,4,5-TP (Silvex)	0.0500	ND	0.0332	0.0333	66.4	66.6	1	50.0-125			0.301	20
(S) 2,4-Dichlorophenyl Acetic Acid					*64.2*	*68.6*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	LCS-41261	SampType:	LCS		TestCode:	EPA Method 8015M/D: Diesel Range Organics				
Client ID:	LCSS	Batch ID:	41261		RunNo:	55288				
Prep Date:	10/30/2018	Analysis Date:	10/31/2018		SeqNo:	1840657	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	41	10	50.00	0	82.9	70	130			
Surr: DNOP	4.2		5.000		84.4	50.6	138			

Sample ID	MB-41261	SampType:	MBLK		TestCode:	EPA Method 8015M/D: Diesel Range Organics				
Client ID:	PBS	Batch ID:	41261		RunNo:	55288				
Prep Date:	10/30/2018	Analysis Date:	10/31/2018		SeqNo:	1840658	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.7		10.00		86.8	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-41327**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844411** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0015		0.002500		61.8	58.3	109			
Surr: Tetrachloro-m-xylene	0.0012		0.002500		49.9	40.1	101			

Sample ID **LCS-41327**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844412** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00040	0.00010	0.0005000	0	80.9	49.5	127			
gamma-BHC (Lindane)	0.00037	0.00010	0.0005000	0	74.5	49.9	124			
Heptachlor	0.00031	0.00010	0.0005000	0	61.9	41	122			
Heptachlor epoxide	0.00040	0.00010	0.0005000	0	79.3	52.2	121			
Methoxychlor	0.00039	0.00010	0.0005000	0	78.5	40.2	134			
Surr: Decachlorobiphenyl	0.0018		0.002500		70.4	58.3	109			
Surr: Tetrachloro-m-xylene	0.0016		0.002500		64.6	40.1	101			

Sample ID **LCSD-41327**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **41327**	RunNo: **55427**
Prep Date: **11/2/2018**	Analysis Date: **11/6/2018**	SeqNo: **1844413** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00043	0.00010	0.0005000	0	85.3	49.5	127	5.29	20	
gamma-BHC (Lindane)	0.00041	0.00010	0.0005000	0	82.5	49.9	124	10.2	20	
Heptachlor	0.00036	0.00010	0.0005000	0	71.8	41	122	14.8	20	
Heptachlor epoxide	0.00042	0.00010	0.0005000	0	84.8	52.2	121	6.72	20	
Methoxychlor	0.00042	0.00010	0.0005000	0	83.8	40.2	134	6.50	20	
Surr: Decachlorobiphenyl	0.0018		0.002500		73.7	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0019		0.002500		76.4	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	lcs-41230	SampType:	LCS		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	LCSS	Batch ID:	41230		RunNo:	55274				
Prep Date:	10/29/2018	Analysis Date:	10/30/2018		SeqNo:	1838996	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	99.6	70	130			
Toluene	1.0	0.050	1.000	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		87.2	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		101	70	130			
Surr: Dibromofluoromethane	0.46		0.5000		91.2	70	130			
Surr: Toluene-d8	0.48		0.5000		95.7	70	130			

Sample ID	mb-41230	SampType:	MBLK		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	PBS	Batch ID:	41230		RunNo:	55274				
Prep Date:	10/29/2018	Analysis Date:	10/30/2018		SeqNo:	1838997	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		89.7	70	130			
Surr: 4-Bromofluorobenzene	0.52		0.5000		104	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		95.8	70	130			
Surr: Toluene-d8	0.48		0.5000		96.1	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **1810e19-001ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S9-3-IDW** Batch ID: **41293** RunNo: **55351**

Prep Date: **10/31/2018** Analysis Date: **11/1/2018** SeqNo: **1842241** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.30	0.4000	0	103	44.5	152			
Chlorobenzene	0.41	0.30	0.4000	0	102	70	130			
1,1-Dichloroethene	0.45	0.30	0.4000	0	111	79.1	132			
Trichloroethene (TCE)	0.38	0.30	0.4000	0	95.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		87.3	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		92.2	70	130			
Surr: Toluene-d8	0.19		0.2000		92.6	70	130			

Sample ID **1810e19-001amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106S9-3-IDW** Batch ID: **41293** RunNo: **55351**

Prep Date: **10/31/2018** Analysis Date: **11/1/2018** SeqNo: **1842242** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.38	0.30	0.4000	0	95.4	44.5	152	8.02	20	
Chlorobenzene	0.39	0.30	0.4000	0	98.2	70	130	4.04	20	
1,1-Dichloroethene	0.40	0.30	0.4000	0	99.7	79.1	132	11.1	20	
Trichloroethene (TCE)	0.35	0.30	0.4000	0	86.9	70	130	9.28	20	
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		85.3	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148	0	0	
Surr: Dibromofluoromethane	0.18		0.2000		88.9	70	130	0	0	
Surr: Toluene-d8	0.18		0.2000		91.8	70	130	0	0	

Sample ID **lcs-41293** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**

Client ID: **LCSS** Batch ID: **41293** RunNo: **55351**

Prep Date: **10/31/2018** Analysis Date: **11/1/2018** SeqNo: **1842244** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.30	0.4000	0	102	70	130			
Chlorobenzene	0.41	0.30	0.4000	0	103	70	130			
1,1-Dichloroethene	0.44	0.30	0.4000	0	111	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.17		0.2000		86.5	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.18		0.2000		89.5	70	130			
Surr: Toluene-d8	0.19		0.2000		94.1	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	mb-41293	SampType:	MBLK	TestCode:	Volatiles by 8260B/1311		
Client ID:	PBS	Batch ID:	41293	RunNo:	55351		
Prep Date:	10/31/2018	Analysis Date:	11/1/2018	SeqNo:	1842245	Units:	mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.18		0.2000		88.6	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.9	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		92.9	70	130			
Surr: Toluene-d8	0.18		0.2000		91.6	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-41326**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **41326**	RunNo: **55409**
Prep Date: **11/2/2018**	Analysis Date: **11/5/2018**	SeqNo: **1843734** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.074	0.0010	0.1000	0	74.5	47.8	99.2			
3+4-Methylphenol	0.15	0.0010	0.2000	0	73.8	41.5	118			
2,4-Dinitrotoluene	0.065	0.0010	0.1000	0	64.6	44.4	81			
Hexachlorobenzene	0.076	0.0010	0.1000	0	76.4	49.5	91.6			
Hexachlorobutadiene	0.053	0.0010	0.1000	0	53.1	38.6	93			
Hexachloroethane	0.050	0.0010	0.1000	0	50.0	39.4	79.9			
Nitrobenzene	0.082	0.0010	0.1000	0	81.8	47.4	96.2			
Pentachlorophenol	0.042	0.0010	0.1000	0	42.2	39.4	79.9			
Pyridine	0.044	0.0010	0.1000	0	44.3	15	79.9			
2,4,5-Trichlorophenol	0.066	0.0010	0.1000	0	66.1	47.4	118			
2,4,6-Trichlorophenol	0.063	0.0010	0.1000	0	62.9	47.4	101			
Cresols, Total	0.22	0.0010	0.3000	0	74.0	44.1	111			
Surr: 2-Fluorophenol	0.12		0.2000		59.1	15	102			
Surr: Phenol-d5	0.10		0.2000		50.6	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		68.0	39.9	111			
Surr: Nitrobenzene-d5	0.077		0.1000		77.3	35.1	107			
Surr: 2-Fluorobiphenyl	0.067		0.1000		66.5	36.7	100			
Surr: 4-Terphenyl-d14	0.057		0.1000		57.1	42.6	129			

Sample ID **lcsd-41326**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **41326**	RunNo: **55409**
Prep Date: **11/2/2018**	Analysis Date: **11/5/2018**	SeqNo: **1843735** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.071	0.0010	0.1000	0	71.2	47.8	99.2	4.50	20	
3+4-Methylphenol	0.15	0.0010	0.2000	0	73.9	41.5	118	0.135	20	
2,4-Dinitrotoluene	0.059	0.0010	0.1000	0	58.8	44.4	81	9.50	20	
Hexachlorobenzene	0.071	0.0010	0.1000	0	71.4	49.5	91.6	6.79	20	
Hexachlorobutadiene	0.063	0.0010	0.1000	0	63.2	38.6	93	17.3	20	
Hexachloroethane	0.058	0.0010	0.1000	0	58.2	39.4	79.9	15.2	20	
Nitrobenzene	0.081	0.0010	0.1000	0	81.0	47.4	96.2	0.983	20	
Pentachlorophenol	0.042	0.0010	0.1000	0	41.9	39.4	79.9	0.714	20	
Pyridine	0.056	0.0010	0.1000	0	56.2	15	79.9	23.8	20	R
2,4,5-Trichlorophenol	0.060	0.0010	0.1000	0	60.4	47.4	118	8.89	20	
2,4,6-Trichlorophenol	0.067	0.0010	0.1000	0	66.7	47.4	101	5.86	20	
Cresols, Total	0.22	0.0010	0.3000	0	73.0	44.1	111	1.40	20	
Surr: 2-Fluorophenol	0.14		0.2000		68.0	15	102	0	20	
Surr: Phenol-d5	0.11		0.2000		57.0	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		64.4	39.9	111	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	lcsd-41326	SampType:	LCSD	TestCode:	EPA Method 8270C TCLP					
Client ID:	LCSS02	Batch ID:	41326	RunNo:	55409					
Prep Date:	11/2/2018	Analysis Date:	11/5/2018	SeqNo:	1843735	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.075		0.1000		74.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.065		0.1000		65.2	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.056		0.1000		55.6	42.6	129	0	20	

Sample ID	mb-41326	SampType:	MBLK	TestCode:	EPA Method 8270C TCLP					
Client ID:	PBS	Batch ID:	41326	RunNo:	55409					
Prep Date:	11/2/2018	Analysis Date:	11/5/2018	SeqNo:	1843736	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.13		0.2000		63.7	15	102			
Surr: Phenol-d5	0.095		0.2000		47.4	15	87.7			
Surr: 2,4,6-Tribromophenol	0.15		0.2000		74.9	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		80.2	35.1	107			
Surr: 2-Fluorobiphenyl	0.072		0.1000		72.0	36.7	100			
Surr: 4-Terphenyl-d14	0.058		0.1000		58.1	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	MB-41359	SampType:	MBLK	TestCode:	MERCURY, TCLP					
Client ID:	PBW	Batch ID:	41359	RunNo:	55440					
Prep Date:	11/5/2018	Analysis Date:	11/6/2018	SeqNo:	1844905	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	LCS-41359	SampType:	LCS	TestCode:	MERCURY, TCLP					
Client ID:	LCSW	Batch ID:	41359	RunNo:	55440					
Prep Date:	11/5/2018	Analysis Date:	11/6/2018	SeqNo:	1844906	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	95.6	80	120			

Sample ID	1810E19-001AMS	SampType:	MS	TestCode:	MERCURY, TCLP					
Client ID:	KAFB-106S9-3-IDW	Batch ID:	41359	RunNo:	55440					
Prep Date:	11/5/2018	Analysis Date:	11/6/2018	SeqNo:	1844908	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	97.5	75	125			

Sample ID	1810E19-001AMSD	SampType:	MSD	TestCode:	MERCURY, TCLP					
Client ID:	KAFB-106S9-3-IDW	Batch ID:	41359	RunNo:	55440					
Prep Date:	11/5/2018	Analysis Date:	11/6/2018	SeqNo:	1844909	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	MB-41394	SampType:	MBLK	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	PBW	Batch ID:	41394	RunNo:	55462					
Prep Date:	11/6/2018	Analysis Date:	11/7/2018	SeqNo:	1846509	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	LCS-41394	SampType:	LCS	TestCode:	EPA Method 6010B: TCLP Metals					
Client ID:	LCSW	Batch ID:	41394	RunNo:	55462					
Prep Date:	11/6/2018	Analysis Date:	11/7/2018	SeqNo:	1846510	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	100	80	120			
Barium	ND	100	0.5000	0	97.6	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	97.9	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	97.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1810E19

12-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	lcs-41230	SampType:	LCS		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	LCSS	Batch ID:	41230		RunNo:	55512				
Prep Date:	10/29/2018	Analysis Date:	10/30/2018		SeqNo:	1848182	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	113	70.4	131			
Surr: BFB	510		500.0		101	70	130			

Sample ID	mb-41230	SampType:	MBLK		TestCode:	EPA Method 8015D Mod: Gasoline Range				
Client ID:	PBS	Batch ID:	41230		RunNo:	55512				
Prep Date:	10/29/2018	Analysis Date:	10/30/2018		SeqNo:	1848183	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	510		500.0		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1810E19 | RcptNo: 1

Received By: Jazzmine Burkhead 10/26/2018 3:00:00 PM

Completed By: Anne Thorne 10/29/2018 11:50:37 AM

Reviewed By: JAB 10/29/18

Labeled by: AT 10/29/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
Samples were collected the same day and chilled.			
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.1	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

COC

[1] COC NUMBER: KAFB-1065 9-3-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.37~~ PF 62735DM02 1017.08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219.	Pam Moss/pmoss@eaest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4410	505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[15] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081B/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-1065 9-3-idw	Roll off 9-3	Soil	10-26-18	0750	IV	7	3	X	X	X	X	X	X		PF		composite	HEALTH 1810E19	001
2																				
3																				
4																				
5																				
6						PF														
7																				
8																				
9																				
10																				

[24] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Farrar

[25] COURIER AND SHIPPING NUMBER:
FedEx Number: N/A Hand delivered to Hall Lab

Temp - 5.1-1.0(cf)=4.1

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Farrar Pete Farrar	10-26-18	1500	Printed Name and Signature: Jazzmine Burkhead Jazzmine Burkhead	10/26/18	15:00
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

6 March 2019

MEMORANDUM FOR: AFCEC/CZO

FROM: 377 MSG/CEIE (Solid Waste Program Manager)

SUBJECT: Landfill Disposal

Reference: EA Engineering, Science, & Technology, Inc, letters (5), dated: 1 March 2019
USACE Contract No. W9128F-13-D-0006-DM02

Disposal of non-hazardous soil cuttings from groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247

1. Authorization is granted to EA to dispose of soil generated from installation of groundwater monitoring wells KAFB-106S1, KAFB-106S7, KAFB-106S8, and KAFB-106247, in support of the Bulk Fuels Facility project, at the Kirtland AFB Construction & Demolition Landfill. The soil will be delivered to the landfill by Advanced Chemical Transport Environmental Services, Inc (ACT), and will be in two 15-cubic-yard hard-top roll-offs labeled **ACT-2058** and **ACT-2057**; and three 20-cubic-yard open-top roll-offs labeled **104051, 20B-27,** and **5060**. The roll-offs will be transported using one of two 2015 Western Star roll-off trucks depending on ACT's vehicle availability: either **NM license plate WD121651**, or **NM license plate WD124756**. Lab results are on file in the Solid Waste Management office. EA shall be issued a Kirtland AFB landfill pass for this disposal action. A copy of this letter will accompany each roll-off and will be left with the gate keeper at the landfill.

2. Please direct questions to me at 853-2486.

WHEELOCK.KATRINA.E.1402749586
Digitally signed by WHEELOCK.KATRINA.E.1402749586
Date: 2019.03.06 16:57:34 -07'00'

KATRINA E. WHEELOCK
Solid Waste Program Manager
Environmental Management

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

March 1, 2019

Ms. Katrina Wheelock
Solid Waste Program Manager
Environmental Management
377 MSG/CEIE
Kirtland AFB, New Mexico 87117

Subject: Request to dispose non-hazardous soil cuttings at Kirtland C&D Landfill
Roll-off Identification: KAFB-106247-1 (Bin ID # 104051)
USACE Contract No. W9128F-13-D-0006-DM02

Dear Ms. Wheelock,

EA Engineering, Science, and Technology, Inc., PBC (EA) is requesting permission to dispose of non-hazardous soil drill cuttings and plastic liner from one roll-off container to the Kirtland Air Force Base (AFB) Construction and Demolition (C&D) debris landfill. The roll-off bin included in this request is:

- EA identification of 247-1 (Bin ID # 104051) contains approximately 13 cubic yards of soil in a 20-yard, open top, roll off.

Beginning in Fall 2018, EA initiated drilling activities as part of the Vadoze Zone Treatability Studies associated with the Kirtland Bulk Fuels Facility environmental restoration project. As part of the project, EA will install a groundwater monitoring well, KAFB-106247, located in the eastern portion of the Bulk Fuels Facility. Drill cuttings were containerized in a plastic-lined, steel, roll-off pending laboratory analysis for waste characterization. Any excess moisture in the bin was stabilized using Hydrosorb®, a superabsorbent polymer. The roll-off bin is currently residing in the EA investigation derived waste yard near 1601 Perimeter Circle SE, on Kirtland AFB.

One five-point composite waste characterization sample was collected from the roll-off bin and delivered to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for analysis. The sample was analyzed for all the required parameters per the Kirtland AFB Landfill Acceptance Memorandum (January 2009). The attached analytical results (Report 1902433) for the composite sample confirms the drill cuttings meet waste acceptance requirements for disposal at the Kirtland C&D landfill.

The roll-off container is owned and/or leased by Advanced Chemical Transport Environmental Services Inc. (ACT) with the roll-off identification numbers marked clearly on the roll off. ACT will utilize one of the following vehicles for waste transport:

- 2015 Western Star Roll Off Truck, License #: WD121651, registered in New Mexico
- 2015 Western Star Roll Off Truck, License #: WD124756, registered in New Mexico

Mr. Scott Clark (AFCEC/CZO) has reviewed this package and authorized EA to forward it for your review. EA respectfully requests your review of the attached summary table and analytical data for determination if disposal can be authorized at the Kirtland AFB C&D landfill. Upon receiving notification of Kirtland AFB's acceptance of the waste, EA will coordinate transport and disposal of the roll-off contents with ACT.

EA's Kirtland AFB Point of Contact is Mr. Scott Clark; (505) 846-9017.

If you have any questions, please do not hesitate to contact me at (505) 266-2225, or via e-mail at asmith@eaest.com.

Sincerely,

Amanda M. Smith

Attachments: Summary Analytical Table
Hall Environmental Analysis Laboratory Order No: Report 1902433

cc: Scott Clark, scott.clark@us.af.mil
Sheen Kottkamp, sheen.kottkamp.1@us.af.mil
Melissa Clark, melissa.clark.8@us.af.mil
Ben Moayyad, Behnaum.Moayyad@usace.army.mil
Devon Jercinovic, djercinovic@eaest.com
Bernie Bockisch, bbockisch@eaest.com
Earl Morse, emorse@eaest.com
Lane Andress, landress@eaest.com

			LOCATION CODE				
			FIELD SAMPLE ID		KAFB-106247-1-idw		
			SAMPLE DATE		8-Feb-19		
			SAMPLE PURPOSE		Waste Characterization		
			ROLL-OFF NO.		106247-1		
Parameter	Method	Analyte	Units	TCLP Regulatory Level[a] or KAFB Limits[b]	Result	QUAL	PQL
RCRA Characteristics	SW1010A Mod	IGNITABILITY	°F	See footnote[c]	> 170	--	--
	SW9012B	REACTIVE CYANIDE (as total)	mg/kg	NE	ND	--	0.25
	SW9034	REACTIVE SULFIDE (as total)	mg/kg	NE	ND	--	25.0
	SW9045D	CORROSIVITY (pH)	S.U.	≥2 or ≤12.5	8.93	J	--
TCLP HERBICIDES	SW1311/8151A	2,4,5-TP (Silvex)	mg/L	1	ND	--	1.0
		2,4-D (2,4-Dichlorophenoxyacetic acid)	mg/L	10	ND	--	10
TCLP METALS	SW1311/6010B	ARSENIC	mg/L	5	ND	--	5.0
		BARIUM	mg/L	100	ND	--	100
		CADMIUM	mg/L	1	ND	--	1.0
		CHROMIUM	mg/L	5	ND	--	5.0
		LEAD	mg/L	5	ND	--	5.0
		SELENIUM	mg/L	1	ND	--	1.0
		SILVER	mg/L	5	ND	--	5.0
	SW1311/7470A	MERCURY	mg/L	0.02	ND	--	0.020
TCLP PESTICIDES	SW1311/8081	CHLORDANE	mg/L	0.03	ND	--	0.030
		ENDRIN	mg/L	0.02	ND	--	0.020
		GAMMA-BHC (LINDANE)	mg/L	0.4	ND	--	0.40
		HEPTACHLOR	mg/L	0.008	ND	--	0.0080
		HEPTACHLOR EPOXIDE	mg/L	0.008	ND	--	0.0080
		METHOXYCHLOR	mg/L	10	ND	--	10
		TOXAPHENE	mg/L	0.5	ND	--	0.50
TCLP SVOCs	SW1311/8270C	2,4,5-TRICHLOROPHENOL	mg/L	400	ND	--	400
		2,4,6-TRICHLOROPHENOL	mg/L	2	ND	--	2.0
		2,4-DINITROTOLUENE	mg/L	0.13	ND	--	0.13
		2-METHYLPHENOL (o-Cresol)	mg/L	200	ND	--	200
		3- and 4-METHYLPHENOL (m- and o-Cresol)	mg/L	200	ND	--	200
		HEXACHLOROBENZENE	mg/L	0.13	ND	--	0.13
		HEXACHLOROBUTADIENE	mg/L	0.5	ND	--	0.50
		HEXACHLOROETHANE	mg/L	3	ND	--	3.0
		NITROBENZENE	mg/L	2	ND	--	2.0
		PENTACHLOROPHENOL	mg/L	100	ND	--	100
		PYRIDINE	mg/L	5	ND	--	5.0
		CRESOLS, TOTAL	mg/L	200	ND	--	200
TCLP VOCS	SW1311/8260B	1,1-DICHLOROETHENE	mg/L	0.7	ND	--	0.70
		1,2-DICHLOROETHANE	mg/L	0.5	ND	--	0.50
		1,4-DICHLOROBENZENE	mg/L	7.5	ND	--	7.5
		2-BUTANONE (MEK)	mg/L	200	ND	--	200
		BENZENE	mg/L	0.5	ND	--	0.50
		CARBON TETRACHLORIDE	mg/L	0.5	ND	--	0.50
		CHLOROBENZENE	mg/L	100	ND	--	100
		CHLOROFORM	mg/L	6.0	ND	--	6.0
		TETRACHLOROETHENE	mg/L	0.7	ND	--	0.70
		TRICHLOROETHENE	mg/L	0.5	ND	--	0.50
		VINYL CHLORIDE	mg/L	0.2	ND	--	0.20
TPH	SW8015M/D	DIESEL RANGE ORGANICS	mg/kg	100[d]	ND	--	10
		MOTOR OIL RANGE ORGANICS	mg/kg	100[d]	ND	--	50
		GASOLINE RANGE ORGANICS	mg/kg	100[d]	ND	--	5.0
VOLATILES (BTEX)	SW8260B	BENZENE	mg/kg	10	ND	--	0.025
		ETHYLBENZENE	mg/kg	50[e]	ND	--	0.050
		TOLUENE	mg/kg	50[e]	ND	--	0.050
		XYLENES, TOTAL	mg/kg	50[e]	ND	--	0.10

Notes:

[a]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[b]KAFB Limits - Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009)* .

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

[d]KAFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.

[e]KAFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.

> - greater than
BTEX - benzene, toluene, ethylbenzene, total xylenes
°F - degrees farenheit
J - Analyte detected below quantitation limit or estimated value
mg/L - milligram per liter
mg/kg - milligram per kilogram
NE - not established
ND - not detected above the PQL
PQL - practical quantitation limit
QUAL - laboratory data qualifier
Shade- analyte detected above the detection limit
Shade and Bold- analyte detected above KAFB Landfill acceptance limit or TCLP Regulatory Level.
SVOCs - semivolatile organic compounds
S.U. - Standard units
TCLP - Toxicity characteristic leaching procedure
TPH - total petroleum hydrocarbons
VOCs - volatile organic compounds

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 25, 2019

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1902433

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/8/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-1-idw
Project: Kirtland AFB BFF
Collection Date: 2/8/2019 11:40:00 AM
Lab ID: 1902433-001 **Matrix:** SOIL
Received Date: 2/8/2019 1:23:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/15/2019 2:53:40 PM	43164
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	2/14/2019 9:39:22 AM	43141
Barium	ND	100		mg/L	1	2/14/2019 9:39:22 AM	43141
Cadmium	ND	1.0		mg/L	1	2/14/2019 9:39:22 AM	43141
Chromium	ND	5.0		mg/L	1	2/14/2019 9:39:22 AM	43141
Lead	ND	5.0		mg/L	1	2/14/2019 9:39:22 AM	43141
Selenium	ND	1.0		mg/L	1	2/14/2019 9:39:22 AM	43141
Silver	ND	5.0		mg/L	1	2/14/2019 9:39:22 AM	43141
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/22/2019 10:23:59 AM	43222
Endrin	ND	0.020		mg/L	1	2/22/2019 10:23:59 AM	43222
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/22/2019 10:23:59 AM	43222
Heptachlor	ND	0.0080		mg/L	1	2/22/2019 10:23:59 AM	43222
Heptachlor epoxide	ND	0.0080		mg/L	1	2/22/2019 10:23:59 AM	43222
Methoxychlor	ND	10		mg/L	1	2/22/2019 10:23:59 AM	43222
Toxaphene	ND	0.50		mg/L	1	2/22/2019 10:23:59 AM	43222
Surr: Decachlorobiphenyl	50.6	42.6-98.5		%Rec	1	2/22/2019 10:23:59 AM	43222
Surr: Tetrachloro-m-xylene	49.1	28.9-96.7		%Rec	1	2/22/2019 10:23:59 AM	43222
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/15/2019 12:23:33 AM	43142
2,4-D	ND	10		mg/L	1	2/15/2019 12:23:33 AM	43142
Surr: 2,4-Dichlorophenylacetic acid	111	70-130		%Rec	1	2/15/2019 12:23:33 AM	43142
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	2/12/2019 7:54:21 PM	43090
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	2/12/2019 7:54:21 PM	43090
Surr: DNOP	96.2	50.6-138		%Rec	1	2/12/2019 7:54:21 PM	43090
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	2/12/2019 3:59:03 PM	43071
Surr: BFB	103	73.8-119		%Rec	1	2/12/2019 3:59:03 PM	43071
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/14/2019 6:56:38 PM	43128
3+4-Methylphenol	ND	200		mg/L	1	2/14/2019 6:56:38 PM	43128
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/14/2019 6:56:38 PM	43128
Hexachlorobenzene	ND	0.13		mg/L	1	2/14/2019 6:56:38 PM	43128
Hexachlorobutadiene	ND	0.50		mg/L	1	2/14/2019 6:56:38 PM	43128

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-1-idw
Project: Kirtland AFB BFF
Collection Date: 2/8/2019 11:40:00 AM
Lab ID: 1902433-001 **Matrix:** SOIL **Received Date:** 2/8/2019 1:23:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/14/2019 6:56:38 PM	43128
Nitrobenzene	ND	2.0		mg/L	1	2/14/2019 6:56:38 PM	43128
Pentachlorophenol	ND	100		mg/L	1	2/14/2019 6:56:38 PM	43128
Pyridine	ND	5.0		mg/L	1	2/14/2019 6:56:38 PM	43128
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/14/2019 6:56:38 PM	43128
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/14/2019 6:56:38 PM	43128
Cresols, Total	ND	200		mg/L	1	2/14/2019 6:56:38 PM	43128
Surr: 2-Fluorophenol	48.4	15-102		%Rec	1	2/14/2019 6:56:38 PM	43128
Surr: Phenol-d5	39.1	15-87.7		%Rec	1	2/14/2019 6:56:38 PM	43128
Surr: 2,4,6-Tribromophenol	76.3	39.9-111		%Rec	1	2/14/2019 6:56:38 PM	43128
Surr: Nitrobenzene-d5	69.8	35.1-107		%Rec	1	2/14/2019 6:56:38 PM	43128
Surr: 2-Fluorobiphenyl	58.1	36.7-100		%Rec	1	2/14/2019 6:56:38 PM	43128
Surr: 4-Terphenyl-d14	91.4	42.6-129		%Rec	1	2/14/2019 6:56:38 PM	43128
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.025		mg/Kg	1	2/12/2019 6:10:18 PM	43071
Toluene	ND	0.050		mg/Kg	1	2/12/2019 6:10:18 PM	43071
Ethylbenzene	ND	0.050		mg/Kg	1	2/12/2019 6:10:18 PM	43071
Xylenes, Total	ND	0.10		mg/Kg	1	2/12/2019 6:10:18 PM	43071
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	2/12/2019 6:10:18 PM	43071
Surr: 4-Bromofluorobenzene	93.4	70-130		%Rec	1	2/12/2019 6:10:18 PM	43071
Surr: Dibromofluoromethane	105	70-130		%Rec	1	2/12/2019 6:10:18 PM	43071
Surr: Toluene-d8	102	70-130		%Rec	1	2/12/2019 6:10:18 PM	43071
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	2/13/2019 3:30:30 PM	43105
2-Butanone	ND	200		mg/L	1	2/13/2019 3:30:30 PM	43105
Carbon Tetrachloride	ND	0.50		mg/L	1	2/13/2019 3:30:30 PM	43105
Chlorobenzene	ND	100		mg/L	1	2/13/2019 3:30:30 PM	43105
Chloroform	ND	6.0		mg/L	1	2/13/2019 3:30:30 PM	43105
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/13/2019 3:30:30 PM	43105
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/13/2019 3:30:30 PM	43105
1,1-Dichloroethene	ND	0.70		mg/L	1	2/13/2019 3:30:30 PM	43105
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/13/2019 3:30:30 PM	43105
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/13/2019 3:30:30 PM	43105
Vinyl chloride	ND	0.20		mg/L	1	2/13/2019 3:30:30 PM	43105
Surr: 1,2-Dichloroethane-d4	112	70-130		%Rec	1	2/13/2019 3:30:30 PM	43105
Surr: 4-Bromofluorobenzene	99.0	57.3-148		%Rec	1	2/13/2019 3:30:30 PM	43105
Surr: Dibromofluoromethane	105	70-130		%Rec	1	2/13/2019 3:30:30 PM	43105
Surr: Toluene-d8	101	70-130		%Rec	1	2/13/2019 3:30:30 PM	43105

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/14/2019 16:06	WG1236918

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/13/2019 17:12	WG1235966

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.93	T8	1	02/14/2019 09:55	WG1236637

Sample Narrative:

L1069276-01 WG1236637: 8.93 at 20.5C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/19/2019 15:03	WG1238897

Method Blank (MB)

(MB) R3383882-1 02/14/19 15:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1069768-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069768-01 02/14/19 16:16 • (DUP) R3383882-8 02/14/19 16:17

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/14/19 16:19 • (DUP) R3383882-9 02/14/19 16:20

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383882-2 02/14/19 15:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.45	98.2	50.0-150	

L1069273-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069273-01 02/14/19 16:02 • (MS) R3383882-4 02/14/19 16:03 • (MSD) R3383882-5 02/14/19 16:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.60	1.68	96.2	101	1	75.0-125			4.91	20

L1069762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069762-01 02/14/19 16:13 • (MS) R3383882-6 02/14/19 16:14 • (MSD) R3383882-7 02/14/19 16:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.54	1.50	92.7	89.8	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3383539-1 02/13/19 17:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/13/19 17:12 • (DUP) R3383539-3 02/13/19 17:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383539-2 02/13/19 17:12

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	75.1	75.1	70.0-130	

L1069276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069276-01 02/14/19 09:55 • (DUP) R3383690-3 02/14/19 09:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.93	8.94	1	0.112		1

Sample Narrative:

OS: 8.93 at 20.5C

DUP: 8.94 at 20.4C

Laboratory Control Sample (LCS)

(LCS) R3383690-1 02/14/19 09:55

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.02 at 18C

L1068614-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1068614-01 02/19/19 15:03 • (DUP) R3385034-2 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	80.9	82.9	1	2.44		10

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/19/19 15:03 • (DUP) R3385034-3 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1069653-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069653-01 02/19/19 15:03 • (DUP) R3385034-4 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	124	126	1	1.60		10

L1070555-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-01 02/19/19 15:03 • (DUP) R3385034-5 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1070555-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-02 02/19/19 15:03 • (DUP) R3385034-6 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	106	105	1	0.949		10

L1070555-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1070555-03 02/19/19 15:03 • (DUP) R3385034-7 02/19/19 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	105	103	1	1.93		10

Laboratory Control Sample (LCS)

(LCS) R3385034-1 02/19/19 15:03

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	81.9	99.8	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-43090**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929614** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	50.6	138			

Sample ID **LCS-43090**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43090**	RunNo: **57659**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929615** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	49	10	50.00	0	97.8	63.9	124			
Surr: DNOP	4.9		5.000		98.7	50.6	138			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-43071**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**43071**		RunNo:	**57650**				
Prep Date:	**2/11/2019**	Analysis Date:	**2/12/2019**		SeqNo:	**1929282**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		107	73.8	119			

Sample ID	**LCS-43071**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**43071**		RunNo:	**57650**				
Prep Date:	**2/11/2019**	Analysis Date:	**2/12/2019**		SeqNo:	**1929283**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	105	80.1	123			
Surr: BFB	1200		1000		121	73.8	119			S

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **LCS-43222**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938472** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00032	0.00010	0.0005000	0	63.7	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00037	0.00010	0.0005000	0	74.4	52.2	121			
Methoxychlor	0.00026	0.00010	0.0005000	0	51.1	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		64.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.7	28.9	96.7			

Sample ID **LCSD-43222**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	8.66	20	
gamma-BHC (Lindane)	0.00035	0.00010	0.0005000	0	69.1	49.9	124	11.4	20	
Heptachlor	0.00034	0.00010	0.0005000	0	68.0	41	122	7.73	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121	4.72	20	
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134	28.0	20	R
Surr: Decachlorobiphenyl	0.0015		0.002500		61.6	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		48.3	28.9	96.7	0	0	

Sample ID **MB-43222**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43222**	RunNo: **57895**
Prep Date: **2/19/2019**	Analysis Date: **2/22/2019**	SeqNo: **1938561** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0011		0.002500		44.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00090		0.002500		35.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-43142**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931599** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		103	70	130			

Sample ID **LCS-43142**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	95.0	70	130			
2,4-D	0.077	0.010	0.07500	0	103	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.075		0.07500		99.7	70	130			

Sample ID **1902433-001AMS**	SampType: **MS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **KAFB-106247-1-idw**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1931608** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	97.4	70	130			
2,4-D	0.078	0.010	0.07500	0	104	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.081		0.07500		109	70	130			

Sample ID **1902433-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **KAFB-106247-1-idw**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1931609** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	96.9	70	130	0	20	
2,4-D	0.078	0.010	0.07500	0	104	70	130	0.209	20	
Surr: 2,4-Dichlorophenylacetic aci	0.077		0.07500		103	70	130	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-43071**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43071**	RunNo: **57661**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929702** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		93.9	70	130			
Surr: Dibromofluoromethane	0.51		0.5000		102	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID **lcs-43071**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43071**	RunNo: **57661**
Prep Date: **2/11/2019**	Analysis Date: **2/12/2019**	SeqNo: **1929703** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.3	70	130			
Toluene	0.91	0.050	1.000	0	91.2	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.1	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.4	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.7	70	130			
Surr: Toluene-d8	0.49		0.5000		98.9	70	130			

Sample ID **mb-43103**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930715** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID **lcs-43103**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930716** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		110	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.3	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-43105**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930720** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		114	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		93.0	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		99.0	70	130			

Sample ID **lcs-43105**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930721** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	95.6	70	130			
1,1-Dichloroethene	0.43	0.30	0.4000	0	108	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.20		0.2000		98.9	70	130			

Sample ID **1902433-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-1-idw**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930723** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.87	0.30	0.8000	0	109	68.3	131			
Chlorobenzene	0.79	0.30	0.8000	0	98.4	80	120			
1,1-Dichloroethene	0.89	0.30	0.8000	0	111	64.3	135			
Trichloroethene (TCE)	0.75	0.30	0.8000	0	93.5	80	120			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		109	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **1902433-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-1-idw**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930723** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.4	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		107	70	130			
Surr: Toluene-d8	0.20		0.2000		101	70	130			

Sample ID **1902433-001amsd**	SampType: **MSD**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-1-idw**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930724** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.30	0.8000	0	116	68.3	131	6.35	20	
Chlorobenzene	0.75	0.30	0.8000	0	94.2	80	120	4.43	20	
1,1-Dichloroethene	0.94	0.30	0.8000	0	118	64.3	135	5.66	20	
Trichloroethene (TCE)	0.78	0.30	0.8000	0	97.3	80	120	3.96	20	
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		117	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.19		0.2000		95.9	57.3	148	0	0	
Surr: Dibromofluoromethane	0.23		0.2000		113	70	130	0	0	
Surr: Toluene-d8	0.20		0.2000		98.3	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-43128**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.8	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	76.7	42.3	108			
2,4-Dinitrotoluene	0.055	0.0010	0.1000	0	55.2	45.8	87.8			
Hexachlorobenzene	0.068	0.0010	0.1000	0	67.8	54.5	104			
Hexachlorobutadiene	0.059	0.0010	0.1000	0	59.0	35.2	95.8			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.6	53.1	98.9			
Pentachlorophenol	0.056	0.0010	0.1000	0	56.1	30.3	104			
Pyridine	0.051	0.0010	0.1000	0	50.8	15	90			
2,4,5-Trichlorophenol	0.063	0.0010	0.1000	0	62.7	42.1	107			
2,4,6-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.0	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		72.0	15	102			
Surr: Phenol-d5	0.13		0.2000		62.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.5	39.9	111			
Surr: Nitrobenzene-d5	0.070		0.1000		70.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.059		0.1000		59.2	36.7	100			
Surr: 4-Terphenyl-d14	0.086		0.1000		85.6	42.6	129			

Sample ID **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.16		0.2000		77.9	15	102			
Surr: Phenol-d5	0.13		0.2000		67.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**
25-Feb-19

Client: EA Engineering Science & Technology
Project: Kirtland AFB BFF

Sample ID **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**							
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		73.7	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		88.6	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-43164**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**43164**	RunNo:	**57746**					
Prep Date:	**2/14/2019**	Analysis Date:	**2/15/2019**	SeqNo:	**1932763**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-43164**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**43164**	RunNo:	**57746**					
Prep Date:	**2/14/2019**	Analysis Date:	**2/15/2019**	SeqNo:	**1932764**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	94.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902433**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-43141**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**43141**	RunNo:	**57698**					
Prep Date:	**2/13/2019**	Analysis Date:	**2/14/2019**	SeqNo:	**1930953**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-43141**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**43141**	RunNo:	**57698**					
Prep Date:	**2/13/2019**	Analysis Date:	**2/14/2019**	SeqNo:	**1930955**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	107	80	120			
Barium	ND	100	0.5000	0	99.9	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902433 RcptNo: 1

Received By: Anne Thorne 2/8/2019 1:23:00 PM Anne Thorne

Completed By: Anne Thorne 2/11/2019 12:43:55 PM Anne Thorne

Reviewed By: JO 2/11/19

Labeled by: AT 02/11/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	No			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106247-1-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[7] PROJECT PHASE/SITE/TASK:	[8] PO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[5] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 238-4410	Tel 505 345 3975 Fax 505 345 4107	Ea-/ Morse/ emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081 /8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106247-1-idw	roll off 247-1	So.	2-8-19	1140	IV	7	3	X	X	X	X	X	X		PF		Composite	HEAL # 1902433	001
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)	[30] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferrari	FedEx Number: NA Hand delivered to Hall Lab	1.0

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari	2-8-19	1216	Printed Name and Signature: Joshua Livingston	2/8/19	1216
Printed Name and Signature: Joshua Livingston	2/8/19	1323	Printed Name and Signature: Anna Thom	02/08/19	1323
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NM9570024423

Manifest Document No.: D237652 | 2. Page 1 of 1

3. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL
KIRTLAND AIR FORCE BASE, NM 87117
SCOTT CLARK 505-846-9017

4. Generator's Phone ( )

5. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO
6. US EPA ID Number: CAR000070540

A. State Transporter's ID
B. Transporter 1 Phone

7. Transporter 2 Company Name
8. US EPA ID Number

C. State Transporter's ID
D. Transporter 2 Phone

9. Designated Facility Name and Site Address
TWIN ENVIRO SERVICES - PHANTOM LANDFILL
2500 FREMONT COUNTY ROAD 67
PENROSE, CO 81240
719-372-6671

10. US EPA ID Number: COR000208454

E. State Facility's ID
F. Facility's Phone

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-RCRA/Non-DOT Regulated Material Solid Sludges (DRILL CUTTINGS)	1	CM	10	~~TON~~ yd
b.				
c.				
d.				

