**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

02 February 2022

Colonel Ryan S. Nye, USAF
Vice Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

Mr. Frederic Shean
Hazardous Waste Bureau (HWB) Chief
New Mexico Environment Department
2905 Rodeo Park Drive East Building 1
Santa Fe NM 87505-6303

Dear Mr. Shean

Attached, please find the *Periodic Monitoring Report for July–September 2021 for the Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, Kirtland Air Force Base, New Mexico*, dated February 2022. This report summarizes groundwater monitoring and interim measure activities associated with the distal plume capture and treatment system at Solid Waste Management Units ST-106/SS-111.

If you have any questions or concerns, please contact Mr. Ryan Wortman at commercial line (505) 853-3484 or email ryan.wortman.3@us.af.mil.

Sincerely

NYE.RYAN.S.1122705990
Digitally signed by NYE.RYAN.S.1122705990
Date: 2022.02.02 14:56:44 -07'00'

RYAN S. NYE, Colonel, USAF
Vice Commander

Attachment:
Periodic Monitoring Report for July–September 2021, Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, Kirtland Air Force Base, New Mexico, Feb 22

cc:
NMED Resource Protection Division (Catechis), letter and CD
NMED HWB (Shean, Andress), 2 Hard Copies/2 CDs
NMED-HWB (Cobrain, Wear), letter and CD
NMED GWQB (Hunter), letter and CD
EPA Region 6 (King, Ellinger), letter and CD
COA (Ziegler), electronic only

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# FINAL

# KIRTLAND AIR FORCE BASE
# ALBUQUERQUE, NEW MEXICO

# PERIODIC MONITORING REPORT – JULY–SEPTEMBER 2021
# BULK FUELS FACILITY
# SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
# KIRTLAND AIR FORCE BASE, NEW MEXICO

## FEBRUARY 2022

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**2050 Wyoming Boulevard SE**
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# KIRTLAND AIR FORCE BASE
# ALBUQUERQUE, NEW MEXICO

# Periodic Monitoring Report – July–September 2021
# Bulk Fuels Facility
# Solid Waste Management Units ST-106/SS-111
# Kirtland Air Force Base, New Mexico

**February 2022**

**Prepared for**
Kirtland Air Force Base
2050 Wyoming Boulevard SE
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**Prepared by**
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**14. ABSTRACT**

This periodic monitoring report was prepared in accordance with Part 6.2.4.4 of the Kirtland Air Force Base (AFB) Resource Conservation and Recovery Act (RCRA) Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423 [Permit]) (New Mexico Environment Department, 2010). This report describes monitoring activities performed from July 1 through September 30, 2021, at Solid Waste Management Units ST-106/ SS-111, the Bulk Fuels Facility site, at Kirtland AFB, New Mexico. During this quarter, groundwater, drinking water from supply wells, and the groundwater treatment system (GWTS) samples were collected and analyzed for contaminants of potential concern, notably 1,2-dibromoethane (ethylene dibromide [EDB]), and other relevant field and laboratory parameters in accordance with the applicable provisions in Part 6.5 of the Permit. During this quarter, 64,497,300 gallons of groundwater were extracted and treated in the GWTS using a granular activated carbon filtration system; the treated effluent was discharged to the Tijeras Arroyo Golf Course main pond and injection wells KAFB-7 and KAFB-106IN2. The GWTS was operational for 97.5 percent of the time and removed approximately 1.82 grams of EDB during this quarter.

**15. SUBJECT TERMS**

Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, ethylene dibromide, 1,2-dibromoethane, EDB, interim measure, RCRA, groundwater sampling, groundwater treatment system operation, granular activated carbon

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# 40 CFR 270.11
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RYAN S. NYE, Colonel, U.S. Air Force
Vice Commander, 377th Air Base Wing

02-Feb-22
Date

This document has been approved for public release.

Brannon Lamar

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

04 FEB 2022
Date

# PREFACE

This periodic monitoring report for July–September 2021 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 W912PP-20-C-0020. The report addresses groundwater monitoring, drinking water supply well monitoring, interim measure operation and monitoring, and waste management activities at the Kirtland AFB Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, located adjacent to the City of Albuquerque, New Mexico. Note that soil vapor monitoring takes place routinely during the second and fourth quarters of the year.

The report contains data collected by EA as well as by other entities/sources that are not under EA's direct control (collectively called "non-EA Data"). All non-EA data reported herein are displayed in the form in which they were received from their source entity, and EA assumes no liability for its accuracy.

This report was prepared in accordance with applicable federal, state, and local laws and regulations, including the New Mexico Hazardous Waste Act, New Mexico Statutes Annotated 1978, New Mexico Hazardous Waste Management Regulations, Resource Conservation and Recovery Act, and regulatory correspondence between the New Mexico Environment Department Hazardous Waste Bureau and the U.S. Air Force, dated March 25 and May 20, 2016. The work presented in this report was conducted in accordance with Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit Number NM9570024423 and the Class V Underground Injection Well Discharge Permit Number 1839, both issued by the New Mexico Environment Department.

Monitoring of groundwater and drinking water, as well as operation of the groundwater treatment system, were conducted from July 1 through September 30, 2021.

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| µg/L | microgram(s) per liter |
| % | percent |
| AFB | Air Force Base |
| BFF | Bulk Fuels Facility |
| BTEX | benzene, toluene, ethylbenzene, and total xylenes |
| CFR | Code of Federal Regulations |
| DL | detection limit |
| DoD | Department of Defense |
| DP | Discharge Permit |
| EDB | 1,2-dibromoethane (ethylene dibromide) |
| EPA | U.S. Environmental Protection Agency |
| ft | foot (feet) |
| GAC | granular activated carbon |
| GCMP | Golf Course main pond |
| gpm | gallon(s) per minute |
| GWM | groundwater monitoring |
| GWTS | groundwater treatment system |
| IDW | investigation-derived waste |
| IMOA | Interim Measure Operational Area |
| LNAPL | light non-aqueous phase liquid |
| LOQ | limit of quantitation |
| MCL | maximum contaminant level |
| NMAC | New Mexico Administrative Code |
| NMED | New Mexico Environment Department |
| No. | Number |
| O&M | operation and maintenance |
| Permit | Hazardous Waste Treatment Facility Operating Permit No. NM9570024423 |
| psi | pound(s) per square inch |
| Q1 | first quarter of the year, January 1 through March 31 |
| Q2 | second quarter of the year, April 1 through June 30 |
| Q3 | third quarter of the year, July 1 through September 30 |
| Q4 | fourth quarter of the year, October 1 through December 31 |
| QAPP | Quality Assurance Project Plan |
| QSM | Quality Systems Manual |

| | |
|---|---|
| RCRA | Resource Conservation and Recovery Act |
| REI | reference elevation interval |
| SE | Southeast |
| SWMU | Solid Waste Management Unit |
| USGS | U.S. Geological Survey |
| VA | Veterans Affairs |
| VFD | variable frequency drive |
| VOC | volatile organic compound |
| WQCC | Water Quality Control Commission |

# EXECUTIVE SUMMARY

This report summarizes the monitoring activities performed for the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) site during the third quarter (Q3) of 2021 (July 1–September 30). These activities include quarterly groundwater monitoring, monthly drinking water supply well sampling and analysis, and evaluation of the groundwater pump and treat interim measure, which targets the off-Base dissolved-phase 1,2-dibromoethane (ethylene dibromide [EDB]) plume.

In Q3 2021, 71 groundwater monitoring wells were sampled. Consistent with previous quarters, the highest EDB and benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations were detected in wells within and near the BFF source area. EDB and BTEX were not detected in concentrations above the project screening levels for any groundwater sample collected north of Ridgecrest Drive Southeast (SE) in the Interim Measure Operational Area.

Sentinel wells, located between the groundwater plume and drinking water wells, were sampled in Q3 2021, and neither EDB nor BTEX were detected in those samples. Sentinel wells are sampled to provide early warning of approaching contamination to drinking water wells owned and operated by Kirtland AFB, the Albuquerque Bernalillo County Water Utility Authority, and the Raymond G. Murphy Veterans Affairs Medical Center.

Drinking water wells were sampled in Q3 2021, and neither EDB nor BTEX were detected in the final samples. There was an estimated detection of 0.10J micrograms per liter (µg/L) for total xylenes in the initial sample collected from KAFB-016 in September 2021, which is below the U.S. Environmental Protection Agency Maximum Contaminant Level (MCL) of 10,000 µg/L. KAFB-016 was resampled later in the month and results were non-detect for EDB and BTEX. The resample results are considered more representative for the September 2021 sampling event, because total xylenes have not previously been reported in KAFB-016 and may be associated with laboratory contamination or recently completed well maintenance. The detection and resample are discussed in detail in Section 4.2. Samples could not be collected from well KAFB-016 during July and August 2021 and well KAFB-015 in August and September 2021 since those wells were not operational during those sampling events.

Depths to groundwater were gauged in 174 groundwater monitoring wells. Groundwater elevations ranged from 4871.37 to 4877.19 feet (ft) above mean sea level, at an average depth of 460.79 ft below ground surface. The water table dropped an average of 0.54 ft since the second quarterly monitoring event. Light non-aqueous phase liquid (LNAPL) was detected and measured in five wells on Kirtland AFB within the source area plume in wells KAFB-106005 (0.04 ft), KAFB-106059 (0.01 ft), KAFB-106076 (0.02 ft), KAFB-106150-484 (0.71 ft), and KAFB-106154-484 (0.42 ft). The locations and thicknesses of LNAPL were consistent with previous monitoring events. The extent of LNAPL has remained stable since 2011, confined to the source area as noted in previous reports, and thus is delineated for Q3 2021.

Groundwater pumped from four extraction wells (KAFB-106228, KAFB-106234, KAFB-106233, and KAFB-106239) within the dissolved-phase EDB plume is treated at the groundwater treatment system (GWTS) on Kirtland AFB. In Q3 2020, the GWTS was operational 97.5 percent of the time, treated 67,497,300 gallons of groundwater, and removed an estimated 1.82 grams of EDB. The GWTS influent was below the MCL of 0.05 µg/L for EDB, and BTEX was not detected. Although the EDB concentrations were below the MCL, the influent was filtered through two treatment trains containing granular activated carbon. The effluent was pumped to the lined main pond at the Kirtland AFB Tijeras Arroyo Golf Course (52,106,700 gallons) and gravity-fed into injection wells KAFB-7 (4,859,400 gallons) and KAFB-106IN2 (10,531,200 gallons). The GWTS was intermittently offline August 2

through August 4, 2021, and September 14 through September 16, 2021, to facilitate the backflushing of injection well KAFB-106IN2 as needed.

# 1. INTRODUCTION

The monitoring and interim measure of the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) 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 Number (No.) NM9570024423 [Permit]) (New Mexico Environment Department [NMED], 2010). This periodic monitoring report was prepared in accordance with Parts 6.2.4.1, Quarterly Reporting, and 6.2.4.4, Periodic Monitoring Reports, of the Permit and presents data gathered during third quarter (Q3) 2021 operations. The reporting schedule is provided in the Work Plan for BFF Expansion of the Dissolved-Phase Plume Groundwater Treatment System (GWTS) Design (Kirtland AFB, 2017a).

The BFF site is located within the northwestern portion of Kirtland AFB, adjacent to the City of Albuquerque, as shown on the site location map (Figure 1-1). The Phase I RCRA Facility Investigation (Kirtland AFB, 2018a) provides a detailed description and history of the BFF. Ongoing groundwater monitoring (GWM) and the groundwater interim measure are discussed in this report.

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# 2. REGULATORY CRITERIA

The monitoring and interim measure of the Kirtland AFB BFF release are being implemented pursuant to the corrective action provisions in Kirtland AFB's Permit (NMED, 2010). The Permit is enforced by NMED's Hazardous Waste Bureau, which is authorized to administer the Permit by the U.S. Environmental Protection Agency (EPA). The site-specific monitoring and interim measure are conducted in accordance with the approved documents presented in Section 3. Relevant regulatory correspondence for Q3 2021 is provided in Appendix A-1.

## 2.1 Regulatory Standards and Project Screening Levels

The following regulatory standards and project screening levels are applied to assess the data collected during GWM and the interim measure being conducted at SWMUs ST-106/SS-111:

- For samples collected from GWM wells and drinking water supply wells, concentrations are compared to the project screening levels, which are the cleanup levels for contaminants in groundwater as provided in Part 6.2.3.1 of the Permit (NMED, 2010):
  - The project screening levels are the lowest of the:
    - New Mexico Water Quality Control Commission (WQCC) standard for groundwater with a total dissolved solids concentration of 10,000 milligrams per liter or less (New Mexico Administrative Code [NMAC], Title 20, Chapter 6, Part 2, Section 3103 (20.6.2.3103 NMAC); for metals, the New Mexico WQCC standard applies to dissolved metals and total mercury
    - Current EPA primary drinking water regulations (40 Code of Federal Regulations [CFR] Part 141, 1975) and secondary drinking water regulations (40 CFR Part 143, 1979) adopted by EPA under the Safe Drinking Water Act (42 U.S. Code §300f et seq., 1974)
  - If no federal maximum contaminant level or New Mexico WQCC standard exists for an analyte, the project screening level is the EPA Residential Tap Water Regional Screening Level (EPA, 2021)
- For samples collected monthly from drinking water supply wells for organic compound analysis, concentrations are compared to the primary and secondary drinking water regulations noted above.

## 2.2 Regulatory Correspondence and Permit Requirements

Regulatory correspondence for Q3 2021 is provided in Appendix A-1. In addition, the following documents are provided in Appendix A-2:

- Response to NMED regulatory comments to the Quarterly Monitoring Report for April–June 2019 (NMED, 2020b) (Note: The letter was received on July 11, 2020, but was labeled as July 11, 2019)
- Response to reporting requirements for all document submittals dated September 2, 2020

A crosswalk table between the Permit reporting requirements and this periodic monitoring report is

provided as Appendix A-3.

GWTS operation and performance monitoring are subject to the terms of Class V Underground Injection Well Discharge Permit (DP) No. 1839 (NMED, 2017a) for injecting treated groundwater to wells KAFB-7 and KAFB-106IN2. Kirtland AFB is also permitted to discharge to Tijeras Arroyo under National Pollutant Discharge Elimination System Permit No. NM0031216 (EPA, 2019). This discharge point was not used in Q3 2021; it is a contingency for emergency situations only (i.e., in the event that the Tijeras Arroyo Golf Course main pond [GCMP], KAFB-7, and KAFB-106IN2 are all inoperable).

## 2.3 Analytical Reporting Limits

To satisfy Department of Defense (DoD) contractual project requirements, groundwater sample analysis was performed in accordance with DoD Quality Systems Manual (QSM) Version 5.3 (DoD and Department of Energy, 2019), which addresses the EPA SW-846 methodologies performed on project samples. Drinking water analyses being performed under this contract are in accordance with the Permit and project work plans. The DoD QSM reporting limit requirements include: (1) detection limit (DL), (2) limit of detection, and (3) limit of quantitation (LOQ). The DoD reporting limits are commonly associated with the EPA method detection limit, reporting detection limit, and practical quantitation limit. Discussion regarding DoD reporting limits and laboratory data qualifiers is provided in Section 4.1.4.

# 3. SCOPE OF ACTIVITIES

The following activities were performed during Q3 2021 (representing 100 percent of planned work for this quarter):

- Groundwater sampling
- Water level and light non-aqueous phase liquid (LNAPL) gauging
- Drinking water supply well sampling
- GWTS operation and maintenance (O&M)
- Chemical analysis of samples collected
- Investigation-derived waste (IDW) management, disposal, and reporting

The Q3 2021 monitoring program was performed as follows:

- GWM was performed in accordance with the following work plans:
  - Work Plan for BFF Expansion of the Dissolved-Phase Plume GWTS Design, Revision 2 (Kirtland AFB, 2017a), approved with conditions by NMED in the letter dated May 31, 2017 (NMED, 2017b)
  - Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Revision 1 (Kirtland AFB, 2017b), approved with conditions by NMED in the letter dated February 23, 2018 (NMED, 2018a)
  - Work Plan for Data Gap Monitoring Well Installation (Kirtland AFB, 2017c), approved with conditions by NMED in the letter dated February 28, 2018 (NMED, 2018b)
- Drinking water supply well sampling was performed in accordance with the Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Revision 1 (Kirtland AFB, 2017b), approved with conditions by NMED in the letter dated February 23, 2018 (NMED, 2018a)
- GWTS operations, sampling, and the discharge of treated effluent were performed in accordance with the following:
  - GWTS O&M Plan (Kirtland AFB, 2016a), which was approved with modifications by NMED in the letter dated December 12, 2016 (NMED, 2016), and revisions to the O&M Plan, which address the expanded GWTS (Kirtland AFB, 2017d, 2018b)
  - DP-1839, issued by NMED in April 2017 (NMED, 2017a)
  - EPA National Pollutant Discharge Elimination System Permit No. NM0031216, issued in September 2019 (EPA, 2019)

Field methods are provided in Appendix B-1, and a list of former well identifications for cross-reference with historical documentation is provided in Appendix B-2. A consolidated GWM work plan (Kirtland AFB, 2021a) and an updated O&M plan (Kirtland AFB, 2021b) were submitted to NMED in the first quarter (Q1) of 2021 and will be implemented following approval by NMED.

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# 4. MONITORING RESULTS

The following sections describe results of samples collected from GWM wells and drinking water supply wells during Q3 2021.

## 4.1 Groundwater Monitoring

As of Q3 2021, the BFF GWM well network was comprised of 174 GWM wells as shown on Figure 4-1. Figure 4-2 depicts the well network sampled during Q3 2021. The groundwater monitoring program is summarized in Table 4-1, and well gauging results are summarized in Table 4-2. Work was performed following the field methods specified in Appendix B-1.

Appendices pertinent to GWM are listed below:

- Appendix C:
  - C-1 Daily Quality Control Reports – Groundwater Sampling
  - C-2 Groundwater and LNAPL Measurements
  - C-3 Groundwater Purge Logs and Sample Collection Logs
  - C-4 Groundwater Sample Chain-of-Custody Forms
  - C-5 Descriptions from Previous Reports
  - C-6 U.S. Geological Survey Sentinel Well and VA Proximal Well Data
- Appendix D:
  - D-1 Groundwater Analytical Data
  - D-2 Data Quality Evaluation Report – Groundwater Samples
  - D-3 Data Packages – Groundwater Samples
  - D-4 EPA Data Verification and Validation Figures

Results of samples collected from GWM wells are discussed based on their location (north or south) in relation to Ridgecrest Drive Southeast (SE). The source area plume is located south of Ridgecrest Drive SE. The Interim Measure Operational Area (IMOA) for groundwater is located north of Ridgecrest Drive SE (Figure 4-1). The current sampling regime by quarter is provided in Table 4-1.

GWM activities included gauging the depths to groundwater and measuring LNAPL thickness (Table 4-2, Figures 4-3 and 4-4); field parameters were measured in groundwater from wells sampled using low-flow techniques. Water quality field parameter measurements are not performed on groundwater samples collected using passive sampling methodology. Groundwater samples were submitted for laboratory analysis, and results are discussed in Section 4.1.5.

### 4.1.1 New Groundwater Monitoring Activities

Six GWM wells were installed between November 2020 and March 2021 in accordance with the Work Plan for Data Gap Monitoring Well Installation KAFB-106248 to KAFB-106252 (Kirtland AFB, 2019). These monitoring wells were completed as nested wells that included one water table well and one well screened in the vadose zone to account for expected water table rise. The nomenclature for these wells follows the convention used for previous nested GWM wells installed for SWMUs ST-106/SS-111 including the prefix KAFB, the borehole identification, and a three-digit suffix identifying the depth in

feet below ground surface to the top of the screen in each well. The six new GWM wells require a total of eight quarters of baseline sampling before they will be incorporated into the sampling regimen based on their objective. The summary of the sample dates and the remaining quarters of the quarterly baseline sampling for these wells is provided in Table 4-3. The status of these six GWM wells is as follows:

- Monitoring well KAFB-106S10-443, installed in Q4 2020, was sampled for the first time in Q1 2021. The analytical results are presented in Section 4.1.5.

- Four GWM wells, KAFB-106249-450, KAFB-106250-447, KAFB-106251-443, and KAFB-106252-425, were installed in Q1 2021 and sampled for the first time in second quarter (Q2) 2021 between February 23 and March 23, 2021.

- Well KAFB-106248-452 was completed in March 2021, and baseline sampling was initiated in Q2 2021 on April 5, 2021.

### 4.1.2 Groundwater and Light Non-Aqueous Phase Liquid Gauging

Gauging performed in Q3 2021 is summarized in Table 4-2. Daily quality control reports for groundwater sampling are contained in Appendix C-1. Gauging deviations, including wells not gauged, are discussed in Section 4.1.2.2. Measurement instrument calibration is provided in Appendix C-2, Table C-2-1. Gauging monitoring results are presented in Section 4.1.2.1. Depth to water and thickness of LNAPL in the GWM wells were gauged using five oil-water interface probes, each dedicated to groups of wells with similar historical analytical results to reduce cross-contamination potential. Measurement differences from a control probe were calculated in accordance with the methods described in Appendix B-1, and subsequent data corrections are presented in Appendix C-2, Table C-2-2.

The interface probes were checked for proper operation, and the cables were checked for integrity prior to each use; the equipment was decontaminated after gauging each well. If LNAPL was detected using the interface probe, a plastic bailer was used to confirm the presence and thickness of the LNAPL. In addition, during low-flow sampling using Bennett pumps, every well was checked for the presence of LNAPL prior to setting the pump. Depths to LNAPL, if applicable, and depths to groundwater were recorded electronically in the field, and data are shown in Appendix C-2, Table C-2-2.

#### *4.1.2.1 Groundwater Gauging Results*

Within the GWM network, well screens were designed to either intersect the water table or to be completely below the water table to capture conditions at deeper intervals. Of the wells designed to intersect the water table, 52 now have submerged well screens; screen submergence ranged from 2.51 feet (ft) in well KAFB-106207 to 23.00 ft in well KAFB-106025. On average, the water table dropped by 0.54 ft since the Q2 2021 monitoring event, and the depth to water across the site was approximately 460 ft below ground surface.

The potentiometric surface map for REI 4857 was created using the GWM wells in REI 4857 and REI 4857/4838 (Figure 4-3). There are some older wells (pre-2011 installation) that are assigned to both REI 4857 and REI 4838 because their screened intervals lie approximately between REI 4857 and REI 4838. These wells are referred to as REI 4857/4838 in the Q3 tables, and data from these wells are used in the analysis of both REI 4857 and REI 4838; however, wells that are designated as only belonging to REI 4838 are not included in Figure 4-3.

Figure 4-3 excludes KAFB-106211 and KAFB-106S10-443; KAFB-106211 was dry and the measurement from KAFB-106S10-443 was obtained outside of the synoptic gauging event. Based on the data, horizontal groundwater gradients within REI 4857 are dominated by a radial flow pattern toward depressions in the water table, which are primarily attributable to groundwater extraction wells. The potentiometric surfaces for REI 4838 and REI 4814 are assessed in Q2 and Q4 of each year.

LNAPL was present in five wells: KAFB-106005 (0.04 ft), KAFB-106059 (0.01 ft), KAFB-106076 (0.02 ft), KAFB-106150-484 (0.71 ft), and KAFB-106154-484 (0.42 ft). LNAPL data is consistent with previous (historical) monitoring events (Table 4-4). Figure 4-4 depicts the wells where LNAPL was detected in Q3 2021, as well as historical LNAPL locations. The extent of LNAPL is confined to the area south of Ridgecrest Drive SE, on Kirtland AFB, and within the footprint of the source area plume. The extent of LNAPL was delineated in Q3 2021 as confirmed by surrounding wells with screens that intersect the water table.

#### *4.1.2.2 Gauging Deviations*

There were no gauging deviations in Q3 2021.