GENERATOR

G. Additional Descriptions for Materials Listed Above: Project Number 198757 Document #: D237652
) P-20190213 KIT- 1X-7cy

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

Bin # 1041056

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Scott Clark | Signature | Date: Month 4 Day 10 Year 19

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Justin Grey | Signature | Date: Month 04 Day 10 Year 19

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Chuycen Roberts | Signature | Date: Month 5 Day 23 Year 19

NON-HAZARDOUS WASTE

PRINTED ON RECYCLED PAPER USING SOYBEAN INK PRINTED WITH SOY INK

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 19, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1903154

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/4/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-2
Project: Kirtland AFB BFF
Collection Date: 3/4/2019 12:15:00 PM
Lab ID: 1903154-001 **Matrix:** SOIL
Received Date: 3/4/2019 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**
Chlordane	ND	0.030		mg/L	1	3/12/2019 12:49:41 PM
Endrin	ND	0.020		mg/L	1	3/12/2019 12:49:41 PM
gamma-BHC (Lindane)	ND	0.40		mg/L	1	3/12/2019 12:49:41 PM
Heptachlor	ND	0.0080		mg/L	1	3/12/2019 12:49:41 PM
Heptachlor epoxide	ND	0.0080		mg/L	1	3/12/2019 12:49:41 PM
Methoxychlor	ND	10		mg/L	1	3/12/2019 12:49:41 PM
Toxaphene	ND	0.50		mg/L	1	3/12/2019 12:49:41 PM
Surr: Decachlorobiphenyl	87.0	42.6-98.5		%Rec	1	3/12/2019 12:49:41 PM
Surr: Tetrachloro-m-xylene	89.4	28.9-96.7		%Rec	1	3/12/2019 12:49:41 PM
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	3/11/2019 4:49:54 PM
2,4-D	ND	10		mg/L	1	3/11/2019 4:49:54 PM
Surr: 2,4-Dichlorophenylacetic acid	112	70-130		%Rec	1	3/11/2019 4:49:54 PM
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	3/6/2019 12:21:05 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	3/6/2019 12:21:05 PM
Surr: DNOP	80.4	70-130		%Rec	1	3/6/2019 12:21:05 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/6/2019 11:54:53 AM
Surr: BFB	102	73.8-119		%Rec	1	3/6/2019 11:54:53 AM
MERCURY, TCLP						Analyst: **pmf**
Mercury	ND	0.020		mg/L	1	3/13/2019 10:16:51 AM
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**
Arsenic	ND	5.0		mg/L	1	3/11/2019 10:16:52 AM
Barium	ND	100		mg/L	1	3/11/2019 10:16:52 AM
Cadmium	ND	1.0		mg/L	1	3/11/2019 10:16:52 AM
Chromium	ND	5.0		mg/L	1	3/11/2019 10:16:52 AM
Lead	ND	5.0		mg/L	1	3/11/2019 4:20:56 PM
Selenium	ND	1.0		mg/L	1	3/11/2019 10:16:52 AM
Silver	ND	5.0		mg/L	1	3/11/2019 10:16:52 AM
EPA METHOD 8270C TCLP						Analyst: **DAM**
2-Methylphenol	ND	200		mg/L	1	3/13/2019 10:14:56 AM
3+4-Methylphenol	ND	200		mg/L	1	3/13/2019 10:14:56 AM
2,4-Dinitrotoluene	ND	0.13		mg/L	1	3/13/2019 10:14:56 AM
Hexachlorobenzene	ND	0.13		mg/L	1	3/13/2019 10:14:56 AM
Hexachlorobutadiene	ND	0.50		mg/L	1	3/13/2019 10:14:56 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-2
Project: Kirtland AFB BFF
Collection Date: 3/4/2019 12:15:00 PM
Lab ID: 1903154-001 **Matrix:** SOIL
Received Date: 3/4/2019 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C TCLP						Analyst: **DAM**
Hexachloroethane	ND	3.0		mg/L	1	3/13/2019 10:14:56 AM
Nitrobenzene	ND	2.0		mg/L	1	3/13/2019 10:14:56 AM
Pentachlorophenol	ND	100		mg/L	1	3/13/2019 10:14:56 AM
Pyridine	ND	5.0		mg/L	1	3/13/2019 10:14:56 AM
2,4,5-Trichlorophenol	ND	400		mg/L	1	3/13/2019 10:14:56 AM
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	3/13/2019 10:14:56 AM
Cresols, Total	ND	200		mg/L	1	3/13/2019 10:14:56 AM
Surr: 2-Fluorophenol	53.3	22.2-88.7		%Rec	1	3/13/2019 10:14:56 AM
Surr: Phenol-d5	39.5	16.4-74.1		%Rec	1	3/13/2019 10:14:56 AM
Surr: 2,4,6-Tribromophenol	74.1	28.1-108		%Rec	1	3/13/2019 10:14:56 AM
Surr: Nitrobenzene-d5	71.8	20.1-112		%Rec	1	3/13/2019 10:14:56 AM
Surr: 2-Fluorobiphenyl	63.7	19.1-97.5		%Rec	1	3/13/2019 10:14:56 AM
Surr: 4-Terphenyl-d14	69.0	31.1-114		%Rec	1	3/13/2019 10:14:56 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	3/7/2019 1:18:22 PM
Toluene	ND	0.049		mg/Kg	1	3/7/2019 1:18:22 PM
Ethylbenzene	ND	0.049		mg/Kg	1	3/7/2019 1:18:22 PM
Xylenes, Total	ND	0.098		mg/Kg	1	3/7/2019 1:18:22 PM
Surr: 1,2-Dichloroethane-d4	95.0	70-130		%Rec	1	3/7/2019 1:18:22 PM
Surr: 4-Bromofluorobenzene	96.8	70-130		%Rec	1	3/7/2019 1:18:22 PM
Surr: Dibromofluoromethane	100	70-130		%Rec	1	3/7/2019 1:18:22 PM
Surr: Toluene-d8	102	70-130		%Rec	1	3/7/2019 1:18:22 PM
VOLATILES BY 8260B/1311						Analyst: **RAA**
Benzene	ND	0.50		mg/L	1	3/8/2019 2:46:00 PM
2-Butanone	ND	200		mg/L	1	3/8/2019 2:46:00 PM
Carbon Tetrachloride	ND	0.50		mg/L	1	3/8/2019 2:46:00 PM
Chlorobenzene	ND	100		mg/L	1	3/8/2019 2:46:00 PM
Chloroform	ND	6.0		mg/L	1	3/8/2019 2:46:00 PM
1,4-Dichlorobenzene	ND	7.5		mg/L	1	3/8/2019 2:46:00 PM
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	3/8/2019 2:46:00 PM
1,1-Dichloroethene	ND	0.70		mg/L	1	3/8/2019 2:46:00 PM
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	3/8/2019 2:46:00 PM
Trichloroethene (TCE)	ND	0.50		mg/L	1	3/8/2019 2:46:00 PM
Vinyl chloride	ND	0.20		mg/L	1	3/8/2019 2:46:00 PM
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	1	3/8/2019 2:46:00 PM
Surr: 4-Bromofluorobenzene	98.4	57.3-148		%Rec	1	3/8/2019 2:46:00 PM
Surr: Dibromofluoromethane	96.8	70-130		%Rec	1	3/8/2019 2:46:00 PM
Surr: Toluene-d8	97.2	70-130		%Rec	1	3/8/2019 2:46:00 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	03/11/2019 15:05	WG1248010

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfice	30.5		25.0	1	03/13/2019 14:12	WG1248443

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	10.2	T6	1	03/09/2019 09:45	WG1247175

Sample Narrative:
L1076337-01 WG1247175: 10.23 at 18.4C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	03/14/2019 12:50	WG1249170

WG1248010

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1075337-01

ONE LAB. NATIONWIDE

Method Blank (MB)

(MB) R3390548-1 03/11/19 14:55

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1076373-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1076373-03 03/11/19 15:17 • (DUP) R3390548-6 03/11/19 15:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3390548-2 03/11/19 14:56

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.64	106	50.0-150	

L1076355-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1076355-01 03/11/19 15:10 • (MS) R3390548-4 03/11/19 15:11 • (MSD) R3390548-5 03/11/19 15:12

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.57	1.60	94.5	96.2	1	75.0-125			1.75	20

L1076377-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1076377-03 03/11/19 15:24 • (MS) R3390548-7 03/11/19 15:25 • (MSD) R3390548-8 03/11/19 15:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.50	1.50	89.8	89.9	1	75.0-125			0.174	20

WG1248443

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1076337-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3391215-1 03/13/19 14:12

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1076276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076276-01 03/13/19 14:12 • (DUP) R3391215-3 03/13/19 14:12

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	ND	ND	1	0.000		20

L1076873-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1076873-02 03/13/19 14:12 • (DUP) R3391215-4 03/13/19 14:12

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	67.0	60.9	1	9.52		20

Laboratory Control Sample (LCS)

(LCS) R3391215-2 03/13/19 14:12

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	85.3	85.3	70.0-130	

WG1247175

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1076337-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3390100-1 03/09/19 09:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.02 at 18.9C

WG1249170

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1076337-01

ONE LAB. NATIONWIDE.

L1076276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076276-01 03/14/19 12:50 • (DUP) R3391570-2 03/14/19 12:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1076873-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1076873-02 03/14/19 12:50 • (DUP) R3391570-3 03/14/19 12:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3391570-1 03/14/19 12:50

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.0	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are seperated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43513**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43513**	RunNo: **58155**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950384** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	105	63.9	124			
Surr: DNOP	4.4		5.000		88.7	70	130			

Sample ID: **MB-43513**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43513**	RunNo: **58155**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950385** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43507**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950615** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	970		1000		96.7	73.8	119			

Sample ID: **LCS-43507**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950616** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	103	80.1	123			
Surr: BFB	1100		1000		107	73.8	119			

Sample ID: **1903146-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950618** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.8	24.25	0	117	69.1	142			
Surr: BFB	1100		969.9		114	73.8	119			

Sample ID: **1903146-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950619** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	30	4.6	23.13	0	129	69.1	142	4.69	20	
Surr: BFB	1100		925.1		116	73.8	119	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43575**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43575**	RunNo: **58293**
Prep Date: **3/8/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955269** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.00079		0.002500		31.7	42.6	98.5			S
Surr: Tetrachloro-m-xylene	0.00078		0.002500		31.2	28.9	96.7			

Sample ID: **LCS-43575**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43575**	RunNo: **58293**
Prep Date: **3/8/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955275** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00025	0.00010	0.0005000	0	49.3	49.5	127			S
gamma-BHC (Lindane)	0.00022	0.00010	0.0005000	0	44.1	49.9	124			S
Heptachlor	0.00022	0.00010	0.0005000	0	44.5	41	122			
Heptachlor epoxide	0.00022	0.00010	0.0005000	0	44.8	52.2	121			S
Methoxychlor	0.00017	0.00010	0.0005000	0	33.8	40.2	134			S
Surr: Decachlorobiphenyl	0.00098		0.002500		39.2	42.6	98.5			S
Surr: Tetrachloro-m-xylene	0.0011		0.002500		45.4	28.9	96.7			

Sample ID: **1903088-001AMS**	SampType: **MS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **BatchQC**	Batch ID: **43575**	RunNo: **58293**
Prep Date: **3/8/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955283** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	ND	0.00010	0.0005000	0	0	34.5	165			S
gamma-BHC (Lindane)	ND	0.00010	0.0005000	0	0	49.2	129			S
Heptachlor	ND	0.00010	0.0005000	0	0	43.1	134			S
Heptachlor epoxide	ND	0.00010	0.0005000	0	0	32.7	162			S
Methoxychlor	ND	0.00010	0.0005000	0	0	45.1	162			S
Surr: Decachlorobiphenyl	0.00017		0.002500		6.65	42.6	98.5			S
Surr: Tetrachloro-m-xylene	0.00016		0.002500		6.55	28.9	96.7			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903088-001AMSD** SampType: **MSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **BatchQC** Batch ID: **43575** RunNo: **58293**

Prep Date: **3/8/2019** Analysis Date: **3/12/2019** SeqNo: **1955284** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	ND	0.00010	0.0005000	0	0	34.5	165	0	31.1	S
gamma-BHC (Lindane)	ND	0.00010	0.0005000	0	0	49.2	129	0	27	S
Heptachlor	ND	0.00010	0.0005000	0	0	43.1	134	0	33.7	S
Heptachlor epoxide	ND	0.00010	0.0005000	0	0	32.7	162	0	32.4	S
Methoxychlor	ND	0.00010	0.0005000	0	0	45.1	162	0	42.2	S
Surr: Decachlorobiphenyl	0.00015		0.002500		5.98	42.6	98.5	0	0	S
Surr: Tetrachloro-m-xylene	0.00014		0.002500		5.41	28.9	96.7	0	0	S

Sample ID: **MB-43663** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **PBW** Batch ID: **43663** RunNo: **58404**

Prep Date: **3/13/2019** Analysis Date: **3/15/2019** SeqNo: **1960090** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0017		0.002500		69.2	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		58.3	28.9	96.7			

Sample ID: **MB-43696** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **PBW** Batch ID: **43696** RunNo: **58404**

Prep Date: **3/14/2019** Analysis Date: **3/15/2019** SeqNo: **1960091** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0019		0.002500		74.8	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		56.1	28.9	96.7			

Sample ID: **LCS-43663** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSW** Batch ID: **43663** RunNo: **58404**

Prep Date: **3/13/2019** Analysis Date: **3/15/2019** SeqNo: **1960092** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0020		0.002500		81.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		61.1	28.9	96.7			

Sample ID: **LCS-43696** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSW** Batch ID: **43696** RunNo: **58404**

Prep Date: **3/14/2019** Analysis Date: **3/15/2019** SeqNo: **1960093** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0014		0.002500		55.0	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0012		0.002500		46.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903292-001AMS** SampType: **MS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **BatchQC** Batch ID: **43663** RunNo: **58404**

Prep Date: **3/13/2019** Analysis Date: **3/15/2019** SeqNo: **1960101** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0011		0.002500		45.8	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00091		0.002500		36.4	28.9	96.7			

Sample ID: **1903637-001AMS** SampType: **MS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **BatchQC** Batch ID: **43696** RunNo: **58404**

Prep Date: **3/14/2019** Analysis Date: **3/15/2019** SeqNo: **1960102** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0016		0.002500		62.9	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		56.6	28.9	96.7			

Sample ID: **1903292-001AMSD** SampType: **MSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **BatchQC** Batch ID: **43663** RunNo: **58404**

Prep Date: **3/13/2019** Analysis Date: **3/15/2019** SeqNo: **1960103** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0013		0.002500		52.2	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.00092		0.002500		36.9	28.9	96.7	0	0	

Sample ID: **1903637-001AMSD** SampType: **MSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **BatchQC** Batch ID: **43696** RunNo: **58404**

Prep Date: **3/14/2019** Analysis Date: **3/15/2019** SeqNo: **1960104** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0011		0.002500		45.8	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.00098		0.002500		39.3	28.9	96.7	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43579**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954215** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		114	70	130			

Sample ID: **LCS-43579**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954216** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	115	70	130			
2,4-D	ND	10	0.07500	0	125	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.079		0.07500		105	70	130			

Sample ID: **1903292-001AMS**	SampType: **MS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **BatchQC**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954222** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	97.5	70	130			
2,4-D	ND	10	0.07500	0	123	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		104	70	130			

Sample ID: **1903292-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **BatchQC**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954223** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	97.5	70	130	0	20	
2,4-D	ND	10	0.07500	0	124	70	130	0	20	
Surr: 2,4-Dichlorophenylacetic aci	0.074		0.07500		99.3	70	130	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43507**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952086** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		95.8	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.8	70	130			
Surr: Toluene-d8	0.50		0.5000		99.2	70	130			

Sample ID: **lcs-43507**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952087** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	1.000	0	98.5	70	130			
Toluene	1.0	0.050	1.000	0	99.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.0	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.7	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		95.4	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			

Sample ID: **1903154-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106247-2**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952089** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.024	0.9671	0	97.4	68.9	131			
Toluene	0.96	0.048	0.9671	0	99.4	64.3	137			
Surr: 1,2-Dichloroethane-d4	0.45		0.4836		93.9	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.4836		89.8	70	130			
Surr: Dibromofluoromethane	0.48		0.4836		98.7	70	130			
Surr: Toluene-d8	0.47		0.4836		97.8	70	130			

Sample ID: **1903154-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **KAFB-106247-2**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952090** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	0.9891	0	97.1	68.9	131	1.96	20	
Toluene	0.95	0.049	0.9891	0	96.4	64.3	137	0.831	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903154-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: Volatiles Short List**

Client ID: **KAFB-106247-2** Batch ID: **43507** RunNo: **58203**

Prep Date: **3/5/2019** Analysis Date: **3/7/2019** SeqNo: **1952090** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.46		0.4946		93.4	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.47		0.4946		95.1	70	130	0	0	
Surr: Dibromofluoromethane	0.49		0.4946		99.2	70	130	0	0	
Surr: Toluene-d8	0.49		0.4946		99.0	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43511**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954007** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.10	0.4000	0	88.0	70	130			
Chlorobenzene	0.38	0.10	0.4000	0	95.2	70	130			
1,1-Dichloroethene	0.33	0.10	0.4000	0	82.5	70	130			
Trichloroethene (TCE)	0.32	0.10	0.4000	0	80.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.2	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		95.5	70	130			
Surr: Toluene-d8	0.19		0.2000		96.0	70	130			

Sample ID: **mb-43511**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954008** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		103	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.8	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		96.3	70	130			
Surr: Toluene-d8	0.19		0.2000		96.0	70	130			

Sample ID: **1903154-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-2**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954016** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.10	0.4000	0	88.7	68.3	131			
Chlorobenzene	0.38	0.10	0.4000	0	95.2	70	130			
1,1-Dichloroethene	0.34	0.10	0.4000	0	83.9	64.3	135			
Trichloroethene (TCE)	0.32	0.10	0.4000	0	81.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.20		0.2000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903154-001ams**	SampType: **MS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-2**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954016** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.2	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		93.5	70	130			
Surr: Toluene-d8	0.19		0.2000		95.6	70	130			

Sample ID: **1903154-001amsd**	SampType: **MSD**	TestCode: **Volatiles by 8260B/1311**
Client ID: **KAFB-106247-2**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954017** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.34	0.10	0.4000	0	84.3	68.3	131	5.02	20	
Chlorobenzene	0.36	0.10	0.4000	0	90.7	70	130	4.92	20	
1,1-Dichloroethene	0.32	0.10	0.4000	0	79.6	64.3	135	5.22	20	
Trichloroethene (TCE)	0.31	0.10	0.4000	0	76.9	70	130	5.26	20	
Surr: 1,2-Dichloroethane-d4	0.20		0.2000		102	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.3	57.3	148	0	0	
Surr: Dibromofluoromethane	0.19		0.2000		96.3	70	130	0	0	
Surr: Toluene-d8	0.19		0.2000		95.9	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903038-006ams** SampType: **MS** TestCode: **EPA Method 8270C TCLP**

Client ID: **BatchQC** Batch ID: **43574** RunNo: **58352**

Prep Date: **3/8/2019** Analysis Date: **3/13/2019** SeqNo: **1957407** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.046	0.0010	0.1000	0	46.1	43.1	114			
3+4-Methylphenol	0.090	0.0010	0.2000	0	44.8	37.8	128			
2,4-Dinitrotoluene	0.047	0.0010	0.1000	0	47.3	36.5	125			
Hexachlorobenzene	0.054	0.0010	0.1000	0	53.6	41.4	108			
Hexachlorobutadiene	0.036	0.0010	0.1000	0	35.9	30.4	101			
Hexachloroethane	0.033	0.0010	0.1000	0	32.7	37.3	115			S
Nitrobenzene	0.050	0.0010	0.1000	0	49.6	40.2	132			
Pentachlorophenol	0.040	0.0010	0.1000	0	39.6	8.72	103			
Pyridine	0.012	0.0010	0.1000	0	12.4	9.36	106			
2,4,5-Trichlorophenol	0.052	0.0010	0.1000	0	52.0	16.5	123			
2,4,6-Trichlorophenol	0.053	0.0010	0.1000	0	53.5	11.3	117			
Cresols, Total	0.14	0.0010	0.3000	0	45.3	23.2	151			
Surr: 2-Fluorophenol	0.051		0.2000		25.4	22.2	88.7			
Surr: Phenol-d5	0.037		0.2000		18.4	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.090		0.2000		45.0	28.1	108			
Surr: Nitrobenzene-d5	0.046		0.1000		45.8	20.1	112			
Surr: 2-Fluorobiphenyl	0.044		0.1000		43.7	19.1	97.5			
Surr: 4-Terphenyl-d14	0.048		0.1000		48.0	31.1	114			

Sample ID: **1903038-006amsd** SampType: **MSD** TestCode: **EPA Method 8270C TCLP**

Client ID: **BatchQC** Batch ID: **43574** RunNo: **58352**

Prep Date: **3/8/2019** Analysis Date: **3/13/2019** SeqNo: **1957408** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.064	0.0010	0.1000	0	64.1	43.1	114	32.6	28.4	R
3+4-Methylphenol	0.13	0.0010	0.2000	0	64.3	37.8	128	35.7	29.4	R
2,4-Dinitrotoluene	0.057	0.0010	0.1000	0	56.9	36.5	125	18.5	24.7	
Hexachlorobenzene	0.066	0.0010	0.1000	0	66.3	41.4	108	21.2	20	R
Hexachlorobutadiene	0.051	0.0010	0.1000	0	50.9	30.4	101	34.4	29	R
Hexachloroethane	0.048	0.0010	0.1000	0	47.9	37.3	115	37.8	25.2	R
Nitrobenzene	0.070	0.0010	0.1000	0	70.5	40.2	132	34.8	26.9	R
Pentachlorophenol	0.051	0.0010	0.1000	0	51.3	8.72	103	25.7	59.2	
Pyridine	0.023	0.0010	0.1000	0	22.6	9.36	106	58.1	48	R
2,4,5-Trichlorophenol	0.064	0.0010	0.1000	0	63.9	16.5	123	20.4	70.8	
2,4,6-Trichlorophenol	0.066	0.0010	0.1000	0	66.4	11.3	117	21.6	78	
Cresols, Total	0.19	0.0010	0.3000	0	64.2	23.2	151	34.7	30.8	R
Surr: 2-Fluorophenol	0.087		0.2000		43.4	22.2	88.7	0	0	
Surr: Phenol-d5	0.062		0.2000		30.8	16.4	74.1	0	0	
Surr: 2,4,6-Tribromophenol	0.13		0.2000		65.6	28.1	108	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1903038-006amsd**	SampType: **MSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **BatchQC**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957408** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.072		0.1000		72.1	20.1	112	0	0	
Surr: 2-Fluorobiphenyl	0.063		0.1000		62.5	19.1	97.5	0	0	
Surr: 4-Terphenyl-d14	0.068		0.1000		67.8	31.1	114	0	0	

Sample ID: **lcs-43574**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957414** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.056	0.0010	0.1000	0	55.6	42.2	104			
3+4-Methylphenol	0.10	0.0010	0.2000	0	51.9	42.3	108			
2,4-Dinitrotoluene	0.058	0.0010	0.1000	0	57.6	45.8	87.8			
Hexachlorobenzene	0.062	0.0010	0.1000	0	61.7	54.5	104			
Hexachlorobutadiene	0.045	0.0010	0.1000	0	44.7	35.2	95.8			
Hexachloroethane	0.043	0.0010	0.1000	0	43.1	32.3	91.8			
Nitrobenzene	0.058	0.0010	0.1000	0	57.9	53.1	98.9			
Pentachlorophenol	0.051	0.0010	0.1000	0	50.6	30.3	104			
Pyridine	0.018	0.0010	0.1000	0	18.5	15	90			
2,4,5-Trichlorophenol	0.061	0.0010	0.1000	0	60.7	42.1	107			
2,4,6-Trichlorophenol	0.060	0.0010	0.1000	0	60.1	43.8	110			
Cresols, Total	0.16	0.0010	0.3000	0	53.1	44.1	111			
Surr: 2-Fluorophenol	0.061		0.2000		30.5	22.2	88.7			
Surr: Phenol-d5	0.051		0.2000		25.3	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.11		0.2000		53.9	28.1	108			
Surr: Nitrobenzene-d5	0.052		0.1000		52.1	20.1	112			
Surr: 2-Fluorobiphenyl	0.044		0.1000		44.0	19.1	97.5			
Surr: 4-Terphenyl-d14	0.047		0.1000		47.1	31.1	114			

Sample ID: **mb-43574**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957415** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43574**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957415** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.11		0.2000		55.3	22.2	88.7			
Surr: Phenol-d5	0.089		0.2000		44.7	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.19		0.2000		92.7	28.1	108			
Surr: Nitrobenzene-d5	0.077		0.1000		76.8	20.1	112			
Surr: 2-Fluorobiphenyl	0.064		0.1000		64.2	19.1	97.5			
Surr: 4-Terphenyl-d14	0.087		0.1000		87.2	31.1	114			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43641**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**							
Client ID: **PBW**	Batch ID: **43641**	RunNo: **58335**							
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956850**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43641**	SampType: **LCS**	TestCode: **MERCURY, TCLP**							
Client ID: **LCSW**	Batch ID: **43641**	RunNo: **58335**							
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956851**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.4	80	120			

Sample ID: **1903154-001AMS**	SampType: **MS**	TestCode: **MERCURY, TCLP**							
Client ID: **KAFB-106247-2**	Batch ID: **43641**	RunNo: **58335**							
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956853**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	98.8	75	125			

Sample ID: **1903154-001AMSD**	SampType: **MSD**	TestCode: **MERCURY, TCLP**							
Client ID: **KAFB-106247-2**	Batch ID: **43641**	RunNo: **58335**							
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956854**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.5	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43529**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955049** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43529**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955051** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			
Barium	ND	100	0.5000	0	98.2	80	120			
Cadmium	ND	1.0	0.5000	0	104	80	120			
Chromium	ND	5.0	0.5000	0	98.0	80	120			
Selenium	ND	1.0	0.5000	0	101	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Sample ID: **1902C74-003BMS**	SampType: **MS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **BatchQC**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955090** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	75	125			
Barium	ND	100	0.5000	1.022	78.2	75	125			
Cadmium	ND	1.0	0.5000	0.04577	101	75	125			
Chromium	ND	5.0	0.5000	0	90.4	75	125			
Selenium	ND	1.0	0.5000	0	96.5	75	125			
Silver	ND	5.0	0.1000	0.01087	101	75	125			

Sample ID: **1902C74-003BMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **BatchQC**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955091** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	99.3	75	125	0	20	
Barium	ND	100	0.5000	1.022	77.7	75	125	0	20	
Cadmium	ND	1.0	0.5000	0.04577	102	75	125	0	20	
Chromium	ND	5.0	0.5000	0	91.5	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903154**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **1902C74-003BMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **BatchQC**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955091** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	1.0	0.5000	0	100	75	125	0	20	
Silver	ND	5.0	0.1000	0.01087	102	75	125	0	20	

Sample ID: **MB-43529**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955123** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0								

Sample ID: **LCS-43529**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955124** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	96.7	80	120			

Sample ID: **1902C74-003BMS**	SampType: **MS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **BatchQC**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955147** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0.02302	92.2	75	125			

Sample ID: **1902C74-003BMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **BatchQC**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955148** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0.02302	88.6	75	125	0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1903154 RcptNo: 1

Received By: **Desiree Dominguez** 3/4/2019 2:35:00 PM

Completed By: **Anne Thorne** 3/5/2019 10:41:46 AM

Reviewed By: VV2 3/5/19

Labeled by: YG 3/5/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: YG 3/5/19 (<2 or >12 unless noted)
Adjusted?
Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	9.6	Good	Not Present			

205 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER:

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599 BM01.1017.3~~ LA 62735 DM02 1017-08	Hall Environmental	Amanda Smith/ asmith@enest.com
[5] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ LA Vadose Zone Wells		~~15183~~ LA 16219	Pam Moss/pmoss@enest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ LA 505-238-4410	tel: 505 345-3975 fax: 505 345-4017	Earl Morse / emorse@enest.com

[14] ANALYSES REQUIRED (Include Method Number)

[15] ITEM	[16] SAMPLE IDENTIFIER	[17] SAMPLE DESCRIPTION/LOCATION	[18] MATRIX (see codes on SOP)	[19] DATE COLLECTED	[20] TIME COLLECTED	[21] DATA PKG LEVEL (see codes on SOP) Standard QA/QC	Lab TAT (business days)	Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081B/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9043D)	Ignitability (1010A)				[25] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS HEAL #	[28] LAB ID (for lab's use)
1	KAFB-106247-2	rolloff 247-2	Soil	3-4-19	1215	~~N~~	7		X	X	X	X	X	X		LA		Composite	1903154	001
2																				
3																				
4																				
5																				
6									LA											
7																				
8																				
9																				
10																				

[22] SAMPLER(S) AND COMPANY: (please print)	[23] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Terranova	FedEx Number: NA: Hand Delivered to Hall Lab	DAD 3/4/19 ~~3.7, 4.5, 9.6, 1.6°C~~

[24] RELINQUISHED BY	DATE	TIME	[26] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Terranova	3-4-19	1435	Printed Name and Signature: DESIREE DOMINGUEZ	3/4/19	14:35
Printed Name and Signature:			Printed Name and Signature		
Printed Name and Signature			Printed Name and Signature		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NM9570024423

Manifest Document No.: D237653

2. Page 1 of 1

3. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL
KIRTLAND AIR FORCE BASE, NM 87117
SCOTT CLARK 505-846-9017

4. Generator's Phone

5. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO

6. US EPA ID Number: CAR000070540

A. State Transporter's ID

B. Transporter 1 Phone

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
TWIN ENVIRO SERVICES - PHANTOM LANDFILL
2500 FREMONT COUNTY ROAD 67
PENROSE, CO 81240
719-372-6671

10. US EPA ID Number: COR000208454

E. State Facility's ID

F. Facility's Phone

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-RCRA/Non-DOT Regulated Material Solid Sludges (DRILL CUTTINGS)	1	CM	10	~~TON~~ YD
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above
Project Number 198758 Document #: D237653
1) P-20190213 KIT- 1 x 20y

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

Bill # ACT2046

GENERATOR

16. **GENERATOR'S CERTIFICATION:** I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Scott Clark | Signature | Date: Month 4 Day 16 Year 19

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Justin Gray | Signature | Date: Month 04 Day 10 Year 19

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Harley Merchant | Signature | Date: Month 4 Day 15 Year 19

NON-HAZARDOUS WASTE

PRINTED ON RECYCLED PAPER USING SOYBEAN INK PRINTED WITH SOY INK

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 19, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1903158

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/4/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-3
Project: Kirtland AFB BFF
Collection Date: 3/4/2019 11:30:00 AM
Lab ID: 1903158-001 **Matrix:** SOIL
Received Date: 3/4/2019 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**
Chlordane	ND	0.030		mg/L	1	3/12/2019 12:09:43 PM
Endrin	ND	0.020		mg/L	1	3/12/2019 12:09:43 PM
gamma-BHC (Lindane)	ND	0.40		mg/L	1	3/12/2019 12:09:43 PM
Heptachlor	ND	0.0080		mg/L	1	3/12/2019 12:09:43 PM
Heptachlor epoxide	ND	0.0080		mg/L	1	3/12/2019 12:09:43 PM
Methoxychlor	ND	10		mg/L	1	3/12/2019 12:09:43 PM
Toxaphene	ND	0.50		mg/L	1	3/12/2019 12:09:43 PM
Surr: Decachlorobiphenyl	110	42.6-98.5	S	%Rec	1	3/12/2019 12:09:43 PM
Surr: Tetrachloro-m-xylene	109	28.9-96.7	S	%Rec	1	3/12/2019 12:09:43 PM
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	3/11/2019 5:16:02 PM
2,4-D	ND	10		mg/L	1	3/11/2019 5:16:02 PM
Surr: 2,4-Dichlorophenylacetic acid	109	70-130		%Rec	1	3/11/2019 5:16:02 PM
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	3/6/2019 9:22:09 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	3/6/2019 9:22:09 AM
Surr: DNOP	89.4	70-130		%Rec	1	3/6/2019 9:22:09 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/6/2019 12:18:36 PM
Surr: BFB	102	73.8-119		%Rec	1	3/6/2019 12:18:36 PM
MERCURY, TCLP						Analyst: **pmf**
Mercury	ND	0.020		mg/L	1	3/13/2019 10:22:25 AM
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**
Arsenic	ND	5.0		mg/L	1	3/11/2019 11:23:17 AM
Barium	ND	100		mg/L	1	3/11/2019 11:23:17 AM
Cadmium	ND	1.0		mg/L	1	3/11/2019 11:23:17 AM
Chromium	ND	5.0		mg/L	1	3/11/2019 11:23:17 AM
Lead	ND	5.0		mg/L	1	3/11/2019 4:22:32 PM
Selenium	ND	1.0		mg/L	1	3/11/2019 11:23:17 AM
Silver	ND	5.0		mg/L	1	3/11/2019 11:23:17 AM
EPA METHOD 8270C TCLP						Analyst: **DAM**
2-Methylphenol	ND	200		mg/L	1	3/13/2019 10:44:25 AM
3+4-Methylphenol	ND	200		mg/L	1	3/13/2019 10:44:25 AM
2,4-Dinitrotoluene	ND	0.13		mg/L	1	3/13/2019 10:44:25 AM
Hexachlorobenzene	ND	0.13		mg/L	1	3/13/2019 10:44:25 AM
Hexachlorobutadiene	ND	0.50		mg/L	1	3/13/2019 10:44:25 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-3
Project: Kirtland AFB BFF
Collection Date: 3/4/2019 11:30:00 AM
Lab ID: 1903158-001 **Matrix:** SOIL
Received Date: 3/4/2019 2:35:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C TCLP						Analyst: **DAM**
Hexachloroethane	ND	3.0		mg/L	1	3/13/2019 10:44:25 AM
Nitrobenzene	ND	2.0		mg/L	1	3/13/2019 10:44:25 AM
Pentachlorophenol	ND	100		mg/L	1	3/13/2019 10:44:25 AM
Pyridine	ND	5.0		mg/L	1	3/13/2019 10:44:25 AM
2,4,5-Trichlorophenol	ND	400		mg/L	1	3/13/2019 10:44:25 AM
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	3/13/2019 10:44:25 AM
Cresols, Total	ND	200		mg/L	1	3/13/2019 10:44:25 AM
Surr: 2-Fluorophenol	54.3	22.2-88.7		%Rec	1	3/13/2019 10:44:25 AM
Surr: Phenol-d5	44.7	16.4-74.1		%Rec	1	3/13/2019 10:44:25 AM
Surr: 2,4,6-Tribromophenol	76.5	28.1-108		%Rec	1	3/13/2019 10:44:25 AM
Surr: Nitrobenzene-d5	72.7	20.1-112		%Rec	1	3/13/2019 10:44:25 AM
Surr: 2-Fluorobiphenyl	64.4	19.1-97.5		%Rec	1	3/13/2019 10:44:25 AM
Surr: 4-Terphenyl-d14	69.1	31.1-114		%Rec	1	3/13/2019 10:44:25 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.024		mg/Kg	1	3/7/2019 1:47:30 PM
Toluene	ND	0.048		mg/Kg	1	3/7/2019 1:47:30 PM
Ethylbenzene	ND	0.048		mg/Kg	1	3/7/2019 1:47:30 PM
Xylenes, Total	ND	0.096		mg/Kg	1	3/7/2019 1:47:30 PM
Surr: 1,2-Dichloroethane-d4	99.4	70-130		%Rec	1	3/7/2019 1:47:30 PM
Surr: 4-Bromofluorobenzene	92.4	70-130		%Rec	1	3/7/2019 1:47:30 PM
Surr: Dibromofluoromethane	102	70-130		%Rec	1	3/7/2019 1:47:30 PM
Surr: Toluene-d8	98.7	70-130		%Rec	1	3/7/2019 1:47:30 PM
VOLATILES BY 8260B/1311						Analyst: **RAA**
Benzene	ND	0.50		mg/L	1	3/8/2019 3:58:00 PM
2-Butanone	ND	200		mg/L	1	3/8/2019 3:58:00 PM
Carbon Tetrachloride	ND	0.50		mg/L	1	3/8/2019 3:58:00 PM
Chlorobenzene	ND	100		mg/L	1	3/8/2019 3:58:00 PM
Chloroform	ND	6.0		mg/L	1	3/8/2019 3:58:00 PM
1,4-Dichlorobenzene	ND	7.5		mg/L	1	3/8/2019 3:58:00 PM
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	3/8/2019 3:58:00 PM
1,1-Dichloroethene	ND	0.70		mg/L	1	3/8/2019 3:58:00 PM
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	3/8/2019 3:58:00 PM
Trichloroethene (TCE)	ND	0.50		mg/L	1	3/8/2019 3:58:00 PM
Vinyl chloride	ND	0.20		mg/L	1	3/8/2019 3:58:00 PM
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	3/8/2019 3:58:00 PM
Surr: 4-Bromofluorobenzene	99.0	57.3-148		%Rec	1	3/8/2019 3:58:00 PM
Surr: Dibromofluoromethane	92.5	70-130		%Rec	1	3/8/2019 3:58:00 PM
Surr: Toluene-d8	95.2	70-130		%Rec	1	3/8/2019 3:58:00 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	03/11/2019 15:03	WG1248093

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	42.6		25.0	1	03/13/2019 14:12	WG1248442

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.43	T8	1	03/09/2019 09:45	WG1247175

Sample Narrative:
L1076336-01 WG1247175: 8.43 at 18.6C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	03/14/2019 12:50	WG1249170

WG1248010

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1076336-01

ONE LAB. NATIONWIDE

Method Blank (MB)

(MB) R3390548-1 03/11/19 14:55

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1076336-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076336-01 03/11/19 15:03 • (DUP) R3390548-3 03/11/19 15:04

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1076373-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1076373-03 03/11/19 15:17 • (DUP) R3390548-6 03/11/19 15:20

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Reactive Cyanide	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3390548-2 03/11/19 14:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.64	106	50.0-150	

L1076355-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1076355-01 03/11/19 15:10 • (MS) R3390548-4 03/11/19 15:11 • (MSD) R3390548-5 03/11/19 15:12

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.57	1.60	94.5	96.2	1	75.0-125			1.75	20

L1076377-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1076377-03 03/11/19 15:24 • (MS) R3390548-7 03/11/19 15:25 • (MSD) R3390548-8 03/11/19 15:26

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	U	1.50	1.50	89.8	89.9	1	75.0-125			0.174	20

WG1248443

Wet Chemistry by Method 9034-90308

QUALITY CONTROL SUMMARY

L1076336-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3391215-1 03/13/19 14:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1076276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076276-01 03/13/19 14:12 • (DUP) R3391215-3 03/13/19 14:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

L1076873-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1076873-02 03/13/19 14:12 • (DUP) R3391215-4 03/13/19 14:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	67.0	60.9	1	9.52		20

Laboratory Control Sample (LCS)

(LCS) R3391215-2 03/13/19 14:12

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	85.3	85.3	70.0-130	

WG1247175

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1075336-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3390100-1 03/09/19 09:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.02 at 18.9C

WG1249170

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1076336-01

ONE LAB. NATIONWIDE.