### 4.1.3 Groundwater Sampling

Groundwater samples were collected from the Q3 GWM network between July 7 and July 22, 2021; a combination of low-flow pump systems and passive sampling was utilized (Table 4-5). Table 4-5 also shows sample depths. Wells sampled in Q3 2021 are shown on Figure 4-2.

The standard analytical suite for Q3 2021 includes benzene, toluene, ethylbenzene, and total xylenes (BTEX), 1,2-dibromoethane (ethylene dibromide [EDB]), metals, anions, and alkalinity with the analyses varying by well location (see Table 4-5). In addition, wells in the baseline period (KAFB-106S10-443, KAFB-106249-450, KAFB-106250-447, KAFB-106251-443, KAFB-106252-425, and KAFB-106248-452) were sampled for volatile organic compounds (VOCs) in lieu of BTEX, gasoline range organics, and diesel range organics. Field parameters were measured in wells sampled using low-flow pump systems only. Appendix B-1 describes the field methods used for GWM. The groundwater purge and sampling forms are provided in Appendix C-3, and the chain-of-custody forms are provided in Appendix C-4.

Groundwater samples were analyzed by Eurofins Lancaster Laboratories Environmental, LLC, in Lancaster, Pennsylvania, which maintains current DoD Environmental Laboratory Accreditation Program certification. Sampling was conducted in accordance with the applicable technical requirements in Parts 6.5.5 and 6.5.17 of the Permit (NMED, 2010).

In response to the changing regional groundwater gradient, GWM wells and their associated groundwater data are currently described based on one of the three reference elevation intervals (REIs) for the BFF site: 4857, 4838, and 4814. REIs are feet above mean sea level elevations that divide the GWM network into data sets comprised of wells that are screened across their respective elevations, allowing for a vertical evaluation of groundwater parameters and contaminant concentrations. A detailed explanation of how the REIs are defined is provided in Appendix C-5. In addition, this appendix includes discussion on field parameters in reference to passive sampling, passive sampling data evaluation, regional groundwater gradient, and former well designation and associated sampling regimes.

#### *4.1.3.1 Sampling Deviations*

There were no groundwater sampling deviations in Q3 2021.

### 4.1.4 Data Review and Usability Results

Laboratory deliverables and data quality evaluation reports were prepared and provided in accordance with Parts 6.5.18.2 and 6.5.18.3 of the Permit (NMED, 2010). Data verification and data validation are sequential steps in a data review process that are performed by the contractor collecting the data (verification) and an independent third-party subcontractor (validation). Data verification was performed on the Q3 2021 data set to ensure method, procedural, and contractual compliance with project-specific requirements in the Quality Assurance Project Plan (QAPP) for Groundwater Monitoring and Interim Remedial Operations, BFF, SWMU ST106/SS-111, Kirtland AFB, New Mexico (Kirtland AFB, 2021c).

Following data verification, 100 percent (%) of the Q3 2021 groundwater analytical data underwent EPA Stage 2B data validation by an independent third-party subcontractor, Environmental Data Services, Inc., Palm Beach Gardens, Florida. Data validation consists of an analyte- and sample-specific process that extends the evaluation of analytical data beyond the data verification process to determine the quality of a specific data set in accordance with analytical method quality control and DoD QSM requirements as documented in the QAPP (Kirtland AFB, 2021c). Validation includes review of data quality indicators to assess the precision, accuracy, representativeness, comparability, completeness, and sensitivity of the analytical data set and determine that the data achieve the project data quality objectives. Data qualifiers that may be applied to data during the validation process include "J", "U", and "R". The "J" qualifier signifies an estimated result, the "U" qualifier indicates a non-detect result, and "R" signifies rejected data. Data qualified with "J" and "U" are usable to achieve project objectives; however, "R" qualified sample data do not meet project objectives. Upon completion of the verification and validation process, the data were assessed to determine if the project data quality objectives were achieved and deemed usable for their intended purpose; no data was rejected.

Final validated groundwater analytical data are presented in Appendix D-1. The Data Quality Evaluation Report for groundwater samples collected in Q3 2021 is provided in Appendix D-2, and the EPA Level II laboratory data reports are provided in Appendix D-3. Further details regarding EPA data verification and validation processes are documented in Figures 2 and 4 of the Guidance on Environmental Data Verification and Data Validation (EPA, 2002) provided in Appendix D-4.

Data from GWM monitoring in Q3 2021 were found to be usable to achieve the project data quality objectives as qualified based on validation. Analytical data were qualified "J" and "UJ" for estimated detect and non-detect data, respectively, and "U" for signifying non-detect results. In addition, the laboratory data results indicate the LOQs (the equivalent to the EPA practical quantitation limits) exceeded the project screening level for five non-detect VOC analytes (acrolein, acrylonitrile, hexachloro-1,3-butadiene, 1,2-dibromo-3-chloropropane, and 1,2,3-trichloropropane) reported for three samples that did not require dilution during analysis. The project screening level for the five analytes is lower than the laboratory DoD QSM reporting limits. However, the analytes were not detected and are not considered contaminants of concern related to the BFF site. The five VOC analytes were reported from the SW8260C long baseline sampling list of VOCs for the newly installed well samples GW248-452 and duplicate, and GW252- 425 and duplicate, and GW252- 425. All other non-detect results with LOQs exceeding project screening levels were associated with samples requiring dilution due to elevated target analyte concentrations (Appendix D-1). The laboratory may also perform screening of samples prior to analysis so they are able to achieve DoD QSM contractual analytical requirements; the screening would indicate when dilution is necessary, so analysis is performed within the calibration standards. Qualified data are still deemed usable to achieve project objectives based on validation guidance. Details regarding data validation and data qualifiers are included in Appendix D-2.

Subsequent to performing data validation, the validation data qualifiers were uploaded to the EQuIS® project database. The groundwater data presented and discussed in this report are final validated data and determined through validation to have achieved project data quality objectives and is thus usable for the purpose it was collected. Final validated data will be uploaded to the U.S. Air Force data repository through the Environmental Resources Program Information Management System. EPA Level IV data packages will be maintained by Kirtland AFB and made available to NMED upon request in accordance with Part 6.5.18.2 of the Permit (NMED, 2010).

### 4.1.5 Groundwater Chemical Analytical Data Results

Groundwater analytical data results for newly installed wells that are within the baseline period are presented in Table 4-6. Analytical results for other wells are presented in Tables 4-7 and 4-8; EDB and BTEX are presented in Table 4-7, and inorganic compounds are presented in Table 4-8. Contaminant concentrations are discussed in the following sections. Analytical results for both regular samples and field duplicates are presented in the tables. When a duplicate sample was reported to have a higher value than the regular sample, it was presented in the figures in lieu of the regular sample value for conservatism. Analytical results and screening levels are provided in a sortable, searchable format in Appendix D-1, and further discussion is included in the Data Quality Evaluation Report (Appendix D-2).

In this report, sample results from GWM wells are discussed based on their location relative to the IMOA, the southern border of which is defined by Ridgecrest Drive SE (Figure 4-1); as a consequence, they will be described as north or south of Ridgecrest Drive SE. The source area plume is located south of Ridgecrest Drive SE. The IMOA for the groundwater interim measure is located north of Ridgecrest Drive SE.

Historical analytical results, including the current quarter and the previous three sampling events for the wells sampled in Q3 2021, are provided in Tables 4-9 and 4-10 for EDB and BTEX, respectively. Q3 2021 concentrations are depicted for EDB on Figure 4-5 and for BTEX on Figure 4-6.

The following analytical methods were used for sample analysis:

- EDB by EPA Method SW8011
- BTEX and VOCs by EPA Method SW8260C
- Total petroleum hydrocarbons by EPA Method SW8015D
- Metals by EPA Methods SW6010C and SW6020A
- Anions by EPA Methods E300.0 and E353.2
- Alkalinity by Standard Method 2320B

#### *4.1.5.1 Organic Compounds Analytical Results*

The following subsections discuss EDB and BTEX groundwater analytical results for the current quarter.

##### *4.1.5.1.1 EDB Analytical Results*

Results for EDB for monitoring wells within the baseline period are presented in Table 4-6, and EDB analytical results for the remaining wells are presented in Table 4-7. The EDB analytical results are summarized below.

***EDB Analytical Results Sentinel Wells***

There were no detections of EDB in sentinel GWM wells in Q3 2021; sentinel well locations are shown on Figure 4-7. Sentinel wells are those located between contaminant plumes and a water supply well. These wells provide early detection if contaminants migrate toward the water supply wells. EDB concentrations are depicted on Figure 4-5.

***EDB Analytical Results North of Ridgecrest Drive SE***

Concentrations of EDB did not exceed the 0.05 micrograms per liter (µg/L) project screening level in any of the groundwater samples collected north of Ridgecrest Drive SE. However, EDB was detected below the project screening level in the groundwater samples collected from monitoring wells KAFB-106041 (0.036 µg/L), KAFB-106224 (0.01 J µg/L), KAFB-106241-428 (0.013 J µg/L), KAFB-106243-425 (0.025 J µg/L), and KAFB-106252-425 (0.014 J µg/L) as shown in Figure 4-5 and Tables 4-6 and 4-7.

***EDB Analytical Results South of Ridgecrest Drive SE***

Concentrations of EDB exceeded the project screening level in 10 wells south of Ridgecrest Drive SE. EDB concentrations in these wells ranged from 0.055 µg/L in well KAFB-106S3-449 (Figure 4-5 and Table 4-7) to 230 µg/L in well KAFB-106S10-443 (Figure 4-5 and Table 4-6). These data are consistent with previous quarterly results, where project screening level exceedances for EDB are located within and near the source area.

#### *4.1.5.1.2 BTEX Analytical Results*

Groundwater samples were collected for BTEX analysis in accordance with Table 4-5. BTEX concentrations are depicted on Figure 4-6. The BTEX results are discussed below.

***BTEX Analytical Results Sentinel Wells***

There were no detections of BTEX in sentinel GWM wells in Q3 2021; sentinel well locations are shown on Figure 4-7.

***BTEX Analytical Results North of Ridgecrest Drive SE***

The only well in the IMOA that was part of the sampling regimen for BTEX in Q3 2021 was well KAFB-106252-425, and the results were below the laboratory detection limits (Table 4-6).

***BTEX Analytical Results South of Ridgecrest Drive SE***

Benzene exceeded the project screening level of 5.0 µg/L in nine wells, similar to the exceedance distribution for EDB. Concentrations ranged from 37 µg/L in well KAFB-106S9-447 to 7,400 µg/L in well KAFB-106S8-451 (Table 4-7).

Toluene exceeded the 1,000 µg/L project screening level in four wells, ranging from 6,400 µg/L in well KAFB-106S1-447 (Table 4-7) to 13,000 µg/L in well KAFB-106S10-443 (Table 4-6).

Ethylbenzene exceeded the 700 µg/L project screening level in well KAFB-106S5-446 at a concentration of 1,600 µg/L (Table 4-7).

Total xylenes exceeded the 620 µg/L project screening level in seven wells. Concentrations ranged from 650 µg/L in well KAFB-106005 to 4,100 µg/L in well KAFB-106S8-451 (Table 4-7).

#### *4.1.5.2 Inorganic Compound Analytical Results*

Analyses for inorganic compounds included total metals (arsenic, lead, calcium, magnesium, potassium, and sodium), dissolved metals (iron and manganese), anions (bromide, chloride, sulfate, and nitrate/nitrite nitrogen), and alkalinity. Inorganic analytical results are presented in Tables 4-6 and 4-8. Total metals, anions, and alkalinity are not site contaminants but are analyzed to evaluate the geochemical conditions of the aquifer.

#### *4.1.5.3 Sampling Results for U.S. Geological Survey Sentinel Wells and VA Proximal Wells*

The U.S. Geological Survey (USGS) monitors 11 sentinel and 3 proximal wells located in a total of 4 well nests (USGS VA well nest, USGS Trumbull well nest, USGS Southern well nest, and USGS Caesar Chavez well nest) between the Kirtland AFB BFF EDB plume and water supply wells that are owned and operated by the Albuquerque Bernalillo County Water Utility Authority and Raymond G. Murphy VA Medical Center (Figure 4-7). This monitoring is conducted as a means of providing independent observation of water quality in the vicinity of these water supply wells. Samples are collected from these sentinel wells quarterly. For Q3 2021, these samples were collected using dual membrane samplers from February 1 to February 5, 2021. The samples were analyzed for VOCs and EDB by the USGS National Water Quality Laboratory using Method O-4127-96 (Connor et al., 1998). No detections were found in the Q3 2021 samples. The USGS transmittal letter, including the Q3 2021 data results, is provided in Appendix C-6.