L1076276-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076276-01 03/14/19 12:50 • (DUP) R3391570-2 03/14/19 12:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1076873-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1076873-02 03/14/19 12:50 • (DUP) R3391570-3 03/14/19 12:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3391570-1 03/14/19 12:50

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	84.0	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43513**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43513**	RunNo: **58155**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950384** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	105	63.9	124			
Surr: DNOP	4.4		5.000		88.7	70	130			

Sample ID: **MB-43513**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43513**	RunNo: **58155**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950385** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43507**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950615** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	970		1000		96.7	73.8	119			

Sample ID: **LCS-43507**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43507**	RunNo: **58161**
Prep Date: **3/5/2019**	Analysis Date: **3/6/2019**	SeqNo: **1950616** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	103	80.1	123			
Surr: BFB	1100		1000		107	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43575**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43575**	RunNo: **58293**
Prep Date: **3/8/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955269** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.00079		0.002500		31.7	42.6	98.5			S
Surr: Tetrachloro-m-xylene	0.00078		0.002500		31.2	28.9	96.7			

Sample ID: **LCS-43575**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43575**	RunNo: **58293**
Prep Date: **3/8/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955275** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00025	0.00010	0.0005000	0	49.3	49.5	127			S
gamma-BHC (Lindane)	0.00022	0.00010	0.0005000	0	44.1	49.9	124			S
Heptachlor	0.00022	0.00010	0.0005000	0	44.5	41	122			
Heptachlor epoxide	0.00022	0.00010	0.0005000	0	44.8	52.2	121			S
Methoxychlor	0.00017	0.00010	0.0005000	0	33.8	40.2	134			S
Surr: Decachlorobiphenyl	0.00098		0.002500		39.2	42.6	98.5			S
Surr: Tetrachloro-m-xylene	0.0011		0.002500		45.4	28.9	96.7			

Sample ID: **MB-43663**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43663**	RunNo: **58404**
Prep Date: **3/13/2019**	Analysis Date: **3/15/2019**	SeqNo: **1960090** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0017		0.002500		69.2	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		58.3	28.9	96.7			

Sample ID: **MB-43696**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **43696**	RunNo: **58404**
Prep Date: **3/14/2019**	Analysis Date: **3/15/2019**	SeqNo: **1960091** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0019		0.002500		74.8	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		56.1	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43663**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43663**	RunNo: **58404**
Prep Date: **3/13/2019**	Analysis Date: **3/15/2019**	SeqNo: **1960092** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0020		0.002500		81.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		61.1	28.9	96.7			

Sample ID: **LCS-43696**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **43696**	RunNo: **58404**
Prep Date: **3/14/2019**	Analysis Date: **3/15/2019**	SeqNo: **1960093** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0014		0.002500		55.0	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0012		0.002500		46.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43579**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954215** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		114	70	130			

Sample ID: **LCS-43579**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43579**	RunNo: **58266**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1954216** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	115	70	130			
2,4-D	ND	10	0.07500	0	125	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.079		0.07500		105	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43507**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952086** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		95.8	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.8	70	130			
Surr: Toluene-d8	0.50		0.5000		99.2	70	130			

Sample ID: **lcs-43507**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43507**	RunNo: **58203**
Prep Date: **3/5/2019**	Analysis Date: **3/7/2019**	SeqNo: **1952087** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	1.000	0	98.5	70	130			
Toluene	1.0	0.050	1.000	0	99.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.0	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.7	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		95.4	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43511**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954007** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.35	0.10	0.4000	0	88.0	70	130			
Chlorobenzene	0.38	0.10	0.4000	0	95.2	70	130			
1,1-Dichloroethene	0.33	0.10	0.4000	0	82.5	70	130			
Trichloroethene (TCE)	0.32	0.10	0.4000	0	80.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		99.2	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		95.5	70	130			
Surr: Toluene-d8	0.19		0.2000		96.0	70	130			

Sample ID: **mb-43511**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43511**	RunNo: **58257**
Prep Date: **3/5/2019**	Analysis Date: **3/8/2019**	SeqNo: **1954008** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		103	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		98.8	57.3	148			
Surr: Dibromofluoromethane	0.19		0.2000		96.3	70	130			
Surr: Toluene-d8	0.19		0.2000		96.0	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43574**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957414** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.056	0.0010	0.1000	0	55.6	42.2	104			
3+4-Methylphenol	0.10	0.0010	0.2000	0	51.9	42.3	108			
2,4-Dinitrotoluene	0.058	0.0010	0.1000	0	57.6	45.8	87.8			
Hexachlorobenzene	0.062	0.0010	0.1000	0	61.7	54.5	104			
Hexachlorobutadiene	0.045	0.0010	0.1000	0	44.7	35.2	95.8			
Hexachloroethane	0.043	0.0010	0.1000	0	43.1	32.3	91.8			
Nitrobenzene	0.058	0.0010	0.1000	0	57.9	53.1	98.9			
Pentachlorophenol	0.051	0.0010	0.1000	0	50.6	30.3	104			
Pyridine	0.018	0.0010	0.1000	0	18.5	15	90			
2,4,5-Trichlorophenol	0.061	0.0010	0.1000	0	60.7	42.1	107			
2,4,6-Trichlorophenol	0.060	0.0010	0.1000	0	60.1	43.8	110			
Cresols, Total	0.16	0.0010	0.3000	0	53.1	44.1	111			
Surr: 2-Fluorophenol	0.061		0.2000		30.5	22.2	88.7			
Surr: Phenol-d5	0.051		0.2000		25.3	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.11		0.2000		53.9	28.1	108			
Surr: Nitrobenzene-d5	0.052		0.1000		52.1	20.1	112			
Surr: 2-Fluorobiphenyl	0.044		0.1000		44.0	19.1	97.5			
Surr: 4-Terphenyl-d14	0.047		0.1000		47.1	31.1	114			

Sample ID: **mb-43574**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957415** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.11		0.2000		55.3	22.2	88.7			
Surr: Phenol-d5	0.089		0.2000		44.7	16.4	74.1			
Surr: 2,4,6-Tribromophenol	0.19		0.2000		92.7	28.1	108			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43574**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43574**	RunNo: **58352**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957415** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.077		0.1000		76.8	20.1	112			
Surr: 2-Fluorobiphenyl	0.064		0.1000		64.2	19.1	97.5			
Surr: 4-Terphenyl-d14	0.087		0.1000		87.2	31.1	114			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43641**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43641**	RunNo: **58335**
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956850** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43641**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43641**	RunNo: **58335**
Prep Date: **3/12/2019**	Analysis Date: **3/13/2019**	SeqNo: **1956851** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	99.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903158**

19-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43529**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955049** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43529**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955051** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	104	80	120			
Barium	ND	100	0.5000	0	98.2	80	120			
Cadmium	ND	1.0	0.5000	0	104	80	120			
Chromium	ND	5.0	0.5000	0	98.0	80	120			
Selenium	ND	1.0	0.5000	0	101	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Sample ID: **MB-43529**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955123** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0								

Sample ID: **LCS-43529**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43529**	RunNo: **58242**
Prep Date: **3/6/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955124** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	96.7	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1903158 RcptNo: 1

Received By: **Desiree Dominguez** 3/4/2019 2:35:00 PM

Completed By: **Anne Thorne** 3/5/2019 10:57:09 AM

Reviewed By: VVZ 3/5/19
LB YG 3/5/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: YG 3/5/19 (<2 or >12 unless noted)

Adjusted?

Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____

By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: ____

Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	6.0	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax NO: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER:

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62509 DM01.1017.3~~ 627350M02 1017-08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ LA Vadose zone Wells		~~15183~~ LA 16219	Pam Moss/pmoss@eaest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-234-9013~~ LA 505-258 4410	tel: 505-845-3975 fax: 505-845-4407	Earl Morse / emorse@eaest.com

[14] ANALYSES REQUIRED (Include Method Numbers)

[15] ITEM	[16] SAMPLE IDENTIFIER	[17] SAMPLE DESCRIPTION/LOCATION	[18] MATRIX (see codes on SOP)	[19] DATE COLLECTED	[20] TIME COLLECTED	[21] DATA PACKAGE (see codes on SOP) Standard QC Level IV	Lab FAX (Initials only)	[22] Bottle Type / Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/808 1/8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[23] SAMPLE TYPE (see codes on SOP)	[17] COMMENTS/ SCREENING READINGS	[24] LAB ID (for lab's use)
																			FEALH	
1	~~KAFB-106 247-2~~ LA	~~rolloff 247-2~~ LA	SOIL	3-4-19	1130	X	7	3	X	X	X	X	X	X			QR	COMPOSITE	1903158	ECL
1.2	KAFB-106 247-3	rolloff 247-3																		
3																				
4																				
5									LA											
6																				
7																				
8																				
9																				
10																				

[25] SAMPLER(S) AND COMPANY: (please print)	[26] COURIER AND SHIPPING NUMBER:	
Field Sampler/EA Engineering Pete Ferrari	FedEx Number: NA: Hand Delivered to Hall Lab	DAD 3/4/19 3.7, ~~4.5, 9.6~~, 1.6°C

[27] RELINQUISHED BY	DATE	TIME		[28] RECEIVED BY	DATE	TIME
Printed Name and Signature				Printed Name and Signature		
Pete Ferrari Pete Ferrari	3-4-19	1435		DESIREE DOMINGUEZ DD	3/4/19	14:35
Printed Name and Signature				Printed Name and Signature		
Printed Name and Signature				Printed Name and Signature		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report:) [ ] Copy 1 - Project File

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NM9570024423

Manifest Document No.: D237651

2. Page 1 of 1

3. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL
KIRTLAND AIR FORCE BASE, NM 87117
SCOTT CLARK 505-846-9017

4. Generator's Phone ( )

5. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO

6. US EPA ID Number: CAR000070540

A. State Transporter's ID

B. Transporter 1 Phone

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
TWIN ENVIRO SERVICES - PHANTOM LANDFILL
2500 FREMONT COUNTY ROAD 67
PENROSE, CO 81240
719-372-6671

10. US EPA ID Number: COR000208454

E. State Facility's ID

F. Facility's Phone

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-RCRA/Non-DOT Regulated Material Solid Sludges (DRILL CUTTINGS)	1	CM	2.	~~TON~~ yd
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above
Project Number 198756 Document #: D237651
) P-20190213 KIT- 1 x 15yd

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

Bin # ACT2003

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

GENERATOR

Printed/Typed Name: Scott Clark | Signature | Date: Month 04 Day 10 Year 19

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Justin Curry | Signature | Date: Month 04 Day 10 Year 19

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Harley Merchant | Signature | Date: Month 4 Day 15 Year 19

NON-HAZARDOUS WASTE

PRINTED ON RECYCLED PAPER USING SOYBEAN INK PRINTED WITH SOY INK

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 083304

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

☒ *Physical Address:*
1132 Carpenter St. NE
Rio Rancho, NM 87144
SWM #231402

☐ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

Profile # 104434NM-KIW

1. Generator's work site name and address
Kirtland AFB,

2. Generator's name and address Kirtland AFB
2050 Wyoming Blvd SE Bldg 20685, Environmental
Kirtland AFB, NM 87117
505.846.9017

Generator's Telephone no.
505 846 9017

3. Authorized Agent's name and mailing address (if different from #2)

Agent's Telephone no.

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3) (tons)
Non RCRA Non DOT Regulated Material solid (TPH Soil)	01	CM	12 yards

7. **Special handling instructions:** Bin # 2058

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
Holly O'Grady	Holly O'Grady	01 / 25 / 19

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
Advanced Chemical Transport Inc (ACT) 208 Murray Rd SE Albuquerque NM 87105	David Rivera	01 / 25 / 19

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates
N 35° 15.615 W 106° 42.88 5631

Received By (printed/typed name):	Signature	Month / Day / Year
Kaitlyn Johnson		1 25 19

White/GEN Yellow/CUSTOMER Pink/LANDFILL

WASTE MANAGEMENT

WM of New Mexico - Rio Rancho Landfill
Northern & 33rd Street
Rio Rancho, NM, 87124

Original
Ticket# 962921
Ph: (505) 892-2055

Customer Name ADVANCEDCHEMICALTRANS Advance
Ticket Date 01/25/2019
Payment Type Credit Account
Manual Ticket#
Route
Hauling Ticket#
Destination ACTIVE FACE
PO#

Carrier A C T ADVANCED CHEMICAL TRANSPORT
Vehicle# T112 Volume
Container
Driver
Check#
Billing# 0000361
Grid

	Time	Scale	Operator	Inbound		
In	01/25/2019 10:09:25	Inbound	kjohns57		Gross	48500 lb
Out	01/25/2019 10:44:36	Outbound	kjohns57		Tare	28920 lb
					Net	19580 lb
					Tons	9.79

Comments

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	ContSoilPet-Tons-Cont	S	100	9.79	Tons			ALBU
2	EVFt-P-Standard Environm		100		%			ALBU
3	FUEL-T-Fuel Surcharge -		100		%			ALBU
4	RCRt-P-Regulatory Cost R		100		%			ALBU
5	WWMt-P-Waste Water Manag		100		%			ALBU

Total Tax
Total Ticket

Driver's Signature David Rivera

403WM

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 17, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1901132

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/4/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106V1/V2-1-idw
Project: Kirtland AFB BFF
Collection Date: 1/4/2019 12:35:00 PM
Lab ID: 1901132-001 **Matrix:** SOIL
Received Date: 1/4/2019 2:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	1/10/2019 12:20:15 PM	42525
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	1/14/2019 3:27:32 PM	42569
Barium	ND	100		mg/L	1	1/14/2019 5:50:10 PM	42569
Cadmium	ND	1.0		mg/L	1	1/14/2019 5:50:10 PM	42569
Chromium	ND	5.0		mg/L	1	1/14/2019 3:27:32 PM	42569
Lead	ND	5.0		mg/L	5	1/14/2019 5:51:47 PM	42569
Selenium	ND	1.0		mg/L	1	1/14/2019 3:27:32 PM	42569
Silver	ND	5.0		mg/L	1	1/14/2019 3:27:32 PM	42569
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	1/16/2019 1:43:35 PM	42613
Endrin	ND	0.020		mg/L	1	1/16/2019 1:43:35 PM	42613
gamma-BHC (Lindane)	ND	0.40		mg/L	1	1/16/2019 1:43:35 PM	42613
Heptachlor	ND	0.0080		mg/L	1	1/16/2019 1:43:35 PM	42613
Heptachlor epoxide	ND	0.0080		mg/L	1	1/16/2019 1:43:35 PM	42613
Methoxychlor	ND	10		mg/L	1	1/16/2019 1:43:35 PM	42613
Toxaphene	ND	0.50		mg/L	1	1/16/2019 1:43:35 PM	42613
Surr: Decachlorobiphenyl	76.9	58.3-109		%Rec	1	1/16/2019 1:43:35 PM	42613
Surr: Tetrachloro-m-xylene	69.1	40.1-101		%Rec	1	1/16/2019 1:43:35 PM	42613
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	8100	940		mg/Kg	100	1/10/2019 1:55:17 PM	42480
Motor Oil Range Organics (MRO)	ND	4700		mg/Kg	100	1/10/2019 1:55:17 PM	42480
Surr: DNOP	0	50.6-138	S	%Rec	100	1/10/2019 1:55:17 PM	42480
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	1100	97		mg/Kg	20	1/10/2019 10:54:52 AM	42491
Surr: BFB	395	73.8-119	S	%Rec	20	1/10/2019 10:54:52 AM	42491
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	1/15/2019 11:31:56 AM	42526
3+4-Methylphenol	ND	200		mg/L	1	1/15/2019 11:31:56 AM	42526
2,4-Dinitrotoluene	ND	0.13		mg/L	1	1/15/2019 11:31:56 AM	42526
Hexachlorobenzene	ND	0.13		mg/L	1	1/15/2019 11:31:56 AM	42526
Hexachlorobutadiene	ND	0.50		mg/L	1	1/15/2019 11:31:56 AM	42526
Hexachloroethane	ND	3.0		mg/L	1	1/15/2019 11:31:56 AM	42526
Nitrobenzene	ND	2.0		mg/L	1	1/15/2019 11:31:56 AM	42526
Pentachlorophenol	ND	100		mg/L	1	1/15/2019 11:31:56 AM	42526
Pyridine	ND	5.0		mg/L	1	1/15/2019 11:31:56 AM	42526
2,4,5-Trichlorophenol	ND	400		mg/L	1	1/15/2019 11:31:56 AM	42526

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106V1/V2-1-idw
Project: Kirtland AFB BFF
Collection Date: 1/4/2019 12:35:00 PM
Lab ID: 1901132-001 **Matrix:** SOIL
Received Date: 1/4/2019 2:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	1/15/2019 11:31:56 AM	42526
Cresols, Total	ND	200		mg/L	1	1/15/2019 11:31:56 AM	42526
Surr: 2-Fluorophenol	56.8	15-102		%Rec	1	1/15/2019 11:31:56 AM	42526
Surr: Phenol-d5	47.5	15-87.7		%Rec	1	1/15/2019 11:31:56 AM	42526
Surr: 2,4,6-Tribromophenol	82.6	39.9-111		%Rec	1	1/15/2019 11:31:56 AM	42526
Surr: Nitrobenzene-d5	78.7	35.1-107		%Rec	1	1/15/2019 11:31:56 AM	42526
Surr: 2-Fluorobiphenyl	77.8	36.7-100		%Rec	1	1/15/2019 11:31:56 AM	42526
Surr: 4-Terphenyl-d14	67.2	42.6-129		%Rec	1	1/15/2019 11:31:56 AM	42526
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	0.24		mg/Kg	10	1/9/2019 12:42:22 PM	42491
Toluene	13	0.48		mg/Kg	10	1/9/2019 12:42:22 PM	42491
Ethylbenzene	12	0.48		mg/Kg	10	1/9/2019 12:42:22 PM	42491
Xylenes, Total	44	0.97		mg/Kg	10	1/9/2019 12:42:22 PM	42491
Surr: Dibromofluoromethane	103	70-130		%Rec	10	1/9/2019 12:42:22 PM	42491
Surr: 1,2-Dichloroethane-d4	99.6	70-130		%Rec	10	1/9/2019 12:42:22 PM	42491
Surr: Toluene-d8	97.0	70-130		%Rec	10	1/9/2019 12:42:22 PM	42491
Surr: 4-Bromofluorobenzene	149	70-130	S	%Rec	10	1/9/2019 12:42:22 PM	42491
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	1/9/2019 11:50:05 AM	42494
2-Butanone	ND	200		mg/L	1	1/9/2019 11:50:05 AM	42494
Carbon Tetrachloride	ND	0.50		mg/L	1	1/9/2019 11:50:05 AM	42494
Chlorobenzene	ND	100		mg/L	1	1/9/2019 11:50:05 AM	42494
Chloroform	ND	6.0		mg/L	1	1/9/2019 11:50:05 AM	42494
1,4-Dichlorobenzene	ND	7.5		mg/L	1	1/9/2019 11:50:05 AM	42494
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	1/9/2019 11:50:05 AM	42494
1,1-Dichloroethene	ND	0.70		mg/L	1	1/9/2019 11:50:05 AM	42494
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	1/9/2019 11:50:05 AM	42494
Trichloroethene (TCE)	ND	0.50		mg/L	1	1/9/2019 11:50:05 AM	42494
Vinyl chloride	ND	0.20		mg/L	1	1/9/2019 11:50:05 AM	42494
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	1	1/9/2019 11:50:05 AM	42494
Surr: 4-Bromofluorobenzene	90.5	57.3-148		%Rec	1	1/9/2019 11:50:05 AM	42494
Surr: Dibromofluoromethane	107	70-130		%Rec	1	1/9/2019 11:50:05 AM	42494
Surr: Toluene-d8	106	70-130		%Rec	1	1/9/2019 11:50:05 AM	42494

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		1/7/2019 10:19:19 AM	WG1220097
Fluid	1		1/7/2019 10:19:19 AM	WG1220097
Initial pH	8.99		1/7/2019 10:19:19 AM	WG1220097
Final pH	5.51		1/7/2019 10:19:19 AM	WG1220097

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Cyanide	ND		0.250	1	01/08/2019 12:39	WG1220340

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Reactive Sulfide	ND		25.0	1	01/10/2019 17:10	WG1221601

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	su				
Corrosivity by pH	8.46	T8	1	01/08/2019 16:40	WG1220467

Sample Narrative:
L1058312-01 WG1220467: 8.46 at 20.4C

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	Deg. F				
Ignitability	DNI at 170		1	01/08/2019 14:16	WG1219901

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result	Qualifier	RDL	Limit	Dilution	Analysis date / time	Batch
	mg/l		mg/l	mg/l			
2,4,5-TP (Silvex)	ND		0.00200	1	1	01/09/2019 15:03	WG1220908
2,4-D	ND	J5	0.00200	10	1	01/09/2019 15:03	WG1220908
(S) 2,4-Dichlorophenyl Acetic Acid	*125*		*14.0-158*			*01/09/2019 15:03*	WG1220908

WG1220340

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1058312-01

Method Blank (MB)

(MB) R3374158-1 01/08/19 12:21

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1058222-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1058222-01 01/08/19 12:33 • (DUP) R3374158-3 01/08/19 12:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	200	P1	20

L1058398-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1058398-01 01/08/19 12:42 • (DUP) R3374158-6 01/08/19 12:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.0974	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3374158-2 01/08/19 12:22

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.51	100	50.0-150	

L1058222-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1058222-02 01/08/19 12:35 • (MS) R3374158-4 01/08/19 12:36 • (MSD) R3374158-5 01/08/19 12:37

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.57	ND	1.08	0.718	64.8	43.1	1	75.0-125	J6	J3 J6	40.2	20

L1058398-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1058398-02 01/08/19 12:46 • (MS) R3374158-7 01/08/19 12:47 • (MSD) R3374158-8 01/08/19 12:48

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.57	ND	1.50	1.45	89.9	87.1	1	75.0-125			3.09	20

WG1221601

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1058312-01

Method Blank (MB)

(MB) R3374977-1 01/10/19 17:10

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

Laboratory Control Sample (LCS)

(LCS) R3374977-2 01/10/19 17:10

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	85.0	85.0	70.0-130	

WG1220467

Wet Chemistry by Method 9045D

QUALITY CONTROL SUMMARY

L1058312-01

L1058312-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1058312-01 01/08/19 16:40 • (DUP) R3374297-2 01/08/19 16:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.46	8.43	1	0.355		1

Sample Narrative:

OS: 8.46 at 20.4C

DUP: 8.43 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3374297-1 01/08/19 16:40

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.93	99.3	99.0-101	

Sample Narrative:

LCS: 9.93 at 18.1C

WG1219901

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1058312-01

L1058361-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1058361-02 01/08/19 14:16 • (DUP) R3374181-2 01/08/19 14:16

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3374181-1 01/08/19 14:16

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	Deg. F	Deg. F	%	%	
Ignitability	82.0	83.7	102	96.0-104	

WG1220908

Chlorinated Acid Herbicides (GC) by Method 8151A

QUALITY CONTROL SUMMARY

L1058312-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3374672-1 01/09/19 14:22

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
2,4-D	U		0.000657	0.00200
2,4,5-TP (Silvex)	U		0.000657	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*86.6*			*14.0-158*

Laboratory Control Sample (LCS)

(LCS) R3374672-2 01/09/19 14:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
2,4-D	0.0500	0.0529	106	50.0-120	P
2,4,5-TP (Silvex)	0.0500	0.0480	96.0	50.0-125	
(S) 2,4-Dichlorophenyl Acetic Acid			*92.6*	*14.0-158*	

L1058312-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1058312-01 01/09/19 15:03 • (MS) R3374672-3 01/09/19 15:16 • (MSD) R3374672-4 01/09/19 15:30

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
2,4-D	0.0500	ND	0.0618	0.0547	124	109	1	50.0-120	J5 P	P	12.2	20
2,4,5-TP (Silvex)	0.0500	ND	0.0543	0.0483	109	96.6	1	50.0-125	P	P	11.7	20
(S) 2,4-Dichlorophenyl Acetic Acid					*111*	*99.0*		*14.0-158*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P	RPD between the primary and confirmatory analysis exceeded 40%.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
TB	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42480**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**LCSS**	Batch ID:	**42480**		RunNo:	**56854**					
Prep Date:	**1/8/2019**	Analysis Date:	**1/9/2019**		SeqNo:	**1903633**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		40	10	50.00	0	79.3	70	130			
Surr: DNOP		4.1		5.000		81.9	50.6	138			

Sample ID	**MB-42480**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**					
Client ID:	**PBS**	Batch ID:	**42480**		RunNo:	**56854**					
Prep Date:	**1/8/2019**	Analysis Date:	**1/9/2019**		SeqNo:	**1903634**	Units:	**mg/Kg**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)		ND	10								
Motor Oil Range Organics (MRO)		ND	50								
Surr: DNOP		9.0		10.00		90.2	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42491**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42491**		RunNo:	**56872**				
Prep Date:	**1/8/2019**	Analysis Date:	**1/9/2019**		SeqNo:	**1903162**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	980		1000		98.0	73.8	119			

Sample ID	**LCS-42491**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42491**		RunNo:	**56872**				
Prep Date:	**1/8/2019**	Analysis Date:	**1/9/2019**		SeqNo:	**1903163**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	103	80.1	123			
Surr: BFB	1100		1000		110	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42527**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42527**	RunNo: **56996**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1906691** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0018		0.002500		73.2	58.3	109			
Surr: Tetrachloro-m-xylene	0.0015		0.002500		58.7	40.1	101			

Sample ID **LCS-42527**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42527**	RunNo: **56996**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1906692** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0015		0.002500		61.8	58.3	109			
Surr: Tetrachloro-m-xylene	0.0013		0.002500		51.9	40.1	101			

Sample ID **LCSD-42527**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **42527**	RunNo: **56996**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1906693** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	0.0018		0.002500		72.0	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0015		0.002500		58.5	40.1	101	0	0	

Sample ID **MB-42613**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42613**	RunNo: **57040**
Prep Date: **1/15/2019**	Analysis Date: **1/16/2019**	SeqNo: **1908106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0019		0.002500		77.8	58.3	109			
Surr: Tetrachloro-m-xylene	0.0018		0.002500		73.6	40.1	101			

Sample ID **LCS-42613**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42613**	RunNo: **57040**
Prep Date: **1/15/2019**	Analysis Date: **1/16/2019**	SeqNo: **1908124** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00041	0.00010	0.0005000	0	81.5	49.5	127			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **LCS-42613**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42613**	RunNo: **57040**
Prep Date: **1/15/2019**	Analysis Date: **1/16/2019**	SeqNo: **1908124** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
gamma-BHC (Lindane)	0.00034	0.00010	0.0005000	0	67.5	49.9	124			
Heptachlor	0.00034	0.00010	0.0005000	0	68.4	41	122			
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.4	52.2	121			
Methoxychlor	0.00036	0.00010	0.0005000	0	71.7	40.2	134			
Surr: Decachlorobiphenyl	0.0017		0.002500		66.0	58.3	109			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		56.8	40.1	101			

Sample ID **LCSD-42613**	SampType: **LCSD**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02**	Batch ID: **42613**	RunNo: **57040**
Prep Date: **1/15/2019**	Analysis Date: **1/16/2019**	SeqNo: **1908125** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00054	0.00010	0.0005000	0	107	49.5	127	27.4	20	R
gamma-BHC (Lindane)	0.00044	0.00010	0.0005000	0	88.3	49.9	124	26.8	20	R
Heptachlor	0.00046	0.00010	0.0005000	0	92.8	41	122	30.2	20	R
Heptachlor epoxide	0.00047	0.00010	0.0005000	0	93.4	52.2	121	28.1	20	R
Methoxychlor	0.00046	0.00010	0.0005000	0	91.4	40.2	134	24.1	20	R
Surr: Decachlorobiphenyl	0.0021		0.002500		84.4	58.3	109	0	0	
Surr: Tetrachloro-m-xylene	0.0019		0.002500		75.9	40.1	101	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42491**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **42491**	RunNo: **56874**
Prep Date: **1/8/2019**	Analysis Date: **1/9/2019**	SeqNo: **1903243** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.47		0.5000		94.8	70	130			
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		88.6	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.4	70	130			

Sample ID **lcs-42491**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **42491**	RunNo: **56874**
Prep Date: **1/8/2019**	Analysis Date: **1/9/2019**	SeqNo: **1903244** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	1.000	0	95.5	70	130			
Toluene	0.98	0.050	1.000	0	98.1	70	130			
Surr: Dibromofluoromethane	0.48		0.5000		96.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.9	70	130			
Surr: Toluene-d8	0.49		0.5000		98.3	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		99.0	70	130			

Sample ID **1901132-001ams**	SampType: **MS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106V1/V2-1-id**	Batch ID: **42491**	RunNo: **56874**
Prep Date: **1/8/2019**	Analysis Date: **1/9/2019**	SeqNo: **1903247** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.3	0.25	0.9823	0.3986	95.2	68.9	131			
Toluene	13	0.49	0.9823	13.18	-31.2	64.3	137			S
Surr: Dibromofluoromethane	5.3		4.912		109	70	130			
Surr: 1,2-Dichloroethane-d4	5.2		4.912		105	70	130			
Surr: Toluene-d8	4.8		4.912		96.8	70	130			
Surr: 4-Bromofluorobenzene	7.7		4.912		157	70	130			S

Sample ID **1901132-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **KAFB-106V1/V2-1-id**	Batch ID: **42491**	RunNo: **56874**
Prep Date: **1/8/2019**	Analysis Date: **1/9/2019**	SeqNo: **1903248** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.2	0.24	0.9588	0.3986	82.7	68.9	131	11.3	20	
Toluene	12	0.48	0.9588	13.18	-122	64.3	137	6.94	20	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**1901132-001amsd**	SampType:	**MSD**	TestCode:	**EPA Method 8260B: Volatiles**
Client ID:	**KAFB-106V1/V2-1-id**	Batch ID:	**42491**	RunNo:	**56874**
Prep Date:	**1/8/2019**	Analysis Date:	**1/9/2019**	SeqNo:	**1903248** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	5.3		4.794		111	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	5.1		4.794		106	70	130	0	0	
Surr: Toluene-d8	4.6		4.794		96.7	70	130	0	0	
Surr: 4-Bromofluorobenzene	7.1		4.794		148	70	130	0	0	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **1901132-001ams** SampType: **MS** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106V1/V2-1-id** Batch ID: **42494** RunNo: **56871**

Prep Date: **1/8/2019** Analysis Date: **1/9/2019** SeqNo: **1903116** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.41	0.30	0.4000	0	103	44.5	152			
Chlorobenzene	0.41	0.30	0.4000	0	102	70	130			
1,1-Dichloroethene	0.40	0.30	0.4000	0	99.7	79.1	132			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.5	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		107	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		92.8	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		107	70	130			
Surr: Toluene-d8	0.20		0.2000		102	70	130			

Sample ID **1901132-001amsd** SampType: **MSD** TestCode: **Volatiles by 8260B/1311**

Client ID: **KAFB-106V1/V2-1-id** Batch ID: **42494** RunNo: **56871**

Prep Date: **1/8/2019** Analysis Date: **1/9/2019** SeqNo: **1903117** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.39	0.30	0.4000	0	97.2	44.5	152	5.82	20	
Chlorobenzene	0.40	0.30	0.4000	0	99.1	70	130	3.21	20	
1,1-Dichloroethene	0.37	0.30	0.4000	0	93.5	79.1	132	6.45	20	
Trichloroethene (TCE)	0.35	0.30	0.4000	0	86.8	70	130	7.38	20	
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		109	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.19		0.2000		95.6	57.3	148	0	0	
Surr: Dibromofluoromethane	0.21		0.2000		107	70	130	0	0	
Surr: Toluene-d8	0.20		0.2000		101	70	130	0	0	

Sample ID **lcs-42494** SampType: **LCS** TestCode: **Volatiles by 8260B/1311**

Client ID: **LCSS** Batch ID: **42494** RunNo: **56871**

Prep Date: **1/8/2019** Analysis Date: **1/9/2019** SeqNo: **1903118** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.40	0.30	0.4000	0	98.8	70	130			
Chlorobenzene	0.40	0.30	0.4000	0	99.5	70	130			
1,1-Dichloroethene	0.39	0.30	0.4000	0	98.5	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		102	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42494**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **42494**	RunNo: **56871**
Prep Date: **1/8/2019**	Analysis Date: **1/9/2019**	SeqNo: **1903119** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		103	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.21		0.2000		105	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42526**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **42526**	RunNo: **57007**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1907130** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.073	0.0010	0.1000	0	72.9	42.2	104			
3+4-Methylphenol	0.16	0.0010	0.2000	0	77.8	42.3	108			
2,4-Dinitrotoluene	0.063	0.0010	0.1000	0	63.1	45.8	87.8			
Hexachlorobenzene	0.079	0.0010	0.1000	0	78.5	54.5	104			
Hexachlorobutadiene	0.077	0.0010	0.1000	0	76.6	35.2	95.8			
Hexachloroethane	0.074	0.0010	0.1000	0	73.6	32.3	91.8			
Nitrobenzene	0.084	0.0010	0.1000	0	84.4	53.1	98.9			
Pentachlorophenol	0.060	0.0010	0.1000	0	60.3	30.3	104			
Pyridine	0.058	0.0010	0.1000	0	57.5	15	90			
2,4,5-Trichlorophenol	0.065	0.0010	0.1000	0	64.6	42.1	107			
2,4,6-Trichlorophenol	0.075	0.0010	0.1000	0	74.9	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.2	44.1	111			
Surr: 2-Fluorophenol	0.12		0.2000		57.7	15	102			
Surr: Phenol-d5	0.079		0.2000		39.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		71.6	39.9	111			
Surr: Nitrobenzene-d5	0.079		0.1000		78.7	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		74.0	36.7	100			
Surr: 4-Terphenyl-d14	0.050		0.1000		50.4	42.6	129			

Sample ID **mb-42526**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42526**	RunNo: **57007**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1907131** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.094		0.2000		47.2	15	102			
Surr: Phenol-d5	0.070		0.2000		34.8	15	87.7			
Surr: 2,4,6-Tribromophenol	0.13		0.2000		62.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42526**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42526**	RunNo: **57007**
Prep Date: **1/10/2019**	Analysis Date: **1/15/2019**	SeqNo: **1907131** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.066		0.1000		65.7	35.1	107			
Surr: 2-Fluorobiphenyl	0.063		0.1000		63.3	36.7	100			
Surr: 4-Terphenyl-d14	0.043		0.1000		42.7	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42525**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42525**	RunNo:	**56888**					
Prep Date:	**1/9/2019**	Analysis Date:	**1/10/2019**	SeqNo:	**1903750**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-42525**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42525**	RunNo:	**56888**					
Prep Date:	**1/9/2019**	Analysis Date:	**1/10/2019**	SeqNo:	**1903751**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.9	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901132**

17-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42569**	SampType:	**MBLK**		TestCode:	**EPA Method 6010B: TCLP Metals**				
Client ID:	**PBW**	Batch ID:	**42569**		RunNo:	**56993**				
Prep Date:	**1/11/2019**	Analysis Date:	**1/14/2019**		SeqNo:	**1906645**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Chromium	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42569**	SampType:	**LCS**		TestCode:	**EPA Method 6010B: TCLP Metals**				
Client ID:	**LCSW**	Batch ID:	**42569**		RunNo:	**56993**				
Prep Date:	**1/11/2019**	Analysis Date:	**1/14/2019**		SeqNo:	**1906647**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	108	80	120			
Chromium	ND	5.0	0.5000	0	97.0	80	120			
Selenium	ND	1.0	0.5000	0	111	80	120			
Silver	ND	5.0	0.1000	0	105	80	120			

Sample ID	**MB-42569**	SampType:	**MBLK**		TestCode:	**EPA Method 6010B: TCLP Metals**				
Client ID:	**PBW**	Batch ID:	**42569**		RunNo:	**56993**				
Prep Date:	**1/11/2019**	Analysis Date:	**1/14/2019**		SeqNo:	**1906669**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100								
Cadmium	ND	1.0								
Lead	ND	5.0								

Sample ID	**LCS-42569**	SampType:	**LCS**		TestCode:	**EPA Method 6010B: TCLP Metals**				
Client ID:	**LCSW**	Batch ID:	**42569**		RunNo:	**56993**				
Prep Date:	**1/11/2019**	Analysis Date:	**1/14/2019**		SeqNo:	**1906671**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	100	0.5000	0	95.6	80	120			
Cadmium	ND	1.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	95.9	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1901132 RcptNo: 1

Received By: Anne Thorne 1/4/2019 2:45:00 PM Anne Thorne

Completed By: Anne Thorne 1/4/2019 3:01:59 PM Anne Thorne

Reviewed By: DAD 1/4/19

Labeled by: AT 01/04/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑

    # of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
    Adjusted? _____
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

    Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

    Person Notified: _____ Date _____
    By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
    Regarding: _____
    Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106 VV2-1

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.3~~ PF 627350M02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ 16219	Pam Moss/pmoss@eaest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ M 505 238 4410	Tel 505 345-3975 Fax 505 345-4107	Earl Morse/emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[12] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type	Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081A/8151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106 VV2-1 ~~-dup~~ VV2-1	Roll off VV2-1	Soil	1-4-19	1235	IV	7		3	X	X	X	X	X	X		PF		Composite	190132	001
2	~~A~~ 01108119																				
3																					
4																					
5										PF											
6																					
7																					
8																					
9																					
10																					

[24] SAMPLER(S) AND COMPANY: (please print)
Field Sampler/EA Engineering
Pete Furrow

[10] COURIER AND SHIPPING NUMBER:
FedEx Number: N/A Hand delivered to Hall Lab

3.1

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Furrow/Peter Furrow	1-4-19	1310	Printed Name and Signature: Joshua Livingston	01/04/19	1310
Printed Name and Signature: Joshua Livingston	01/04/19	~~15~~ 1445	Printed Name and Signature:	01/04/19	1445
Printed Name and Signature:			Printed Name and Signature:		

Distribution: | Original - Laboratory (To be returned with Analytical Report); | Copy 1 - Project File

SPECIAL WASTE SHIPMENT RECORD

SO#194023

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 078956

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

☑ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

☐ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

Profile # 104434NM

1. Generator's work site name and address: KIRTLAND AIRFORCE BASE

2. Generator's name and address: Kirtland AFB
2050 Wyoming Blvd. SE
Bldg. 20685, Env. Restoration
Kirtland Airforce Base, NM 87117

Generator's Telephone no.: (505) 846-9017

3. Authorized Agent's name and mailing address (if different from #2)

Agent's Telephone no.