#### *4.1.5.4 Field Parameter Monitoring Results*

Field parameters were collected from wells sampled using the low-flow sampling method; these wells are located in the source area plume. Field parameter data for Q3 2021 and historical field parameter data from the three previous quarters are presented in Appendix C-3, Table C-3-1.

### 4.1.6 Groundwater Monitoring Well Network Maintenance

The GWM well network was inspected to ensure that the condition of all protective covers and wellheads met the intended performance and security requirements. During the inspection period, 21 wells required additional adhesive to be applied to vault seals, 14 wells required bolt thread housing re-threading, 8 bolts were replaced, 3 wells required the replacement of vault seals, 1 exhaust line plug was replaced, 1 security lid was drilled out in order to allow a better rotation of the lock, 1 lock was replaced, and 1 well required the replacement of a 9/16” bolt for a 1/2” security bolt (well KAFB-106250). In addition, standing water (between 0.05 and 0.5 ft) was removed from 12 well vaults. Due to competent “J-plugs” that seal the well from water intrusion, standing water did not impact the wells’ water quality. See Table 4-11.

## 4.2 Drinking Water Supply Well Monitoring

Four drinking water supply wells are sampled monthly as part of the monitoring program associated with the BFF site. Wells KAFB-003, KAFB-015, and KAFB-016 provide drinking water to Kirtland AFB employees on Base and tenants of Maxwell Housing, which is located outside of Kirtland AFB. Drinking water supply well ST106-VA-2 provides drinking water to VA Medical Center patients, employees, and visitors. These drinking water wells belong to community water systems that are regulated by the NMED Drinking Water Bureau in accordance with the Safe Drinking Water Act that require that samples be analyzed for EDB and BTEX to document that they have not been impacted by the contaminant plume.

### 4.2.1 Drinking Water Supply Well Sampling

Drinking water supply wells KAFB-003, KAFB-015, KAFB-016, and ST106-VA-2 were sampled monthly during Q3 2021 if they were operational. Samples were not collected from well KAFB-016 during July and August 2021 and well KAFB-015 in August and September 2021 since the wells were not operational during those sampling events.

Daily quality control reports are provided in Appendix E-1, and the completed sample collection logs and chain-of-custody forms are provided in Appendix E-2. Drinking water supply samples were submitted to Eurofins TestAmerica Inc., Savannah, Georgia, for the following analyses:

- EDB using EPA Method 504.1
- BTEX using EPA Method 524.2

Analytical results were validated by Environmental Data Services, Inc. The Data Quality Evaluation Report is provided in Appendix F-1. The Level II analytical laboratory data reports for July, August, and September 2021 are provided in Appendix F-2.

#### *4.2.1.1 Sampling Deviations*

Samples were not collected from supply well KAFB-016 during July and August 2021 and from supply well KAFB-015 in August and September 2021 since the wells were not operational during those sampling events. In accordance with project requirements, well KAFB-016 was resampled on September 28, 2021, due to a low-level detection of total xylenes (0.10 J µg/L) reported in the well sample collected September 7, 2021. Total xylenes have not previously been reported in KAFB-016, so the data appear to be anomalous and may be associated with laboratory contamination or recently completed well maintenance. The results of the resample and field duplicate were non-detect for BTEX, in line with historical results (see Table 4-11).

### 4.2.2 Data Review and Usability Results

Following data verification, the Q3 2021 drinking water analytical data underwent a 100% Stage 3 data validation performed by Environmental Data Services, Inc. The data verification and validation steps are discussed in detail in Section 4.1.4.

All data were valid based on the evaluation criteria, and the data completeness was 100%. The data met data quality objectives and were appropriate for use in project decision-making. Upon completion of the verification and validation process, the data were assessed to determine if the project data quality objectives were achieved and deemed usable for their intended purpose. The quality control parameter

and data quality evaluation results are provided in the Data Quality Evaluation Report provided in Appendix F-1. Final validated data are provided in Table 4-11.

### 4.2.3 Drinking Water Supply Well Analytical Results for Q3 2021

Appendix F-3 includes supply well analytical data from Q3 2021 and the three previous quarters. EDB and BTEX monthly results for Q3 2021 are presented in Table 4-11 and Figure 4-8. Other than as discussed for well KAFB-016 and the September 28, 2021, resampling event, no detectable concentrations of EDB or BTEX were observed in the drinking water supply wells samples, consistent with historical results. Well KAFB-016 will continue to be monitored on a monthly basis.

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# 5. INTERIM MEASURE OPERATION AND MONITORING

This section presents the Q3 2021 GWTS operation, performance monitoring and EDB removal, system maintenance and expansion, and analysis of the lines of evidence for the system. Appendices pertinent to GWTS operation and performance are:

- Appendix G-1 GWTS Plant O&M Documentation
- Appendix G-2 GWTS Performance Sample Collection Logs
- Appendix G-3 GWTS Performance Analytical Data
- Appendix G-4 Data Quality Evaluation Report – GWTS Samples
- Appendix G-5 Data Packages – GWTS Samples
- Appendix G-6 New Mexico 811 Line Locate Tickets

## 5.1 Groundwater Treatment System Operation

The GWTS is part of the interim measure implemented pursuant to the corrective action provisions in Kirtland AFB's Permit, which states that interim measures may be necessary to reduce or prevent migration of hazardous wastes or hazardous constituents that have, or may result in, an unacceptable human or environmental receptor exposure to hazardous wastes or hazardous constituents while long-term corrective actions remedies are being evaluated and implemented (NMED, 2010). The purpose of the interim measure is to collapse and treat the dissolved-phase EDB plume within the IMOA, which is located north of Ridgecrest Drive SE. The GWTS includes:

- Four extraction wells: KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239
- Influent conveyance piping
- Two carbon treatment trains (designed for but not currently operating at 800-gallon per minute [gpm] maximum capacity) located within the GWTS building
- Effluent conveyance lines

Treated effluent is discharged to either the GCMP or is gravity-fed into one of the injection wells, KAFB-7 or KAFB-106IN2 (Figure 5-1). Kirtland AFB is also permitted to discharge to Tijeras Arroyo under the National Pollutant Discharge Elimination System Permit NM0031216 (EPA, 2019). This discharge point will only be used in emergency situations (i.e., in the event that the GCMP, KAFB-7, or KAFB-106IN2 are all inoperable). In Q3 2021, monitoring wells in the vicinity of well KAFB-7 were sampled for EDB, BTEX, and metals. Wells KAFB-0505, ST105MW507R, KAFB-0508, KAFB-2628, and KAFB-2629, associated with the Kirtland ST-105 abatement plan, were sampled July 13–14, 2021. As a requirement of DP-1839, these wells are sampled annually; this was the fourth sampling event for these wells since DP-1839 was issued on April 28, 2017. Analytical results are presented in Table 5-1. Analytical results for these wells did not exceed their respective project screening level, where a project screening level has been established. The analytical data, along with an analysis of groundwater flow in the vicinity of KAFB-7, will be included in the ST-105 Annual Report.

The operation of the GWTS is subject to the terms of DP-1839. The requirements associated with the conditions of DP-1839 and the location of reporting requirements in this report are summarized in Table 5-2.

### 5.1.1 Groundwater Treatment System Treatment Volumes and Percentage Run Time

For the purpose of run time evaluation, GWTS operation is defined as the time during which groundwater is being pumped from at least one extraction well and subsequently treated and discharged. Table 5-3 provides a monthly and quarterly summary of the extraction well performance during Q3 2021, including individual extraction well run times.

Table 5-4 provides a cumulative summary of groundwater quantities extracted, treated, and discharged. During Q3 2021, the GWTS treated 67,497,300 gallons of groundwater, of which 41,966,500 gallons were treated in Train 1 and 25,530,800 gallons were treated in Train 2. The GCMP received 52,106,700 gallons of the treated effluent, while 4,859,400 gallons were discharged to injection well KAFB-7 and 10,531,200 gallons were discharged to injection well KAFB-106IN2.

During this quarter, the GWTS was operational 97.5% of the time (Table 5-3), with planned and unplanned system shutdowns, including shutdowns during well conditioning of KAFB-106IN2, affecting the overall run time as described in Sections 5.3.1 and 5.3.3.

### 5.1.2 Extraction Well Performance Metrics

Quarterly extraction well performance data required for DP-1839 reporting compliance are provided in Table 5-3. Average operational extraction flow rates do not include flow rates during downtime. Well performance graphs are provided in Appendix G-1.

Extraction wells are prioritized for pumping based on their impact on the EDB plume in the IMOA and protection of the municipal water supply wells. Based on GWTS performance monitoring and wellhead sampling results, extraction wells KAFB-106228 and KAFB-106239 are the highest priority as they currently have the greatest impact on the reduction of the EDB plume in the IMOA. Well KAFB-106234 is the next highest priority as it serves to capture the distal plume and acts as a hydrologic barrier between the EDB plume in the IMOA and the municipal water supply wells to the northeast. Well KAFB-106233 has minimal impact on EDB plume reduction and is, therefore, the most likely to be deprioritized. The following is a summary of average operational flows and run times in Q3 2021 (Table 5-3):

- Water was extracted from KAFB-106228 at an average operational flow rate of 132.0 gpm with a run time of 96.9%.
- Water was extracted from KAFB-106233 at an average operational flow rate of 158.7 gpm with a run time of 97.5%.
- Water was extracted from KAFB-106234 at an average operational flow rate of 170.3 gpm with a run time of 97.5%.
- Water was extracted from KAFB-106239 at an average operational flow rate of 74.1 gpm with a run time of 96.0%.

### 5.1.3 Injection Well Performance Metrics

Quarterly injection well performance data required for DP-1839 reporting compliance are provided in Table 5-5. Injection well performance figures are provided in Appendix G-1. The following performance data apply to effluent injection in Q3 2021:

- Groundwater was injected into KAFB-7 at an average operational flow rate of 597.8 gpm with a run time of 7.3%.

- Groundwater was injected into KAFB-106IN2 at an average operational flow rate of 558.4 gpm with a run time of 16.1%.

## 5.2 Groundwater Treatment System Performance Monitoring and 1,2-Dibromoethane Removal

GWTS performance monitoring is performed in conformance with the most recently approved Work Plan (Kirtland AFB, 2017a) as well as the O&M Plan (NMED, 2016; Kirtland AFB, 2016a, 2017d, 2018b). DP-1839 provides additional sampling criteria. Table 2 of DP-1839 provides a list of the compounds that are most frequently monitored at the GWTS (NMED, 2017a). Q3 2021 GWTS analytical performance metrics and EDB mass removal are discussed in the following sections.

### 5.2.1 Sampling and Analytical Results

In Q3 2021, water samples from Train 1 (connected to KAFB-106233 and KAFB-106234) and Train 2 (connected to KAFB-106228 and KAFB-106239) were collected monthly from:

1. The untreated influent sample identifications GWTS-BFF-INF1 and GWTS-BFF-INF2 for Train 1 and 2, respectively)

2. A port located in-between the initial and final granular activated carbon (GAC) vessels (sample identifications GWTS-BFF-GAC1 and GWTS-BFF-GAC2 for Train 1 and 2, respectively)

3. The treated effluent (sample identifications GWTS-BFF-EFF1 and GWTS-BFF-EFF2 for Train 1 and 2, respectively)

These samples were analyzed for EDB, BTEX, and dissolved iron and manganese. EDB concentrations and mass removal for Q3 2021 are summarized in Table 5-6. Sample results and effluent discharge limits are provided in Tables 5-7 and 5-8 for Trains 1 and 2, respectively, and are discussed in detail below. GWTS performance sample collection logs are provided in Appendix G-2, and analytical data for this quarter and the previous three quarters are provided in Appendix G-3.

Concentrations of EDB in the influent samples for Train 1 were below the laboratory DL for all samples collected during Q3 2021; therefore, no mass of EDB was estimated to be captured and removed in the initial GAC vessel of Train 1.

For the last groundwater samples collected during each of the months in Q3 2021, concentrations of EDB were detected in the influent samples for Train 2 below the 0.05 µg/L project screening level at estimated concentrations of 0.015 J, 0.028 J, and 0.014 J µg/L on July 26, August 23, and September 27, 2021, respectively. An estimated 1.82 grams of EDB was captured in the initial GAC vessel and was removed by Train 2. Mass removal is determined by multiplying the monthly influent concentration by the respective total weekly treated volume for the respective treatment train. Quantities of mass removed (along with additional concentration data for influent EDB) during Q3 2021 are presented in Table 5-6.

BTEX was not detected in influent samples collected from either train during Q3 2021.

Dissolved manganese was not detected in the influent samples collected from Train 1 and was detected below the project screening level in monthly influent samples collected from Train 2 in Q3 2021. Dissolved iron was not detected in monthly influent samples collected from either train.

Concentrations of EDB, BTEX, dissolved iron, and dissolved manganese were non-detect in effluent monthly samples collected from both trains during Q3 2021.

In addition to above mentioned samples, samples were collected from both Train 1 and Train 2 influent and effluent in July 2021 to satisfy annual influent and effluent sampling requirements as provided in Table 3 of DP-1839. The samples were analyzed for VOCs, semivolatile organic compounds, anions, and total phenol, in addition to the routine monthly analytes. Results for the annual samples collected from both trains are provided in Table 5-9. Influent and effluent samples collected for annual analysis had detected concentrations of nitrite-nitrate nitrogen below the project screening level of 10 milligrams per liter (Table 5-9). VOCs, semivolatile organic compounds, and phenols were not detected in any of the samples collected. Results for the annual samples indicate no significant changes in the concentrations of the contaminants of concern since the 2020 annual samples were collected (Kirtland AFB, 2020).

#### *5.2.1.1 Sampling Deviations*

There were no GWTS sampling deviations in Q3 2021.

### 5.2.2 Data Review and Usability Results

The Q3 2021 GWTS analytical data underwent EPA Stage 2B data validation by Environmental Data Services, Inc. following data verification. The data verification and validation steps are discussed in detail in Section 4.1.4.

Upon completion of the verification and validation process, the data were assessed for accuracy, precision, representativeness, comparability, completeness, and sensitivity to determine if the project data quality objectives were achieved and deemed usable for their intended purpose. The data validation results are included in the Data Quality Evaluation Report provided in Appendix G-4, and the Level II laboratory data reports are provided in Appendix G-5.

## 5.3 Groundwater Treatment System Maintenance and Expansion Activities

Q3 2021 maintenance activities at the GWTS were performed in accordance with the O&M Plan (NMED, 2016; Kirtland AFB, 2016a, 2017d, 2018b) and are discussed in the following sections.

### 5.3.1 Routine Maintenance Activities

Routine maintenance is any activity described as such in the GWTS O&M Plan. A summary of routine maintenance activities is provided below.

#### *5.3.1.1 Quarterly Routine Maintenance Activities*

During Q3 2021, influent and effluent bag filters on both trains were not replaced for Q3 as they did not reach the differential pressure of 4 pounds per square inch (psi) required for replacement by the GWTS O&M Plan. The differential pressure at the initial GAC vessel on Train 1 was 3.1 psi on June 30, 2021, and, on September 27, 2021, the differential pressure was 3.1 psi (Appendix G-1). The differential pressure at the initial GAC vessel on Train 2 was 7.7 psi on June 28, 2021, and, on September 27, 2021,

the differential pressure was 8.2 psi.

In Q3 2021, the influent basket strainers were cleaned 15 times for Train 1 and 17 times for Train 2. The effluent Wye strainers were cleaned twice for both trains. Wye strainers/basket strainers were cleaned to maintain equalization of the influent tanks and prevent cavitation at the influent pump intakes as they accumulate biologic materials coming in with the influent.

The GWTS routine maintenance schedule is provided in Table 5-10, and non-routine maintenance activities that were performed during Q3 2021 are discussed in Section 5.3.3 and in Table 5-11.

### 5.3.2 Conveyance Line Security and Administrative Controls

Kirtland AFB is registered as a line-owner with New Mexico 811 for the off-Base portion of the conveyance lines. U.S. Air Force permits are required for all on-Base excavation projects, and, in Q3 2021, Kirtland AFB responded to 14 off-Base tickets requested through New Mexico 811 (Appendix G-6). There were no conveyance line breaches, and all off-Base conveyance lines remained intact.

### 5.3.3 Quarterly Non-Routine Maintenance Activities

Non-routine maintenance activities are defined as maintenance items that fall outside the scope of the GWTS O&M Plan but need to be addressed to maintain consistent GWTS operation. A summary of shutdowns associated with non-routine maintenance activities occurring during Q3 2021 is provided in Table 5-11. Major non-routine maintenance performed in Q3 2021 is described in the following paragraphs.

On July 9, 2021, KAFB-106233 and KAFB-106234 went offline for approximately 0.5 hours due to an internal sump pump malfunction.

On July 22, 2021, KAFB-106228 went offline for approximately 14.5 hours due to a level transducer malfunction. The well was shut down again on July 26, 2021, for 1 hour to install a new transducer.

On July 27, August 30, and September 24, 2021, the GWTS was shut down for testing on the uninterrupted power supply. This is done to ensure that all backup power supplies are functioning properly in the event of an unexpected system shutdown.

From August 2 to August 4, 2021, the GWTS was offline intermittently for the conditioning of injection well KAFB-IN2. The injection well conditioning consists of a series of backwash and injection cycles that are performed to remove formational plugging in the subsurface and return capacity to the injection well. Backwash cycles consist of backwashing (pumping groundwater) the injection at a flowrate that is greater than the injection flowrate to remove sediment and condition the flow pathways in the subsurface. Water purged from the well during the backwash cycles was transferred to the GCMP via the effluent conveyance line. Backwash cycles consist of backwashing (pumping groundwater) the injection at a flowrate that is greater than the injection flowrate to remove sediment and condition the flow pathways in the subsurface. Water purged from the well during the backwash cycles was transferred to the GCMP via the effluent conveyance line. Injection cycles consisted of the injection of treated effluent water into the well at the plant operational flowrate. Injection cycles consisted of the injection of treated effluent water into the well at the plant operational flowrate.

A total of 22 backwashing cycles and 6 injection cycles were performed during the well conditioning program. The injection specific capacity was increased from 15.32 gpm per foot of screen at the beginning of the program to 30.88 gpm per foot of screen at completion. Injection well KAFB-106IN2 was placed back in service up completion of the conditioning program.

On August 3, 2021, KAFB-106239 was shut down for 10.25 hours because of slime build-up from conditioning. Disinfecting the well took place on August 16, 2021.

On August 12, 2021, the plant was shut down for about 3 hours to run pressure testing through the effluent line of the GWTS. This was done to ensure that there were no leaks in the system from possible over-pressurization at KAFB-106IN2 during conditioning. The GWTS effluent line passed the pressure test.

Extraction well KAFB-106239 was disinfected on August 16, 2021, to mitigate bacterial growth and biofouling as well as to increase well efficiency. Extraction well disinfection was performed in accordance with the Standard Operating Procedure (NMED, 2018b). Pre- and post-treatment samples were analyzed for bromate and chlorite using EPA Method E300.1. Perchlorate was analyzed using EPA Method E331.0. Bromate and chlorite were not detected in either sample. Perchlorate was detected at concentrations ranging from 0.13 to 0.18 µg/L, below the project screening level of 14 µg/L, in both samples (Appendix G-1, Table G-1-5). Groundwater from the Middle Rio Grande Basin has naturally-occurring perchlorate concentrations ranging from 0.12 to 1.8 µg/L (Plummer et al., 2006).

On August 19, 2021, KAFB-106228 was offline for approximately 3.25 hours during the installation of additional security fencing around the KAFB-106228 electrical shed. The well was restarted upon completion of the fencing installation.

On September 13, 2021, the GWTS was offline for approximately 0.2 hours to replace the internal sump pump.

From September 14 to September 16, 2021, the GWTS was offline intermittently for the conditioning of injection well KAFB-IN2. A total of 35 backwashing cycles and 9 injection cycles were performed during the well conditioning program. The injection specific capacity was increased from 14.57 gpm per foot of screen at the beginning of the program to 23.82 gpm per foot of screen at completion. Injection well KAFB-106IN2 was placed back in service upon completion of the conditioning program.

On September 20, 2021, Train 1 was shut down for 1.0 hours and Train 2 was shut down for 0.5 hours to assess a malfunction with the effluent variable frequency drive (VFD) cooling fans. The cooling fan within the Train 1 VFD was replaced. Replacement of the Train 2 effluent VFD cooling fan is scheduled for Q4 2021.

# 6. WASTE MANAGEMENT

All GWM activities are pre-planned each quarter to prepare for the proper handling, packaging, storage, and disposal of IDW. The initial planning process for quarterly GWM activities includes the categorization of GWM wells into three groups: non-hazardous, intermediate, and hazardous. This grouping guides how generated purge water is handled and managed.

Well-specific GWM data from the previous two quarters were reviewed to determine into what category purge water from each well will be placed for the current quarter. For non-hazardous monitoring wells with extensive, historical GWM data that consistently demonstrated purge water met GWTS acceptance criteria (i.e., "Generator Knowledge, Section 6.2), those wells were discharged to the GWTS without further review. Non-hazardous and non-hazardous intermediate wells (wells with previous detections of analytes of concern) had purge water segregated for placement in the IDW yards. Upon receipt of new quarterly GWM data, an evaluation was conducted against the acceptance criteria of the GWTS for final disposal determination. GWM data from intermediate wells was reviewed prior to approval for discharge to the GWTS or offsite disposal. All wells categorized as hazardous were managed as a hazardous waste and were not discharged to the GWTS.

Both hazardous and non-hazardous IDW was generated in Q3 2021. This section discusses the details of the waste generated, disposed of, and managed during the quarter.

The following activities generated IDW during Q3 2021:

- Groundwater monitoring activities generating both hazardous and non-hazardous liquid waste
- Excess trip blank liquid deemed unusable generated non-hazardous liquid waste

There was no solid non-hazardous or hazardous waste generated during Q3 2021.

Appendices pertinent to waste management are:

- H-1 Non-Hazardous Liquid IDW Profiling and Disposal Documentation
- H-2 Hazardous IDW Profiling and Disposal Documentation

## 6.1 Non-Hazardous Investigation-Derived Waste

Non-hazardous liquid waste was generated from quarterly GWM sampling activities. Appendix H-1 provides specific information regarding the non-hazardous liquid IDW generated and disposed of during Q3 2021.

### 6.1.1 Groundwater Monitoring Liquid Investigation-Derived Waste

Non-hazardous and intermediate IDW purge water collected during sampling of the GWM wells was placed in 55-gallon plastic drums. The drums were sealed with matching plastic lids with steel locking-ring collars, labeled with vinyl non-hazardous waste labels, and transferred to the designated non-hazardous IDW yard located on Kirtland AFB. Small volumes of IDW water, typically generated from passive sampling devices or sampling of drinking water wells, were placed in labeled, 5-gallon plastic buckets (pails) with sealing lids. In Q3 2021, 288.5 gallons of non-hazardous water was generated from standard GWM activities and disposed of at the GWTS (Appendix H-1, Table H-1-1). A total of 10 gallons of trip blank water was disposed of in Q3 2021 (Appendix H-1, Table H-1-2). All non-hazardous

waste met the GWTS acceptance criteria, was processed through the GWTS, and was discharged to the GCMP.

Some liquid IDW that was approved for GWTS disposal was not processed through the GWTS due to scheduling constraints, GWTS discharge limitations, and/or O&M activities. At the end of Q3 2021, 13 gallons of water originating from GWM were temporarily accumulated in the "Pending Disposal" area of the IDW yard (Appendix H-1, Table H-1-3).