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3) (tons)
Non-RCRA/Non-DOT Regulated Material Solid (TPH Soil)	01	CM	10 yrds

7. **Special handling instructions:**

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
Holly O'Grady	Holly O'Grady	2 / 20 / 2019

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
ACT Enviro 208 Murray rd SE Albuquerque, NM David Rivera	David Rivera	/ / 2-20-19

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates: N 35° 16.660 W 106° 40.006 5629

Received By (printed/typed name):	Signature	Month / Day / Year
Matthew Johnson		2 2019

Appendix I

White/GEN Yellow/CUSTOMER Pink/LANDFILL

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 08, 2019

Amanda Smith

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1901823

Dear Amanda Smith:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/22/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106VI/V2-2-idw
Project: Kirtland AFB BFF
Collection Date: 1/22/2019 12:10:00 PM
Lab ID: 1901823-001 **Matrix:**
Received Date: 1/22/2019 12:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	1/28/2019 7:09:05 PM	42847
EPA METHOD 6010B: TCLP METALS						Analyst: **rde**	
Arsenic	ND	5.0		mg/L	1	1/25/2019 12:58:38 PM	42808
Barium	ND	100		mg/L	1	1/25/2019 12:58:38 PM	42808
Cadmium	ND	1.0		mg/L	1	1/25/2019 12:58:38 PM	42808
Chromium	ND	5.0		mg/L	1	1/25/2019 12:58:38 PM	42808
Lead	ND	5.0		mg/L	1	1/25/2019 12:58:38 PM	42808
Selenium	ND	1.0		mg/L	1	1/25/2019 12:58:38 PM	42808
Silver	ND	5.0		mg/L	1	1/25/2019 12:58:38 PM	42808
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	1/30/2019 4:54:29 PM	42831
Endrin	ND	0.020		mg/L	1	1/30/2019 4:54:29 PM	42831
gamma-BHC (Lindane)	ND	0.40		mg/L	1	1/30/2019 4:54:29 PM	42831
Heptachlor	ND	0.0080		mg/L	1	1/30/2019 4:54:29 PM	42831
Heptachlor epoxide	ND	0.0080		mg/L	1	1/30/2019 4:54:29 PM	42831
Methoxychlor	ND	10		mg/L	1	1/30/2019 4:54:29 PM	42831
Toxaphene	ND	0.50		mg/L	1	1/30/2019 4:54:29 PM	42831
Surr: Decachlorobiphenyl	84.9	42.6-98.5		%Rec	1	1/30/2019 4:54:29 PM	42831
Surr: Tetrachloro-m-xylene	76.5	28.9-96.7		%Rec	1	1/30/2019 4:54:29 PM	42831
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	1/29/2019 11:04:53 AM	42829
2,4-D	ND	10		mg/L	1	1/29/2019 11:04:53 AM	42829
Surr: 2,4-Dichlorophenylacetic acid	117	70-130		%Rec	1	1/29/2019 11:04:53 AM	42829
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	4700	99		mg/Kg	10	1/28/2019 2:49:54 PM	42785
Motor Oil Range Organics (MRO)	ND	500		mg/Kg	10	1/28/2019 2:49:54 PM	42785
Surr: DNOP	0	50.6-138	S	%Rec	10	1/28/2019 2:49:54 PM	42785
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	410	100		mg/Kg	20	1/23/2019 10:28:37 AM	42749
Surr: BFB	226	73.8-119	S	%Rec	20	1/23/2019 10:28:37 AM	42749
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/6/2019 5:44:13 PM	42882
3+4-Methylphenol	ND	200		mg/L	1	2/6/2019 5:44:13 PM	42882
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/6/2019 5:44:13 PM	42882
Hexachlorobenzene	ND	0.13		mg/L	1	2/6/2019 5:44:13 PM	42882
Hexachlorobutadiene	ND	0.50		mg/L	1	2/6/2019 5:44:13 PM	42882

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106VI/V2-2-idw
Project: Kirtland AFB BFF
Collection Date: 1/22/2019 12:10:00 PM
Lab ID: 1901823-001 **Matrix:**
Received Date: 1/22/2019 12:55:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/6/2019 5:44:13 PM	42882
Nitrobenzene	ND	2.0		mg/L	1	2/6/2019 5:44:13 PM	42882
Pentachlorophenol	ND	100		mg/L	1	2/6/2019 5:44:13 PM	42882
Pyridine	ND	5.0		mg/L	1	2/6/2019 5:44:13 PM	42882
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/6/2019 5:44:13 PM	42882
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/6/2019 5:44:13 PM	42882
Cresols, Total	ND	200		mg/L	1	2/6/2019 5:44:13 PM	42882
Surr: 2-Fluorophenol	30.4	15-102		%Rec	1	2/6/2019 5:44:13 PM	42882
Surr: Phenol-d5	25.7	15-87.7		%Rec	1	2/6/2019 5:44:13 PM	42882
Surr: 2,4,6-Tribromophenol	47.7	39.9-111		%Rec	1	2/6/2019 5:44:13 PM	42882
Surr: Nitrobenzene-d5	44.6	35.1-107		%Rec	1	2/6/2019 5:44:13 PM	42882
Surr: 2-Fluorobiphenyl	47.5	36.7-100		%Rec	1	2/6/2019 5:44:13 PM	42882
Surr: 4-Terphenyl-d14	35.2	42.6-129	S	%Rec	1	2/6/2019 5:44:13 PM	42882
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.25	D	mg/Kg	10	1/24/2019 1:16:52 AM	42749
Toluene	5.1	0.50	D	mg/Kg	10	1/24/2019 1:16:52 AM	42749
Ethylbenzene	4.5	0.50	D	mg/Kg	10	1/24/2019 1:16:52 AM	42749
Xylenes, Total	22	1.0	D	mg/Kg	10	1/24/2019 1:16:52 AM	42749
Surr: 1,2-Dichloroethane-d4	98.3	70-130	D	%Rec	10	1/24/2019 1:16:52 AM	42749
Surr: 4-Bromofluorobenzene	139	70-130	SD	%Rec	10	1/24/2019 1:16:52 AM	42749
Surr: Dibromofluoromethane	95.9	70-130	D	%Rec	10	1/24/2019 1:16:52 AM	42749
Surr: Toluene-d8	100	70-130	D	%Rec	10	1/24/2019 1:16:52 AM	42749
VOLATILES BY 8260B/1311						Analyst: **AG**	
Benzene	ND	0.50		mg/L	1	1/24/2019 5:04:31 PM	42765
2-Butanone	ND	200		mg/L	1	1/24/2019 5:04:31 PM	42765
Carbon Tetrachloride	ND	0.50		mg/L	1	1/24/2019 5:04:31 PM	42765
Chlorobenzene	ND	100		mg/L	1	1/24/2019 5:04:31 PM	42765
Chloroform	ND	6.0		mg/L	1	1/24/2019 5:04:31 PM	42765
1,4-Dichlorobenzene	ND	7.5		mg/L	1	1/24/2019 5:04:31 PM	42765
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	1/24/2019 5:04:31 PM	42765
1,1-Dichloroethene	ND	0.70		mg/L	1	1/24/2019 5:04:31 PM	42765
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	1/24/2019 5:04:31 PM	42765
Trichloroethene (TCE)	ND	0.50		mg/L	1	1/24/2019 5:04:31 PM	42765
Vinyl chloride	ND	0.20		mg/L	1	1/24/2019 5:04:31 PM	42765
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	1/24/2019 5:04:31 PM	42765
Surr: 4-Bromofluorobenzene	99.7	57.3-148		%Rec	1	1/24/2019 5:04:31 PM	42765
Surr: Dibromofluoromethane	111	70-130		%Rec	1	1/24/2019 5:04:31 PM	42765
Surr: Toluene-d8	101	70-130		%Rec	1	1/24/2019 5:04:31 PM	42765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	01/28/2019 17:33	WG1228732

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	01/30/2019 12:07	WG1229515

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis cate / time	Batch
Corrosivity by pH	8.32	T8	1	01/25/2019 10:03	WG1228045

Sample Narrative:
L1063444-01 WG1228045: 8.32 at 19.7C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	01/25/2019 13:52	WG1228315

WG1228732

Wet Chemistry by Method 9012 B

QUALITY CONTROL SUMMARY

L1063444-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3379239-1 01/28/19 16:54

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Cyanide	U		0.0390	0.250

L1062805-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1062805-03 01/28/19 17:12 • (DUP) R3379239-4 01/28/19 17:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3379239-2 01/28/19 16:55

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Cyanide	2.50	2.75	110	50.0-150	

L1063430-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1063430-01 01/28/19 17:22 • (MS) R3379239-5 01/28/19 17:23 • (MSD) R3379239-6 01/28/19 17:24

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.59	1.63	95.5	97.9	1	75.0-125			2.47	20

L1063444-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1063444-01 01/28/19 17:33 • (MS) R3379239-7 01/28/19 17:34 • (MSD) R3379239-8 01/28/19 17:35

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Reactive Cyanide	1.67	ND	1.62	1.59	97.3	95.2	1	75.0-125			2.18	20

WG1229515

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1063444-01

Method Blank (MB)

(MB) R3379836-1 01/30/19 12:07

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Reactive Sulfide	U		7.63	25.0

L1063993-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1063993-02 01/30/19 12:07 • (DUP) R3379836-3 01/30/19 12:07

Analyte	Orginal Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/kg	mg/kg		%		%
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3379836-2 01/30/19 12:07

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Reactive Sulfide	100	85.0	85.0	70.0-130	

L1063430-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1063430-01 01/25/19 10:03 • (DUP) R3378610-2 01/25/19 10:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
Corrosivity by pH	8.79	8.78	1	0.114		1

Sample Narrative:
OS: 8.79 at 20.7C
DUP: 8.78 at 19.8C

Laboratory Control Sample (LCS)

(LCS) R3378610-1 01/25/19 10:03

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:
LCS: 9.97 at 18.3C

L1063430-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1063430-01 01/26/19 13:52 • (DUP) R3378888-2 01/26/19 13:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	Deg. F	Deg. F		%		%
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3378888-1 01/26/19 13:52

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	Deg. F	Deg. F	%	%	
Ignitability	82.0	82.4	101	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**LCS-42785**	SampType:	**LCS**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**LCSS**	Batch ID:	**42785**		RunNo:	**57248**				
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**		SeqNo:	**1915016**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	100	63.9	124			
Surr: DNOP	4.0		5.000		80.6	50.6	138			

Sample ID	**MB-42785**	SampType:	**MBLK**		TestCode:	**EPA Method 8015M/D: Diesel Range Organics**				
Client ID:	**PBS**	Batch ID:	**42785**		RunNo:	**57248**				
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**		SeqNo:	**1915017**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	12		10.00		117	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42749**	SampType:	**MBLK**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**PBS**	Batch ID:	**42749**		RunNo:	**57204**				
Prep Date:	**1/22/2019**	Analysis Date:	**1/23/2019**		SeqNo:	**1913354**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		112	73.8	119			

Sample ID	**LCS-42749**	SampType:	**LCS**		TestCode:	**EPA Method 8015D: Gasoline Range**				
Client ID:	**LCSS**	Batch ID:	**42749**		RunNo:	**57204**				
Prep Date:	**1/22/2019**	Analysis Date:	**1/23/2019**		SeqNo:	**1913355**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	25.00	0	110	80.1	123			
Surr: BFB	1200		1000		124	73.8	119			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **MB-42831**	SampType: **MBLK**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **PBW**	Batch ID: **42831**	RunNo: **57375**
Prep Date: **1/28/2019**	Analysis Date: **1/30/2019**	SeqNo: **1919885** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0016		0.002500		65.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		57.0	28.9	96.7			

Sample ID **LCS-42831**	SampType: **LCS**	TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW**	Batch ID: **42831**	RunNo: **57375**
Prep Date: **1/28/2019**	Analysis Date: **1/30/2019**	SeqNo: **1919886** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00048	0.00010	0.0005000	0	95.9	49.5	127			
gamma-BHC (Lindane)	0.00038	0.00010	0.0005000	0	75.9	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	74.6	41	122			
Heptachlor epoxide	0.00041	0.00010	0.0005000	0	81.9	52.2	121			
Methoxychlor	0.00038	0.00010	0.0005000	0	75.7	40.2	134			
Surr: Decachlorobiphenyl	0.0019		0.002500		74.5	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.2	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42829**	SampType:	**MBLK**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**PBW**	Batch ID:	**42829**		RunNo:	**57334**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918107**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0									
2,4-D	ND	10									
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130				

Sample ID	**LCS-42829**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57334**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918108**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	110	70	130				
2,4-D	ND	10	0.07500	0	120	70	130				
Surr: 2,4-Dichlorophenylacetic aci	0.090		0.07500		120	70	130				

Sample ID	**1901823-001AMS**	SampType:	**MS**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**KAFB-106VI/V2-2-id**	Batch ID:	**42829**		RunNo:	**57334**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918120**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	104	70	130				
2,4-D	ND	10	0.07500	0	116	70	130				
Surr: 2,4-Dichlorophenylacetic aci	0.089		0.07500		119	70	130				

Sample ID	**1901823-001AMSD**	SampType:	**MSD**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**KAFB-106VI/V2-2-id**	Batch ID:	**42829**		RunNo:	**57334**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918121**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	110	70	130	0	20		
2,4-D	ND	10	0.07500	0	123	70	130	0	20		
Surr: 2,4-Dichlorophenylacetic aci	0.094		0.07500		125	70	130	0	20		

Sample ID	**TOM 42829 IDOC-1**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**					
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57343**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918586**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	103	70	130				
2,4-D	ND	10	0.07500	0	112	70	130				
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		114	70	130				

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**TOM 42829 IDOC-2**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**				
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57343**				
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918588**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	102	70	130			
2,4-D	ND	10	0.07500	0	110	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		104	70	130			

Sample ID	**TOM 42829 IDOC-3**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**				
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57343**				
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918590**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	107	70	130			
2,4-D	ND	10	0.07500	0	115	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130			

Sample ID	**TOM 42829 IDOC-4**	SampType:	**LCS**		TestCode:	**EPA Method 8151: Herbicides TCLP**				
Client ID:	**LCSW**	Batch ID:	**42829**		RunNo:	**57343**				
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918591**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	103	70	130			
2,4-D	ND	10	0.07500	0	112	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.083		0.07500		110	70	130			

Sample ID	**MB-42829**	SampType:	**MBLK**		TestCode:	**EPA Method 8151: Herbicides TCLP**				
Client ID:	**PBW**	Batch ID:	**42829**		RunNo:	**57343**				
Prep Date:	**1/28/2019**	Analysis Date:	**1/29/2019**		SeqNo:	**1918592**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.086		0.07500		115	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42749**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **42749**	RunNo: **57208**
Prep Date: **1/22/2019**	Analysis Date: **1/23/2019**	SeqNo: **1913609** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		88.2	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.8	70	130			
Surr: Dibromofluoromethane	0.44		0.5000		88.4	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Sample ID **lcs-42749**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **42749**	RunNo: **57208**
Prep Date: **1/22/2019**	Analysis Date: **1/23/2019**	SeqNo: **1913610** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.025	1.000	0	88.9	70	130			
Toluene	1.0	0.050	1.000	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	0.44		0.5000		87.7	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		103	70	130			
Surr: Dibromofluoromethane	0.44		0.5000		87.6	70	130			
Surr: Toluene-d8	0.52		0.5000		104	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42765**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **42765**	RunNo: **57241**
Prep Date: **1/23/2019**	Analysis Date: **1/24/2019**	SeqNo: **1914651** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.41	0.30	0.4000	0	101	70	130			
1,1-Dichloroethene	0.42	0.30	0.4000	0	104	70	130			
Trichloroethene (TCE)	0.38	0.30	0.4000	0	95.4	70	130			
Surr: 1,2-Dichloroethane-d4	0.21		0.2000		104	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		107	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		111	70	130			
Surr: Toluene-d8	0.19		0.2000		97.1	70	130			

Sample ID **mb-42765**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **42765**	RunNo: **57241**
Prep Date: **1/23/2019**	Analysis Date: **1/24/2019**	SeqNo: **1914652** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		108	70	130			
Surr: 4-Bromofluorobenzene	0.21		0.2000		105	57.3	148			
Surr: Dibromofluoromethane	0.23		0.2000		114	70	130			
Surr: Toluene-d8	0.20		0.2000		99.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcs-42882**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS**	Batch ID: **42882**	RunNo: **57511**							
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924418**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.099	0.0010	0.1000	0	99.1	42.2	104			
3+4-Methylphenol	0.23	0.0010	0.2000	0	113	42.3	108			S
2,4-Dinitrotoluene	0.090	0.0010	0.1000	0	90.3	45.8	87.8			S
Hexachlorobenzene	0.11	0.0010	0.1000	0	106	54.5	104			S
Hexachlorobutadiene	0.087	0.0010	0.1000	0	87.5	35.2	95.8			
Hexachloroethane	0.081	0.0010	0.1000	0	80.7	32.3	91.8			
Nitrobenzene	0.10	0.0010	0.1000	0	102	53.1	98.9			S
Pentachlorophenol	0.086	0.0010	0.1000	0	86.1	30.3	104			
Pyridine	0.040	0.0010	0.1000	0	39.5	15	90			
2,4,5-Trichlorophenol	0.090	0.0010	0.1000	0	89.7	42.1	107			
2,4,6-Trichlorophenol	0.099	0.0010	0.1000	0	98.9	43.8	110			
Cresols, Total	0.32	0.0010	0.3000	0	108	44.1	111			
Surr: 2-Fluorophenol	0.17		0.2000		84.3	15	102			
Surr: Phenol-d5	0.13		0.2000		66.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.21		0.2000		107	39.9	111			
Surr: Nitrobenzene-d5	0.11		0.1000		109	35.1	107			S
Surr: 2-Fluorobiphenyl	0.10		0.1000		103	36.7	100			S
Surr: 4-Terphenyl-d14	0.079		0.1000		78.5	42.6	129			

Sample ID **lcs-42966**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS**	Batch ID: **42966**	RunNo: **57511**							
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924419**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.15		0.2000		73.7	15	102			
Surr: Phenol-d5	0.13		0.2000		65.0	15	87.7			
Surr: 2,4,6-Tribromophenol	0.17		0.2000		82.8	39.9	111			
Surr: Nitrobenzene-d5	0.095		0.1000		94.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.082		0.1000		82.3	36.7	100			
Surr: 4-Terphenyl-d14	0.061		0.1000		61.4	42.6	129			

Sample ID **lcsd-42882**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**							
Client ID: **LCSS02**	Batch ID: **42882**	RunNo: **57511**							
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924420**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.061	0.0010	0.1000	0	61.1	42.2	104	47.5	27.1	R
3+4-Methylphenol	0.12	0.0010	0.2000	0	59.8	42.3	108	61.3	29.1	R
2,4-Dinitrotoluene	0.048	0.0010	0.1000	0	48.0	45.8	87.8	61.2	30.6	R
Hexachlorobenzene	0.057	0.0010	0.1000	0	56.8	54.5	104	60.2	22.5	R

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **lcsd-42882**	SampType: **LCSD**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS02**	Batch ID: **42882**	RunNo: **57511**
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924420** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachlorobutadiene	0.051	0.0010	0.1000	0	50.8	35.2	95.8	53.1	27.4	R
Hexachloroethane	0.050	0.0010	0.1000	0	50.1	32.3	91.8	46.8	28	R
Nitrobenzene	0.061	0.0010	0.1000	0	61.2	53.1	98.9	49.6	26.2	R
Pentachlorophenol	0.044	0.0010	0.1000	0	43.5	30.3	104	65.7	21.3	R
Pyridine	0.028	0.0010	0.1000	0	28.3	15	90	33.0	20	R
2,4,5-Trichlorophenol	0.051	0.0010	0.1000	0	51.0	42.1	107	55.1	29.3	R
2,4,6-Trichlorophenol	0.058	0.0010	0.1000	0	58.1	43.8	110	52.1	27.4	R
Cresols, Total	0.18	0.0010	0.3000	0	60.3	44.1	111	56.9	27.4	R
Surr: 2-Fluorophenol	0.098		0.2000		49.1	15	102	0	20	
Surr: Phenol-d5	0.083		0.2000		41.3	15	87.7	0	20	
Surr: 2,4,6-Tribromophenol	0.11		0.2000		56.5	39.9	111	0	20	
Surr: Nitrobenzene-d5	0.062		0.1000		61.8	35.1	107	0	20	
Surr: 2-Fluorobiphenyl	0.058		0.1000		58.1	36.7	100	0	20	
Surr: 4-Terphenyl-d14	0.048		0.1000		48.0	42.6	129	0	20	

Sample ID **mb-42882**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42882**	RunNo: **57511**
Prep Date: **1/30/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924421** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.057		0.2000		28.6	15	102			
Surr: Phenol-d5	0.087		0.2000		43.7	15	87.7			
Surr: 2,4,6-Tribromophenol	0.080		0.2000		40.1	39.9	111			
Surr: Nitrobenzene-d5	0.080		0.1000		80.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.082		0.1000		82.1	36.7	100			
Surr: 4-Terphenyl-d14	0.068		0.1000		67.5	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID **mb-42966**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **42966**	RunNo: **57511**
Prep Date: **2/5/2019**	Analysis Date: **2/6/2019**	SeqNo: **1924422** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	0.11		0.2000		54.6	15	102			
Surr: Phenol-d5	0.091		0.2000		45.5	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		70.2	39.9	111			
Surr: Nitrobenzene-d5	0.077		0.1000		77.1	35.1	107			
Surr: 2-Fluorobiphenyl	0.070		0.1000		70.1	36.7	100			
Surr: 4-Terphenyl-d14	0.056		0.1000		55.8	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42847**	SampType:	**MBLK**	TestCode:	**MERCURY, TCLP**					
Client ID:	**PBW**	Batch ID:	**42847**	RunNo:	**57309**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/28/2019**	SeqNo:	**1917121**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	**LCS-42847**	SampType:	**LCS**	TestCode:	**MERCURY, TCLP**					
Client ID:	**LCSW**	Batch ID:	**42847**	RunNo:	**57309**					
Prep Date:	**1/28/2019**	Analysis Date:	**1/28/2019**	SeqNo:	**1917122**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	96.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1901823**

08-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID	**MB-42808**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**PBW**	Batch ID:	**42808**	RunNo:	**57271**					
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**	SeqNo:	**1915492**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	**LCS-42808**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: TCLP Metals**					
Client ID:	**LCSW**	Batch ID:	**42808**	RunNo:	**57271**					
Prep Date:	**1/24/2019**	Analysis Date:	**1/25/2019**	SeqNo:	**1915493**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	108	80	120			
Barium	ND	100	0.5000	0	96.8	80	120			
Cadmium	ND	1.0	0.5000	0	103	80	120			
Chromium	ND	5.0	0.5000	0	98.3	80	120			
Lead	ND	5.0	0.5000	0	99.1	80	120			
Selenium	ND	1.0	0.5000	0	111	80	120			
Silver	ND	5.0	0.1000	0	106	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1901823** RcptNo: 1

Received By: **Victoria Zellar** **1/22/2019 12:55:00 PM** Victoria Zellar

Completed By: **Desiree Dominguez** **1/22/2019 1:05:34 PM** DD

Reviewed By: JO 1/22/19

LB: VVZ 1/22/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	VVZ 1/22/19
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.9	Good	Yes			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106 V1/V2-2-idw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[4] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599DM01.1017.5~~ PF 62735DM02 1017.08	Hall Environmental 1901823	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] PO NUMBER:	[7] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ Vadose Zone Wells		~~16182~~ PF 16219	Pam Moss/pmoss@eaest.com
[8] PROJECT CONTACT:	[9] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ 505 238 4410	Tel 505 345 3975 Fax 505 345 4107	Earl Morse / emorse@eaest.com

[25] ANALYSES REQUIRED (Include Method Numbers)

[14] ITEM	[15] SAMPLE IDENTIFIER	[16] SAMPLE DESCRIPTION/LOCATION	[17] MATRIX (see codes on SOP)	[18] DATE COLLECTED	[19] TIME COLLECTED	[20] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Bottle Type: Number of Bottles	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081/6151A/6010B/7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[24] SAMPLE TYPE (see codes on SOP)	[21] COMMENTS/ SCREENING READINGS	[23] LAB ID (for lab's use)
1	KAFB-106 V1/V2-2-idw	Roll-off V1/V2-2	Soil	1-22-19	1210	IV	7	3	X	X	X	X	X	X		PF		Composite	1901823	-001
2																				
3																				
4																				
5									PF											
6																				
7																				
8																				
9																				
10																				

[26] SAMPLER(S) AND COMPANY: (please print)	[27] COURIER AND SHIPPING NUMBER:
Field Sampler/EA Engineering Pete Ferraci	FedEx Number: N/A Hand delivered to Hall Lab

[28] RELINQUISHED BY	DATE	TIME	[29] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferraci Pete Ferraci	1-22-19	1255	Printed Name and Signature: Monica Gillen Temp = 3.9°C	1/22/19	0955
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 078955

SO# 195422

Profile # 104434NM

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

❑ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

❑ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

1. Generator's work site name and address: KIRTLAND AIRFORCE BASE		
2. Generator's name and address: Kirtland AFB 2050 Wyoming Blvd. SE Bldg. 20685, Env. Restoration Kirtland Airforce Base, NM 87117		Generator's Telephone no. (505) 846-9017
3. Authorized Agent's name and mailing address (if different from #2)		Agent's Telephone no.
4. Proper name and type of waste	5. Containers No. / Type	6. Total quantity (yd3) / (tons)
Non-RCRA / Non-DOT Regulated Material Solid (TPH Soil)	01 CM	12

7. Special handling instructions:

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
Holly O'Grady	Holly O'Grady	3 / 13 / 2019

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
ACT ENVIRO. 208 Murray Rd SE Alb, NM 87105 505.448.9400 Martin Aranda		03 / 13 / 19

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates: N 35° 16.713 W 106° 40.120 E 5641

Received By (printed/typed name):	Signature	Month / Day / Year
Kathleen Johnson		3 / 15 / 19

White/GEN Yellow/CUSTOMER Pink/LANDFILL

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 25, 2019

Earl Morse

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland AFB BFF OrderNo.: 1902469

Dear Earl Morse:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/11/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106V1/V2-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:04:00 PM
Lab ID: 1902469-001 **Matrix:** SOIL
Received Date: 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
MERCURY, TCLP						Analyst: **pmf**	
Mercury	ND	0.020		mg/L	1	2/15/2019 3:07:21 PM	43164
EPA METHOD 6010B: TCLP METALS						Analyst: **ELS**	
Arsenic	ND	5.0		mg/L	1	2/14/2019 9:48:47 AM	43141
Barium	ND	100		mg/L	1	2/14/2019 9:48:47 AM	43141
Cadmium	ND	1.0		mg/L	1	2/14/2019 9:48:47 AM	43141
Chromium	ND	5.0		mg/L	1	2/14/2019 9:48:47 AM	43141
Lead	ND	5.0		mg/L	5	2/14/2019 10:19:03 AM	43141
Selenium	ND	1.0		mg/L	1	2/14/2019 9:48:47 AM	43141
Silver	ND	5.0		mg/L	1	2/14/2019 9:48:47 AM	43141
EPA METHOD 8081: PESTICIDES TCLP						Analyst: **JME**	
Chlordane	ND	0.030		mg/L	1	2/22/2019 11:04:03 AM	43222
Endrin	ND	0.020		mg/L	1	2/22/2019 11:04:03 AM	43222
gamma-BHC (Lindane)	ND	0.40		mg/L	1	2/22/2019 11:04:03 AM	43222
Heptachlor	ND	0.0080		mg/L	1	2/22/2019 11:04:03 AM	43222
Heptachlor epoxide	ND	0.0080		mg/L	1	2/22/2019 11:04:03 AM	43222
Methoxychlor	ND	10		mg/L	1	2/22/2019 11:04:03 AM	43222
Toxaphene	ND	0.50		mg/L	1	2/22/2019 11:04:03 AM	43222
Surr: Decachlorobiphenyl	71.5	42.6-98.5		%Rec	1	2/22/2019 11:04:03 AM	43222
Surr: Tetrachloro-m-xylene	70.6	28.9-96.7		%Rec	1	2/22/2019 11:04:03 AM	43222
EPA METHOD 8151: HERBICIDES TCLP						Analyst: **JME**	
2,4,5-TP (Silvex)	ND	1.0		mg/L	1	2/15/2019 2:33:03 AM	43142
2,4-D	ND	10		mg/L	1	2/15/2019 2:33:03 AM	43142
Surr: 2,4-Dichlorophenylacetic acid	111	70-130		%Rec	1	2/15/2019 2:33:03 AM	43142
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **lrm**	
Diesel Range Organics (DRO)	9200	100		mg/Kg	10	2/14/2019 7:33:44 PM	43121
Motor Oil Range Organics (MRO)	ND	500		mg/Kg	10	2/14/2019 7:33:44 PM	43121
Surr: DNOP	0	50.6-138	S	%Rec	10	2/14/2019 7:33:44 PM	43121
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	620	97		mg/Kg	20	2/13/2019 11:34:20 AM	43103
Surr: BFB	289	73.8-119	S	%Rec	20	2/13/2019 11:34:20 AM	43103
EPA METHOD 8270C TCLP						Analyst: **DAM**	
2-Methylphenol	ND	200		mg/L	1	2/14/2019 8:23:34 PM	43128
3+4-Methylphenol	ND	200		mg/L	1	2/14/2019 8:23:34 PM	43128
2,4-Dinitrotoluene	ND	0.13		mg/L	1	2/14/2019 8:23:34 PM	43128
Hexachlorobenzene	ND	0.13		mg/L	1	2/14/2019 8:23:34 PM	43128
Hexachlorobutadiene	ND	0.50		mg/L	1	2/14/2019 8:23:34 PM	43128

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106V1/V2-3-idw
Project: Kirtland AFB BFF
Collection Date: 2/11/2019 1:04:00 PM
Lab ID: 1902469-001 **Matrix:** SOIL
Received Date: 2/11/2019 3:08:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C TCLP						Analyst: **DAM**	
Hexachloroethane	ND	3.0		mg/L	1	2/14/2019 8:23:34 PM	43128
Nitrobenzene	ND	2.0		mg/L	1	2/14/2019 8:23:34 PM	43128
Pentachlorophenol	ND	100		mg/L	1	2/14/2019 8:23:34 PM	43128
Pyridine	ND	5.0		mg/L	1	2/14/2019 8:23:34 PM	43128
2,4,5-Trichlorophenol	ND	400		mg/L	1	2/14/2019 8:23:34 PM	43128
2,4,6-Trichlorophenol	ND	2.0		mg/L	1	2/14/2019 8:23:34 PM	43128
Cresols, Total	ND	200		mg/L	1	2/14/2019 8:23:34 PM	43128
Surr: 2-Fluorophenol	33.9	15-102		%Rec	1	2/14/2019 8:23:34 PM	43128
Surr: Phenol-d5	27.1	15-87.7		%Rec	1	2/14/2019 8:23:34 PM	43128
Surr: 2,4,6-Tribromophenol	60.1	39.9-111		%Rec	1	2/14/2019 8:23:34 PM	43128
Surr: Nitrobenzene-d5	45.4	35.1-107		%Rec	1	2/14/2019 8:23:34 PM	43128
Surr: 2-Fluorobiphenyl	40.0	36.7-100		%Rec	1	2/14/2019 8:23:34 PM	43128
Surr: 4-Terphenyl-d14	60.9	42.6-129		%Rec	1	2/14/2019 8:23:34 PM	43128
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.24		mg/Kg	10	2/13/2019 11:19:22 PM	43103
Toluene	4.5	0.49		mg/Kg	10	2/13/2019 11:19:22 PM	43103
Ethylbenzene	5.9	0.49		mg/Kg	10	2/13/2019 11:19:22 PM	43103
Xylenes, Total	26	0.97		mg/Kg	10	2/13/2019 11:19:22 PM	43103
Surr: 1,2-Dichloroethane-d4	112	70-130		%Rec	10	2/13/2019 11:19:22 PM	43103
Surr: 4-Bromofluorobenzene	157	70-130	S	%Rec	10	2/13/2019 11:19:22 PM	43103
Surr: Dibromofluoromethane	109	70-130		%Rec	10	2/13/2019 11:19:22 PM	43103
Surr: Toluene-d8	97.5	70-130		%Rec	10	2/13/2019 11:19:22 PM	43103
VOLATILES BY 8260B/1311						Analyst: **DJF**	
Benzene	ND	0.50		mg/L	1	2/13/2019 5:56:48 PM	43105
2-Butanone	ND	200		mg/L	1	2/13/2019 5:56:48 PM	43105
Carbon Tetrachloride	ND	0.50		mg/L	1	2/13/2019 5:56:48 PM	43105
Chlorobenzene	ND	100		mg/L	1	2/13/2019 5:56:48 PM	43105
Chloroform	ND	6.0		mg/L	1	2/13/2019 5:56:48 PM	43105
1,4-Dichlorobenzene	ND	7.5		mg/L	1	2/13/2019 5:56:48 PM	43105
1,2-Dichloroethane (EDC)	ND	0.50		mg/L	1	2/13/2019 5:56:48 PM	43105
1,1-Dichloroethene	ND	0.70		mg/L	1	2/13/2019 5:56:48 PM	43105
Tetrachloroethene (PCE)	ND	0.70		mg/L	1	2/13/2019 5:56:48 PM	43105
Trichloroethene (TCE)	ND	0.50		mg/L	1	2/13/2019 5:56:48 PM	43105
Vinyl chloride	ND	0.20		mg/L	1	2/13/2019 5:56:48 PM	43105
Surr: 1,2-Dichloroethane-d4	118	70-130		%Rec	1	2/13/2019 5:56:48 PM	43105
Surr: 4-Bromofluorobenzene	98.2	57.3-148		%Rec	1	2/13/2019 5:56:48 PM	43105
Surr: Dibromofluoromethane	114	70-130		%Rec	1	2/13/2019 5:56:48 PM	43105
Surr: Toluene-d8	94.4	70-130		%Rec	1	2/13/2019 5:56:48 PM	43105

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	02/14/2019 16:16	WG1236918

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		25.0	1	02/17/2019 14:46	WG1238312

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	8.53	T8	1	02/14/2019 15:45	WG1236929

Sample Narrative:

L1069768-01 WG1236929: 8.53 at 19.5C

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	02/20/2019 13:35	WG1239346

Method Blank (MB)

(MB) R3383882-1 02/14/19 15:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1069768-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069768-01 02/14/19 16:16 • (DUP) R3383882-8 02/14/19 16:17

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1069135-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069135-01 02/14/19 16:19 • (DUP) R3383882-9 02/14/19 16:20

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3383882-2 02/14/19 15:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.45	98.2	50.0-150	

L1069273-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069273-01 02/14/19 16:02 • (MS) R3383882-4 02/14/19 16:03 • (MSD) R3383882-5 02/14/19 16:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.60	1.68	96.2	101	1	75.0-125			4.91	20

L1069762-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1069762-01 02/14/19 16:13 • (MS) R3383882-6 02/14/19 16:14 • (MSD) R3383882-7 02/14/19 16:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.54	1.50	92.7	89.8	1	75.0-125			3.11	20

Method Blank (MB)

(MB) R3384436-1 02/17/19 14:46

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

L1069762-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1069762-01 02/17/19 14:46 • (DUP) R3384436-3 02/17/19 14:46

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3384436-2 02/17/19 14:46

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	87.7	87.7	70.0-130	

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3383902-2 02/14/19 15:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		su		%		%
Corrosivity by pH		8.28	1	0.363		1

Sample Narrative:

DUP: 8.28 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3383902-1 02/14/19 15:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 17.5C

Laboratory Control Sample (LCS)

(LCS) R3385432-1 02/20/19 13:35

Analyte	Spike Amount Deg. F	LCS Result Deg. F	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ignitability	82.0	81.9	99.9	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43121**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929530** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	55	10	50.00	0	111	63.9	124			
Surr: DNOP	4.7		5.000		93.5	50.6	138			

Sample ID: **MB-43121**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43121**	RunNo: **57656**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1929531** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		99.5	50.6	138			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43103**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930637** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	980		1000		97.5	73.8	119			

Sample ID: **LCS-43103**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57668**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930638** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	109	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **LCS-43222** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSW** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938472** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00032	0.00010	0.0005000	0	63.7	49.5	127			
gamma-BHC (Lindane)	0.00039	0.00010	0.0005000	0	77.4	49.9	124			
Heptachlor	0.00037	0.00010	0.0005000	0	73.5	41	122			
Heptachlor epoxide	0.00037	0.00010	0.0005000	0	74.4	52.2	121			
Methoxychlor	0.00026	0.00010	0.0005000	0	51.1	40.2	134			
Surr: Decachlorobiphenyl	0.0016		0.002500		64.7	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.0014		0.002500		55.7	28.9	96.7			

Sample ID: **LCSD-43222** SampType: **LCSD** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **LCSS02** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Endrin	0.00035	0.00010	0.0005000	0	69.4	49.5	127	8.66	20	
gamma-BHC (Lindane)	0.00035	0.00010	0.0005000	0	69.1	49.9	124	11.4	20	
Heptachlor	0.00034	0.00010	0.0005000	0	68.0	41	122	7.73	20	
Heptachlor epoxide	0.00035	0.00010	0.0005000	0	70.9	52.2	121	4.72	20	
Methoxychlor	0.00034	0.00010	0.0005000	0	67.7	40.2	134	28.0	20	R
Surr: Decachlorobiphenyl	0.0015		0.002500		61.6	42.6	98.5	0	0	
Surr: Tetrachloro-m-xylene	0.0012		0.002500		48.3	28.9	96.7	0	0	

Sample ID: **MB-43222** SampType: **MBLK** TestCode: **EPA Method 8081: Pesticides TCLP**

Client ID: **PBW** Batch ID: **43222** RunNo: **57895**

Prep Date: **2/19/2019** Analysis Date: **2/22/2019** SeqNo: **1938561** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlordane	ND	0.030								
Endrin	ND	0.020								
gamma-BHC (Lindane)	ND	0.40								
Heptachlor	ND	0.0080								
Heptachlor epoxide	ND	0.0080								
Methoxychlor	ND	10								
Toxaphene	ND	0.50								
Surr: Decachlorobiphenyl	0.0011		0.002500		44.4	42.6	98.5			
Surr: Tetrachloro-m-xylene	0.00090		0.002500		35.9	28.9	96.7			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43142**	SampType: **MBLK**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **PBW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931599** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0								
2,4-D	ND	10								
Surr: 2,4-Dichlorophenylacetic aci	0.078		0.07500		103	70	130			

Sample ID: **LCS-43142**	SampType: **LCS**	TestCode: **EPA Method 8151: Herbicides TCLP**
Client ID: **LCSW**	Batch ID: **43142**	RunNo: **57724**
Prep Date: **2/14/2019**	Analysis Date: **2/14/2019**	SeqNo: **1931600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4,5-TP (Silvex)	ND	1.0	0.07500	0	95.0	70	130			
2,4-D	0.077	0.010	0.07500	0	103	70	130			
Surr: 2,4-Dichlorophenylacetic aci	0.075		0.07500		99.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43103**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930715** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: **lcs-43103**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **43103**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930716** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	109	70	130			
Toluene	0.94	0.050	1.000	0	94.3	70	130			
Surr: 1,2-Dichloroethane-d4	0.55		0.5000		110	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.3	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		108	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43105**	SampType: **MBLK**	TestCode: **Volatiles by 8260B/1311**
Client ID: **PBS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930720** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.50								
2-Butanone	ND	200								
Carbon Tetrachloride	ND	0.50								
Chlorobenzene	ND	100								
Chloroform	ND	6.0								
1,4-Dichlorobenzene	ND	7.5								
1,2-Dichloroethane (EDC)	ND	0.50								
1,1-Dichloroethene	ND	0.70								
Tetrachloroethene (PCE)	ND	0.70								
Trichloroethene (TCE)	ND	0.50								
Vinyl chloride	ND	0.20								
Surr: 1,2-Dichloroethane-d4	0.23		0.2000		114	70	130			
Surr: 4-Bromofluorobenzene	0.19		0.2000		93.0	57.3	148			
Surr: Dibromofluoromethane	0.22		0.2000		109	70	130			
Surr: Toluene-d8	0.20		0.2000		99.0	70	130			

Sample ID: **lcs-43105**	SampType: **LCS**	TestCode: **Volatiles by 8260B/1311**
Client ID: **LCSS**	Batch ID: **43105**	RunNo: **57676**
Prep Date: **2/12/2019**	Analysis Date: **2/13/2019**	SeqNo: **1930721** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.44	0.30	0.4000	0	109	70	130			
Chlorobenzene	0.38	0.30	0.4000	0	95.6	70	130			
1,1-Dichloroethene	0.43	0.30	0.4000	0	108	70	130			
Trichloroethene (TCE)	0.37	0.30	0.4000	0	93.7	70	130			
Surr: 1,2-Dichloroethane-d4	0.22		0.2000		110	70	130			
Surr: 4-Bromofluorobenzene	0.20		0.2000		101	57.3	148			
Surr: Dibromofluoromethane	0.21		0.2000		106	70	130			
Surr: Toluene-d8	0.20		0.2000		98.9	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **lcs-43128**	SampType: **LCS**	TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	0.075	0.0010	0.1000	0	74.8	42.2	104			
3+4-Methylphenol	0.15	0.0010	0.2000	0	76.7	42.3	108			
2,4-Dinitrotoluene	0.055	0.0010	0.1000	0	55.2	45.8	87.8			
Hexachlorobenzene	0.068	0.0010	0.1000	0	67.8	54.5	104			
Hexachlorobutadiene	0.059	0.0010	0.1000	0	59.0	35.2	95.8			
Hexachloroethane	0.056	0.0010	0.1000	0	56.5	32.3	91.8			
Nitrobenzene	0.068	0.0010	0.1000	0	67.6	53.1	98.9			
Pentachlorophenol	0.056	0.0010	0.1000	0	56.1	30.3	104			
Pyridine	0.051	0.0010	0.1000	0	50.8	15	90			
2,4,5-Trichlorophenol	0.063	0.0010	0.1000	0	62.7	42.1	107			
2,4,6-Trichlorophenol	0.065	0.0010	0.1000	0	65.4	43.8	110			
Cresols, Total	0.23	0.0010	0.3000	0	76.0	44.1	111			
Surr: 2-Fluorophenol	0.14		0.2000		72.0	15	102			
Surr: Phenol-d5	0.13		0.2000		62.9	15	87.7			
Surr: 2,4,6-Tribromophenol	0.14		0.2000		72.5	39.9	111			
Surr: Nitrobenzene-d5	0.070		0.1000		70.4	35.1	107			
Surr: 2-Fluorobiphenyl	0.059		0.1000		59.2	36.7	100			
Surr: 4-Terphenyl-d14	0.086		0.1000		85.6	42.6	129			

Sample ID: **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Methylphenol	ND	200								
3+4-Methylphenol	ND	200								
2,4-Dinitrotoluene	ND	0.13								
Hexachlorobenzene	ND	0.13								
Hexachlorobutadiene	ND	0.50								
Hexachloroethane	ND	3.0								
Nitrobenzene	ND	2.0								
Pentachlorophenol	ND	100								
Pyridine	ND	5.0								
2,4,5-Trichlorophenol	ND	400								
2,4,6-Trichlorophenol	ND	2.0								
Cresols, Total	ND	200								
Surr: 2-Fluorophenol	0.16		0.2000		77.9	15	102			
Surr: Phenol-d5	0.13		0.2000		67.2	15	87.7			
Surr: 2,4,6-Tribromophenol	0.16		0.2000		79.5	39.9	111			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **mb-43128**	SampType: **MBLK**	TestCode: **EPA Method 8270C TCLP**
Client ID: **PBS**	Batch ID: **43128**	RunNo: **57722**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1933129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	0.082		0.1000		81.5	35.1	107			
Surr: 2-Fluorobiphenyl	0.074		0.1000		73.7	36.7	100			
Surr: 4-Terphenyl-d14	0.089		0.1000		88.6	42.6	129			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43164**	SampType: **MBLK**	TestCode: **MERCURY, TCLP**
Client ID: **PBW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932763** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID: **LCS-43164**	SampType: **LCS**	TestCode: **MERCURY, TCLP**
Client ID: **LCSW**	Batch ID: **43164**	RunNo: **57746**
Prep Date: **2/14/2019**	Analysis Date: **2/15/2019**	SeqNo: **1932764** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	94.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1902469**

25-Feb-19

Client: EA Engineering Science & Technology

Project: Kirtland AFB BFF

Sample ID: **MB-43141**	SampType: **MBLK**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **PBW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930953** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID: **LCS-43141**	SampType: **LCS**	TestCode: **EPA Method 6010B: TCLP Metals**
Client ID: **LCSW**	Batch ID: **43141**	RunNo: **57698**
Prep Date: **2/13/2019**	Analysis Date: **2/14/2019**	SeqNo: **1930955** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	107	80	120			
Barium	ND	100	0.5000	0	99.9	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	101	80	120			
Lead	ND	5.0	0.5000	0	101	80	120			
Selenium	ND	1.0	0.5000	0	112	80	120			
Silver	ND	5.0	0.1000	0	107	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1902469 RcptNo: 1

Received By: Anne Thorne 2/11/2019 3:08:00 PM Anne Thorne

Completed By: Anne Thorne 2/11/2019 4:32:53 PM Anne Thorne

Reviewed By: DAD 2/12/19

Labeled by: TO 2/12/19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	TO
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 2/12/19 (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.8	Good	Not Present			

225 Schilling Circle Suite 400, Hunt Valley MD 21031
Tel No: (410) 584-7000
Fax No: (410) 771-1625

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: KAFB-106VI/V2-3-1dw

[2] PROJECT NAME:	[3] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 1 (Name and Company)
Kirtland AFB BFF	~~62599BM01.1017.3~~ PF 62735 BM02 1017 08	Hall Environmental	Amanda Smith/ asmith@eaest.com
[5] PROJECT PHASE/SITE/TASK:	[6] DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 2 (Name and Company)
~~Data Gap Wells~~ PF Vadose Zone Wells		~~15182~~ PF 16219	Pam Moss/pmoss@eaest.com
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO: RECIPIENT 3 (Name and Company)
E. Morse	~~505-224-9013~~ PF 505 238 4710	Tel 505 345 3975 Fax 505 345 4107	Earl Morse/emorse@eaest.com

[14] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	Lab TAT (business days)	Number of Bottles	Bottle Type	TCLP VOC, SVOC, Pest, Herb, Metals (1311/8260B/8270C/8081 B/8151A/6010B/ 7470A)	BTEX (8260B)	TPH GRO, DRO, RRO (8015D)	Reactive Cyanide/ Sulfide (9012B/9034)	Corrosivity - PH (9045D)	Ignitability (1010A)				[25] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	KAFB-106VI/V2-3-1dw	roll to BF VI/V2-3	Soil	2/11/19	1304	IV	7	3		X	X	X	X	X	X		PF		Composite	HEAL # 1902469	
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

PF

[29] SAMPLER(S) AND COMPANY: (please print)

Field Sampler/EA Engineering
Pete Ferrari

[30] COURIER AND SHIPPING NUMBER:

FedEx Number: N/A Hand delivered to hall lab

1.8 °C

[31] RELINQUISHED BY	DATE	TIME	[31] RECEIVED BY	DATE	TIME
Printed Name and Signature: Pete Ferrari Pete Ferrari	2-11-19	1440	Printed Name and Signature: Joshua Livingston	2/11/19	1440
Printed Name and Signature: Joshua Livingston	2/11/19	1808	Printed Name and Signature: COC	2/11/19	1508
Printed Name and Signature:			Printed Name and Signature:		

Distribution: [ ] [Original - Laboratory (To be returned with Analytical Report);] [ ] Copy 1 - Project File

EZ Profile™

Requested Facility: Rio Rancho Landfill ❑ Unsure Profile Number: 104434NM
❑ Multiple Generator Locations (Attach Locations) ❑ Request Certificate of Disposal ❑ Renewal? Original Profile Number: _____

A. GENERATOR INFORMATION (MATERIAL ORIGIN)

1. Generator Name: KIRTLAND AIR FORCE BASE
2. Site Address: 2050 WYOMING BLVD SE
   (City, State, ZIP) Kirtland AFB NM 87117
3. County: Bernalillo
4. Contact Name: Scott Clark
5. Email: scott.clark@us.af.mil
6. Phone: (505) 846-9017 7. Fax: _____
8. Generator EPA ID: NM9570024423 ❑ N/A
9. State ID: _____ ☑ N/A

B. BILLING INFORMATION ❑ SAME AS GENERATOR

1. Billing Name: Advanced Chemical Transport
2. Billing Address: 967 Mabury Rd
   (City, State, ZIP) San Jose CA 95133
3. Contact Name: Jared Kinsey
4. Email: jkinsey@actenviro.com
5. Phone: (505) 205-3364 6. Fax: _____
7. WM Hauled? ❑ Yes ☑ No
8. P.O. Number: _____
9. Payment Method: ☑ Credit Account ❑ Cash ❑ Credit Card

C. MATERIAL INFORMATION

1. Common Name: TPH Soil
   Describe Process Generating Material: ❑ See Attached
   Contaminated soil, generated during drilling at fuel spill site
2. Material Composition and Contaminants: ❑ See Attached

1. soil	100 %
2. Diesel Range Organics	480 mg/kg
3. Gasoline Range Organics	110 mg/kg
4. Benzene	.098 mg/kg
Total comp. must be equal to or greater than 100%	≥100%

3. State Waste Codes: _____ ☑ N/A
4. Color: Brown
5. Physical State at 70˚F: ☑ Solid ❑ Liquid ❑ Other: _____
6. Free Liquid Range Percentage: _____ to _____ ☑ N/A
7. pH: 5 to 9 ❑ N/A
8. Strong Odor: ❑ Yes ☑ No Describe: _____
9. Flash Point: ❑ <140˚F ❑ 140˚–199˚F ❑ ≥200˚ ☑ N/A

D. REGULATORY INFORMATION

1. EPA Hazardous Waste? ❑ Yes* ☑ No
   Code: _____
2. State Hazardous Waste? ❑ Yes ☑ No
   Code: _____
3. Is this material non-hazardous due to Treatment, Delisting, or an Exclusion? ❑ Yes* ☑ No
4. Contains Underlying Hazardous Constituents? ❑ Yes* ☑ No
5. From an industry regulated under Benzene NESHAP? ❑ Yes* ☑ No
6. Facility remediation subject to 40 CFR 63 GGGGG? ❑ Yes* ☑ No
7. CERCLA or State-mandated clean-up? ❑ Yes* ☑ No
8. NRC or State-regulated radioactive or NORM waste? ❑ Yes* ☑ No

***If Yes, see Addendum (page 2) for additional questions and space.**

9. Contains PCBs? → If Yes, answer a, b and c. ❑ Yes ☑ No
   a. Regulated by 40 CFR 761? ❑ Yes ❑ No
   b. Remediation under 40 CFR 761.61 (a)? ❑ Yes ❑ No
   c. Were PCB imported into the US? ❑ Yes ❑ No
10. Regulated and/or Untreated Medical/Infectious Waste? ❑ Yes ☑ No
11. Contains Asbestos? ❑ Yes ☑ No
    → If Yes: ❑ Non-Friable ❑ Non-Friable – Regulated ❑ Friable

E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION

1. Analytical attached ☑ Yes
   Please identify applicable samples and/or lab reports:
   Lab ID: 1811675-001 Client Sample ID: KAFB-106-S9-2-idw
2. Other information attached (such as MSDS)? ❑ Yes

F. SHIPPING AND DOT INFORMATION

1. ☑ One-Time Event ❑ Repeat Event/Ongoing Business
2. Estimated Quantity/Unit of Measure: 2
   ❑ Tons ☑ Yards ❑ Drums ❑ Gallons ❑ Other: _____
3. Container Type and Size: 20 cubic yard rolloff
4. USDOT Proper Shipping Name: ☑ N/A

G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): _____ Date: _____
Title: _____
Company: _____

Certification Signature

THINK GREEN.®

QUESTIONS? CALL 800 963 4776 FOR ASSISTANCE

Revised June 30, 2015
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EZ Profile™ Addendum

Only complete this Addendum if prompted by responses on EZ Profile™ (page 1) or to provide additional information. Sections and question numbers correspond to EZ Profile™.