Non-hazardous liquid IDW that was collected but held pending receipt and evaluation of analytical data to determine if it met GWTS acceptance criteria was placed in the "Pending Analysis" area of the IDW yard. At the end of Q3 2021, 7.0 gallons of liquids were being held in this area (Appendix H-1, Table H-1-4).

### 6.1.2 Non-Hazardous Drilling Liquid Investigation-Derived Waste

There was no non-hazardous liquid IDW generated or held in Q3 2021.

### 6.1.3 Non-Hazardous Solid Waste

No non-hazardous solid waste was generated from GWM or GWTS operations in Q3 2021. However, routine, non-hazardous disposable solid waste was generated during GWM activities. This included single-use dual membrane samplers, disposable in-line filters, nitrile gloves, and paper trash. These items were disposed of as municipal solid waste, and volumes were not tracked.

### 6.1.4 Non-Hazardous Well Drilling Solid Investigation-Derived Waste

No non-hazardous solids (i.e., soil) was generated during Q3 2021.

### 6.1.5 Special Waste Well Drilling Solid Investigation-Derived Waste

No special waste was generated or disposed of in Q3 2021. Special waste is defined as petroleum-contaminated soil that has total petroleum hydrocarbon concentrations greater than 100 milligrams per kilogram (Subparagraph [i] of Paragraph [13] of Subsection S of NMAC 20.9.2.7).

## 6.2 Hazardous Investigation-Derived Waste

Hazardous or potentially hazardous IDW generated as part of the Kirtland BFF Project are accumulated in one of two less than 90-day RCRA accumulation areas. Hazardous waste generated from routine GWM sampling and/or well maintenance activities (purge or well rehabilitation water) are placed in the BFF less than 90-Day RCRA accumulation area. Hazardous or potentially hazardous waste generated during drilling activities are held in the Zia Park temporary less than 90-day RCRA accumulation area.

Waste determination is performed using analytical data of the purge water or through "Generator Knowledge." If the waste was verified to be hazardous, the IDW would remain in this accumulation area until it was removed from Kirtland AFB and properly disposed of off-Base. If the IDW was determined to not meet hazardous waste criteria, it was recategorized as non-hazardous and transferred to the "Pending Disposal" area of the non-hazardous IDW yard.

For monitoring wells located in the source area of the groundwater plume that show consistent data to indicate the purge water to be hazardous, "Generator Knowledge" was used for hazardous waste determination per RCRA regulations 40 CFR 262.11(d)(1).

All hazardous waste must be removed from Kirtland AFB and properly disposed of off-Base within the required 90-day accumulation time limit. Hazardous waste was transported off Kirtland AFB only after it was properly profiled, manifested, and approved for transport by the Kirtland AFB Environmental Restoration Group. Waste was transported by a licensed hazardous waste hauler to a permitted treatment, storage, and disposal facility.

### 6.2.1 Liquid Hazardous Investigation-Derived Waste

Prior to the start of the Q3 2021 GWM sampling event, an evaluation was made to identify monitoring wells that were anticipated to generate characteristically hazardous liquid IDW. This evaluation flagged wells that required purge water to be managed as "hazardous" from the point of generation and assisted in the initial waste segregation. Based on historical analytical data for each well, the water was suspected to be characteristically hazardous if the concentration of benzene exceeded 500 µg/L (per 40 CFR Part 261.24) in either of the previous two sampling events.

Liquid hazardous waste originating in purging of wells prior to sampling or during well development was placed in 55-gallon steel drums with steel tops and locking rings (UN designation 1A2/Y1.2/100/**). When small volumes (less than 5 gallons) of waste were generated at a well, a plastic container with a threaded top (jerrican) was used to contain the liquid. The jerrican was then placed in a 55-gallon steel drum for additional security. Waste containers were properly labeled, sealed, and placed on secondary containment pallets located within the appropriate less than 90-day RCRA accumulation area. The accumulation areas and waste containers were inspected on a weekly basis by trained personnel as required under 40 CFR 262.34.

When possible, liquid hazardous waste was consolidated. This was typically done to combine small volumes of waste liquids generated during passive sampling activities at multiple well sites. Consolidation was also performed to reduce the total number of drums that require offsite disposal. Appendix H-2 provides specific information regarding the hazardous liquid waste disposed of during Q3 2021.

A total of 62 gallons of liquid hazardous waste was generated and disposed of during Q3 2021 (Appendix H-2, Table H-2-1). Of this quantity, 100% of this waste was sourced from GWM activities. Clean Earth transported the waste from Kirtland AFB to Chemical Reclamation Services, LLC in Avalon, Texas, a permitted hazardous waste disposal facility.

No liquid hazardous waste was held in the "Pending Disposal" category at the end of Q3 2021.

### 6.2.2 Solid Hazardous Investigation-Derived Waste

No hazardous solid waste (soil) was generated or held in the "Pending Disposal" category in Q3 2021.

### 6.2.3 Quarterly Hazardous Investigation-Derived Waste Volume Totals

A total of 62 gallons of hazardous purge water was generated and managed in Q3 2021 (Appendix H-2, Table H-2-2). Through Q3 2021, a total of 633 gallons of liquid hazardous waste has been generated, managed, manifested, and properly disposed of at Chemical Reclamation Services, LLC in Avalon, Texas.

# 7. CONCLUSIONS AND RECOMMENDATIONS

## 7.1 Discussion and Conclusions

The following section summarizes the data collected during Q3 2021.

### 7.1.1 Groundwater Monitoring

Depth to water was measured in 174 wells in Q3 2021. Gauging data, including groundwater elevations and LNAPL thicknesses, are provided in Table 4-2. The horizontal groundwater gradient within the monitoring network was dominated by flow patterns toward depressions in the water table created by interim measure and Kirtland AFB groundwater extraction wells (Figure 4-3). In Q3 2021, groundwater elevations ranged from 4871.37 to 4877.19 ft above mean sea level with a depth to water of 460.79 ft below ground surface.

During gauging, LNAPL was detected and measured in five wells located on-Base within the source area plume: KAFB-106005 (0.04 ft), KAFB-106059 (0.01 ft), KAFB-106076 (0.02 ft), KAFB-106150-484 (0.71 ft), and KAFB-106154-484 (0.42 ft) (Tables 4-2 and 4-4, Figure 4-4).

Groundwater samples were collected from 71 GWM wells between July 7 and July 22, 2021. Groundwater analytical results for Q3 2021 are provided in Tables 4-6 through 4-8 and include comparisons to project screening levels. EDB and BTEX results are posted on Figures 4-5 and 4-6. Consistent with previous quarters, the highest EDB and BTEX concentrations were observed in the source area plume (Tables 4-9 and 4-10). Analytical results for inorganic compounds are provided in Tables 4-6 and 4-8.

### 7.1.2 Drinking Water Supply Well Monitoring

Analytical data for samples collected from drinking water supply wells are provided in Table 4-11. Consistent with previous monitoring events, neither EDB nor BTEX was detected in Q3 2021 (Appendix F-3).

### 7.1.3 Groundwater Treatment System Operation and Performance

During Q3 2021, the GWTS operated 97.5% of the time and treated 67,497,300 gallons of groundwater. The effluent was discharged to the GCMP and underground injection control wells KAFB-7 and KAFB-106IN2 (Table 5-5). An estimated 1.82 grams of EDB was removed by the GWTS during this quarter (Table 5-6).

Analytical results for effluent samples and the discharge limits for the GWTS are provided in Tables 5-7 and 5-8; concentrations for all analytes were below the laboratory reporting limit during this quarter.

## 7.2 Data Gaps

No data gaps were identified in Q3 2021. The installation of six nested water table wells was completed between November 2020 and March 2021 to address a previous data gap created by well screens becoming submerged as a result of the water table rise. All of the new wells were sampled in Q3 2021.

## 7.3 Recommendations

It is recommended that monitoring and GWTS operation continue in accordance with the schedules provided in the approved work plans (Section 3).

Planned activities for Q4 2021 are summarized below.

**Vadose Zone Monitoring:**

- Perform semi-annual soil vapor monitoring

**Groundwater Monitoring:**

- Perform quarterly GWM
- Report quarterly monitoring of USGS sentinel wells (by USGS)

**Drinking Water Supply Well Monitoring:**

- Perform monthly sampling for analysis of organic compounds
- Perform sampling once for semi-annual analysis of inorganic compounds

**Groundwater Treatment System Operation:**

- Continue operating the GWTS and extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239
- Perform GWTS well disinfection as required
- Complete performance assessment of the GWTS extraction system

**Reporting:**

- Prepare a quarterly report to detail the activities conducted during the quarter

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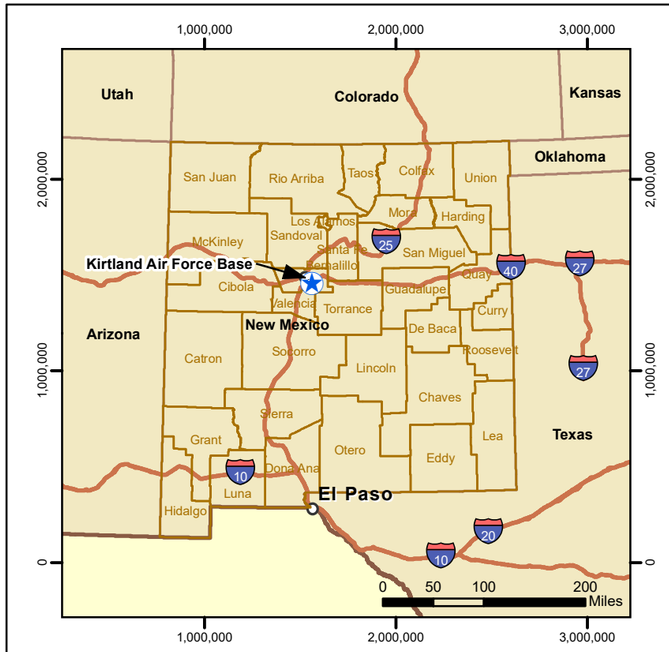
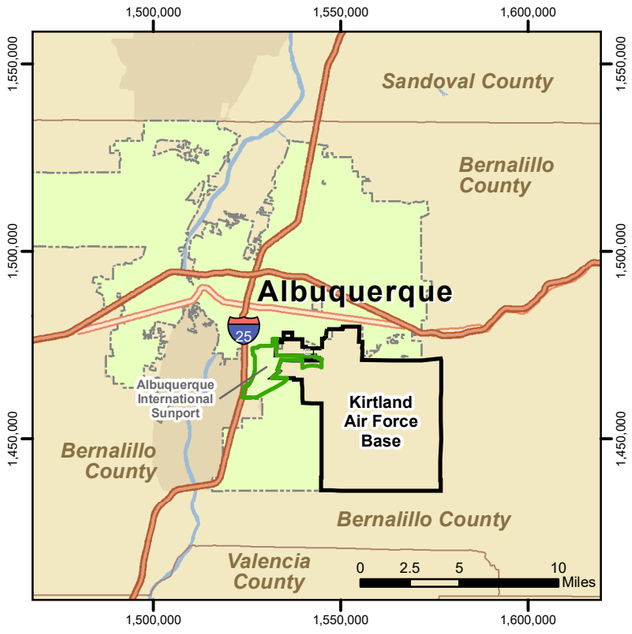
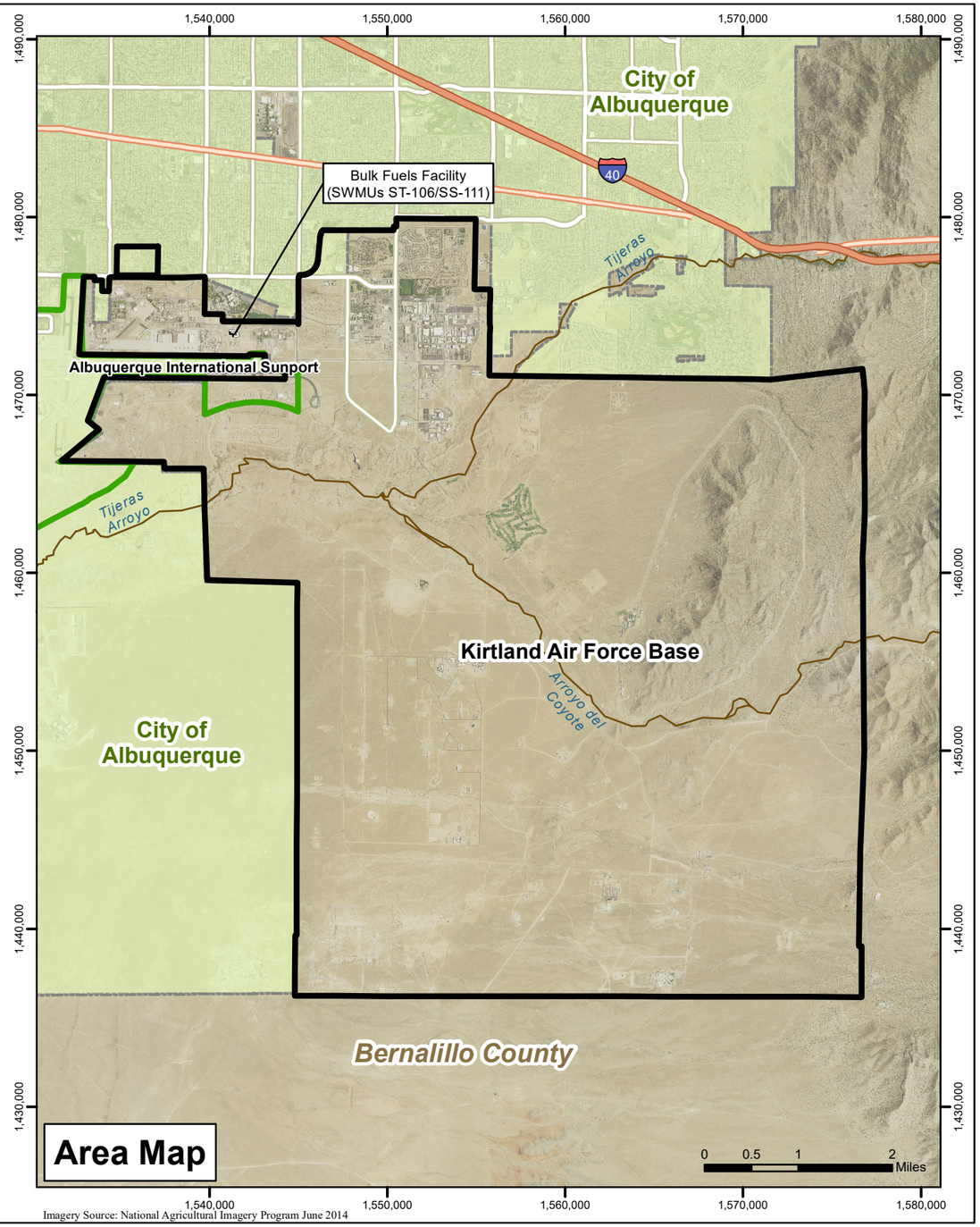
# FIGURES




Imagery Source: National Agricultural Imagery Program June 2014

## Legend

- Kirtland Air Force Base Installation Boundary
- Albuquerque International Sunport Airport
- Source Area
- US County Names (1.5m-50k)
- Coastline
- States
- International
- Coastline
- States
- International
- Coastline
- Counties
- States
- International
- Major Highways
- Highways
- Major Roads
- Arroyos
- Rivers
- City of Albuquerque

N

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

PERIODIC MONITORING REPORT
JULY - SEPTEMBER 2021
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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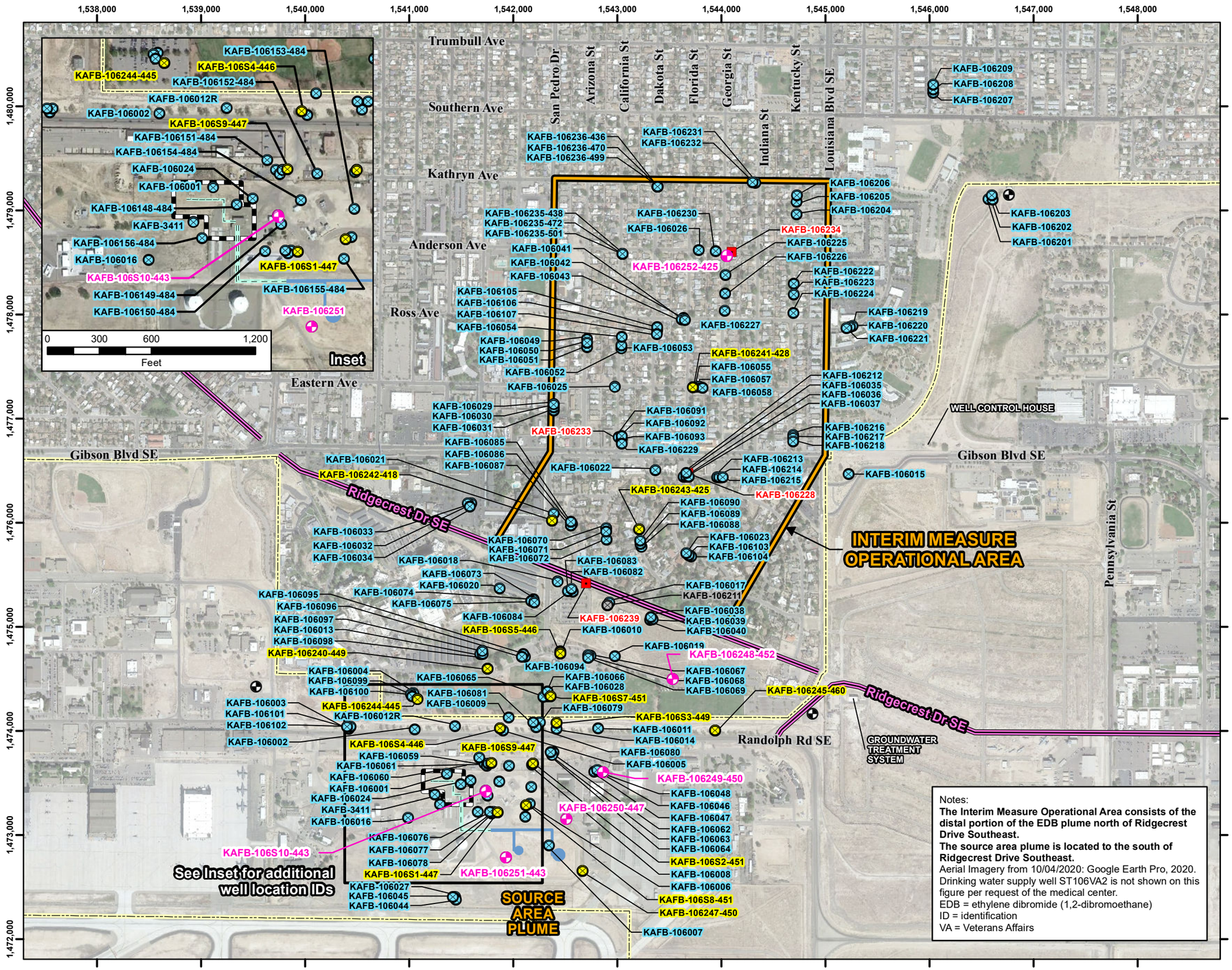


Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
**The source area plume is located to the south of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
Drinking water supply well ST106VA2 is not shown on this figure per request of the medical center.
EDB = ethylene dibromide (1,2-dibromoethane)
ID = identification
VA = Veterans Affairs

PERIODIC MONITORING REPORT
JULY - SEPTEMBER 2021
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4-1

# GROUNDWATER MONITORING NETWORK, DRINKING WATER SUPPLY WELL, AND EXTRACTION WELL LOCATIONS

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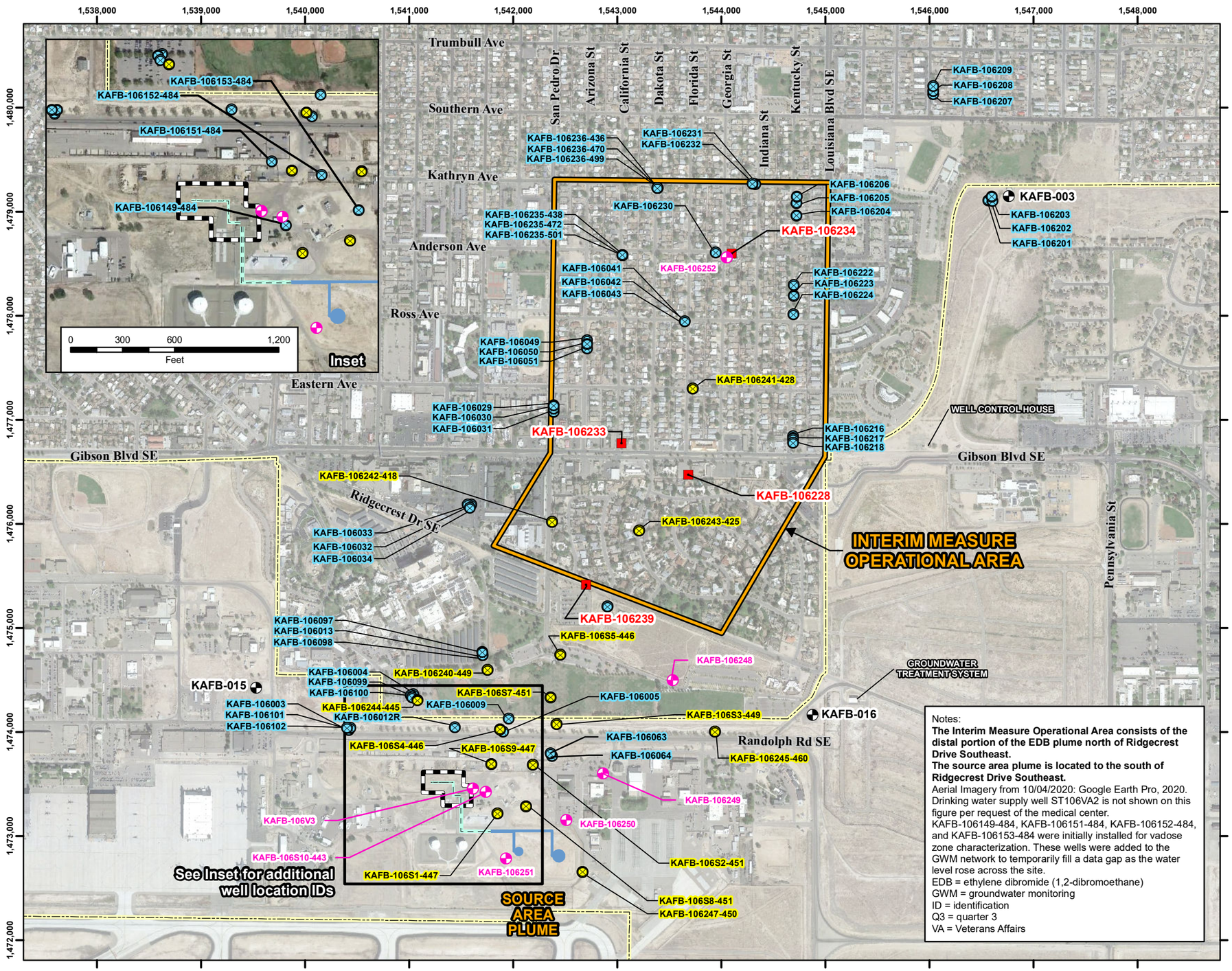
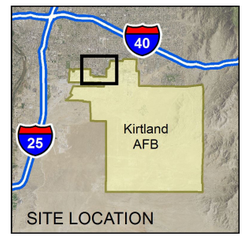



## Legend

- Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Monitoring Well (pending water table rise)
- Data Gap Well Installed in 2018 and 2019
- Well Installed between November 2020 and March 2021
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area




N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

Notes:

**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**

**The source area plume is located to the south of Ridgecrest Drive Southeast.**

Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.