Profile Number: 104434NM

C. MATERIAL INFORMATION

Describe Process Generating Material (Continued from page 1): If more space is needed, please attach additional pages.

Material Composition and Contaminants (Continued from page 1): If more space is needed, please attach additional pages.

5. Toluene	1.2 mg/kg
6. Ethylbenzene	.67 mg/kg
7. Xylene	2.7 mg/kg
8.	
9.	
Total composition must be equal to or greater than 100%	≥100%

D. REGULATORY INFORMATION

Only questions with a "Yes" response in Section D on the EZ Profile™ form (page 1) need to be answered here.

1. EPA Hazardous Waste
   a. Please list all USEPA listed and characteristic waste code numbers:
   b. Is the material subject to the Alternative Debris standards (40 CFR 268.45)? ❑ Yes ❑ No
   c. Is the material subject to the Alternative Soil standards (40 CFR 268.49)? → If Yes, complete question 4. ❑ Yes ❑ No
   d. Is the material exempt from Subpart CC Controls (40 CFR 264.1083)? ❑ Yes ❑ No
      → If Yes, please check **one** of the following:
      ❑ Waste meets LDR or treatment exemptions for organics (40 CFR 264.1082(c)(2) or (c)(4))
      ❑ Waste contains VOCs that average <500 ppmw (CFR 264.1082(c)(1)) – will require annual update.
2. State Hazardous Waste → Please list all state waste codes: _____
3. For material that is Treated, Delisted, or Excluded → Please indicate the category, below:
   ❑ Delisted Hazardous Waste ❑ Excluded Waste under 40 CFR 261.4 → Specify Exclusion: _____
   ❑ Treated Hazardous Waste Debris ❑ Treated Characteristic Hazardous Waste → If checked, complete question 4.
4. Underlying Hazardous Constituents → Please list all Underlying Hazardous Constituents:
5. Industries regulated under Benzene NESHAP include petroleum refineries, chemical manufacturing plants, coke by-product recovery plants, and TSDFs.
   a. Are you a TSDF? → If yes, please complete Benzene NESHAP questionnaire. If not, continue. ❑ Yes ❑ No
   b. Does this material contain benzene? ❑ Yes ❑ No
      1. If yes, what is the flow weighted average concentration? _____ ppmw
   c. What is your facility's current total annual benzene quantity in Megagrams? ❑ <1 Mg ❑ 1–9.99 Mg ❑ ≥10 Mg
   d. Is this waste soil from a remediation? ❑ Yes ❑ No
      1. If yes, what is the benzene concentration in remediation waste? _____ ppmw
   e. Does the waste contain >10% water/moisture? ❑ Yes ❑ No
   f. Has material been treated to remove 99% of the benzene or to achieve <10 ppmw? ❑ Yes ❑ No
   g. Is material exempt from controls in accordance with 40 CFR 61.342? ❑ Yes ❑ No
      → If yes, specify exemption: _____
   h. Based on your knowledge of your waste and the BWON regulations, do you believe that this waste stream is subject to treatment and control requirements at an off-site TSDF? ❑ Yes ❑ No
6. 40 CFR 63 GGGGG → Does the material contain <500 ppmw VOHAPs at the point of determination? ❑ Yes ❑ No
7. CERCLA or State-Mandated clean up → Please submit the Record of Decision or other documentation with process information to assist others in the evaluation for proper disposal. A "Determination of Acceptability" may be needed for CERCLA wastes not going to a CERCLA approved facility.
8. NRC or state regulated radioactive or NORM Waste → Please identify Isotopes and pCi/g: _____

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APPENDIX G

INVESTIGATION-DERIVED LIQUID WASTE DOCUMENTATION

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM9570024423	1	505 385 3679	012267322 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: SCOTT CLARK 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: 505-349-5220
U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	6	DM	2640	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA (6) 55 Project Number 198536 Document #: D237405

24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature — Month: 4 Day: 24 Year: 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Adam Kemp — Signature — Month: 4 Day: 24 Year: 19

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1 | 2. | 3. | 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

Pleas

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190424

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] **GENERATOR KNOWLEDGE** [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

LOCATION CODE	KAFB BFF
FIELD SAMPLE ID	KAFB-106S1-DW-idw
SAMPLE DATE	6-Mar-19
SAMPLE PURPOSE	Waste Characterization

Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.78	J	--
METALS	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.12	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	ND	--	0.02
		Manganese (dissolved)	mg/L	0.20	NS	**1.2**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	5	500	**1700**	--	20
		Ethylbenzene	µg/L	700	NS	530	--	20
		Toluene	µg/L	1000	NS	**4400**	--	200
		Xylenes, total	µg/L	620	NS	**2500**	--	30
		Methyl tert-butyl ether	µg/L	100	NS	ND	--	20
		1,2,4-Trimethylbenzene	µg/L	NS	NS	350	--	20
		1,3,5-Trimethylbenzene	µg/L	NS	NS	110	--	20
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.05	NS	**99**	--	9.4

Notes:

[a] NMWQCC numeric standards per the NMAC Title 20.6.2.3103A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2018).

For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> = greater than

< = less than

µg/L = microgram per liter

°F = degrees farenheit

ID = identification

J = estimated value

mg/L = milligram per liter

ND = not detected above the PQL

NS = no standard

PQL = practical quantitation limit

QUAL = laboratory data qualifier

RCRA = Resource Conservation and Recovery Act

TCLP = Toxicity characteristic leaching procedure

Shading = detected concentration above the PQL

Bold/Shading = reported concentration exceeds the project screening level

S.U. = Standard units

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 15, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1903291

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/6/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S1-DW-idw
Project: Kirtland BFF Project
Collection Date: 3/6/2019 2:40:00 PM
Lab ID: 1903291-001 **Matrix:** AQUEOUS **Received Date:** 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	3/11/2019 7:23:06 PM	43610
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	ND	0.020		mg/L	1	3/8/2019 9:34:54 AM	A58213
Manganese	1.2	0.010		mg/L	5	3/8/2019 9:50:09 AM	A58213
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	3/13/2019 5:48:24 PM	43593
Barium	0.12	0.020		mg/L	1	3/11/2019 6:49:45 PM	43593
Cadmium	ND	0.0020		mg/L	1	3/11/2019 6:49:45 PM	43593
Chromium	ND	0.0060		mg/L	1	3/11/2019 6:49:45 PM	43593
Lead	ND	0.0050		mg/L	1	3/13/2019 5:48:24 PM	43593
Selenium	ND	0.050		mg/L	1	3/11/2019 6:49:45 PM	43593
Silver	ND	0.0050		mg/L	1	3/11/2019 6:49:45 PM	43593
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	99	9.4		µg/L	1E+	3/13/2019 9:57:18 AM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	1700	20		µg/L	20	3/12/2019 3:47:00 AM	SL58271
Toluene	4400	200		µg/L	200	3/12/2019 12:52:00 PM	SL58313
Ethylbenzene	530	20		µg/L	20	3/12/2019 3:47:00 AM	SL58271
Methyl tert-butyl ether (MTBE)	ND	20		µg/L	20	3/12/2019 3:47:00 AM	SL58271
1,2,4-Trimethylbenzene	350	20		µg/L	20	3/12/2019 3:47:00 AM	SL58271
1,3,5-Trimethylbenzene	110	20		µg/L	20	3/12/2019 3:47:00 AM	SL58271
Xylenes, Total	2500	30		µg/L	20	3/12/2019 3:47:00 AM	SL58271
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	20	3/12/2019 3:47:00 AM	SL58271
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	20	3/12/2019 3:47:00 AM	SL58271
Surr: Dibromofluoromethane	92.3	70-130		%Rec	20	3/12/2019 3:47:00 AM	SL58271
Surr: Toluene-d8	97.4	70-130		%Rec	20	3/12/2019 3:47:00 AM	SL58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1903291-002
Matrix: TRIP BLANK
Received Date: 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	ND	0.0095		µg/L	1	3/12/2019 4:56:46 PM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
Toluene	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
Ethylbenzene	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 4:11:00 AM	SL58271
Xylenes, Total	ND	1.5		µg/L	1	3/12/2019 4:11:00 AM	SL58271
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	3/12/2019 4:11:00 AM	SL58271
Surr: 4-Bromofluorobenzene	97.6	70-130		%Rec	1	3/12/2019 4:11:00 AM	SL58271
Surr: Dibromofluoromethane	99.3	70-130		%Rec	1	3/12/2019 4:11:00 AM	SL58271
Surr: Toluene-d8	96.7	70-130		%Rec	1	3/12/2019 4:11:00 AM	SL58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	03/13/2019 15:15	WG1248453

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.78	T8	1	03/10/2019 09:00	WG1247650

Sample Narrative:
L1077053-01 WG1247650: 7.78 at 18.2C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	03/09/2019 11:40	WG1247121

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	03/12/2019 21:52	WG1247501

WG1248453

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1077053-01

Method Blank (MB)

(MB) R3391267-1 03/13/19 12:59

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

Laboratory Control Sample (LCS)

(LCS) R3391267-2 03/13/19 13:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.101	101	85.0-115	

WG1247650

Wet Chemistry by Method 4500H+ B-2011

QUALITY CONTROL SUMMARY

L1077053-01

Laboratory Control Sample (LCS)

(LCS) R3390229-1 03/10/19 09:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 19.1°C

WG1247121

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1077053-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3390115-1 03/09/19 11:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1076340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076340-01 03/09/19 11:35 • (DUP) R3390115-3 03/09/19 11:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

L1077167-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077167-01 03/09/19 11:42 • (DUP) R3390115-6 03/09/19 11:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3390115-2 03/09/19 11:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.438	87.6	85.0-115	

WG1247501

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1077053-01

ONE LAB. NATIONWIDE.

L1076340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076340-01 03/12/19 21:52 • (DUP) R3390971-2 03/12/19 21:52

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1077053-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077053-01 03/12/19 21:52 • (DUP) R3390971-3 03/12/19 21:52

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3390971-1 03/12/19 21:52

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	81.4	99.2	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43625**	SampType: **MBLK**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **PBW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955903** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID: **LCS-43625**	SampType: **LCS**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **LCSW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955904** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.11	0.010	0.1000	0	108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954426** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	88.0	70	130			
Toluene	19	1.0	20.00	0	96.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		97.9	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.0	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.9	70	130			
Surr: Toluene-d8	9.6		10.00		95.6	70	130			

Sample ID: **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.8	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.1	70	130			
Surr: Toluene-d8	9.6		10.00		96.5	70	130			

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955791** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	20	1.0	20.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	9.9		10.00		98.8	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.7	70	130			
Surr: Dibromofluoromethane	9.3		10.00		93.2	70	130			
Surr: Toluene-d8	9.6		10.00		96.4	70	130			

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955792** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955792** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	9.5		10.00		94.6	70	130			
Surr: Toluene-d8	9.7		10.00		96.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43610**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955319** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID: **LCS-43610**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955320** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.9	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952628** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952629** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	103	80	120			
Manganese	0.50	0.0020	0.5000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903291**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955503** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955504** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.46	0.020	0.5000	0	92.4	80	120			
Barium	0.47	0.020	0.5000	0	94.9	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.47	0.0060	0.5000	0	93.5	80	120			
Selenium	0.47	0.050	0.5000	0	93.2	80	120			
Silver	0.098	0.0050	0.1000	0	98.3	80	120			

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957972** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Lead	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957973** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.48	0.020	0.5000	0	96.4	80	120			
Lead	0.48	0.0050	0.5000	0	96.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1903291 RcptNo: 1

Received By: Leah Baca 3/6/2019 4:00:00 PM Leah Baca

Completed By: Anne Thorne 3/7/2019 8:50:25 AM Anne Thorne

Reviewed By: [illegible] 3/7/19

Labeled by: IO 3/7/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 2 2
(<2 or >12 unless noted)
Adjusted? NO
Checked by: IO 3/7/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	7.8	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW # 306
Mailing Address:
Albuquerque, NM 87102
Phone #: 505 238-4410
email or Fax#: emorse@eaest.com
QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush
Project Name: Kirtland BFF Project
Project #: 62735DM02 1017 08
PO 16219
Project Manager: Deron Jercinovic
Sampler: Pete Ferrari
On Ice: ☑ Yes ☐ No
# of Coolers: (1)
Cooler Temp(including CF): 7.8

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1903291
3-6-19	1440	H_2O	KAFB-1065I-DW-idw	3 40 ml	HCl	001
				3 40 ml	$Na_2S_2O_3$	002
				1 250 ml	HNO_3	003
				1 125 ml	HNO_3	004
				3 asst.	500 ml	005
			Trip Blank			006
			03/06/19			

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss Fe Mn filtered	RCI
X											
			X								
					X						
										X	
											X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3-6 2019	1520	Pete Ferrari		PF	3-6-19	1520
3-6-2019	1600			Client	3/6/19	1600

Remarks: Email results to pmoss@eaest.com emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 13, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1811F02

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-2-idw
Project: Kirtland BFF Project
Collection Date: 11/29/2018 1:55:00 PM
Lab ID: 1811F02-001 **Matrix:** AQUEOUS **Received Date:** 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/4/2018 1:27:50 PM	41861
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	0.063	0.020		mg/L	1	12/7/2018 8:06:52 AM	A56159
Manganese	1.2	0.010		mg/L	5	12/7/2018 8:27:45 AM	A56159
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **ELS**	
Arsenic	ND	0.020		mg/L	1	12/4/2018 9:29:48 AM	41840
Barium	0.26	0.020		mg/L	1	12/4/2018 9:29:48 AM	41840
Cadmium	ND	0.0020		mg/L	1	12/4/2018 9:29:48 AM	41840
Chromium	ND	0.0060		mg/L	1	12/4/2018 9:29:48 AM	41840
Lead	ND	0.0050		mg/L	1	12/4/2018 12:46:49 PM	41840
Selenium	ND	0.050		mg/L	1	12/4/2018 9:29:48 AM	41840
Silver	ND	0.0050		mg/L	1	12/4/2018 9:29:48 AM	41840
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	0.35	0.019		µg/L	2	12/10/2018 11:59:36 AM	41941
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	12/5/2018 6:53:36 PM	B56109
Benzene	5.8	1.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
Toluene	30	1.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
Ethylbenzene	7.8	1.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
Xylenes, Total	35	2.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
1,2,4-Trimethylbenzene	17	1.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
1,3,5-Trimethylbenzene	5.7	1.0		µg/L	1	12/5/2018 6:53:36 PM	B56109
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	12/5/2018 6:53:36 PM	B56109

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	12/07/2018 16:57	WG1206104

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.62	T8	1	12/07/2018 09:21	WG1206760

Sample Narrative:
L1C49501-01 WG1206760: 7.62 at 19.2C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND	J6	0.0500	1	12/06/2018 15:25	WG1206297

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/06/2018 22:21	WG1205657

WG1206104

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1049501-01

ONE LAB. NATIONWIDE

Method Blank (MB)

(MB) R3366341-1 12/07/18 16:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	J		0.00180	0.00500

L1049065-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1049065-02 12/07/18 16:41 • (DUP) R3366341-3 12/07/18 16:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1049507-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049507-01 12/07/18 15:58 • (DUP) R3366341-6 12/07/18 15:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3366341-2 12/07/18 16:33

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.104	104	85.0-115	

L1049442-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049442-02 12/07/18 16:47 • (MS) R3366341-4 12/07/18 16:48 • (MSD) R3366341-5 12/07/18 16:49

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0915	0.0896	91.5	89.6	1	75.0-125			2.10	20

L1049683-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049683-01 12/07/18 17:02 • (MS) R3366341-7 12/07/18 17:03 • (MSD) R3366341-8 12/07/18 17:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	U	0.0860	0.0913	86.0	91.3	1	75.0-125			5.98	20

WG1206760

Wet Chemistry by Method 4500H+ B-2011

QUALITY CONTROL SUMMARY

L1049501-01

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3366132-1 12/07/18 09:21 • (LCSD) R3366132-2 12/07/18 09:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.0997	1

Sample Narrative:

LCS: 10.03 at 17.3C

LCSD: 10.04 at 17.3C

WG1206297

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1049501-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3365922-1 12/06/18 15:22

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1049495-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049495-01 12/06/18 15:25 • (DUP) R3365922-3 12/06/18 15:25

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.0220	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3365922-2 12/06/18 15:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.533	107	85.0-115	

L1049501-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049501-01 12/06/18 15:25 • (MS) R3365922-4 12/06/18 15:26 • (MSD) R3365922-5 12/06/18 15:26

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Sulfide	1.00	ND	0.810	0.809	77.9	77.8	1	80.0-120	J6	J6	0.124	20

WG1205657

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1049501-01

L1049227-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1049227-02 12/06/18 22:21 • (DUP) R3366144-2 12/06/18 22:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1049501-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049501-01 12/06/18 22:21 • (DUP) R3366144-3 12/06/18 22:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3366144-1 12/06/18 22:21

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	82.2	100	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result [corrected for any sample specific characteristics] reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F02**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41941**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**41941**	RunNo:	**56195**					
Prep Date:	**12/7/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1877195**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-41941**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**41941**	RunNo:	**56195**					
Prep Date:	**12/7/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1877197**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.096	0.010	0.1000	0	96.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F02**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56109**	RunNo: **56109**
Prep Date:	Analysis Date: **12/5/2018**	SeqNo: **1874337** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		102	80	120			

Sample ID **100NG BTEX LCSB**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56109**	RunNo: **56109**
Prep Date:	Analysis Date: **12/5/2018**	SeqNo: **1874338** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17	2.5	20.00	0	86.2	64.5	120			
Benzene	17	1.0	20.00	0	86.6	80	120			
Toluene	18	1.0	20.00	0	90.3	80	120			
Ethylbenzene	19	1.0	20.00	0	93.1	80	120			
Xylenes, Total	58	2.0	60.00	0	97.5	80	120			
1,2,4-Trimethylbenzene	20	1.0	20.00	0	101	80	120			
1,3,5-Trimethylbenzene	20	1.0	20.00	0	98.8	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F02**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41861**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872280**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-41861**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872287**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0042	0.00020	0.005000	0	83.3	80	120			

Sample ID	**1811F02-001CMS**	SampType:	**MS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872313**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	.00003773	110	75	125			

Sample ID	**1811F02-001CMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872315**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	.00003773	110	75	125	0.0108	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F02**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1875987**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1875988**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.50	0.020	0.5000	0	99.6	80	120			
Manganese	0.50	0.0020	0.5000	0	99.2	80	120			

Sample ID	**1811F02-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1875996**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.57	0.020	0.5000	0.06258	101	75	125			

Sample ID	**1811F02-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1876000**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.56	0.020	0.5000	0.06258	98.8	75	125	1.85	20	

Sample ID	**1811F02-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1876009**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	3.7	0.010	2.500	1.158	102	75	125			

Sample ID	**1811F02-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S2-2-idw**	Batch ID:	**A56159**	RunNo:	**56159**					
Prep Date:		Analysis Date:	**12/7/2018**	SeqNo:	**1876013**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	3.7	0.010	2.500	1.158	104	75	125	0.947	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F02**

13-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41840**	SampType: **MBLK**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID: **41840**			RunNo: **56059**				
Prep Date:	**12/2/2018**	Analysis Date: **12/4/2018**			SeqNo: **1872022**	Units: **mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-41840**	SampType: **LCS**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID: **41840**			RunNo: **56059**				
Prep Date:	**12/2/2018**	Analysis Date: **12/4/2018**			SeqNo: **1872023**	Units: **mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	102	80	120			
Barium	0.50	0.020	0.5000	0	99.4	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.50	0.0060	0.5000	0	101	80	120			
Selenium	0.51	0.050	0.5000	0	101	80	120			
Silver	0.099	0.0050	0.1000	0	99.4	80	120			

Sample ID	**MB-41840**	SampType: **MBLK**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID: **41840**			RunNo: **56059**				
Prep Date:	**12/2/2018**	Analysis Date: **12/4/2018**			SeqNo: **1872094**	Units: **mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	0.0050								

Sample ID	**LCS-41840**	SampType: **LCS**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID: **41840**			RunNo: **56059**				
Prep Date:	**12/2/2018**	Analysis Date: **12/4/2018**			SeqNo: **1872095**	Units: **mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.49	0.0050	0.5000	0	97.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1811F02 RcptNo: 1

Received By: Isaiah Ortiz 11/29/2018 3:50:00 PM I Ortiz

Completed By: Anne Thorne 11/30/2018 11:46:20 AM Anne Thorne

Reviewed By: ENM 11/30/18

LB. DAD 11/30/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2:2 (<2 or >12 unless noted)

Adjusted? NO

Checked by: DAD 11/30/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW #1300
Mailing Address:
Albuquerque NM 87102
Phone #: 505 238 4410
email or Fax#: emorse@eaest.com
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush
Project Name: Portland BFF Project
Project #: 62735DM02 1017 08
PO 16219
Project Manager: Devon Sercinovic
Sampler: P. Ferrari
On Ice: ☑ Yes ☐ No
# of Coolers: 1 (-2.0)
Cooler Temp(including CF): 6.4

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1811F02	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe, Mn	RCI
11/29/18	1355	H_2O	KAFB-106S2-2-idw	3 40 ml	HCl	001	X											
				3 40 ml	$Na_2S_2O_3$	001				X								
				1 ~~250~~ 125 ml	HNO_3	001						X						
				1 125 ml	HNO_3	001										X		
				3 500 ml	asst	001											X	

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11/29/18	1515	Preston Ferrari	[signature]		11/29/18	1515
11/29/18	1550	[signature]	[signature]	client	11/29/18	1550

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM9570024423	1	505 385 3679	012267170 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: ~~505-349-5220~~ — U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	9	DM	4050	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA (9) 55 Sm — Project Number 190146 — Document #: D227573

~~24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679~~

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature: [signature] — Month: 2 — Day: 11 — Year: 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: _____
Transporter signature (for exports only): Date leaving U.S.: _____

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Adam Kemp — Signature: [signature] — Month: 2 — Day: 11 — Year: 19

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number: — U.S. EPA ID Number

18b. Alternate Facility (or Generator)

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month — Day — Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. **DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM**

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190211

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] **GENERATOR KNOWLEDGE** [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:
I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S2-DM-idw		
				SAMPLE DATE		14-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.35	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.28	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.21	--	0.020
		Manganese (dissolved)	mg/L	0.20	NS	**2.5**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**2200**	--	50
		Ethylbenzene	µg/L	750	NS	**830**	--	50
		Toluene	µg/L	750	NS	**6100**	--	200
		Xylenes, total	µg/L	620	NS	**3700**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	490	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	160	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**110**	--	19

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> - greater than

< - less than

µg/L - microgram per liter

°F - degrees farenheit

ID - identification

mg/L - milligram per liter

ND - not detected above the PQL

NS - no standard

PQL - practical quantitation limit

QUAL - laboratory data qualifier

RCRA - Resource Conservation and Recovery Act

TCLP - Toxicity characteristic leaching procedure

Shading - detected concentration above the PQL

Shade and Bold - reported concentration exceeds the project screening level

S.U. - Standard units

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 07, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1812939

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 12/14/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S2-DM-idw
Project: Kirtland BFF Project
Collection Date: 12/14/2018 11:57:00 AM
Lab ID: 1812939-001 **Matrix:** AQUEOUS **Received Date:** 12/14/2018 2:40:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/19/2018 11:50:34 AM	42182
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **rde**	
Iron	0.21	0.020		mg/L	1	12/31/2018 10:32:57 AM	A56688
Manganese	2.5	0.010		mg/L	5	12/31/2018 11:03:23 AM	A56688
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	12/26/2018 12:47:00 PM	42228
Barium	0.28	0.020		mg/L	1	12/26/2018 12:47:00 PM	42228
Cadmium	ND	0.0020		mg/L	1	12/26/2018 12:47:00 PM	42228
Chromium	ND	0.0060		mg/L	1	12/28/2018 11:52:10 AM	42228
Lead	ND	0.0050		mg/L	1	12/26/2018 12:47:00 PM	42228
Selenium	ND	0.050		mg/L	1	12/26/2018 12:47:00 PM	42228
Silver	ND	0.0050		mg/L	1	12/26/2018 12:47:00 PM	42228
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	110	19		µg/L	2E	12/20/2018 4:28:06 PM	42205
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	120		µg/L	50	12/20/2018 1:23:28 PM	B56490
Benzene	2200	50		µg/L	50	12/20/2018 1:23:28 PM	B56490
Toluene	6100	200		µg/L	200	12/20/2018 6:41:55 PM	B56490
Ethylbenzene	830	50		µg/L	50	12/20/2018 1:23:28 PM	B56490
Xylenes, Total	3700	100		µg/L	50	12/20/2018 1:23:28 PM	B56490
1,2,4-Trimethylbenzene	490	50		µg/L	50	12/20/2018 1:23:28 PM	B56490
1,3,5-Trimethylbenzene	160	50		µg/L	50	12/20/2018 1:23:28 PM	B56490
Surr: 4-Bromofluorobenzene	115	80-120		%Rec	50	12/20/2018 1:23:28 PM	B56490

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1812939-002
Matrix: TRIP BLANK
Received Date: 12/14/2018 2:40:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0095		µg/L	1	12/20/2018 3:42:58 PM	42205
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	12/20/2018 5:56:19 PM	B56490
Benzene	ND	1.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
Toluene	ND	1.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
Ethylbenzene	ND	1.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
Xylenes, Total	ND	2.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	12/20/2018 5:56:19 PM	B56490
Surr: 4-Bromofluorobenzene	93.2	80-120		%Rec	1	12/20/2018 5:56:19 PM	B56490

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	12/19/2018 18:15	WG1212975

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.35	T8	1	12/19/2018 09:49	WG1213019

Sample Narrative:
L1054227-01 WG1213019: 7.35 at 9.9C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	12/19/2018 17:37	WG1213544

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/19/2018 17:22	WG1213360

WG1212975

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1054227-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3369756-1 12/19/18 17:42

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1053139-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1053139-08 12/19/18 17:46 • (DUP) R3369756-3 12/19/18 17:47

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1053193-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1053193-04 12/19/18 18:06 • (DUP) R3369756-8 12/19/18 18:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Reactive Cyanide	0.00183	0.000	1	200	J1	20

Laboratory Control Sample (LCS)

(LCS) R3369756-2 12/19/18 17:43

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.101	101	85.0-115	

L1053139-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053139-11 12/19/18 17:49 • (MS) R3369756-4 12/19/18 17:50 • (MSD) R3369756-5 12/19/18 17:51

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0966	0.0956	96.6	95.6	1	75.0-125			1.04	20

L1053193-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053193-03 12/19/18 18:01 • (MS) R3369756-6 12/19/18 18:02 • (MSD) R3369756-7 12/19/18 18:03

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	U	0.0907	0.0883	90.7	88.3	1	75.0-125			2.68	20

WG1213019

Wet Chemistry by Method 4500H+ B-2011

QUALITY CONTROL SUMMARY

L1054227-01

Laboratory Control Sample (LCS)

(LCS) R3369478-1 12/19/18 09:49

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 17.5C

WG1213544

Wet Chemistry by Method 9034-90308

QUALITY CONTROL SUMMARY

L1054227-01

Method Blank (MB)

(MB) R3369745-1 12/19/18 17:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3369745-2 12/19/18 17:33

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.463	92.6	85.0-115	

WG1213360
Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY
L1054227-01

L1053694-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053694-02 12/19/18 17:22 • (DUP) R3369898-2 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	81.9	80.9	1	1.23		10

L1054273-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054273-01 12/19/18 17:22 • (DUP) R3369898-3 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369898-1 12/19/18 17:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	83.9	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
TB	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42205**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890046**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-42205**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890047**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.089	0.010	0.1000	0	89.0	70	130			

Sample ID	**LCSD-42205**	SampType:	**LCSD**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSS02**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890051**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.084	0.010	0.1000	0	83.6	70	130	6.22	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56490**	RunNo: **56490**
Prep Date:	Analysis Date: **12/20/2018**	SeqNo: **1889832** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	21		20.00		104	80	120			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56490**	RunNo: **56490**
Prep Date:	Analysis Date: **12/20/2018**	SeqNo: **1889833** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17	2.5	20.00	0	85.0	64.5	120			
Benzene	18	1.0	20.00	0	88.8	80	120			
Toluene	19	1.0	20.00	0	93.1	80	120			
Ethylbenzene	19	1.0	20.00	0	94.9	80	120			
Xylenes, Total	59	2.0	60.00	0	97.5	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	96.9	80	120			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	95.2	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	80	120			

Sample ID **1812939-001AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S2-DM-id**	Batch ID: **B56490**	RunNo: **56490**
Prep Date:	Analysis Date: **12/20/2018**	SeqNo: **1889839** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	810	120	1000	0	80.5	63.1	121			
Benzene	3200	50	1000	2193	99.6	80	120			
Toluene	8600	50	1000	7543	105	80	120			E
Ethylbenzene	1900	50	1000	830.7	107	80	120			
Xylenes, Total	6800	100	3000	3707	104	80	120			
1,2,4-Trimethylbenzene	1500	50	1000	493.5	102	79.7	122			
1,3,5-Trimethylbenzene	1200	50	1000	164.6	99.2	80	120			
Surr: 4-Bromofluorobenzene	1200		1000		121	80	120			S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**1812939-001AMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8021B: Volatiles**
Client ID:	**KAFB-106S2-DM-id**	Batch ID:	**B56490**	RunNo:	**56490**
Prep Date:		Analysis Date:	**12/20/2018**	SeqNo:	**1889840** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	860	120	1000	0	85.9	63.1	121	6.47	20	
Benzene	3200	50	1000	2193	99.1	80	120	0.162	20	
Toluene	8600	50	1000	7543	104	80	120	0.155	20	E
Ethylbenzene	1900	50	1000	830.7	106	80	120	0.605	20	
Xylenes, Total	6800	100	3000	3707	102	80	120	1.14	20	
1,2,4-Trimethylbenzene	1500	50	1000	493.5	104	79.7	122	1.47	20	
1,3,5-Trimethylbenzene	1200	50	1000	164.6	101	80	120	1.60	20	
Surr: 4-Bromofluorobenzene	1200		1000		121	80	120	0	0	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42182**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888152**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-42182**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888153**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType: **MBLK**			TestCode: **EPA Method 6010B: Dissolved Metals**				
Client ID:	**PBW**	Batch ID: **A56688**			RunNo: **56688**				
Prep Date:		Analysis Date: **12/31/2018**			SeqNo: **1896947**		Units: **mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType: **LCS**			TestCode: **EPA Method 6010B: Dissolved Metals**				
Client ID:	**LCSW**	Batch ID: **A56688**			RunNo: **56688**				
Prep Date:		Analysis Date: **12/31/2018**			SeqNo: **1896948**		Units: **mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	102	80	120			
Manganese	0.50	0.0020	0.5000	0	99.2	80	120			

Sample ID	**1812939-001DMS**	SampType: **MS**			TestCode: **EPA Method 6010B: Dissolved Metals**				
Client ID:	**KAFB-106S2-DM-id**	Batch ID: **A56688**			RunNo: **56688**				
Prep Date:		Analysis Date: **12/31/2018**			SeqNo: **1896954**		Units: **mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.73	0.020	0.5000	0.2236	101	75	125			

Sample ID	**1812939-001DMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: Dissolved Metals**				
Client ID:	**KAFB-106S2-DM-id**	Batch ID: **A56688**			RunNo: **56688**				
Prep Date:		Analysis Date: **12/31/2018**			SeqNo: **1896955**		Units: **mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.73	0.020	0.5000	0.2236	102	75	125	3.19	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812939**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42228**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**42228**	RunNo:	**56631**
Prep Date:	**12/20/2018**	Analysis Date:	**12/26/2018**	SeqNo:	**1894530** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-42228**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**42228**	RunNo:	**56631**
Prep Date:	**12/20/2018**	Analysis Date:	**12/26/2018**	SeqNo:	**1894531** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.50	0.020	0.5000	0	101	80	120			
Barium	0.50	0.020	0.5000	0	101	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Chromium	0.50	0.0060	0.5000	0	101	80	120			
Lead	0.50	0.0050	0.5000	0	99.2	80	120			
Selenium	0.49	0.050	0.5000	0	98.8	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1812939 | RcptNo: 1

Received By: Isaiah Ortiz 12/14/2018 2:40:00 PM I_Ox

Completed By: Anne Thorne 12/17/2018 12:17:19 PM Anne Thorne

Reviewed By: DAD 12/17/18

labeled by: JU 12.17.18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 : 2 (<2 or >12 unless noted)

Adjusted? No

Checked by: JU 12.17.18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.9	Good	Not Present			

Appendix I

1327 of 1539

Chain-of-Custody Record

Client: EA Engineering

320 Gold SW #1300

Mailing Address:

Albuquerque, NM 87102

Phone #: 505 238 4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: 627350M02 1017 08

P.O. 16219

Project Manager: Devon Jerdonek

Sampler: P. Ferrari

On Ice: ☒ Yes ☐ No

# of Coolers: 1 (CF=1.0)

Cooler Temp (including CF): 4.9

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. B12939	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe, Mn (Filtered)	RCI
12-14-18	1157	H_2O	KAFB-106S2-DM-idw	3 40 ml	HCl	-001	X											
12-14-18				2 40 ml	$Na_2S_2O_3$	-001				X								
				1 250 ml	HNO_3	-001						X						
				1 125 ml	HNO_3	-001										X		
				500 ml	3 asst.	-001											X	
			TB			-002	X			X								
			12.17.18															

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
12-14-18	1440	Peter Ferrari	Ian Cox	COO	12/14/18	1440
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: Email results to pmoss@eaest.com emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM9570024423	1	505 385 3679	012267170 FLE

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name
Advanced Chemical Transport Inc./DBA ACTENVIRO
U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
U.S. EPA ID Number: NMD002208627
Facility's Phone: ~~505-349-5220~~

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	9	DM	4050	P	D018
	2.					
	3.					
	4.					

GENERATOR

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA(9) 55 Sm
Project Number 190146 Document #: D227573

24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E
Signature
Month 2 Day 11 Year 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Adam Kemp
Signature
Month 2 Day 11 Year 19
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
U.S. EPA ID Number

18b. Alternate Facility (or Generator)
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267170FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190211

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] GENERATOR KNOWLEDGE [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S2-DM-idw		
				SAMPLE DATE		14-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.35	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.28	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.21	--	0.020
		Manganese (dissolved)	mg/L	0.20	NS	**2.5**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**2200**	--	50
		Ethylbenzene	µg/L	750	NS	**830**	--	50
		Toluene	µg/L	750	NS	**6100**	--	200
		Xylenes, total	µg/L	620	NS	**3700**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	490	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	160	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**110**	--	19

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

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PQL - practical quantitation limit

QUAL - laboratory data qualifier

RCRA - Resource Conservation and Recovery Act

TCLP - Toxicity characteristic leaching procedure

Shading - detected concentration above the PQL

Shade and Bold - reported concentration exceeds the project screening level

S.U. - Standard units

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S3-DM-idw		
				SAMPLE DATE		11-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	0.0963	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.94	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.29	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	0.007	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.27	--	0.020
		Manganese (dissolved)	mg/L	0.20	NS	**1.0**	--	0.004
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**640**	--	50
		Ethylbenzene	µg/L	750	NS	**790**	--	50
		Toluene	µg/L	750	NS	3500	--	50
		Xylenes, total	µg/L	620	NS	**2700**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	340	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	110	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**0.87**	--	0.095

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C,*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of

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TCLP - Toxicity characteristic leaching procedure

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S.U. - Standard units

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S5-DM-idw		
				SAMPLE DATE		11-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.85	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.18	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.16	--	0.020
		Manganese (dissolved)	mg/L	0.20	NS	**0.97**	--	0.002
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**1200**	--	50
		Ethylbenzene	µg/L	750	NS	670	--	50
		Toluene	µg/L	750	NS	**4000**	--	50
		Xylenes, total	µg/L	620	NS	**1900**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	220	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	80	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**13**	--	0.095

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

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RCRA - Resource Conservation and Recovery Act

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				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S9-DM-idw		
				SAMPLE DATE		14-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.84	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.18	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	**3.9**	--	0.10
		Manganese (dissolved)	mg/L	0.20	NS	**2.4**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**1900**	--	50
		Ethylbenzene	µg/L	750	NS	**820**	--	50
		Toluene	µg/L	750	NS	**4200**	--	50
		Xylenes, total	µg/L	620	NS	**3300**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	510	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	160	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**16**	--	1.9

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

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HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 21, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1812707

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S3-DM-idw
Project: Kirtland BFF Project
Collection Date: 12/11/2018 1:36:00 PM
Lab ID: 1812707-001 **Matrix:** AQUEOUS **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/19/2018 11:39:20 AM	42182
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **rde**	
Iron	0.27	0.020		mg/L	1	12/14/2018 10:38:14 AM	A56358
Manganese	1.0	0.0040		mg/L	2	12/14/2018 10:47:32 AM	A56358
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	12/14/2018 10:02:09 AM	42081
Barium	0.29	0.020		mg/L	1	12/14/2018 10:02:09 AM	42081
Cadmium	ND	0.0020		mg/L	1	12/14/2018 10:02:09 AM	42081
Chromium	0.0070	0.0060		mg/L	1	12/14/2018 10:02:09 AM	42081
Lead	ND	0.0050		mg/L	1	12/14/2018 10:02:09 AM	42081
Selenium	ND	0.050		mg/L	1	12/14/2018 10:02:09 AM	42081
Silver	ND	0.0050		mg/L	1	12/14/2018 10:02:09 AM	42081
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	0.87	0.095		µg/L	10	12/18/2018 7:54:06 AM	42092
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	120		µg/L	50	12/13/2018 9:40:54 PM	B56323
Benzene	640	50		µg/L	50	12/13/2018 9:40:54 PM	B56323
Toluene	3500	50		µg/L	50	12/13/2018 9:40:54 PM	B56323
Ethylbenzene	790	50		µg/L	50	12/13/2018 9:40:54 PM	B56323
Xylenes, Total	2700	100		µg/L	50	12/13/2018 9:40:54 PM	B56323
1,2,4-Trimethylbenzene	340	50		µg/L	50	12/13/2018 9:40:54 PM	B56323
1,3,5-Trimethylbenzene	110	50		µg/L	50	12/13/2018 9:40:54 PM	B56323
Surr: 4-Bromofluorobenzene	108	80-120		%Rec	50	12/13/2018 9:40:54 PM	B56323

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	0.0963		0.00500	1	12/19/2018 13:43	WG1212307

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.94	T8	1	12/15/2018 10:35	WG1211386

Sample Narrative:
L1053188-01 WG1211386: 7.94 at 10C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	12/18/2018 15:53	WG1212541

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/19/2018 17:22	WG1213360

Method Blank (MB)

(MB) R3369599-1 12/19/18 13:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1052990-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1052990-02 12/19/18 13:18 • (DUP) R3369599-3 12/19/18 13:19

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1053139-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1053139-03 12/19/18 13:30 • (DUP) R3369599-6 12/19/18 13:31

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3369599-2 12/19/18 13:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.0989	98.9	85.0-115	

L1053047-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053047-02 12/19/18 13:25 • (MS) R3369599-4 12/19/18 13:26 • (MSD) R3369599-5 12/19/18 13:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0973	0.0958	95.5	94.0	1	75.0-125			1.55	20

L1053139-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053139-05 12/19/18 13:36 • (MS) R3369599-7 12/19/18 13:37 • (MSD) R3369599-8 12/19/18 13:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0910	0.0903	91.0	90.3	1	75.0-125			0.772	20

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3368450-1 12/15/18 10:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 18.2C

Method Blank (MB)

(MB) R3369290-1 12/18/18 15:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3369290-2 12/18/18 15:51

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.484	96.8	85.0-115	

L1053694-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053694-02 12/19/18 17:22 • (DUP) R3369898-2 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	81.9	80.9	1	1.23		10

L1054273-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054273-01 12/19/18 17:22 • (DUP) R3369898-3 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369898-1 12/19/18 17:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	83.9	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812707**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42092**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886382**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-42092**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886389**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.10	0.010	0.1000	0	100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812707**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **B31**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882326** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		101	80	120			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882328** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	18	2.5	20.00	0	88.2	64.5	120			
Benzene	19	1.0	20.00	0	94.4	80	120			
Toluene	20	1.0	20.00	0	97.6	80	120			
Ethylbenzene	19	1.0	20.00	0	97.4	80	120			
Xylenes, Total	59	2.0	60.00	0	98.1	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	95.2	80	120			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	95.7	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		99.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812707**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42182**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888152**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-42182**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888153**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.3	80	120			

Sample ID	**1812707-001CMS**	SampType:	**MS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S3-DM-id**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888157**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	.00006460	104	75	125			

Sample ID	**1812707-001CMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S3-DM-id**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888158**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	.00006460	97.2	75	125	6.42	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812707**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A56358**	RunNo:	**56358**					
Prep Date:		Analysis Date:	**12/14/2018**	SeqNo:	**1887697**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A56358**	RunNo:	**56358**					
Prep Date:		Analysis Date:	**12/14/2018**	SeqNo:	**1887698**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	97.7	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812707**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42081**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887703** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-42081**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887704** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	103	80	120			
Barium	0.50	0.020	0.5000	0	99.3	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.51	0.0060	0.5000	0	101	80	120			
Lead	0.50	0.0050	0.5000	0	100	80	120			
Selenium	0.52	0.050	0.5000	0	104	80	120			
Silver	0.10	0.0050	0.1000	0	100	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb | Work Order Number: 1812707 | RcptNo: 1

Received By: **Erin Melendrez** 12/11/2018 4:00:00 PM

Completed By: **Anne Thorne** 12/12/2018 4:25:04 PM

Reviewed By: ENM 12/13/18

Labeled by: DAD 12/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 (2 or >2 unless noted)

Adjusted? NO

Checked by: DAD 12/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.9	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering

3320 Gold SW #1300

Mailing Address:

Albuquerque, NM 87102

Phone #: 505 238 4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: 62735DM02 1017.08

P.O. 16219

Project Manager: Devon Sercinovic

Sampler: Pete Ferrari

On Ice: ☒ Yes ☐ No

# of Coolers: 1 (CF=0)

Cooler Temp (including CF): 3.9

HEAL No. 1812707

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	
12-11-18	1336	H_2O	KAFB-10653-DM-idw	3 40 ml	HCl	001
				2 40 ml	$Na_2S_2O_3$	001
				1 250 ml	HNO_3	001
				1 125 ml	HNO_3	001
				500 ml	3 asst.	001

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss, Fe Mn filtered	RCI
X											
			X								
					X						
									X		
										X	

Date: 12-11-18 Time: 1600 Relinquished by: Pete Ferrari

Received by: Via: CDO Date: 12/11/18 Time: 1600

Date: Time: Relinquished by:

Received by: Via: Date: Time:

Remarks: Email results to pmoss@eaest.com emorse@eaest.com

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 26, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1811F00

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/29/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-3-idw
Project: Kirtland BFF Project
Collection Date: 11/29/2018 1:55:00 PM
Lab ID: 1811F00-001 **Matrix:** AQUEOUS **Received Date:** 11/29/2018 3:50:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **JLF**	
Iron	0.034	0.020		mg/L	1	12/8/2018 6:56:38 PM	C56205
Manganese	0.70	0.010	*	mg/L	5	12/17/2018 11:29:00 AM	B56396
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/4/2018 1:25:35 PM	41861
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **ELS**	
Arsenic	ND	0.020		mg/L	1	12/4/2018 9:28:07 AM	41840
Barium	0.30	0.020		mg/L	1	12/4/2018 9:28:07 AM	41840
Cadmium	ND	0.0020		mg/L	1	12/4/2018 9:28:07 AM	41840
Chromium	0.018	0.0060		mg/L	1	12/4/2018 9:28:07 AM	41840
Lead	ND	0.0050		mg/L	1	12/4/2018 12:45:00 PM	41840
Selenium	ND	0.050		mg/L	1	12/4/2018 9:28:07 AM	41840
Silver	ND	0.0050		mg/L	1	12/4/2018 9:28:07 AM	41840
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	0.065	0.0097		µg/L	1	12/10/2018 11:31:18 AM	41941
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	12/5/2018 5:45:32 PM	B56109
Benzene	2.2	1.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
Toluene	7.0	1.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
Ethylbenzene	2.5	1.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
Xylenes, Total	6.9	2.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
1,2,4-Trimethylbenzene	1.6	1.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
1,3,5-Trimethylbenzene	1.3	1.0		µg/L	1	12/5/2018 5:45:32 PM	B56109
Surr: 4-Bromofluorobenzene	97.6	80-120		%Rec	1	12/5/2018 5:45:32 PM	B56109

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.00500	1	12/06/2018 10:19	WG1205946

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	7.97	T8	1	12/07/2018 09:21	WG1206760

Sample Narrative:
L1049495-01 WG1206760: 7.97 at 19C

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		0.0500	1	12/06/2018 15:25	WG1206297

Wet Chemistry by Method D93/1010A

Analyte	Result deg F	Qualifier	Dilution	Analysis date / time	Batch
Flashpoint	DNF at 170		1	12/06/2018 22:21	WG1205657

Method Blank (MB)

(MB) R3365718-1 12/06/18 09:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Reactive Cyanide	U		0.00180	0.00500

L1048719-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1048719-01 12/06/18 09:56 • (DUP) R3365718-3 12/06/18 09:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

L1049176-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049176-01 12/06/18 10:07 • (DUP) R3365718-6 12/06/18 10:08

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3365718-2 12/06/18 09:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	0.100	0.101	101	85.0-115	

L1048726-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1048726-01 12/06/18 10:00 • (MS) R3365718-4 12/06/18 10:01 • (MSD) R3365718-5 12/06/18 10:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	0.100	U	0.0920	0.0837	92.0	83.7	1	75.0-125			9.45	20

L1049262-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1049262-03 12/06/18 10:13 • (MS) R3365718-7 12/06/18 10:14 • (MSD) R3365718-8 12/06/18 10:15

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	0.100	0.00493	0.105	0.0931	100	88.2	1	75.0-125			12.0	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3366132-1 12/07/18 09:21 • (LCSD) R3366132-2 12/07/18 09:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	10.0	10.0	100	100	99.0-101			0.0997	1

Sample Narrative:

LCS: 10.03 at 17.3C

LCSD: 10.04 at 17.3C

Method Blank (MB)

(MB) R3365922-1 12/06/18 15:22

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1049495-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049495-01 12/06/18 15:25 • (DUP) R3365922-3 12/06/18 15:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.0220	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3365922-2 12/06/18 15:22

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.533	107	85.0-115	

L1049227-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1049227-02 12/06/18 22:21 • (DUP) R3366144-2 12/06/18 22:21

Analyte	Original Result deg F	DUP Result deg F	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1049501-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1049501-01 12/06/18 22:21 • (DUP) R3366144-3 12/06/18 22:21

Analyte	Original Result deg F	DUP Result deg F	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3366144-1 12/06/18 22:21

Analyte	Spike Amount deg F	LCS Result deg F	LCS Rec. %	Rec. Limits %	LCS Qualifier
Flashpoint	82.0	82.2	100	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-C**	SampType:	**MBLK**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**C56205**	RunNo:	**56205**					
Prep Date:		Analysis Date:	**12/8/2018**	SeqNo:	**1877513**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								

Sample ID	**LLLCS-C**	SampType:	**LCSLL**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID:	**C56205**	RunNo:	**56205**					
Prep Date:		Analysis Date:	**12/8/2018**	SeqNo:	**1877514**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.022	0.020	0.02000	0	109	50	150			

Sample ID	**LCS-C**	SampType:	**LCS**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**C56205**	RunNo:	**56205**					
Prep Date:		Analysis Date:	**12/8/2018**	SeqNo:	**1877518**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0	98.1	85	115			

Sample ID	**1811F00-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**C56205**	RunNo:	**56205**					
Prep Date:		Analysis Date:	**12/8/2018**	SeqNo:	**1877524**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.52	0.020	0.5000	0.03351	96.7	70	130			

Sample ID	**1811F00-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**C56205**	RunNo:	**56205**					
Prep Date:		Analysis Date:	**12/8/2018**	SeqNo:	**1877525**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.52	0.020	0.5000	0.03351	97.5	70	130	0.754	20	

Sample ID	**MB-B**	SampType:	**MBLK**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**B56396**	RunNo:	**56396**					
Prep Date:		Analysis Date:	**12/17/2018**	SeqNo:	**1885221**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	ND	0.0020								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**LCS-B**	SampType:	**LCS**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**LCSW**	Batch ID:	**B56396**		RunNo:	**56396**				
Prep Date:		Analysis Date:	**12/17/2018**		SeqNo:	**1885222**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.48	0.0020	0.5000	0	95.7	85	115			

Sample ID	**LLLCS-B**	SampType:	**LCSLL**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**BatchQC**	Batch ID:	**B56396**		RunNo:	**56396**				
Prep Date:		Analysis Date:	**12/17/2018**		SeqNo:	**1885223**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0020	0.0020	0.002000	0	102	50	150			

Sample ID	**1811F00-001DMS**	SampType:	**MS**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**B56396**		RunNo:	**56396**				
Prep Date:		Analysis Date:	**12/17/2018**		SeqNo:	**1885297**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	3.1	0.010	2.500	0.6980	97.8	70	130			

Sample ID	**1811F00-001DMSD**	SampType:	**MSD**		TestCode:	**EPA Method 200.7: Dissolved Metals**				
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**B56396**		RunNo:	**56396**				
Prep Date:		Analysis Date:	**12/17/2018**		SeqNo:	**1885298**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	3.1	0.010	2.500	0.6980	97.9	70	130	0.127	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41941**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**41941**	RunNo:	**56195**					
Prep Date:	**12/7/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1877195**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-41941**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**41941**	RunNo:	**56195**					
Prep Date:	**12/7/2018**	Analysis Date:	**12/7/2018**	SeqNo:	**1877197**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.096	0.010	0.1000	0	96.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56109**	RunNo: **56109**
Prep Date:	Analysis Date: **12/5/2018**	SeqNo: **1874337** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		102	80	120			

Sample ID **100NG BTEX LCSB**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56109**	RunNo: **56109**
Prep Date:	Analysis Date: **12/5/2018**	SeqNo: **1874338** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17	2.5	20.00	0	86.2	64.5	120			
Benzene	17	1.0	20.00	0	86.6	80	120			
Toluene	18	1.0	20.00	0	90.3	80	120			
Ethylbenzene	19	1.0	20.00	0	93.1	80	120			
Xylenes, Total	58	2.0	60.00	0	97.5	80	120			
1,2,4-Trimethylbenzene	20	1.0	20.00	0	101	80	120			
1,3,5-Trimethylbenzene	20	1.0	20.00	0	98.8	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	80	120			

Sample ID **1811F00-001AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S4-3-idw**	Batch ID: **B56109**	RunNo: **56109**
Prep Date:	Analysis Date: **12/5/2018**	SeqNo: **1874343** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	16	2.5	20.00	0	82.0	63.1	121			
Benzene	20	1.0	20.00	2.237	88.1	80	120			
Toluene	25	1.0	20.00	6.962	92.6	80	120			
Ethylbenzene	21	1.0	20.00	2.483	94.2	80	120			
Xylenes, Total	66	2.0	60.00	6.867	98.1	80	120			
1,2,4-Trimethylbenzene	22	1.0	20.00	1.593	101	79.7	122			
1,3,5-Trimethylbenzene	21	1.0	20.00	1.328	97.2	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**1811F00-001AMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8021B: Volatiles**					
Client ID:	**KAFB-106S4-3-idw**	Batch ID:	**B56109**	RunNo:	**56109**					
Prep Date:		Analysis Date:	**12/5/2018**	SeqNo:	**1874344**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	16	2.5	20.00	0	81.4	63.1	121	0.636	20	
Benzene	19	1.0	20.00	2.237	82.9	80	120	5.44	20	
Toluene	24	1.0	20.00	6.962	84.9	80	120	6.22	20	
Ethylbenzene	20	1.0	20.00	2.483	88.0	80	120	5.92	20	
Xylenes, Total	62	2.0	60.00	6.867	92.4	80	120	5.32	20	
1,2,4-Trimethylbenzene	21	1.0	20.00	1.593	95.5	79.7	122	5.28	20	
1,3,5-Trimethylbenzene	20	1.0	20.00	1.328	92.7	80	120	4.44	20	
Surr: 4-Bromofluorobenzene	20		20.00		101	80	120	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41861**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872280**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-41861**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**41861**	RunNo:	**56066**					
Prep Date:	**12/3/2018**	Analysis Date:	**12/4/2018**	SeqNo:	**1872287**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0042	0.00020	0.005000	0	83.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811F00**

26-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41840**	SampType:	**MBLK**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID:	**41840**		RunNo:	**56059**				
Prep Date:	**12/2/2018**	Analysis Date:	**12/4/2018**		SeqNo:	**1872022**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-41840**	SampType:	**LCS**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID:	**41840**		RunNo:	**56059**				
Prep Date:	**12/2/2018**	Analysis Date:	**12/4/2018**		SeqNo:	**1872023**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	102	80	120			
Barium	0.50	0.020	0.5000	0	99.4	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.50	0.0060	0.5000	0	101	80	120			
Selenium	0.51	0.050	0.5000	0	101	80	120			
Silver	0.099	0.0050	0.1000	0	99.4	80	120			

Sample ID	**MB-41840**	SampType:	**MBLK**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID:	**41840**		RunNo:	**56059**				
Prep Date:	**12/2/2018**	Analysis Date:	**12/4/2018**		SeqNo:	**1872094**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	0.0050								

Sample ID	**LCS-41840**	SampType:	**LCS**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID:	**41840**		RunNo:	**56059**				
Prep Date:	**12/2/2018**	Analysis Date:	**12/4/2018**		SeqNo:	**1872095**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.49	0.0050	0.5000	0	97.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1811F00 RcptNo: 1

Received By: **Anne Thorne** 11/29/2018 3:50:00 PM Anne Thorne

Completed By: **Anne Thorne** 11/30/2018 11:32:45 AM Anne Thorne

Reviewed By: ENM 11/30/18

labeled by: DAD 11/30/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2:2
(<2 or >12 unless noted)
Adjusted? NO
Checked by: DAD 11/30/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date: ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW #1800
Mailing Address:
Albuquerque NM 87102
Phone #: 505 238 4410
email or Fax#: emorse@eaest.com
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush
Project Name: Kirtland BFF Project
Project #: 62735 DM02
1017 08 PO 16219
Project Manager: Devon Jercinovic
Sampler: P. Ferrari
On Ice: ☑ Yes ☐ No
# of Coolers: 1 (-1.0) CF
Cooler Temp(including CF): 3.1

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1811F00	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss Fe Mn Filtered	RC1
11/29/18	1355	H_2O	KAFB-106S 4-3-idw	3 40 ml	HCl	001	X											
				2 40 ml	$Na_2S_2O_3$	001				X								
				1 250 ml	HNO_3	001						X						
				1 125 ml	HNO_3	001										X		
				3 asst	500 ml	001											X	

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11-28-18	1515	Peter Ferrari	Ed Mann		11/28/18	1500
11/29/18	1550	Ed Mann		dirct	11/29/18	1550

Remarks: Email results to
pmoss@eaest.com
emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Appendix L
368 of 1539

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 21, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1812708

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S4-DM-idw
Project: Kirtland BFF Project
Collection Date: 12/11/2018 2:32:00 PM
Lab ID: 1812708-001 **Matrix:** AQUEOUS **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/19/2018 11:46:03 AM	42182
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **rde**	
Iron	0.14	0.020		mg/L	1	12/14/2018 10:39:55 AM	A56358
Manganese	0.054	0.0020		mg/L	1	12/14/2018 10:39:55 AM	A56358
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	12/14/2018 10:09:57 AM	42081
Barium	0.11	0.020		mg/L	1	12/14/2018 10:09:57 AM	42081
Cadmium	ND	0.0020		mg/L	1	12/14/2018 10:09:57 AM	42081
Chromium	ND	0.0060		mg/L	1	12/14/2018 10:09:57 AM	42081
Lead	ND	0.0050		mg/L	1	12/14/2018 10:09:57 AM	42081
Selenium	ND	0.050		mg/L	1	12/14/2018 10:09:57 AM	42081
Silver	ND	0.0050		mg/L	1	12/14/2018 10:09:57 AM	42081
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	0.017	0.0095		µg/L	1	12/18/2018 2:36:05 AM	42092
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	12/13/2018 10:04:14 PM	B56323
Benzene	ND	1.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
Toluene	ND	1.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
Ethylbenzene	ND	1.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
Xylenes, Total	ND	2.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
1,2,4-Trimethylbenzene	3.0	1.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
1,3,5-Trimethylbenzene	1.5	1.0		µg/L	1	12/13/2018 10:04:14 PM	B56323
Surr: 4-Bromofluorobenzene	97.7	80-120		%Rec	1	12/13/2018 10:04:14 PM	B56323

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	12/19/2018 13:41	WG1212307

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.79	T8	1	12/15/2018 10:35	WG1211386

Sample Narrative:
L1053164-01 WG1211386: 7.79 at 11C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	12/17/2018 17:30	WG1211646

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/19/2018 17:22	WG1213360

Method Blank (MB)

(MB) R3369599-1 12/19/18 13:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1052990-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1052990-02 12/19/18 13:18 • (DUP) R3369599-3 12/19/18 13:19

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1053139-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1053139-03 12/19/18 13:30 • (DUP) R3369599-6 12/19/18 13:31

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3369599-2 12/19/18 13:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.0989	98.9	85.0-115	

L1053047-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053047-02 12/19/18 13:25 • (MS) R3369599-4 12/19/18 13:26 • (MSD) R3369599-5 12/19/18 13:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0973	0.0958	95.5	94.0	1	75.0-125			1.55	20

L1053139-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053139-05 12/19/18 13:36 • (MS) R3369599-7 12/19/18 13:37 • (MSD) R3369599-8 12/19/18 13:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0910	0.0903	91.0	90.3	1	75.0-125			0.772	20

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3368450-1 12/15/18 10:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 18.2C

Method Blank (MB)

(MB) R3368939-1 12/17/18 17:26

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1053164-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053164-01 12/17/18 17:30 • (DUP) R3368939-6 12/17/18 17:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3368939-2 12/17/18 17:26

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.470	94.0	85.0-115	

L1053694-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053694-02 12/19/18 17:22 • (DUP) R3369898-2 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	81.9	80.9	1	1.23		10

L1054273-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054273-01 12/19/18 17:22 • (DUP) R3369898-3 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369898-1 12/19/18 17:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	83.9	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812708**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42092**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886382**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-42092**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886389**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.10	0.010	0.1000	0	100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812708**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **B31**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882326** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		101	80	120			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882328** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	18	2.5	20.00	0	88.2	64.5	120			
Benzene	19	1.0	20.00	0	94.4	80	120			
Toluene	20	1.0	20.00	0	97.6	80	120			
Ethylbenzene	19	1.0	20.00	0	97.4	80	120			
Xylenes, Total	59	2.0	60.00	0	98.1	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	95.2	80	120			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	95.7	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		99.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812708**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42182**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888152**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-42182**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888153**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812708**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A56358**	RunNo:	**56358**					
Prep Date:		Analysis Date:	**12/14/2018**	SeqNo:	**1887697**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A56358**	RunNo:	**56358**					
Prep Date:		Analysis Date:	**12/14/2018**	SeqNo:	**1887698**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	97.7	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812708**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42081**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887703** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-42081**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887704** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	103	80	120			
Barium	0.50	0.020	0.5000	0	99.3	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.51	0.0060	0.5000	0	101	80	120			
Lead	0.50	0.0050	0.5000	0	100	80	120			
Selenium	0.52	0.050	0.5000	0	104	80	120			
Silver	0.10	0.0050	0.1000	0	100	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812708 RcptNo: 1

Received By: **Erin Melendrez** 12/11/2018 4:00:00 PM

Completed By: **Anne Thorne** 12/12/2018 4:35:08 PM

Reviewed By: ENM 12/13/18

Labled by: DAD 12/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 : 2
(<2 or >12 unless noted)
Adjusted? NO
Checked by: DAD 12/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date: ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.9	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering

3320 Gold SW #1300

Mailing Address:

Albuquerque, NM 87102

Phone #: 505 238 4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Kirtland BFT Project

Project #: 627350M02 1017.08

P.O. 16219

Project Manager: Devon Sercinovic

Sampler: Pete Fernandez

On Ice: ☒ Yes ☐ No

# of Coolers: 1 (CF=0)

Cooler Temp(including CF): 3.9°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1812708	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Disc. Fe Mn Filtered	RCI
12-11-18	1432	H_2O	KAFB-106.S4-DM-idw	3 40 ml	HCl	001	X											
				2 40 ml	$Na_2S_2O_3$	001				X								
				1 250 ml	HNO_3	001						X						
				1 125 ml	HNO_3	001										X		
				500 ml	3 asst.	001											X	

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Date	Time	Relinquished by:	Received by:	Via:	Date	Time
12-11-18	1600	Pete Fernandez		CDO		
					12/11/18	1600
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: Email results to
pmoss@eaest.com
emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 13, 2018

Devon Jercinovic

EA Engineering
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL: (505) 224-9013
FAX

RE: Kirtland BFF Project OrderNo.: 1810E91

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/30/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering
Client Sample ID: KAFB-106S5-3-idw
Project: Kirtland BFF Project
Collection Date: 10/30/2018 12:45:00 PM
Lab ID: 1810E91-001
Matrix: AQUEOUS
Received Date: 10/30/2018 3:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **rde**	
Mercury	ND	0.00020		mg/L	1	11/12/2018 3:51:57 PM	41469
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	ND	0.020		mg/L	1	11/5/2018 10:44:45 AM	A55387
Manganese	0.28	0.0020		mg/L	1	11/5/2018 10:44:45 AM	A55387
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **ELS**	
Arsenic	ND	0.020		mg/L	1	11/6/2018 9:02:16 AM	41295
Barium	0.28	0.020		mg/L	1	11/5/2018 11:02:45 AM	41295
Cadmium	ND	0.0020		mg/L	1	11/5/2018 11:02:45 AM	41295
Chromium	0.011	0.0060		mg/L	1	11/6/2018 9:02:16 AM	41295
Lead	ND	0.0050		mg/L	1	11/6/2018 9:02:16 AM	41295
Selenium	ND	0.050		mg/L	1	11/5/2018 11:02:45 AM	41295
Silver	ND	0.0050		mg/L	1	11/5/2018 12:19:47 PM	41295
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	0.038	0.0093		µg/L	1	11/6/2018 1:20:32 PM	41348
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	11/2/2018 12:00:21 PM	B55364
Benzene	2.9	1.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
Toluene	27	1.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
Ethylbenzene	13	1.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
Xylenes, Total	33	2.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
1,2,4-Trimethylbenzene	8.3	1.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
1,3,5-Trimethylbenzene	3.4	1.0		µg/L	1	11/2/2018 12:00:21 PM	B55364
Surr: 4-Bromofluorobenzene	107	76.6-136		%Rec	1	11/2/2018 12:00:21 PM	B55364

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**MB-41348**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**41348**	RunNo:	**55476**					
Prep Date:	**11/6/2018**	Analysis Date:	**11/6/2018**	SeqNo:	**1846893**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-41348**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**41348**	RunNo:	**55476**					
Prep Date:	**11/6/2018**	Analysis Date:	**11/6/2018**	SeqNo:	**1846894**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.098	0.010	0.1000	0	98.4	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B55364**	RunNo: **55364**
Prep Date:	Analysis Date: **11/2/2018**	SeqNo: **1842753** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	19		20.00		96.4	76.6	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B55364**	RunNo: **55364**
Prep Date:	Analysis Date: **11/2/2018**	SeqNo: **1842754** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	15	2.5	20.00	0	72.6	64.5	120			
Benzene	18	1.0	20.00	0	87.5	80	120			
Toluene	18	1.0	20.00	0	90.7	80	120			
Ethylbenzene	18	1.0	20.00	0	89.7	80	120			
Xylenes, Total	53	2.0	60.00	0	88.5	80	120			
1,2,4-Trimethylbenzene	18	1.0	20.00	0	88.2	80	120			
1,3,5-Trimethylbenzene	18	1.0	20.00	0	87.8	80	120			
Surr: 4-Bromofluorobenzene	19		20.00		94.2	76.6	136			

Sample ID **1810E91-001AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S5-3-idw**	Batch ID: **B55364**	RunNo: **55364**
Prep Date:	Analysis Date: **11/2/2018**	SeqNo: **1842762** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	14	2.5	20.00	0	71.4	49.8	143			
Benzene	20	1.0	20.00	2.862	85.5	75	121			
Toluene	43	1.0	20.00	27.02	81.6	78.1	119			
Ethylbenzene	30	1.0	20.00	12.89	84.8	78.8	125			
Xylenes, Total	84	2.0	60.00	32.80	85.1	76.4	128			
1,2,4-Trimethylbenzene	26	1.0	20.00	8.303	87.7	67.3	143			
1,3,5-Trimethylbenzene	21	1.0	20.00	3.393	86.1	69	136			
Surr: 4-Bromofluorobenzene	21		20.00		107	76.6	136			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**1810E91-001AMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8021B: Volatiles**
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**B55364**	RunNo:	**55364**
Prep Date:		Analysis Date:	**11/2/2018**	SeqNo:	**1842763** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	14	2.5	20.00	0	68.2	49.8	143	4.55	20	
Benzene	19	1.0	20.00	2.862	81.8	75	121	3.81	20	
Toluene	42	1.0	20.00	27.02	73.6	78.1	119	3.76	20	S
Ethylbenzene	29	1.0	20.00	12.89	78.7	78.8	125	4.14	20	S
Xylenes, Total	81	2.0	60.00	32.80	79.9	76.4	128	3.83	20	
1,2,4-Trimethylbenzene	25	1.0	20.00	8.303	82.7	67.3	143	3.90	20	
1,3,5-Trimethylbenzene	20	1.0	20.00	3.393	82.4	69	136	3.65	20	
Surr: 4-Bromofluorobenzene	21		20.00		106	76.6	136	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**MB-41469**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850864**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-41469**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850865**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.4	80	120			

Sample ID	**1810E91-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850869**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	99.2	75	125			

Sample ID	**1810E91-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850870**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	101	75	125	1.54	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A55387**	RunNo:	**55387**					
Prep Date:		Analysis Date:	**11/5/2018**	SeqNo:	**1842957**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A55387**	RunNo:	**55387**					
Prep Date:		Analysis Date:	**11/5/2018**	SeqNo:	**1842960**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	103	80	120			
Manganese	0.49	0.0020	0.5000	0	98.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**MB-41295**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**41295**	RunNo:	**55387**
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**	SeqNo:	**1842963** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-41295**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**41295**	RunNo:	**55387**
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**	SeqNo:	**1842964** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.52	0.020	0.5000	0	104	80	120			
Barium	0.50	0.020	0.5000	0	101	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.51	0.0060	0.5000	0	103	80	120			
Selenium	0.50	0.050	0.5000	0	101	80	120			
Silver	0.11	0.0050	0.1000	0	108	80	120			

Sample ID	**1810E91-001DMS**	SampType:	**MS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**	RunNo:	**55387**
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**	SeqNo:	**1843000** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.77	0.020	0.5000	0.2842	97.8	75	125			
Cadmium	0.49	0.0020	0.5000	0	98.8	75	125			
Selenium	0.52	0.050	0.5000	0	105	75	125			

Sample ID	**1810E91-001DMSD**	SampType:	**MSD**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**	RunNo:	**55387**
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**	SeqNo:	**1843001** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.77	0.020	0.5000	0.2842	97.4	75	125	0.291	20	
Cadmium	0.49	0.0020	0.5000	0	98.2	75	125	0.560	20	
Selenium	0.52	0.050	0.5000	0	103	75	125	1.39	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1810E91**

13-Nov-18

Client: EA Engineering

Project: Kirtland BFF Project

Sample ID	**LCS-41295**	SampType:	**LCS**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID:	**41295**		RunNo:	**55387**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843019**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	0.49	0.0050	0.5000	0	97.5	80	120			

Sample ID	**MB-41295**	SampType:	**MBLK**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID:	**41295**		RunNo:	**55387**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843026**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	0.0050								

Sample ID	**1810E91-001DMS**	SampType:	**MS**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**		RunNo:	**55387**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843032**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	0.096	0.0050	0.1000	0	95.9	75	125			

Sample ID	**1810E91-001DMSD**	SampType:	**MSD**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**		RunNo:	**55387**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/5/2018**		SeqNo:	**1843033**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	0.094	0.0050	0.1000	0	94.2	75	125	1.77	20	

Sample ID	**1810E91-001DMS**	SampType:	**MS**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**		RunNo:	**55426**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/6/2018**		SeqNo:	**1844330**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.50	0.020	0.5000	0	99.5	75	125			
Chromium	0.51	0.0060	0.5000	0.01134	101	75	125			
Lead	0.51	0.0050	0.5000	0	103	75	125			

Sample ID	**1810E91-001DMSD**	SampType:	**MSD**		TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**KAFB-106S5-3-idw**	Batch ID:	**41295**		RunNo:	**55426**				
Prep Date:	**10/31/2018**	Analysis Date:	**11/6/2018**		SeqNo:	**1844331**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.47	0.020	0.5000	0	94.1	75	125	5.61	20	
Chromium	0.48	0.0060	0.5000	0.01134	94.6	75	125	5.97	20	
Lead	0.49	0.0050	0.5000	0	97.0	75	125	5.81	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1810E91** RcptNo: **1**

Received By: **Jazzmine Burkhead** **10/30/2018 3:45:00 PM**

Completed By: **Ashley Gallegos** **10/30/2018 4:39:06 PM**

Reviewed By: ENM 10/31/18 labeled by: IO 10/31/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2
(<2 or >12 unless noted)
Adjusted? NO
Checked by: IO 10/31/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Not Present			

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Client: EA Engineering

320 Gold SW # 1300

Mailing Address:

Albuquerque NM 87102

Phone #: 505-338-4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☑ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: 16219

Project Manager: Devon Sercinovic

Sampler:

On Ice: ☑ Yes ☐ No

# of Coolers:

Cooler Temp (including CF): 3.1

Per Email 10/31/18

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1810E01
10/30/18	1545	H_2O	KAFB-106 S5-3' DW	3 40 ml	HCl	-001
				3 40 ml	$Na_2S_2O_3$	
				1 250 ml	HNO_3	
				1 125 ml	HNO_3	

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe, Mn (filtered)
X										
			X							
					X					
										X

Date:	Time:	Relinquished by:	Received by:	Via:	Date Time
10-30 2018	1545	Peter Jemart			10/30/18 15:45
Date:	Time:	Relinquished by:	Received by:	Via:	Date Time

Remarks: Email results to: pmoss@eaest.com; dietemorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 14, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1811183

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/2/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S5-4-IDW
Project: Kirtland BFF Project
Collection Date: 11/2/2018 2:00:00 PM
Lab ID: 1811183-001 **Matrix:** AQUEOUS **Received Date:** 11/2/2018 3:25:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **rde**	
Mercury	ND	0.00020		mg/L	1	11/12/2018 4:03:10 PM	41469
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	0.071	0.020		mg/L	1	11/6/2018 8:58:25 AM	A55426
Manganese	0.35	0.0020		mg/L	1	11/6/2018 8:58:25 AM	A55426
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	11/8/2018 11:59:07 AM	41417
Barium	0.39	0.020		mg/L	1	11/8/2018 11:59:07 AM	41417
Cadmium	ND	0.0020		mg/L	1	11/8/2018 11:59:07 AM	41417
Chromium	0.031	0.0060		mg/L	1	11/8/2018 11:59:07 AM	41417
Lead	ND	0.0050		mg/L	1	11/8/2018 11:59:07 AM	41417
Selenium	ND	0.050		mg/L	1	11/8/2018 11:59:07 AM	41417
Silver	ND	0.0050		mg/L	1	11/9/2018 8:45:36 AM	41417
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0093		µg/L	1	11/9/2018 3:02:49 PM	41422
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
Toluene	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
Ethylbenzene	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2018 4:29:15 PM	SL55592
Xylenes, Total	ND	1.5		µg/L	1	11/12/2018 4:29:15 PM	SL55592
Surr: 4-Bromofluorobenzene	90.8	70-130		%Rec	1	11/12/2018 4:29:15 PM	SL55592
Surr: Toluene-d8	90.9	70-130		%Rec	1	11/12/2018 4:29:15 PM	SL55592

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	11/12/2018 13:37	WG1194544

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	8.12	T8	1	11/07/2018 11:35	WG1192549

Sample Narrative:
L1041531-01 WG1192549: 8.12 at 8C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	11/08/2018 17:27	WG1193194

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	11/08/2018 11:29	WG1192675

WG1194544

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1041531-01

Method Blank (MB)

(MB) R3359031-1 11/12/18 13:31

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1041773-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1041773-02 11/12/18 13:55 • (DUP) R3359031-6 11/12/18 13:56

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		mg/l		%		%
Reactive Cyanide		0.0849	1	3.72		20

Laboratory Control Sample (LCS)

(LCS) R3359031-2 11/12/18 13:32

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.0985	98.6	85.0-115	

L1041531-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1041531-01 11/12/18 13:37 • (MS) R3359031-3 11/12/18 13:38 • (MSD) R3359031-4 11/12/18 13:39

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0940	0.0868	94.0	86.8	1	75.0-125			7.96	20

L1041800-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1041800-02 11/12/18 14:07 • (MS) R3359031-7 11/12/18 14:08 • (MSD) R3359031-8 11/12/18 14:09

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l		mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100		0.0822	0.0854	82.2	85.4	1	75.0-125			3.82	20

Laboratory Control Sample (LCS)

(LCS) R3357676-1 11/07/18 11:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:
LCS: 9.98 at 16.9C

Appendix I

Method Blank (MB)

(MB) R3358302-1 11/08/18 17:17

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3358302-2 11/08/18 17:18

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	0.500	0.476	95.2	85.0-115	

WG1192675

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1041531-01

L1040695-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1040695-01 11/08/18 11:29 • (DUP) R3358091-2 11/08/18 11:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1040975-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1040975-01 11/08/18 11:29 • (DUP) R3358091-3 11/08/18 11:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3358091-1 11/08/18 11:29

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	82.5	101	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
I8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41422**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**41422**	RunNo:	**55557**					
Prep Date:	**11/8/2018**	Analysis Date:	**11/9/2018**	SeqNo:	**1850108**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-41422**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**41422**	RunNo:	**55557**					
Prep Date:	**11/8/2018**	Analysis Date:	**11/9/2018**	SeqNo:	**1850109**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.12	0.010	0.1000	0	116	70	130			

Sample ID	**1811183-001BMS**	SampType:	**MS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**KAFB-106S5-4-IDW**	Batch ID:	**41422**	RunNo:	**55557**					
Prep Date:	**11/8/2018**	Analysis Date:	**11/9/2018**	SeqNo:	**1850129**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.084	0.0094	0.09358	0	89.4	55	125			

Sample ID	**1811183-001BMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**KAFB-106S5-4-IDW**	Batch ID:	**41422**	RunNo:	**55557**					
Prep Date:	**11/8/2018**	Analysis Date:	**11/9/2018**	SeqNo:	**1850130**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.084	0.0094	0.09358	0	90.3	55	125	0.991	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL55592**	RunNo: **55592**
Prep Date:	Analysis Date: **11/12/2018**	SeqNo: **1851182** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.7	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		92.1	70	130			
Surr: Dibromofluoromethane	9.1		10.00		91.3	70	130			
Surr: Toluene-d8	9.4		10.00		93.9	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL55592**	RunNo: **55592**
Prep Date:	Analysis Date: **11/12/2018**	SeqNo: **1851183** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	93.2	70	130			
Toluene	19	1.0	20.00	0	96.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.9	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		91.6	70	130			
Surr: Dibromofluoromethane	9.3		10.00		92.5	70	130			
Surr: Toluene-d8	9.2		10.00		91.6	70	130			

Sample ID **1811183-001a ms**	SampType: **MS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **KAFB-106S5-4-IDW**	Batch ID: **SL55592**	RunNo: **55592**
Prep Date:	Analysis Date: **11/12/2018**	SeqNo: **1851185** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	109	60.5	137			
Toluene	21	1.0	20.00	0.8198	99.7	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.3	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		92.1	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.4	70	130			
Surr: Toluene-d8	9.1		10.00		91.1	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**1811183-001a msd**	SampType:	**MSD**	TestCode:	**EPA Method 8260: Volatiles Short List**
Client ID:	**KAFB-106S5-4-IDW**	Batch ID:	**SL55592**	RunNo:	**55592**
Prep Date:		Analysis Date:	**11/12/2018**	SeqNo:	**1851186** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	103	60.5	137	5.37	20	
Toluene	21	1.0	20.00	0.8198	98.6	70	130	1.11	20	
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.4	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.3		10.00		93.2	70	130	0	0	
Surr: Dibromofluoromethane	10		10.00		99.6	70	130	0	0	
Surr: Toluene-d8	9.3		10.00		93.0	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41469**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850864**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-41469**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**41469**	RunNo:	**55586**					
Prep Date:	**11/12/2018**	Analysis Date:	**11/12/2018**	SeqNo:	**1850865**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.4	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**A55426**	RunNo:	**55426**					
Prep Date:		Analysis Date:	**11/6/2018**	SeqNo:	**1844309**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**A55426**	RunNo:	**55426**					
Prep Date:		Analysis Date:	**11/6/2018**	SeqNo:	**1844310**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.50	0.020	0.5000	0	100	80	120			
Manganese	0.50	0.0020	0.5000	0	99.1	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811183**

14-Nov-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41417**	SampType: **MBLK**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID: **41417**			RunNo: **55504**				
Prep Date:	**11/7/2018**	Analysis Date: **11/8/2018**			SeqNo: **1848079**	Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								

Sample ID	**LCS-41417**	SampType: **LCS**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID: **41417**			RunNo: **55504**				
Prep Date:	**11/7/2018**	Analysis Date: **11/8/2018**			SeqNo: **1848081**	Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.49	0.020	0.5000	0	97.8	80	120			
Barium	0.49	0.020	0.5000	0	97.7	80	120			
Cadmium	0.50	0.0020	0.5000	0	99.6	80	120			
Chromium	0.51	0.0060	0.5000	0	103	80	120			
Lead	0.48	0.0050	0.5000	0	97.0	80	120			
Selenium	0.49	0.050	0.5000	0	97.6	80	120			

Sample ID	**MB-41417**	SampType: **MBLK**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID: **41417**			RunNo: **55539**				
Prep Date:	**11/7/2018**	Analysis Date: **11/9/2018**			SeqNo: **1849610**	Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	ND	0.0050								

Sample ID	**LCS-41417**	SampType: **LCS**			TestCode: **EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID: **41417**			RunNo: **55539**				
Prep Date:	**11/7/2018**	Analysis Date: **11/9/2018**			SeqNo: **1849611**	Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Silver	0.10	0.0050	0.1000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1811183 RcptNo: 1

Received By: **Jazzmine Burkhead** 11/2/2018 3:25:00 PM

Completed By: **Anne Thorne** 11/5/2018 1:47:43 PM

Reviewed By: JO 11/5/18

Labeled by: AT 11/05/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 2 2 (<2 or >12 unless noted)
Adjusted?
Checked by: AT 11/05/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	13.2	Good	Not Present			

Appendix I

1410 of 1539

Chain-of-Custody Record

Client: EA Engineering

320 Gold SW #1300

Mailing Address:

Albuquerque, NM 87102

Phone #: 505 238-4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☑ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: 627350M02 1017 08

P.O. 16219

Project Manager: Deron Jercinovic

Sampler: Pete Ferrari

On Ice: ☐ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 1.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1811183	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss Fe, Mn (Filtered)	RCI				
11-2-2018	1400	H_2O	KAFB-10655-4-inlet	3 40 ml	HCl	-001	X															
				3 40 ml	$Na_2S_2O_3$	-201				X												
				1 ~~250~~ 125 ml	HNO_3	-201						X										
				1 125 ml	HNO_3	-201											X					
↓		↓	↓	3 asst.	500 ml	-201												X				

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11-2-2018	1525	Pete Ferrari		Courier		
Date:	Time:	Relinquished by:	Received by:	Via:	11/02/18	15:35

Remarks: Client

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM9570024423	1	505 385 3679	012267170 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: ~~505-349-5220~~ — U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	9	DM	4050	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA(9) 55 Sm — Project Number 190146 — Document #: D227573

~~24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679~~

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature: [signature] — Month: 2 — Day: 11 — Year: 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: _____
Transporter signature (for exports only): Date leaving U.S.: _____

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Adam Kemp — Signature: [signature] — Month: 2 — Day: 11 — Year: 19

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number: — U.S. EPA ID Number

18b. Alternate Facility (or Generator)

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month — Day — Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. **DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM**

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190211

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] **GENERATOR KNOWLEDGE** [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S5-DM-idw		
				SAMPLE DATE		11-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.85	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.18	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.16	--	0.020
		Manganese (dissolved)	mg/L	0.20	NS	**0.97**	--	0.002
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**1200**	--	50
		Ethylbenzene	µg/L	750	NS	670	--	50
		Toluene	µg/L	750	NS	**4000**	--	50
		Xylenes, total	µg/L	620	NS	**1900**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	220	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	80	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**13**	--	0.095

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> - greater than

< - less than

µg/L - microgram per liter

°F - degrees farenheit

ID - identification

mg/L - milligram per liter

ND - not detected above the PQL

NS - no standard

PQL - practical quantitation limit

QUAL - laboratory data qualifier

RCRA - Resource Conservation and Recovery Act

TCLP - Toxicity characteristic leaching procedure

Shading - detected concentration above the PQL

Shade and Bold - reported concentration exceeds the project screening level

S.U. - Standard units

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 21, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1812709

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S5-DM-idw
Project: Kirtland BFF Project
Collection Date: 12/11/2018 2:05:00 PM
Lab ID: 1812709-001 **Matrix:** AQUEOUS **Received Date:** 12/11/2018 4:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/19/2018 11:48:19 AM	42182
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **rde**	
Iron	0.16	0.020		mg/L	1	12/14/2018 10:41:50 AM	A56358
Manganese	0.97	0.0020		mg/L	1	12/14/2018 10:41:50 AM	A56358
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	12/14/2018 10:11:46 AM	42081
Barium	0.18	0.020		mg/L	1	12/14/2018 10:11:46 AM	42081
Cadmium	ND	0.0020		mg/L	1	12/14/2018 10:11:46 AM	42081
Chromium	ND	0.0060		mg/L	1	12/14/2018 10:11:46 AM	42081
Lead	ND	0.0050		mg/L	1	12/14/2018 10:11:46 AM	42081
Selenium	ND	0.050		mg/L	1	12/14/2018 10:11:46 AM	42081
Silver	ND	0.0050		mg/L	1	12/14/2018 10:11:46 AM	42081
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	13	9.5		µg/L	1E	12/18/2018 8:09:03 AM	42092
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	120		µg/L	50	12/13/2018 10:27:37 PM	B56323
Benzene	1200	50		µg/L	50	12/13/2018 10:27:37 PM	B56323
Toluene	4000	50		µg/L	50	12/13/2018 10:27:37 PM	B56323
Ethylbenzene	670	50		µg/L	50	12/13/2018 10:27:37 PM	B56323
Xylenes, Total	1900	100		µg/L	50	12/13/2018 10:27:37 PM	B56323
1,2,4-Trimethylbenzene	220	50		µg/L	50	12/13/2018 10:27:37 PM	B56323
1,3,5-Trimethylbenzene	80	50		µg/L	50	12/13/2018 10:27:37 PM	B56323
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	50	12/13/2018 10:27:37 PM	B56323

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	12/19/2018 13:42	WG1212307

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.85	T8	1	12/15/2018 10:35	WG1211386

Sample Narrative:
L1053187-01 WG1211386: 7.85 at 10.9C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	12/18/2018 15:52	WG1212541

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/19/2018 17:22	WG1213360

Method Blank (MB)

(MB) R3369599-1 12/19/18 13:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1052990-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1052990-02 12/19/18 13:18 • (DUP) R3369599-3 12/19/18 13:19

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

L1053139-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1053139-03 12/19/18 13:30 • (DUP) R3369599-6 12/19/18 13:31

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3369599-2 12/19/18 13:11

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.0989	98.9	85.0-115	

L1053047-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053047-02 12/19/18 13:25 • (MS) R3369599-4 12/19/18 13:26 • (MSD) R3369599-5 12/19/18 13:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0973	0.0958	95.5	94.0	1	75.0-125			1.55	20

L1053139-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053139-05 12/19/18 13:36 • (MS) R3369599-7 12/19/18 13:37 • (MSD) R3369599-8 12/19/18 13:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0910	0.0903	91.0	90.3	1	75.0-125			0.772	20

Appendix I

Laboratory Control Sample (LCS)

(LCS) R3368450-1 12/15/18 10:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 18.2C

Method Blank (MB)

(MB) R3369290-1 12/18/18 15:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3369290-2 12/18/18 15:51

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.484	96.8	85.0-115	

L1053694-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053694-02 12/19/18 17:22 • (DUP) R3369898-2 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	81.9	80.9	1	1.23		10

L1054273-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054273-01 12/19/18 17:22 • (DUP) R3369898-3 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369898-1 12/19/18 17:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	83.9	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42092**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886382**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-42092**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**42092**	RunNo:	**56419**					
Prep Date:	**12/17/2018**	Analysis Date:	**12/17/2018**	SeqNo:	**1886389**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.10	0.010	0.1000	0	100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **B31**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882326** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		101	80	120			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56323**	RunNo: **56323**
Prep Date:	Analysis Date: **12/13/2018**	SeqNo: **1882328** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	18	2.5	20.00	0	88.2	64.5	120			
Benzene	19	1.0	20.00	0	94.4	80	120			
Toluene	20	1.0	20.00	0	97.6	80	120			
Ethylbenzene	19	1.0	20.00	0	97.4	80	120			
Xylenes, Total	59	2.0	60.00	0	98.1	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	95.2	80	120			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	95.7	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		99.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42182**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888152**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-42182**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888153**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType: **MBLK**			TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**PBW**	Batch ID: **A56358**			RunNo: **56358**					
Prep Date:		Analysis Date: **12/14/2018**			SeqNo: **1887697**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType: **LCS**			TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID: **A56358**			RunNo: **56358**					
Prep Date:		Analysis Date: **12/14/2018**			SeqNo: **1887698**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0	97.0	80	120			
Manganese	0.49	0.0020	0.5000	0	97.7	80	120			

Sample ID	**1812709-001DMS**	SampType: **MS**			TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S5-DM-id**	Batch ID: **A56358**			RunNo: **56358**					
Prep Date:		Analysis Date: **12/14/2018**			SeqNo: **1887741**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.65	0.020	0.5000	0.1601	97.1	75	125			
Manganese	1.4	0.0020	0.5000	0.9681	94.6	75	125			E

Sample ID	**1812709-001DMSD**	SampType: **MSD**			TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**KAFB-106S5-DM-id**	Batch ID: **A56358**			RunNo: **56358**					
Prep Date:		Analysis Date: **12/14/2018**			SeqNo: **1887742**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.66	0.020	0.5000	0.1601	99.7	75	125	2.03	20	
Manganese	1.5	0.0020	0.5000	0.9681	96.7	75	125	0.712	20	E

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42081**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887703** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-42081**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887704** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	103	80	120			
Barium	0.50	0.020	0.5000	0	99.3	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Chromium	0.51	0.0060	0.5000	0	101	80	120			
Lead	0.50	0.0050	0.5000	0	100	80	120			
Selenium	0.52	0.050	0.5000	0	104	80	120			
Silver	0.10	0.0050	0.1000	0	100	80	120			

Sample ID	**1812709-001CMS**	SampType:	**MS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**KAFB-106S5-DM-id**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887725** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.52	0.020	0.5000	0	103	75	125			
Barium	0.68	0.020	0.5000	0.1821	99.9	75	125			
Cadmium	0.51	0.0020	0.5000	0	102	75	125			
Chromium	0.50	0.0060	0.5000	0	100	75	125			
Lead	0.50	0.0050	0.5000	0	99.2	75	125			
Selenium	0.51	0.050	0.5000	0	101	75	125			
Silver	0.10	0.0050	0.1000	0	104	75	125			

Sample ID	**1812709-001CMSD**	SampType:	**MSD**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**KAFB-106S5-DM-id**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887726** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	102	75	125	0.622	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812709**

21-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**1812709-001CMSD**	SampType:	**MSD**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**KAFB-106S5-DM-id**	Batch ID:	**42081**	RunNo:	**56358**
Prep Date:	**12/13/2018**	Analysis Date:	**12/14/2018**	SeqNo:	**1887726** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.67	0.020	0.5000	0.1821	98.2	75	125	1.25	20	
Cadmium	0.50	0.0020	0.5000	0	100	75	125	1.43	20	
Chromium	0.49	0.0060	0.5000	0	98.6	75	125	1.84	20	
Lead	0.49	0.0050	0.5000	0	97.1	75	125	2.13	20	
Selenium	0.49	0.050	0.5000	0	98.0	75	125	3.28	20	
Silver	0.10	0.0050	0.1000	0	104	75	125	0.552	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812709 RcptNo: 1

Received By: **Erin Melendrez** 12/11/2017 4:00:00 PM

Completed By: **Anne Thorne** 12/12/2018 4:43:55 PM

Reviewed By: ENM 12/13/18

Labeled by: DAD 12/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 : 2
(2 or >2 unless noted)
Adjusted? No
Checked by: DAD 12/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date: ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.7	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering

Mailing Address: 320 Gold SW #1300 Albuquerque NM 87102

Phone #: 505 238-4410

email or Fax#: emorse@caestlcm

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Kirtland BFT Project

Project #: 627350M02 1017.08

P.O. 16219

Project Manager: Devon Jercinovic

Sampler: Pete Ferrari

On Ice: ☑ Yes ☐ No

# of Coolers: 1 (CF=0)

Cooler Temp (including CF): 1.7°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1812709	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe Mn filtered	RCI
12-11-18	1405	H_2O	~~KAFB-1065-5-DM-idw~~ KAFB-10655-DM-idw pF	3 40 ml	HCl	001	X											
				2 40 ml	$Na_2S_2O_3$	At 12/12/18 001 002				X								
				1 250 ml	HNO_3	001						X						
				1 125 ml	HNO_3	001										X		
↓	↓	↓	↓	500 ml	3 assd.	001											X	

Page 42 of 1539

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-11-18	1600	Pete Ferrari		CDO	12/11/18	1600
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: Email results to
pmoss@caest.com
emorse@caest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM9570024423	1	505 385 3679	012267322 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: SCOTT CLARK 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: 505-349-5220
U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	6	DM	2640	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA (6) 55 Project Number 198536 Document #: D237405

24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature — Month: 4 Day: 24 Year: 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Adam Kemp — Signature — Month: 4 Day: 24 Year: 19

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1 | 2. | 3. | 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month — Day — Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190424

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] GENERATOR KNOWLEDGE [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

LOCATION CODE	KAFB BFF
FIELD SAMPLE ID	KAFB-106S1-DW-idw
SAMPLE DATE	6-Mar-19
SAMPLE PURPOSE	Waste Characterization

Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.78	J	--
METALS	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.12	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	ND	--	0.02
		Manganese (dissolved)	mg/L	0.20	NS	**1.2**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	5	500	**1700**	--	20
		Ethylbenzene	µg/L	700	NS	530	--	20
		Toluene	µg/L	1000	NS	**4400**	--	200
		Xylenes, total	µg/L	620	NS	**2500**	--	30
		Methyl tert-butyl ether	µg/L	100	NS	ND	--	20
		1,2,4-Trimethylbenzene	µg/L	NS	NS	350	--	20
		1,3,5-Trimethylbenzene	µg/L	NS	NS	110	--	20
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.05	NS	**99**	--	9.4

Notes:

[a] NMWQCC numeric standards per the NMAC Title 20.6.2.3103A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2018).

For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> = greater than

< = less than

µg/L = microgram per liter

°F = degrees farenheit

ID = identification

J = estimated value

mg/L = milligram per liter

ND = not detected above the PQL

NS = no standard

PQL = practical quantitation limit

QUAL = laboratory data qualifier

RCRA = Resource Conservation and Recovery Act

TCLP = Toxicity characteristic leaching procedure

Shading = detected concentration above the PQL

Bold/Shading = reported concentration exceeds the project screening level

S.U. = Standard units

LOCATION CODE	KAFB BFF
FIELD SAMPLE ID	KAFB-106S7-DW-idw
SAMPLE DATE	11-Mar-19
SAMPLE PURPOSE	Waste Characterization

Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.67	J	--
METALS	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.34	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.76	--	0.10
		Manganese (dissolved)	mg/L	0.20	NS	**3.5**	--	0.04
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	5	500	**930**	--	50
		Ethylbenzene	µg/L	700	NS	170	--	50
		Toluene	µg/L	1000	NS	**1100**	--	50
		Xylenes, total	µg/L	620	NS	**940**	--	100
		Methyl tert-butyl ether	µg/L	100	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	130	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	56	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.05	NS	**5.7**	--	0.95

Notes:

[a] NMWQCC numeric standards per the NMAC Title 20.6.2.3103A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2018).

For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

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RCRA = Resource Conservation and Recovery Act

TCLP = Toxicity characteristic leaching procedure

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Bold/Shading = reported concentration exceeds the project screening level

S.U. = Standard units

LOCATION CODE	KAFB BFF
FIELD SAMPLE ID	KAFB-106S8-DW-idw
SAMPLE DATE	6-Mar-19
SAMPLE PURPOSE	Waste Characterization

Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.74	J	--
METALS	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.2	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.053	--	0.02
		Manganese (dissolved)	mg/L	0.20	NS	**1.3**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	5	500	**510**	--	20
		Ethylbenzene	µg/L	700	NS	210	--	20
		Toluene	µg/L	1000	NS	**2700**	--	200
		Xylenes, total	µg/L	620	NS	**1200**	--	30
		Methyl tert-butyl ether	µg/L	100	NS	ND	--	20
		1,2,4-Trimethylbenzene	µg/L	NS	NS	150	--	20
		1,3,5-Trimethylbenzene	µg/L	NS	NS	56	--	20
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.05	NS	**29**	--	1.9

Notes:

[a] NMWQCC numeric standards per the NMAC Title 20.6.2.3103A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2018).

For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

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TCLP = Toxicity characteristic leaching procedure

Shading = detected concentration above the PQL

Bold/Shading = reported concentration exceeds the project screening level

S.U. = Standard units

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 22, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: KAFB BFF Project OrderNo.: 1903498

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/11/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S7-DW-idw
Project: KAFB BFF Project
Collection Date: 3/11/2019 2:05:00 PM
Lab ID: 1903498-001 **Matrix:** AQUEOUS **Received Date:** 3/11/2019 3:16:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **bcv**	
Iron	0.76	0.10	*	mg/L	5	3/14/2019 5:10:53 PM	C58381
Manganese	3.5	0.040	*	mg/L	20	3/14/2019 5:16:57 PM	C58381
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	3/20/2019 11:51:52 AM	43775
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	3/19/2019 3:54:25 PM	43666
Barium	0.34	0.020		mg/L	1	3/19/2019 3:54:25 PM	43666
Cadmium	ND	0.0020		mg/L	1	3/19/2019 3:54:25 PM	43666
Chromium	ND	0.0060		mg/L	1	3/19/2019 3:54:25 PM	43666
Lead	ND	0.0050		mg/L	1	3/19/2019 3:54:25 PM	43666
Selenium	ND	0.050		mg/L	1	3/19/2019 3:54:25 PM	43666
Silver	ND	0.0050		mg/L	1	3/19/2019 3:54:25 PM	43666
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	5.7	0.95		µg/L	100	3/13/2019 10:27:13 AM	43625
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	120		µg/L	50	3/12/2019 9:36:07 AM	B58289
Benzene	930	50		µg/L	50	3/12/2019 9:36:07 AM	B58289
Toluene	1100	50		µg/L	50	3/12/2019 9:36:07 AM	B58289
Ethylbenzene	170	50		µg/L	50	3/12/2019 9:36:07 AM	B58289
Xylenes, Total	940	100		µg/L	50	3/12/2019 9:36:07 AM	B58289
1,2,4-Trimethylbenzene	130	50		µg/L	50	3/13/2019 2:58:49 PM	B58349
1,3,5-Trimethylbenzene	56	50		µg/L	50	3/12/2019 9:36:07 AM	B58289
Surr: 4-Bromofluorobenzene	93.8	80-120		%Rec	50	3/12/2019 9:36:07 AM	B58289

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: KAFB BFF Project
Collection Date:
Lab ID: 1903498-002
Matrix: TRIP BLANK
Received Date: 3/11/2019 3:16:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	ND	0.0093		µg/L	1	3/12/2019 7:41:38 PM	43625
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	3/12/2019 12:16:03 PM	B58289
Benzene	ND	1.0		µg/L	1	3/12/2019 12:16:03 PM	B58289
Toluene	ND	1.0		µg/L	1	3/12/2019 12:16:03 PM	B58289
Ethylbenzene	ND	1.0		µg/L	1	3/12/2019 12:16:03 PM	B58289
Xylenes, Total	ND	2.0		µg/L	1	3/12/2019 12:16:03 PM	B58289
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	3/13/2019 3:22:12 PM	B58349
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 12:16:03 PM	B58289
Surr: 4-Bromofluorobenzene	87.9	80-120		%Rec	1	3/12/2019 12:16:03 PM	B58289

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.00500	1	03/14/2019 13:18	WG1249385

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
Corrosivity by pH	7.67	T8	1	03/14/2019 10:34	WG1249292

Sample Narrative:

L1078169-01 WG1249292: 7.67 at 17.8C

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND		0.0500	1	03/15/2019 12:40	WG1250312

Wet Chemistry by Method D93/1010A

Analyte	Result deg F	Qualifier	Dilution	Analysis date / time	Batch
Flashpoint	DNF at 170		1	03/14/2019 14:30	WG1250025

Method Blank (MB)

(MB) R3391586-1 03/14/19 12:46

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1076968-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076968-01 03/14/19 12:52 • (DUP) R3391586-3 03/14/19 12:54

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	U	0.000	1	0.000		20

L1077349-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1077349-06 03/14/19 13:12 • (DUP) R3391586-8 03/14/19 13:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3391586-2 03/14/19 12:47

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.0950	95.0	85.0-115	

L1076968-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1076968-02 03/14/19 12:55 • (MS) R3391586-4 03/14/19 12:56 • (MSD) R3391586-5 03/14/19 12:59

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	U	0.0899	0.0922	89.9	92.2	1	75.0-125			2.53	20

L1077349-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1077349-04 03/14/19 13:06 • (MS) R3391586-6 03/14/19 13:07 • (MSD) R3391586-7 03/14/19 13:08

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	U	0.0867	0.0878	86.7	87.8	1	75.0-125			1.26	20

Laboratory Control Sample (LCS)

(LCS) R3391514-1 03/14/19 10:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 18.5C

Method Blank (MB)

(MB) R3392038-1 03/15/19 12:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3392038-2 03/15/19 12:25

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.429	85.8	85.0-115	

L1075108-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1075108-14 03/14/19 14:30 • (DUP) R3391647-2 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1077890-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077890-01 03/14/19 14:30 • (DUP) R3391647-3 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	131	134	1	2.26		10

Laboratory Control Sample (LCS)

(LCS) R3391647-1 03/14/19 14:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	85.0	104	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **MB-C**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959731** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID: **LLLCS-C**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959733** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	0.0021	0.0020	0.002000	0	105	50	150			

Sample ID: **LCS-C**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959735** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	102	85	115			
Manganese	0.49	0.0020	0.5000	0	99.0	85	115			

Sample ID: **LLLCS-C**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959743** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.023	0.020	0.02000	0	113	50	150			

Sample ID: **1903498-001DMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **KAFB-106S7-DW-id**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959797** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	3.4	0.10	2.500	0.7631	107	70	130			

Sample ID: **1903498-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **KAFB-106S7-DW-id**	Batch ID: **C58381**	RunNo: **58381**
Prep Date:	Analysis Date: **3/14/2019**	SeqNo: **1959798** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	3.4	0.10	2.500	0.7631	105	70	130	1.44	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **MB-43625**	SampType: **MBLK**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **PBW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955903** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID: **LCS-43625**	SampType: **LCS**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **LCSW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955904** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.11	0.010	0.1000	0	108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B58289**	RunNo: **58289**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955742** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	18		20.00		88.9	80	120			

Sample ID: **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B58289**	RunNo: **58289**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955743** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	16	2.5	20.00	0	82.0	64.5	120			
Benzene	20	1.0	20.00	0	98.1	80	120			
Toluene	21	1.0	20.00	0	103	80	120			
Ethylbenzene	19	1.0	20.00	0	97.1	80	120			
Xylenes, Total	57	2.0	60.00	0	94.7	80	120			
1,3,5-Trimethylbenzene	17	1.0	20.00	0	86.5	80	120			
Surr: 4-Bromofluorobenzene	20		20.00		100	80	120			

Sample ID: **1903498-001AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S7-DW-id**	Batch ID: **B58289**	RunNo: **58289**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955747** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	890	120	1000	0	88.9	63.1	121			
Benzene	2100	50	1000	928.2	118	80	120			
Toluene	2200	50	1000	1070	111	80	120			
Ethylbenzene	1200	50	1000	174.2	103	80	120			
Xylenes, Total	3900	100	3000	942.4	98.1	80	120			
1,3,5-Trimethylbenzene	970	50	1000	55.62	91.8	80	120			
Surr: 4-Bromofluorobenzene	1000		1000		99.9	80	120			

Sample ID: **1903498-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S7-DW-id**	Batch ID: **B58289**	RunNo: **58289**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955748** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	830	120	1000	0	83.4	63.1	121	6.39	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **1903498-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **KAFB-106S7-DW-id**	Batch ID: **B58289**	RunNo: **58289**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955748** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2000	50	1000	928.2	111	80	120	3.55	20	
Toluene	2100	50	1000	1070	108	80	120	1.43	20	
Ethylbenzene	1200	50	1000	174.2	103	80	120	0.276	20	
Xylenes, Total	3900	100	3000	942.4	98.5	80	120	0.341	20	
1,3,5-Trimethylbenzene	980	50	1000	55.62	92.8	80	120	0.972	20	
Surr: 4-Bromofluorobenzene	1000		1000		103	80	120	0	0	

Sample ID: **B25**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B58349**	RunNo: **58349**
Prep Date:	Analysis Date: **3/13/2019**	SeqNo: **1957369** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		99.8	80	120			

Sample ID: **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B58349**	RunNo: **58349**
Prep Date:	Analysis Date: **3/13/2019**	SeqNo: **1957370** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	20	1.0	20.00	0	101	80	120			
Surr: 4-Bromofluorobenzene	21		20.00		103	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **MB-43775**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **43775**	RunNo: **58504**
Prep Date: **3/19/2019**	Analysis Date: **3/20/2019**	SeqNo: **1963758** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID: **LCS-43775**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **43775**	RunNo: **58504**
Prep Date: **3/19/2019**	Analysis Date: **3/20/2019**	SeqNo: **1963759** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	101	80	120			

Sample ID: **LCSD-43775**	SampType: **LCSD**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSS02**	Batch ID: **43775**	RunNo: **58504**
Prep Date: **3/19/2019**	Analysis Date: **3/20/2019**	SeqNo: **1963760** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	100	80	120	0.516	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903498**

22-Mar-19

Client: EA Engineering Science & Technology

Project: KAFB BFF Project

Sample ID: **MB-43666**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43666**	RunNo: **58495**
Prep Date: **3/13/2019**	Analysis Date: **3/19/2019**	SeqNo: **1963383** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID: **LCS-43666**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43666**	RunNo: **58495**
Prep Date: **3/13/2019**	Analysis Date: **3/19/2019**	SeqNo: **1963385** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.50	0.020	0.5000	0	99.5	80	120			
Barium	0.50	0.020	0.5000	0	99.8	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Chromium	0.50	0.0060	0.5000	0	99.5	80	120			
Lead	0.51	0.0050	0.5000	0	102	80	120			
Selenium	0.53	0.050	0.5000	0	106	80	120			
Silver	0.10	0.0050	0.1000	0	103	80	120			

Sample ID: **LCSD-43666**	SampType: **LCSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSS02**	Batch ID: **43666**	RunNo: **58495**
Prep Date: **3/13/2019**	Analysis Date: **3/19/2019**	SeqNo: **1963386** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	102	80	120	2.32	20	
Barium	0.50	0.020	0.5000	0	100	80	120	0.406	20	
Cadmium	0.51	0.0020	0.5000	0	102	80	120	0.220	20	
Chromium	0.50	0.0060	0.5000	0	100	80	120	0.740	20	
Lead	0.51	0.0050	0.5000	0	102	80	120	0.562	20	
Selenium	0.51	0.050	0.5000	0	101	80	120	5.14	20	
Silver	0.10	0.0050	0.1000	0	103	80	120	0.148	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1903498** RcptNo: **1**

Received By: **Isaiah Ortiz** **3/11/2019 3:16:00 PM** I-OX

Completed By: **Desiree Dominguez** **3/11/2019 3:18:36 PM** DD

Reviewed By: LB 3/11/19

LB: JMM 3-11-19

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 2 (<2 or >12 unless noted)

Adjusted? No

Checked by: JMM 3-11-19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.2	Good	Not Present			

Chain-of-Custody Record

Client: EA Engineering

Mailing Address: 320 Gold SW #1300 Albuquerque NM 87102

Phone #: 505 238 4410

email or Fax#: emorse@eaest.com

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: G2735DM02 1017 08
PO 16219

Project Manager: Devon Jerednovich

Sampler: P. Ferrari

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 3.2-C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1903498	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe Mn (Filtered) RCI
3-11-2019	1405	H_2O	MAFB-106S7-DW-Idw	3 40 ml	HCl	-001	X										
↓	↓	↓	↓	3 40 ml	$Na_2S_2O_3$	↓				X							
				1 250 ml	HNO_3						X						
				1 125 ml	HNO_3											X	
↓	↓	↓	↓	3 asst	500 ml	↓											X
			Trip Blank TWN 3-11-19	3		-002											
						↓											

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
3-11-2019	1435	Pete Ferrari	Johnny Livingston	Hand Del	3/11/19	1435
3/11/19	1516	Johnny Livingston		CAO	3/11/19	1616

Remarks: Email results to pmoss@eaest.com emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Appendix I

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NM9570024423	1	505 385 3679	012267322 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: SCOTT CLARK 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: 505-349-5220
U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	6	DM	2640	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA (6) 55 Project Number 198536 Document #: D237405

24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature — Month 4 Day 24 Year 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Adam Kemp — Signature — Month 4 Day 24 Year 19

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1 | 2. | 3. | 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190424

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] **GENERATOR KNOWLEDGE** [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

LOCATION CODE	KAFB BFF
FIELD SAMPLE ID	KAFB-106S8-DW-idw
SAMPLE DATE	6-Mar-19
SAMPLE PURPOSE	Waste Characterization

Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.74	J	--
METALS	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.2	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	0.053	--	0.02
		Manganese (dissolved)	mg/L	0.20	NS	**1.3**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	5	500	**510**	--	20
		Ethylbenzene	µg/L	700	NS	210	--	20
		Toluene	µg/L	1000	NS	**2700**	--	200
		Xylenes, total	µg/L	620	NS	**1200**	--	30
		Methyl tert-butyl ether	µg/L	100	NS	ND	--	20
		1,2,4-Trimethylbenzene	µg/L	NS	NS	150	--	20
		1,3,5-Trimethylbenzene	µg/L	NS	NS	56	--	20
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.05	NS	**29**	--	1.9

Notes:

[a] NMWQCC numeric standards per the NMAC Title 20.6.2.3103A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2018).

For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability characteristic for solids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> = greater than

< = less than

µg/L = microgram per liter

°F = degrees farenheit

ID = identification

J = estimated value

mg/L = milligram per liter

ND = not detected above the PQL

NS = no standard

PQL = practical quantitation limit

QUAL = laboratory data qualifier

RCRA = Resource Conservation and Recovery Act

TCLP = Toxicity characteristic leaching procedure

Shading = detected concentration above the PQL

Bold/Shading = reported concentration exceeds the project screening level

S.U. = Standard units

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 15, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1903294

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/6/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S8-DW-idw
Project: Kirtland BFF Project
Collection Date: 3/6/2019 2:55:00 PM
Lab ID: 1903294-001 **Matrix:** AQUEOUS **Received Date:** 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	3/11/2019 7:25:24 PM	43610
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	0.053	0.020		mg/L	1	3/8/2019 9:36:47 AM	A58213
Manganese	1.3	0.010		mg/L	5	3/8/2019 9:52:00 AM	A58213
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	3/13/2019 5:50:01 PM	43593
Barium	0.20	0.020		mg/L	1	3/11/2019 6:51:42 PM	43593
Cadmium	ND	0.0020		mg/L	1	3/11/2019 6:51:42 PM	43593
Chromium	ND	0.0060		mg/L	1	3/11/2019 6:51:42 PM	43593
Lead	ND	0.0050		mg/L	1	3/13/2019 5:50:01 PM	43593
Selenium	ND	0.050		mg/L	1	3/11/2019 6:51:42 PM	43593
Silver	ND	0.0050		mg/L	1	3/11/2019 6:51:42 PM	43593
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	29	1.9		µg/L	200	3/13/2019 10:12:09 AM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	510	20		µg/L	20	3/12/2019 6:11:00 AM	SL58271
Toluene	2700	200		µg/L	200	3/12/2019 1:16:00 PM	SL58313
Ethylbenzene	210	20		µg/L	20	3/12/2019 6:11:00 AM	SL58271
Methyl tert-butyl ether (MTBE)	ND	20		µg/L	20	3/12/2019 6:11:00 AM	SL58271
1,2,4-Trimethylbenzene	150	20		µg/L	20	3/12/2019 6:11:00 AM	SL58271
1,3,5-Trimethylbenzene	56	20		µg/L	20	3/12/2019 6:11:00 AM	SL58271
Xylenes, Total	1200	30		µg/L	20	3/12/2019 6:11:00 AM	SL58271
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	20	3/12/2019 6:11:00 AM	SL58271
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	20	3/12/2019 6:11:00 AM	SL58271
Surr: Dibromofluoromethane	96.0	70-130		%Rec	20	3/12/2019 6:11:00 AM	SL58271
Surr: Toluene-d8	94.6	70-130		%Rec	20	3/12/2019 6:11:00 AM	SL58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1903294-002
Matrix: TRIP BLANK
Received Date: 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	ND	0.0094		µg/L	1	3/12/2019 5:42:00 PM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
Toluene	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
Ethylbenzene	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 6:35:00 AM	SL58271
Xylenes, Total	ND	1.5		µg/L	1	3/12/2019 6:35:00 AM	SL58271
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	3/12/2019 6:35:00 AM	SL58271
Surr: 4-Bromofluorobenzene	98.0	70-130		%Rec	1	3/12/2019 6:35:00 AM	SL58271
Surr: Dibromofluoromethane	96.8	70-130		%Rec	1	3/12/2019 6:35:00 AM	SL58271
Surr: Toluene-d8	96.3	70-130		%Rec	1	3/12/2019 6:35:00 AM	SL58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	03/13/2019 15:14	WG1248453

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.74	T6	1	03/10/2019 09:00	WG1247650

Sample Narrative:
L1077050-01 WG1247650: 7.74 at 18.9C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	03/09/2019 11:40	WG1247121

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	03/14/2019 14:30	WG1250025

WG1248453

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1077050-01

Method Blank (MB)

(MB) R3391267-1 03/13/19 12:59

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	J		0.00180	0.00500

Laboratory Control Sample (LCS)

(LCS) R3391267-2 03/13/19 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.101	101	85.0-115	

WG1247650

Wet Chemistry by Method 4500H+ B-2011

QUALITY CONTROL SUMMARY

L1077050-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3390229-1 03/10/19 09:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	ug	ug	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 19.1C

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

WG1247121

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1077050-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3390115-1 03/09/19 11:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1076340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076340-01 03/09/19 11:35 • (DUP) R3390115-3 03/09/19 11:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

L1077167-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077167-01 03/09/19 11:42 • (DUP) R3390115-6 03/09/19 11:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3390115-2 03/09/19 11:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.438	87.6	85.0-115	

WG1250025

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1077050-01

ONE LAB. NATIONWIDE

L1075108-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1075108-14 03/14/19 14:30 • (DUP) R3391647-2 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1077890-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077890-01 03/14/19 14:30 • (DUP) R3391647-3 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	131	134	1	2.26		10

Laboratory Control Sample (LCS)

(LCS) R3391647-1 03/14/19 14:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	85.0	104	96.0-104	

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43625**	SampType: **MBLK**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **PBW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955903** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID: **LCS-43625**	SampType: **LCS**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **LCSW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955904** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.11	0.010	0.1000	0	108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954426** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	88.0	70	130			
Toluene	19	1.0	20.00	0	96.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		97.9	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.0	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.9	70	130			
Surr: Toluene-d8	9.6		10.00		95.6	70	130			

Sample ID: **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.8	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.1	70	130			
Surr: Toluene-d8	9.6		10.00		96.5	70	130			

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955791** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	20	1.0	20.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	9.9		10.00		98.8	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.7	70	130			
Surr: Dibromofluoromethane	9.3		10.00		93.2	70	130			
Surr: Toluene-d8	9.6		10.00		96.4	70	130			

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955792** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58313**	RunNo: **58313**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1955792** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	9.5		10.00		94.6	70	130			
Surr: Toluene-d8	9.7		10.00		96.8	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43610**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955319** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID: **LCS-43610**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955320** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.9	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952628** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952629** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	103	80	120			
Manganese	0.50	0.0020	0.5000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903294**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955503** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955504** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.46	0.020	0.5000	0	92.4	80	120			
Barium	0.47	0.020	0.5000	0	94.9	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.47	0.0060	0.5000	0	93.5	80	120			
Selenium	0.47	0.050	0.5000	0	93.2	80	120			
Silver	0.098	0.0050	0.1000	0	98.3	80	120			

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957972** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Lead	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957973** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.48	0.020	0.5000	0	96.4	80	120			
Lead	0.48	0.0050	0.5000	0	96.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1903294 RcptNo: 1

Received By: Leah Baca 3/6/2019 4:00:00 PM Leah Baca
Completed By: Anne Thorne 3/7/2019 9:09:17 AM Anne Thorne
Reviewed By: DS 3/7/19
Labeled by: IO 3/7/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 2 2
(<2 or >12 unless noted)
Adjusted? NO
Checked by: IO 3/7/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	8.1	Good	Yes			

Chain-of-Custody Record

Client: EA Engineering

320 Gold Ave SW-Ste 1300

Mailing Address:

ABQ, NM 87102

Phone #: 505-238-4410

email or Fax#: emorse@eaest.com

QA/QC Package:

☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Kirtland BFF Project

Project #: 62735DM02

6017-08

Project Manager: Devon Jercinovic

Sampler: Pete Ferrari

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 8.1C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1903294	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss Fe, Mn, Field Filtered	RCI
3-6-19	1455	H2O	KAFB-10658-DW-1dw LA 10658 LA	3-40mL	HCl	-001	X											
				2-40mL	NH_2SO_3	-001				X								
				1-250mL	HNO_3	-001				LA	X	X						
				1 125mL	HNO_3	-001										X		
				3-500mL	ASA	-001											X	
			TripBlank			-002												
			← 031619															

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3-6-2019	1520	Peter Ferrari		PT	3-6-19	1520
3-6-2019	1600			Client	3/6/19	1600

Remarks: email results to:
pmoss@eaest.com
emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 31, 2018

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1811665

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 11/13/2018 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued December 26, 2018.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S9-2-idw
Project: Kirtland BFF Project
Collection Date: 11/13/2018 11:00:00 AM
Lab ID: 1811665-001 **Matrix:** AQUEOUS **Received Date:** 11/13/2018 12:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Iron	0.077	0.020		mg/L	1	12/17/2018 12:05:26 PM	B56396
Manganese	0.30	0.0020	*	mg/L	1	12/17/2018 12:05:26 PM	B56396
EPA METHOD 7470: MERCURY						Analyst: **rde**	
Mercury	ND	0.00020		mg/L	1	11/16/2018 3:42:03 PM	41585
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	11/19/2018 11:47:18 AM	41597
Barium	0.45	0.020		mg/L	1	11/19/2018 11:47:18 AM	41597
Cadmium	ND	0.0020		mg/L	1	11/19/2018 11:47:18 AM	41597
Chromium	0.055	0.0060		mg/L	1	11/19/2018 11:47:18 AM	41597
Lead	ND	0.0050		mg/L	1	11/19/2018 11:47:18 AM	41597
Selenium	ND	0.050		mg/L	1	11/19/2018 11:47:18 AM	41597
Silver	ND	0.0050		mg/L	1	11/19/2018 11:47:18 AM	41597
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	1.4	0.19		µg/L	20	11/16/2018 1:42:48 PM	41558
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	46	1.0		µg/L	1	11/20/2018 1:46:48 AM	W55740
Toluene	380	10		µg/L	10	11/20/2018 11:08:49 AM	W55791
Ethylbenzene	130	10		µg/L	10	11/20/2018 11:08:49 AM	W55791
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/20/2018 1:46:48 AM	W55740
1,2,4-Trimethylbenzene	160	10		µg/L	10	11/20/2018 11:08:49 AM	W55791
1,3,5-Trimethylbenzene	59	1.0		µg/L	1	11/20/2018 1:46:48 AM	W55740
Xylenes, Total	500	15		µg/L	10	11/20/2018 11:08:49 AM	W55791
Surr: 1,2-Dichloroethane-d4	93.3	70-130		%Rec	1	11/20/2018 1:46:48 AM	W55740
Surr: 4-Bromofluorobenzene	140	70-130	S	%Rec	1	11/20/2018 1:46:48 AM	W55740
Surr: Dibromofluoromethane	106	70-130		%Rec	1	11/20/2018 1:46:48 AM	W55740
Surr: Toluene-d8	91.7	70-130		%Rec	1	11/20/2018 1:46:48 AM	W55740

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1811665-002 **Matrix:** AQUEOUS **Received Date:** 11/13/2018 12:45:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0095		µg/L	1	11/16/2018 2:14:33 PM	41558
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
Toluene	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
Ethylbenzene	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/20/2018 3:14:10 AM	W55740
Xylenes, Total	ND	1.5		µg/L	1	11/20/2018 3:14:10 AM	W55740
Surr: 1,2-Dichloroethane-d4	90.7	70-130		%Rec	1	11/20/2018 3:14:10 AM	W55740
Surr: 4-Bromofluorobenzene	94.7	70-130		%Rec	1	11/20/2018 3:14:10 AM	W55740
Surr: Dibromofluoromethane	98.0	70-130		%Rec	1	11/20/2018 3:14:10 AM	W55740
Surr: Toluene-d8	87.3	70-130		%Rec	1	11/20/2018 3:14:10 AM	W55740

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	11/23/2018 09:27	WG1199345

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	8.17	T8	1	11/20/2018 13:03	WG1199508

Sample Narrative:
L1045130-01 WG1199508: 8.17 at 8.4C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	11/19/2018 14:12	WG1198573

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	11/26/2018 11:52	WG1201440

WG1199345

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1045130-01

Method Blank (MB)

(MB) R3362332-1 11/23/18 09:14

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1044621-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1044621-02 11/23/18 09:20 • (DUP) R3362332-3 11/23/18 09:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	ND	0.00184	1	0.000		20

L1045568-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1045568-01 11/23/18 09:38 • (DUP) R3362332-6 11/23/18 09:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Cyanide	0.0398	0.0418	1	4.90		20

Laboratory Control Sample (LCS)

(LCS) R3362332-2 11/23/18 09:15

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.104	104	85.0-115	

L1045130-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045130-01 11/23/18 09:27 • (MS) R3362332-4 11/23/18 09:28 • (MSD) R3362332-5 11/23/18 09:29

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0946	0.0939	94.6	93.9	1	75.0-175			0.743	20

L1045989-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045989-01 11/23/18 09:47 • (MS) R3362332-7 11/23/18 09:48 • (MSD) R3362332-8 11/23/18 09:51

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	0.0118	0.0721	0.0816	60.3	69.8	1	75.0-125	J6	J6	12.4	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3361597-1 11/20/18 13:03 • (LCSD) R3361597-2 11/20/18 13:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
Corrosivity by pH	10.0	9.96	9.97	99.6	99.7	99.0-101			0.100	1

Sample Narrative:

LCS: 9.96 at 16.2C

LCSD: 9.97 at 16.2C

Method Blank (MB)

(MB) R3361239-1 11/19/18 14:11

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfice	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3361239-2 11/19/18 14:12

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.535	107	85.0-115	

L1046945-15 Original Sample (OS) • Duplicate (DUP)

(OS) L1046945-15 11/26/18 11:52 • (DUP) R3362892-2 11/26/18 11:52

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3362892-1 11/26/18 11:52

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	81.7	99.7	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-B**	SampType:	**MBLK**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**PBW**	Batch ID:	**B56396**	RunNo:	**56396**					
Prep Date:		Analysis Date:	**12/17/2018**	SeqNo:	**1885221**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-B**	SampType:	**LCS**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**LCSW**	Batch ID:	**B56396**	RunNo:	**56396**					
Prep Date:		Analysis Date:	**12/17/2018**	SeqNo:	**1885222**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0	98.5	85	115			
Manganese	0.48	0.0020	0.5000	0	95.7	85	115			

Sample ID	**LLLCS-B**	SampType:	**LCSLL**	TestCode:	**EPA Method 200.7: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID:	**B56396**	RunNo:	**56396**					
Prep Date:		Analysis Date:	**12/17/2018**	SeqNo:	**1885223**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.022	0.020	0.02000	0	111	50	150			
Manganese	0.0020	0.0020	0.002000	0	102	50	150			

Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41558**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**41558**	RunNo:	**55691**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1857030**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-41558**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**41558**	RunNo:	**55691**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1857031**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.10	0.010	0.1000	0	99.5	70	130			

Sample ID	**1811665-001BMS**	SampType:	**MS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**KAFB-106S9-2-idw**	Batch ID:	**41558**	RunNo:	**55731**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/19/2018**	SeqNo:	**1857291**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	1.7	0.19	0.09409	1.394	371	55	125			S

Sample ID	**1811665-001BMSD**	SampType:	**MSD**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**KAFB-106S9-2-idw**	Batch ID:	**41558**	RunNo:	**55731**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/19/2018**	SeqNo:	**1857292**	Units:	**µg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	2.0	0.19	0.09409	1.394	625	55	125	12.8	20	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/19/2018**	SeqNo: **1858192** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
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QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**
31-Dec-18

Client: EA Engineering Science & Technology
Project: Kirtland BFF Project

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/19/2018**	SeqNo: **1858192** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.5		10.00		85.2	70	130			
Surr: 4-Bromofluorobenzene	8.9		10.00		89.4	70	130			
Surr: Dibromofluoromethane	8.9		10.00		89.4	70	130			
Surr: Toluene-d8	9.0		10.00		90.3	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/19/2018**	SeqNo: **1858193** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	98.1	70	130			
Toluene	20	1.0	20.00	0	98.6	70	130			
Chlorobenzene	20	1.0	20.00	0	99.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/19/2018**	SeqNo: **1858193** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	21	1.0	20.00	0	107	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	97.1	70	130			
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.7	70	130			
Surr: 4-Bromofluorobenzene	9.4		10.00		93.8	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.9	70	130			
Surr: Toluene-d8	8.9		10.00		89.4	70	130			

Sample ID **1811665-001a ms**	SampType: **MS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **KAFB-106S9-2-idw**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/20/2018**	SeqNo: **1858203** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	71	1.0	20.00	46.50	122	60.5	137			
Toluene	430	1.0	20.00	394.5	160	70	130			ES
Chlorobenzene	20	1.0	20.00	0	98.4	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	109	67.6	130			
Trichloroethene (TCE)	21	1.0	20.00	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.5	70	130			
Surr: 4-Bromofluorobenzene	13		10.00		127	70	130			
Surr: Dibromofluoromethane	11		10.00		110	70	130			
Surr: Toluene-d8	9.2		10.00		91.6	70	130			

Sample ID **1811665-001a msd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **KAFB-106S9-2-idw**	Batch ID: **W55740**	RunNo: **55740**
Prep Date:	Analysis Date: **11/20/2018**	SeqNo: **1858204** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	67	1.0	20.00	46.50	103	60.5	137	5.39	20	
Toluene	410	1.0	20.00	394.5	92.0	70	130	3.22	20	E
Chlorobenzene	19	1.0	20.00	0	92.5	70	130	6.12	20	
1,1-Dichloroethene	20	1.0	20.00	0	101	67.6	130	8.07	20	
Trichloroethene (TCE)	19	1.0	20.00	0	96.7	70	130	8.74	20	
Surr: 1,2-Dichloroethane-d4	9.4		10.00		93.8	70	130	0	0	
Surr: 4-Bromofluorobenzene	14		10.00		137	70	130	0	0	S
Surr: Dibromofluoromethane	11		10.00		107	70	130	0	0	
Surr: Toluene-d8	9.2		10.00		91.6	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W55791**	RunNo: **55791**
Prep Date:	Analysis Date: **11/20/2018**	SeqNo: **1860051** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.9	70	130			
Surr: 4-Bromofluorobenzene	8.9		10.00		89.4	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.3	70	130			
Surr: Toluene-d8	9.0		10.00		90.0	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W55791**	RunNo: **55791**
Prep Date:	Analysis Date: **11/20/2018**	SeqNo: **1860054** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	20	1.0	20.00	0	99.1	70	130			
Surr: 1,2-Dichloroethane-d4	8.7		10.00		86.8	70	130			
Surr: 4-Bromofluorobenzene	9.0		10.00		89.7	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.2	70	130			
Surr: Toluene-d8	8.7		10.00		87.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41585**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**41585**	RunNo:	**55717**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1856635**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-41585**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**41585**	RunNo:	**55717**					
Prep Date:	**11/16/2018**	Analysis Date:	**11/16/2018**	SeqNo:	**1856636**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	99.5	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1811665**

31-Dec-18

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-41597**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**PBW**	Batch ID:	**41597**	RunNo:	**55737**				
Prep Date:	**11/17/2018**	Analysis Date:	**11/19/2018**	SeqNo:	**1857673**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-41597**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**				
Client ID:	**LCSW**	Batch ID:	**41597**	RunNo:	**55737**				
Prep Date:	**11/17/2018**	Analysis Date:	**11/19/2018**	SeqNo:	**1857674**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	101	80	120			
Barium	0.49	0.020	0.5000	0	97.9	80	120			
Cadmium	0.50	0.0020	0.5000	0	99.9	80	120			
Chromium	0.52	0.0060	0.5000	0	104	80	120			
Lead	0.50	0.0050	0.5000	0	99.4	80	120			
Selenium	0.54	0.050	0.5000	0	109	80	120			
Silver	0.099	0.0050	0.1000	0	99.0	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **EA Engineering Alb** Work Order Number: **1811665** RcptNo: **1**

Received By: **Victoria Zellar** **11/13/2018 12:45:00 PM** Victoria Zellar

Completed By: **Ashley Gallegos** **11/13/2018 2:11:13 PM**

Reviewed By: ENM 11/13/18 labeled by JAB 11/13/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 3 (2) (<2 or >12 unless noted)

Adjusted? No

Checked by: JAB 11/13/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.3	Good	Not Present			

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Client: EA Engineering	Turn-Around Time: ☒ Standard ☐ Rush
Mailing Address: 320 Gold SW #1300 Albuquerque NM 87102	Project Name: Kirtland BFF Project
Phone #: 505 238 4410	Project #: 62735 DM02 1017.08 P.O. 16219
email or Fax#: emorse@eaest.com	Project Manager: Devon Serdenovic
QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation)	Sampler: P Ferran
Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other	On Ice: ☒ Yes ☐ No
☐ EDD (Type)	# of Coolers: 1
	Cooler Temp(including CF): 2.3

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1811065	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe, Mn (Filtered)	
11-13-18	1100	H_2O	KAFB-10659-2-idw	3 40 mL	HCl	-001	X											
				3 40 mL	$Na_2S_2O_3$					X								
				1 250 mL	HNO_3							X						
				1 125 mL	HNO_3												X	
				3 asst	500 mL													X
			Trip Blank JAB 11/13/18			-002												

Date	Time	Relinquished by:	Received by:	Via: CDO	Date	Time
11-13-18	1245				11/13/18	12:45
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: Email Results to pmoss@eaest.com emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NM9570024423	1	505 385 3679	012267170 FLE

GENERATOR

5. Generator's Name and Mailing Address
KIRTLAND AIR FORCE BASE
2050 WYOMING BLVD SE BLDG 20685,
KIRTLAND AIR FORCE BASE, NM 87117
Generator's Phone: 505-846-9017

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: Advanced Chemical Transport Inc./DBA ACTENVIRO — U.S. EPA ID Number: CAR000070540

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Advanced Chemical Treatment
6133 Edith Blvd NE
Albuquerque, NM 87107
Facility's Phone: ~~505-349-5220~~ — U.S. EPA ID Number: NMD002208627

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII	9	DM	4050	P	D018
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) ERG#171; ACT92887 KIA (9) 55 SM — Project Number 190146 — Document #: D227573

~~24 HOUR EMERGENCY CONTACT: SCOTT CLARK 505 385 3679~~

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Wheelan, Katrina E — Signature: [signature] — Month: 2 — Day: 11 — Year: 19

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. — Port of entry/exit: — Date leaving U.S.:
Transporter signature (for exports only):

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Adam Kemp — Signature: [signature] — Month: 2 — Day: 11 — Year: 19
Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month — Day — Year

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete. — DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

GENERATOR NAME	MANIFEST NUMBER
KIRTLAND AIR FORCE BASE	012267322FLE

1. PROFILE NUMBER	2. WASTE CODE	3. WASTE SUBCATEGORY	4. UNDERLYING HAZARDOUS CONSTITUENTS	5. NWW or WW	6. SPECIAL CONDITIONS	N/A
ACT92887	D018	BENZENE		WW		X
			1,1,2,2-TETRACHLOROETHANE			
			1,2-DIBROMO-3-CHLOROPROPANE			
			1, 2-DIBROMOETHANE (EDB)			
			2,4-DIMETHYLPHENOL			
			2-BUTANONE (MEK) (METHYL ETHYL KETONE) [HZ]			
			2-METHYLPHENOL (o-CRESOL)			
			4-METHYL-2-PENTANONE (METHYL ISOBUTYL KETONE)			
			4-METHYLPHENOL (p-CRESOL)			
			ACENAPHTHENE			
			ACENAPHTHYLENE			
			ACETONE			
			ACETOPHENONE			
			ACROLEIN			
			ACRYLONITRILE			
			BARIUM			
			BENZENE			
			BIS(2-CHLOROETHOXY)METHANE			
			ETHYL BENZENE			
			FLUORENE			
			LEAD			
			METHYLENE CHLORIDE			
			NAPHTHALENE			
			PHENANTHRENE			
			PHENOL			
			TOLUENE (METHYLBENZENE)			
			TOTAL XYLENES			

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

Style CF27R LABELMASTER® (800) 621-5808 www.labelmaster.com

ACT environmental services

			TRICHLOROETHENE (TRICHLOROETHYLENE) [HZ]			

SPECIAL CONDITIONS: PLEASE NOTE ANY SPECIAL CONDITIONS THAT MAY APPLY TO EACH WASTE PROFILE NUMBER IN COLUMN 6 OF THIS FORM. IF NONE OF THE SPECIAL CONDITIONS BELOW EXIST AND THE WASTE MUST BE TREATED TO THE APPLICABLE STANDARDS IN 40CFR268.40, CHECK N/A FOR THE APPROPRIATE WASTE PROFILE.

A. Waste Requiring No Further Treatment

B. Lab Pack Waste Qualifying for Alternative Treatment und 40 CFR 268.40

C. Hazardous Waste Debris subject to standard treatment requirements, 40 CFR 268.40

D. Hazardous Waste Debris subject to alternative standards in 40 CFR 268 (list contaminants)

E. Waste Qualifying for Exemption and not subject to Land Disposal Restriction (Explain)

F. Characteristic waste that are subject to the treatment standards in 268.40 (other than those expressed as a required method of treatment) that are reasonably expected to contain underlying hazardous constituents as defined in 268.2(i); are treated on-site to remove hazardous characteristic; and are sent off-site for treatment underlying hazardous constituents (list constituents)

G. Characteristic wastes that contain underlying hazardous constituents as defined 268.2(i) that are treated on-site to remove the hazardous characteristic and the underlying hazardous constituents to levels in 268.48 Universal Treatment Standards.

H. For Chemical Manufacturers, Petroleum Refineries, Coke By-Product Facilities and RCRA TSDF handling wastes subject to 40 CFR 61 subpart FF ONLY. This waste is "Controlled Benzene Waste" which is subject to the notification requirements of 40 CFR subpart FF.

I. Certification for contaminated soil indicating the presence or absence of characteristic and / or listed hazardous wastes.

J. Certification for contaminated soil treated in accordance with 40 CFR 268.49

Waste analysis is attached where available; otherwise the information contained herein is based upon my thorough knowledge of the waste(s).

I hereby certify that I believe that the information I have submitted is true, accurate and complete.

SIGNATURE	TITLE	DATE
[signature]	Physical Scientist	20190211

LAND DISPOSAL RESTRICTION NOTIFICATION FORM FOR WASTES SUBJECT TO THE TREATMENT STANDARDS FOUND IN 40 CFR 268

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I have submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION B

I certify under penalty of law that I personally have examined and am familiar with the waste and that lab pack contains only wastes which have not been excluded under appendix iv to 40 CFR 268. I am aware that there are significant penalties for submitting a false certification, including fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION F

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic. This de-characterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION G

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 286.40 to remove the hazardous characteristic, and that the underlying hazardous constituents, as defined in 268.2 have been treated on site to the 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION I

I certify under penalty of law that I personally have examined this contaminated soil and it [DOES/DOES NOT] contain listed hazardous waste and [DOES/DOES NOT] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c).

WASTE STREAMS IDENTIFIED BY SPECIAL CONDITION J

I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

ORIGINAL SIGNATURE PAGE TO ACCOMPANY MANIFEST

ACT environmental services

6133 Edith Blvd. NE
Albuquerque, NM 87107
Phone: (505) 349-5220
Fax: (505) 344-7986

GENERATOR WASTE PROFILE SHEET

A. GENERATOR INFORMATION

Generator Name: KIRTLAND AIR FORCE BASE
Mailing Address: 2050 WYOMING BLVD SE BLDG 20685, ENVIRONMENTAL RESTORATION
KIRTLAND AIR FORCE BASE, NM 87117
Site Pick-up Address: 2050 WYOMING BLVD SE
KIRTLAND AIR FORCE BASE , NM 87117
Technical Contact: SCOTT CLARK Title: MAIN CONTACT
Name of Waste Process Generating: WELL WATER CONTAMINATED WITH BENZENE FROM BFF PROJECT
HAZARDOUS WELL DEVELOPMENT WATER

Profile Number: ACT92887
Generator US EPA ID: NM9570024423
Phone: 505 846 9017
Fax:
Email:

NAICS CODE: 928110 **Form Code:** W101 **Source Code:** G39

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25C OF 77F

Physical State: LIQUID **Color:** CLEAR **Clarity:** CLEAR **Phase Separation Number of Layers:** SINGLE **Odor:** NONE

PH: 6 - 8 **Specific Gravity:** 1 - 1 SP.GR. **Flash Point (F):** > 170 F **BTU Value:** BTU/LB NA

C. Chemical Composition / UHC's

BASED UPON: ANALYTICAL (INCLUDED) [X] **GENERATOR KNOWLEDGE** [ ]

	Range			
1,2,4-Trimethylbenzene	0	- .51	MG/L
1,2-dibromoethane (EDB)	0	- .11	MG/L
1,3,5-Trimethylbenzene	0	- .16	MG/L
Benzene	0	- 2.2	MG/L
Ethylbenzene	0	- .83	MG/L
Solids	1	- 20	%
Toluene	0	- 6.1	MG/L
Total Xylenes	0	- 3.7	MG/L
Water	80	- 99	%

D. METALS

	Total (PPM)	EP Toxicity (mg/l)
Arsenic:		
Barium:		
Cadmium:		
Chromium:		
Lead:		
Mercury:		
Chromium, Hexavalent		
Selenium:		
Silver:		
Copper:		
Nickel:		
Zinc:		
Thallium:		

E. OTHER COMPONENTS

OXIDIZER:		REACTIVE SULFIDES PPM	N
EXPLOSIVE:	N	REACTIVE CYANIDES PPM	N
SHOCK SENSITIVE:	N	WATER/AIR REACTIVE	N
TIRES:	N	THERMALLY UNSTABLE	N
PYROPHORIC:	N	TSCA REG PCB WASTE:	N
RADIOACTIVE:	N	COMPRESSED GASSES:	N
EXEMPT RAD:	N	CERCLA/SUPERFUND:	N
ETHIOLOGICAL:	N	PESTICIDE MANUFACTURING WASTE:	N

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III
DEBRIS N <500 PPM VOC as generated YES

Subject to NESHAP Regulations
US EPA Hazardous Waste Y
US EPA Hazardous Waste Codes: ; D018

F. Shipping Information:

DOT Hazardous Material YES Exempted NO
Proper Shipping Name: NA3082, Hazardous waste, liquid, n.o.s. (Benzene), 9 , PGIII
Hazard Class: 9
ID #: NA3082
PG: III
Anticipated Volume (Units): 12 DM
Per: QUARTER

G. Special Handling Instructions:

see analytical Hall Labs 1812939 & 1812940

H. GENERATOR'S CERTIFICATION:

I hereby certify that all information in this and all the attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify Advanced Chemical Treatment in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Scott Clark Title: Restoration Program Mgr Date: 1-9-19
Print Name: Scott Clark

				LOCATION CODE		KAFB BFF		
				FIELD SAMPLE ID		KAFB-106S9-DM-idw		
				SAMPLE DATE		14-Dec-18		
				SAMPLE PURPOSE		Waste Characterization		
Parameter	Method	Analyte	Units	NMAC NMWQCC[a]	TCLP Regulatory Level[b]	Result	QUAL	PQL
RCRA Characteristics	D-93/ SW1010A	Ignitability	°F	NS	See footnote[c]	> 170	--	--
	SM4500-CN E-2011	Reactive Cyanide	mg/L	NS	NS	ND	--	0.005
	SW9034	Reactive Sulfide	mg/L	NS	NS	ND	--	0.050
	SM4500-H+ B-2011	Corrosivity	S.U.	≥6 or ≤9	≥2 or ≤12.5	7.84	--	--
Metals	SW6010B	Arsenic	mg/L	0.1	5	ND	--	0.02
		Barium	mg/L	1.0	100	0.18	--	0.02
		Cadmium	mg/L	0.01	1	ND	--	0.002
		Chromium	mg/L	0.05	5	ND	--	0.006
		Lead	mg/L	0.05	5	ND	--	0.005
		Selenium	mg/L	0.05	1	ND	--	0.05
		Silver	mg/L	0.05	5	ND	--	0.005
		Iron (dissolved)	mg/L	1.0	NS	**3.9**	--	0.10
		Manganese (dissolved)	mg/L	0.20	NS	**2.4**	--	0.010
	SW7470A	Mercury	mg/L	0.002	0.2	ND	--	0.0002
Volatile Organic Compounds	SW8260B	Benzene	µg/L	10	500	**1900**	--	50
		Ethylbenzene	µg/L	750	NS	**820**	--	50
		Toluene	µg/L	750	NS	**4200**	--	50
		Xylenes, total	µg/L	620	NS	**3300**	--	100
		Methyl tert-butyl ether	µg/L	NS	NS	ND	--	120
		1,2,4-Trimethylbenzene	µg/L	NS	NS	510	--	50
		1,3,5-Trimethylbenzene	µg/L	NS	NS	160	--	50
Ethylene Dibromide	SW8011	1,2-Dibromoethane	µg/L	0.1	NS	**16**	--	1.9

Notes:

[a]NMWQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Ground Water of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC 2004). For metals, the NMWQCC numeric standard applies to dissolved metals with exception of total mercury.

[b]TCLP Regulatory Level - Resource Conservation Recovery Act (RCRA) hazardous waste characteristic limits per *40CFR Part 261 Subpart C, Section 261.20 - 261.24.*

[c]Ignitability charateristic for soilids from 40 CFR Part 261.21: "It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical change, and when ignited burns so vigorously and persistently that it creates a hazard."

> - greater than

< - less than

µg/L - microgram per liter

°F - degrees farenheit

ID - identification

mg/L - milligram per liter

ND - not detected above the PQL

NS - no standard

PQL - practical quantitation limit

QUAL - laboratory data qualifier

RCRA - Resource Conservation and Recovery Act

TCLP - Toxicity characteristic leaching procedure

Shading - detected concentration above the PQL

Shade and Bold - reported concentration exceeds the project screening level

S.U. - Standard units

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 07, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1812940

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 3 sample(s) on 12/14/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106S9-DM-idw
Project: Kirtland BFF Project
Collection Date: 12/14/2018 12:20:00 PM
Lab ID: 1812940-001 **Matrix:** AQUEOUS **Received Date:** 12/14/2018 2:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	12/19/2018 11:57:27 AM	42182
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **rde**	
Iron	3.9	0.10		mg/L	5	12/31/2018 11:05:35 AM	A56688
Manganese	2.4	0.010		mg/L	5	12/31/2018 11:05:35 AM	A56688
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	12/26/2018 1:07:20 PM	42228
Barium	0.18	0.020		mg/L	1	12/26/2018 1:07:20 PM	42228
Cadmium	ND	0.0020		mg/L	1	12/26/2018 1:07:20 PM	42228
Chromium	ND	0.0060		mg/L	1	12/28/2018 11:53:52 AM	42228
Lead	ND	0.0050		mg/L	1	12/26/2018 1:07:20 PM	42228
Selenium	ND	0.050		mg/L	1	12/26/2018 1:07:20 PM	42228
Silver	ND	0.0050		mg/L	1	12/26/2018 1:07:20 PM	42228
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	16	1.9		µg/L	200	12/21/2018 6:53:13 AM	42205
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	120		µg/L	50	12/20/2018 1:46:15 PM	B56490
Benzene	1900	50		µg/L	50	12/20/2018 1:46:15 PM	B56490
Toluene	4200	50		µg/L	50	12/20/2018 1:46:15 PM	B56490
Ethylbenzene	820	50		µg/L	50	12/20/2018 1:46:15 PM	B56490
Xylenes, Total	3300	100		µg/L	50	12/20/2018 1:46:15 PM	B56490
1,2,4-Trimethylbenzene	510	50		µg/L	50	12/20/2018 1:46:15 PM	B56490
1,3,5-Trimethylbenzene	160	50		µg/L	50	12/20/2018 1:46:15 PM	B56490
Surr: 4-Bromofluorobenzene	115	80-120		%Rec	50	12/20/2018 1:46:15 PM	B56490

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1812940-002
Matrix: TRIP BLANK
Received Date: 12/14/2018 2:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	2.5		µg/L	1	12/20/2018 6:19:07 PM	B56490
Benzene	ND	1.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
Toluene	ND	1.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
Ethylbenzene	ND	1.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
Xylenes, Total	ND	2.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	12/20/2018 6:19:07 PM	B56490
Surr: 4-Bromofluorobenzene	95.6	80-120		%Rec	1	12/20/2018 6:19:07 PM	B56490

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1812940-003
Matrix: TRIP BLANK
Received Date: 12/14/2018 2:00:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **JME**	
1,2-Dibromoethane	ND	0.0095		µg/L	1	12/20/2018 4:13:06 PM	42205

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	12/19/2018 18:16	WG1212975

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	7.84	T8	1	12/19/2018 12:32	WG1213186

Sample Narrative:
L1054232-01 WG1213186: 7.84 at 13.6C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	12/19/2018 17:38	WG1213544

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	12/19/2018 17:22	WG1213360

WG1212975

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1054232-01

ONE LAB. NATIONWIDE.

Method Blank (MB)

(MB) R3369756-1 12/19/18 17:42

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Reactive Cyanide	U		0.00180	0.00500

L1053139-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1053139-08 12/19/18 17:46 • (DUP) R3369756-3 12/19/18 17:47

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Reactive Cyanice	ND	0.000	1	0.000		20

L1053193-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1053193-04 12/19/18 18:06 • (DUP) R3369756-8 12/19/18 18:07

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Reactive Cyanide	0.00183	0.000	1	200	R1	20

Laboratory Control Sample (LCS)

(LCS) R3369756-2 12/19/18 17:43

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Reactive Cyanide	0.100	0.101	101	85.0-115	

L1053139-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053139-11 12/19/18 17:49 • (MS) R3369756-4 12/19/18 17:50 • (MSD) R3369756-5 12/19/18 17:51

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	ND	0.0966	0.0956	96.6	95.6	1	75.0-125			1.04	20

L1053193-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053193-03 12/19/18 18:01 • (MS) R3369756-6 12/19/18 18:02 • (MSD) R3369756-7 12/19/18 18:03

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Reactive Cyanide	0.100	J	0.0907	0.0883	90.7	88.3	1	75.0-125			2.68	20

WG1213186

Wet Chemistry by Method 4500H+ B-2011

QUALITY CONTROL SUMMARY

L1054232-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3369582-1 12/19/18 12:32

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:

LCS: 9.99 at 17.4C

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1054232	12/21/18 08:14

WG1213544

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1054232-01

Method Blank (MB)

(MB) R3359745-1 12/19/18 17:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

Laboratory Control Sample (LCS)

(LCS) R3369745-2 12/19/18 17:33

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.463	92.6	85.0-115	

WG1213360

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1054232-01

ONE LAB. NATIONWIDE.

L1053694-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053694-02 12/19/18 17:22 • (DUP) R3369898-2 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	81.9	80.9	1	1.23		10

L1054273-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1054273-01 12/19/18 17:22 • (DUP) R3369898-3 12/19/18 17:22

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3369898-1 12/19/18 17:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	83.9	102	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812940**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42205**	SampType:	**MBLK**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**PBW**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890046**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID	**LCS-42205**	SampType:	**LCS**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSW**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890047**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.089	0.010	0.1000	0	89.0	70	130			

Sample ID	**LCSD-42205**	SampType:	**LCSD**	TestCode:	**EPA Method 8011/504.1: EDB**					
Client ID:	**LCSS02**	Batch ID:	**42205**	RunNo:	**56512**					
Prep Date:	**12/20/2018**	Analysis Date:	**12/20/2018**	SeqNo:	**1890051**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.084	0.010	0.1000	0	83.6	70	130	6.22	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812940**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **B56490**	RunNo: **56490**
Prep Date:	Analysis Date: **12/20/2018**	SeqNo: **1889832** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	21		20.00		104	80	120			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **B56490**	RunNo: **56490**
Prep Date:	Analysis Date: **12/20/2018**	SeqNo: **1889833** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17	2.5	20.00	0	85.0	64.5	120			
Benzene	18	1.0	20.00	0	88.8	80	120			
Toluene	19	1.0	20.00	0	93.1	80	120			
Ethylbenzene	19	1.0	20.00	0	94.9	80	120			
Xylenes, Total	59	2.0	60.00	0	97.5	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	96.9	80	120			
1,3,5-Trimethylbenzene	19	1.0	20.00	0	95.2	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812940**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42182**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888152**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-42182**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**42182**	RunNo:	**56465**					
Prep Date:	**12/18/2018**	Analysis Date:	**12/19/2018**	SeqNo:	**1888153**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	97.3	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812940**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-A**	SampType:	**MBLK**	TestCode:	**EPA Method 6010B: Dissolved Metals**				
Client ID:	**PBW**	Batch ID:	**A56688**	RunNo:	**56688**				
Prep Date:		Analysis Date:	**12/31/2018**	SeqNo:	**1896947**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID	**LCS-A**	SampType:	**LCS**	TestCode:	**EPA Method 6010B: Dissolved Metals**				
Client ID:	**LCSW**	Batch ID:	**A56688**	RunNo:	**56688**				
Prep Date:		Analysis Date:	**12/31/2018**	SeqNo:	**1896948**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	102	80	120			
Manganese	0.50	0.0020	0.5000	0	99.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1812940**

07-Jan-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID	**MB-42228**	SampType:	**MBLK**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**PBW**	Batch ID:	**42228**	RunNo:	**56631**
Prep Date:	**12/20/2018**	Analysis Date:	**12/26/2018**	SeqNo:	**1894530** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID	**LCS-42228**	SampType:	**LCS**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**LCSW**	Batch ID:	**42228**	RunNo:	**56631**
Prep Date:	**12/20/2018**	Analysis Date:	**12/26/2018**	SeqNo:	**1894531** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.50	0.020	0.5000	0	101	80	120			
Barium	0.50	0.020	0.5000	0	101	80	120			
Cadmium	0.51	0.0020	0.5000	0	102	80	120			
Chromium	0.50	0.0060	0.5000	0	101	80	120			
Lead	0.50	0.0050	0.5000	0	99.2	80	120			
Selenium	0.49	0.050	0.5000	0	98.8	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1812940 RcptNo: 1

Received By: Isaiah Ortiz 12/14/2018 2:00:00 PM I-OK

Completed By: Anne Thorne 12/17/2018 12:27:43 PM Anne Thorne

Reviewed By: VVZ 12/17/18

Labeled by: DAD 12/17/18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Client		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 :1

(<2 or >12 unless noted)

Adjusted? NO

Checked by: DAD 12/17/18

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.2	Good				

Appendix I

1522 of 1539

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW #1300
Mailing Address:
Albuquerque, NM 87102
Phone #: 505 238 4410
email or Fax#: emorse@eaest.com
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush
Project Name: Kirtland BFF Project
Project #: 62735DM02 10T08
P.O. 16219
Project Manager: Devon Sercinovic
Sampler: P. Ferrari
On Ice: ☑ Yes ☐ No
# of Coolers: 1 (CF-1.0)
Cooler Temp(including CF): 1.2°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 812940
12-14-18	1220	H_2O	KAFB-106 S9-DM-idw	3 40 ml	HCl	-001
				2 40 ml	~~HCl~~ $Na_2S_2O_3$	-001
				1 250 ml	HNO_3	-001
				1 125 ml	HNO_3	-001
				500 ml	3 asst.	-001
			Trip Blank DAD 12/17/18			

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss, Fe Mn (Filtered)	RCI
X											
			X								
		—			X						
										X	
											X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-14-18	1440	Peter Ferrari	I—Q	CDO	12/14/18	1400
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 15, 2019

Devon Jercinovic

EA Engineering Science & Technology
320 Gold Ave SW Suite 1210
Albuquerque, NM 87102
TEL:
FAX

RE: Kirtland BFF Project OrderNo.: 1903297

Dear Devon Jercinovic:

Hall Environmental Analysis Laboratory received 2 sample(s) on 3/6/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: KAFB-106247-DW-idw
Project: Kirtland BFF Project
Collection Date: 3/6/2019 3:10:00 PM
Lab ID: 1903297-001 **Matrix:** AQUEOUS **Received Date:** 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **pmf**	
Mercury	ND	0.00020		mg/L	1	3/11/2019 7:27:42 PM	43610
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Iron	0.091	0.020		mg/L	1	3/8/2019 9:38:36 AM	A58213
Manganese	0.38	0.0020		mg/L	1	3/8/2019 9:38:36 AM	A58213
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **rde**	
Arsenic	ND	0.020		mg/L	1	3/13/2019 5:57:37 PM	43593
Barium	0.15	0.020		mg/L	1	3/11/2019 6:53:26 PM	43593
Cadmium	ND	0.0020		mg/L	1	3/11/2019 6:53:26 PM	43593
Chromium	0.024	0.0060		mg/L	1	3/11/2019 6:53:26 PM	43593
Lead	ND	0.0050		mg/L	1	3/13/2019 5:57:37 PM	43593
Selenium	ND	0.050		mg/L	1	3/11/2019 6:53:26 PM	43593
Silver	ND	0.0050		mg/L	1	3/11/2019 6:53:26 PM	43593
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	0.063	0.0095		µg/L	1	3/12/2019 5:56:59 PM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
Toluene	8.0	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
Ethylbenzene	1.1	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 6:58:00 AM	SL58271
Xylenes, Total	5.9	1.5		µg/L	1	3/12/2019 6:58:00 AM	SL58271
Surr: 1,2-Dichloroethane-d4	98.0	70-130		%Rec	1	3/12/2019 6:58:00 AM	SL58271
Surr: 4-Bromofluorobenzene	99.7	70-130		%Rec	1	3/12/2019 6:58:00 AM	SL58271
Surr: Dibromofluoromethane	93.8	70-130		%Rec	1	3/12/2019 6:58:00 AM	SL58271
Surr: Toluene-d8	98.1	70-130		%Rec	1	3/12/2019 6:58:00 AM	SL58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: EA Engineering Science & Technology
Client Sample ID: Trip Blank
Project: Kirtland BFF Project
Collection Date:
Lab ID: 1903297-002
Matrix: TRIP BLANK
Received Date: 3/6/2019 4:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8011/504.1: EDB						Analyst: **CLP**	
1,2-Dibromoethane	ND	0.0094		µg/L	1	3/12/2019 6:12:06 PM	43625
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
Toluene	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
Ethylbenzene	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	3/12/2019 7:22:00 AM	B58271
Xylenes, Total	ND	1.5		µg/L	1	3/12/2019 7:22:00 AM	B58271
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	1	3/12/2019 7:22:00 AM	B58271
Surr: 4-Bromofluorobenzene	98.0	70-130		%Rec	1	3/12/2019 7:22:00 AM	B58271
Surr: Dibromofluoromethane	97.0	70-130		%Rec	1	3/12/2019 7:22:00 AM	B58271
Surr: Toluene-d8	96.8	70-130		%Rec	1	3/12/2019 7:22:00 AM	B58271

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	03/13/2019 15:12	WG1248453

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	su			date / time	
Corrosivity by pH	8.01	T8	1	03/10/2019 09:00	WG1247650

Sample Narrative:
L1077039-01 WG1247650: 8.01 at 18.3C

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	03/09/2019 11:39	WG1247121

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	deg F			date / time	
Flashpoint	DNF at 170		1	03/14/2019 14:30	WG1250025

WG1248453

Wet Chemistry by Method 4500 CN E-2011

QUALITY CONTROL SUMMARY

L1077039-01

Method Blank (MB)

(MB) R3391267-1 03/13/19 12:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Reactive Cyanide	U		0.00180	0.00500

Laboratory Control Sample (LCS)

(LCS) R3391267-2 03/13/19 13:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	0.100	0.101	101	85.0-115	

WG1247650

Wet Chemistry by Method 4500CH+ B-2011

QUALITY CONTROL SUMMARY

L1077039-01

ONE LAB. NATIONWIDE.

Laboratory Control Sample (LCS)

(LCS) R3390229-1 03/10/19 09:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
Corrosivity by pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 19.1C

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:
Hall Environmental Analysis Laboratory		L1077039	03/14/19 17:04

WG1247121

Wet Chemistry by Method 9034-9030B

QUALITY CONTROL SUMMARY

L1077039-01

Method Blank (MB)

(MB) R3390115-1 03/09/19 11:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Reactive Sulfide	U		0.00650	0.0500

L1076340-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1076340-01 03/09/19 11:35 • (DUP) R3390115-3 03/09/19 11:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

L1077167-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077167-01 03/09/19 11:42 • (DUP) R3390115-6 03/09/19 11:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Reactive Sulfide	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3390115-2 03/09/19 11:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Reactive Sulfide	0.500	0.438	87.6	85.0-115	

WG1250025

Wet Chemistry by Method D93/1010A

QUALITY CONTROL SUMMARY

L1077039-01

ONE LAB. NATIONWIDE

L1075108-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1075108-14 03/14/19 14:30 • (DUP) R3391647-2 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	DNF at 170	DNF at 170	1	0.000		10

L1077890-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1077890-01 03/14/19 14:30 • (DUP) R3391647-3 03/14/19 14:30

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	deg F	deg F		%		%
Flashpoint	131	134	1	2.26		10

Laboratory Control Sample (LCS)

(LCS) R3391647-1 03/14/19 14:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	deg F	deg F	%	%	
Flashpoint	82.0	85.0	104	96.0-104	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43625**	SampType: **MBLK**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **PBW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955903** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.010								

Sample ID: **LCS-43625**	SampType: **LCS**	TestCode: **EPA Method 8011/504.1: EDB**
Client ID: **LCSW**	Batch ID: **43625**	RunNo: **58316**
Prep Date: **3/12/2019**	Analysis Date: **3/12/2019**	SeqNo: **1955904** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dibromoethane	0.11	0.010	0.1000	0	108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954426** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	88.0	70	130			
Toluene	19	1.0	20.00	0	96.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		97.9	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.0	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.9	70	130			
Surr: Toluene-d8	9.6		10.00		95.6	70	130			

Sample ID: **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **SL58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/11/2019**	SeqNo: **1954427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.8	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.1	70	130			
Surr: Toluene-d8	9.6		10.00		96.5	70	130			

Sample ID: **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **LCSW**	Batch ID: **B58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1954469** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	96.3	70	130			
Toluene	19	1.0	20.00	0	95.5	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		100	70	130			
Surr: Dibromofluoromethane	10		10.00		99.5	70	130			
Surr: Toluene-d8	9.5		10.00		94.5	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260: Volatiles Short List**
Client ID: **PBW**	Batch ID: **B58271**	RunNo: **58271**
Prep Date:	Analysis Date: **3/12/2019**	SeqNo: **1954474** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		103	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.0	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.4	70	130			
Surr: Toluene-d8	9.5		10.00		95.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43610**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955319** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID: **LCS-43610**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955320** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0048	0.00020	0.005000	0	95.9	80	120			

Sample ID: **1903297-001CMS**	SampType: **MS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **KAFB-106247-DW-id**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955337** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0042	0.00020	0.005000	0	83.6	75	125			

Sample ID: **1903297-001CMSD**	SampType: **MSD**	TestCode: **EPA Method 7470: Mercury**
Client ID: **KAFB-106247-DW-id**	Batch ID: **43610**	RunNo: **58296**
Prep Date: **3/11/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955338** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0040	0.00020	0.005000	0	79.5	75	125	4.96	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-A**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952628** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	0.020								
Manganese	ND	0.0020								

Sample ID: **LCS-A**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A58213**	RunNo: **58213**
Prep Date:	Analysis Date: **3/8/2019**	SeqNo: **1952629** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.51	0.020	0.5000	0	103	80	120			
Manganese	0.50	0.0020	0.5000	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1903297**

15-Mar-19

Client: EA Engineering Science & Technology

Project: Kirtland BFF Project

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955503** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58306**
Prep Date: **3/8/2019**	Analysis Date: **3/11/2019**	SeqNo: **1955504** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.46	0.020	0.5000	0	92.4	80	120			
Barium	0.47	0.020	0.5000	0	94.9	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.1	80	120			
Chromium	0.47	0.0060	0.5000	0	93.5	80	120			
Selenium	0.47	0.050	0.5000	0	93.2	80	120			
Silver	0.098	0.0050	0.1000	0	98.3	80	120			

Sample ID: **MB-43593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957972** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Lead	ND	0.0050								

Sample ID: **LCS-43593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **43593**	RunNo: **58367**
Prep Date: **3/8/2019**	Analysis Date: **3/13/2019**	SeqNo: **1957973** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.48	0.020	0.5000	0	96.4	80	120			
Lead	0.48	0.0050	0.5000	0	96.2	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: EA Engineering Alb Work Order Number: 1903297 RcptNo: 1

Received By: Leah Baca 3/6/2019 4:00:00 PM Leah Baca
Completed By: Anne Thorne 3/7/2019 9:22:06 AM Anne Thorne
Reviewed By: DS 3/7/19
Labeled by: IO 3/7/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Samples were collected the same day and chilled.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 22
(<2 or >12 unless noted)
Adjusted? NO
Checked by: IO 3/7/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	10.8	Good	Yes			

Appendix I

1539 of 1539

Chain-of-Custody Record

Client: EA Engineering
320 Gold SW #1300
Mailing Address:
Albuquerque NM 87102
Phone #: 505 238 4410
email or Fax#: emorse@eaest.com
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush
Project Name: Kirtland BFF Project
Project #: 62735DM02 101708
PO 16219
Project Manager: Devon Sercinovic
Sampler: P. Ferran
On Ice: ☒ Yes ☐ No
# of Coolers: (1)
Cooler Temp (including CF): 10.8C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Diss. Fe Mn	RCI
3-6-19	1510	H_2O	~~KAFB-106247-DW~~	3 40 ml	HCl	1903297-001	X											
			KAFB-106247-DW-idup	3 40 ml	$Na_2S_2O_3$	-001				X								
				1 250 ml	HNO_3	-001						X						
				1 125 ml	HNO_3	-001										X		
				3 asst	500 ml	-001											X	
			Trip Blank			-002												
			~~A~~ 03/0107															

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
3-6 2019	1520	Peter Ferran	Lora Andrews	FF	3-6-19	1520
3-6-19	1600			Client	3/6/19	1606

Remarks: Email results to pmoss@eaest.com emorse@eaest.com

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.