Drinking water supply well ST106VA2 is not shown on this figure per request of the medical center.

KAFB-106149-484, KAFB-106151-484, KAFB-106152-484, and KAFB-106153-484 were initially installed for vadose zone characterization. These wells were added to the GWM network to temporarily fill a data gap as the water level rose across the site.

EDB = ethylene dibromide (1,2-dibromoethane)

GWM = groundwater monitoring

ID = identification

Q3 = quarter 3

VA = Veterans Affairs

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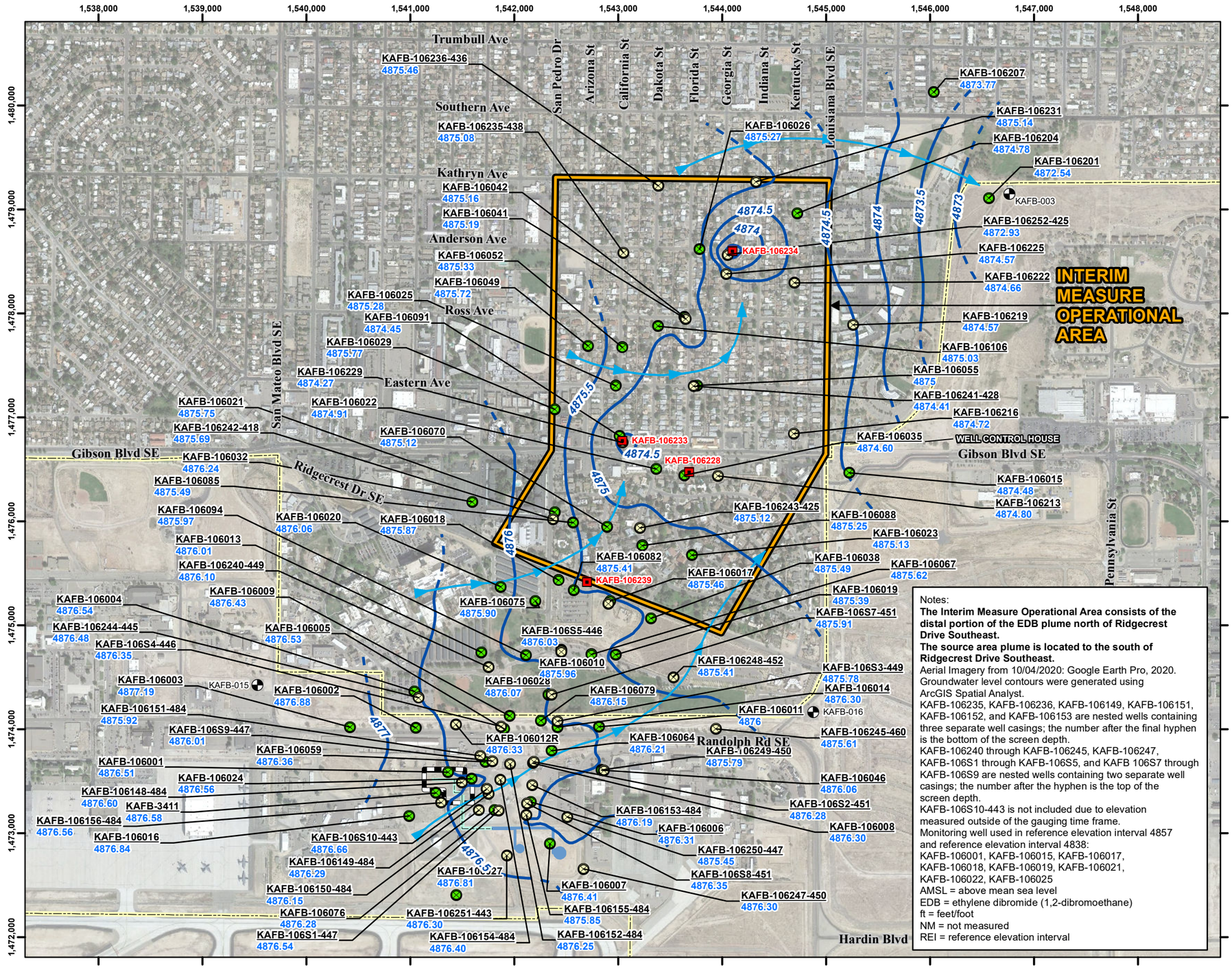
FIGURE 4-2

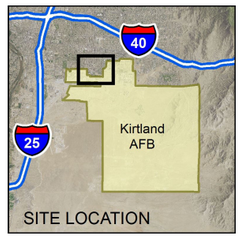
# GROUNDWATER MONITORING WELLS AND DRINKING WATER SUPPLY WELLS SAMPLED IN Q3 2021

Y:\gis2\Federal\6360401_KAFB_BFF\4004_030000_Q321\03_Projects\4-2 Wells Sampled in Q3_Q321.mxd 10/18/2021 EA ecarpio




## Legend

- REI 4857 Monitoring Well (screens not submerged)
- REI 4857 and REI 4857/4838 Groundwater Monitoring Wells with Fully Submerged Screens
- Drinking Water Supply Well
- Extraction Well
- Groundwater Level Contour (ft AMSL)
- Inferred Groundwater Level Contour (ft AMSL)
- Groundwater Flow Direction
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Source Area
- Installation Fence Boundary
- Interim Measure Operational Area
- 4877.69 Groundwater Elevation (ft AMSL)




Notes:

**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**

**The source area plume is located to the south of Ridgecrest Drive Southeast.**

Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
Groundwater level contours were generated using ArcGIS Spatial Analyst.
KAFB-106235, KAFB-106236, KAFB-106149, KAFB-106151, KAFB-106152, and KAFB-106153 are nested wells containing three separate well casings; the number after the final hyphen is the bottom of the screen depth.
KAFB-106240 through KAFB-106245, KAFB-106247, KAFB-106S1 through KAFB-106S5, and KAFB 106S7 through KAFB-106S9 are nested wells containing two separate well casings; the number after the hyphen is the top of the screen depth.
KAFB-106S10-443 is not included due to elevation measured outside of the gauging time frame.
Monitoring well used in reference elevation interval 4857 and reference elevation interval 4838:
KAFB-106001, KAFB-106015, KAFB-106017, KAFB-106018, KAFB-106019, KAFB-106021, KAFB-106022, KAFB-106025
AMSL = above mean sea level
EDB = ethylene dibromide (1,2-dibromoethane)
ft = feet/foot
NM = not measured
REI = reference elevation interval

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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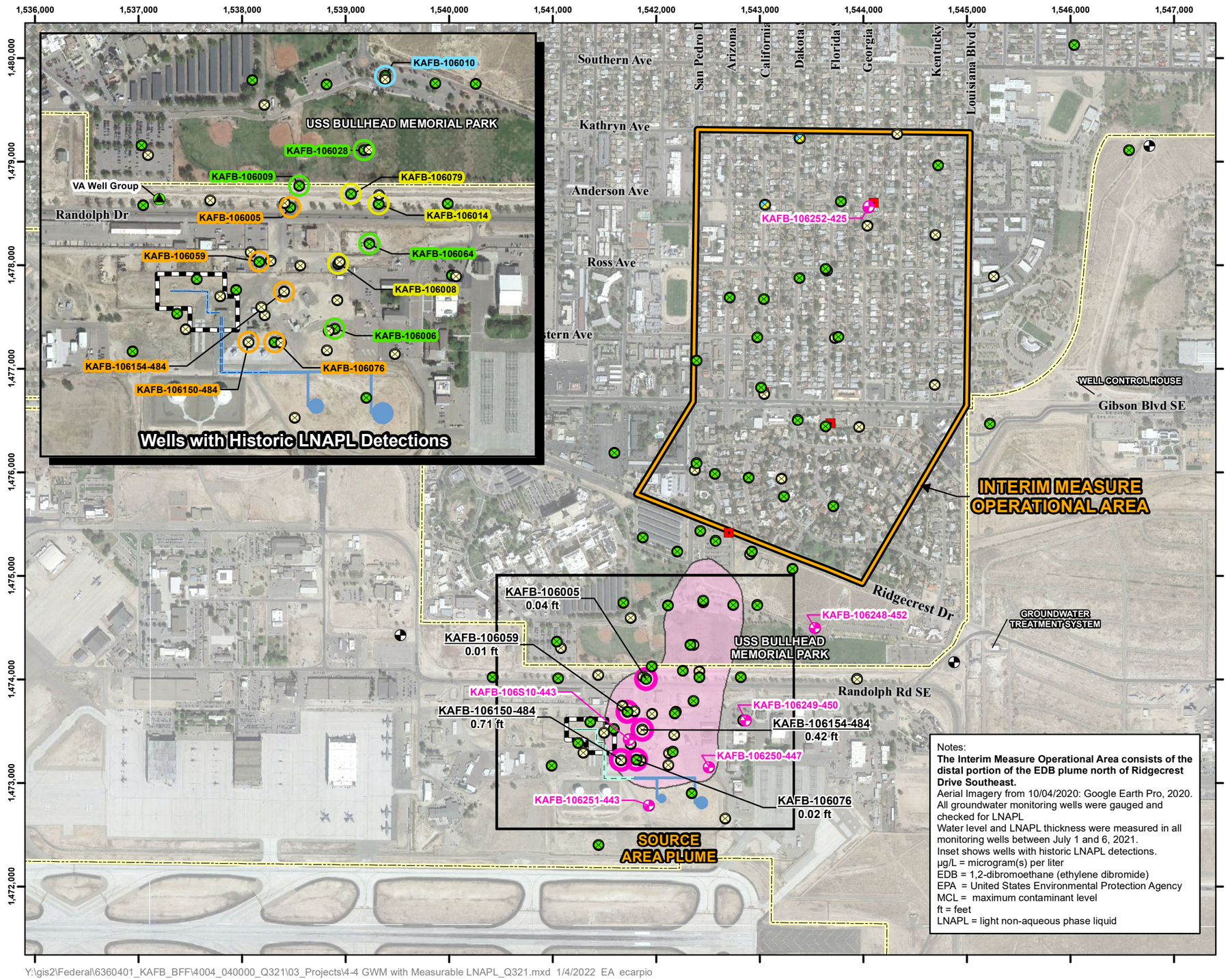
FIGURE 4-3

POTENTIOMETRIC SURFACE, REFERENCE ELEVATION INTERVAL 4857, JULY 1 - 6, 2021

Y:\gis2\Federal\6360401_KAFB_BFF\4004_040000_Q321\03_Projects\4-3 Interval 4857 PotentiometricSurface_Q321.mxd 1/4/2022 EA ecarpio

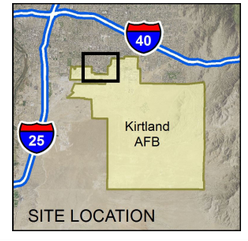



Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
All groundwater monitoring wells were gauged and checked for LNAPL
Water level and LNAPL thickness were measured in all monitoring wells between July 1 and 6, 2021.
Inset shows wells with historic LNAPL detections.
µg/L = microgram(s) per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = United States Environmental Protection Agency
MCL = maximum contaminant level
ft = feet
LNAPL = light non-aqueous phase liquid

## Legend

- Monitoring Well with Confirmed LNAPL in Q3 2021
- Well with measurable LNAPL in 2020 (Inset Map)
- Well with LNAPL last measured between 1 and 5 years ago (Inset Map)
- Well with LNAPL last measured between 5 and 10 years ago (Inset Map)
- Well with LNAPL last measured greater than 10 years ago (Inset Map)
- Reference Elevation Interval 4857 Groundwater Monitoring Well with top of screen unsubmerged
- Reference Elevation Interval 4857 and 4857/4838 Groundwater Monitoring Well with fully submerged screens
- Nested Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Well Installed between November 2020 and March 2021
- Former Aboveground Storage
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area
- Benzene Plume, Q2 2021 ≥5 µg/L (EPA MCL) in the Source Area Plume

**Well Location ID**
**LNAPL Thickness (ft)**




N

0 500 1,000 2,000
Feet
1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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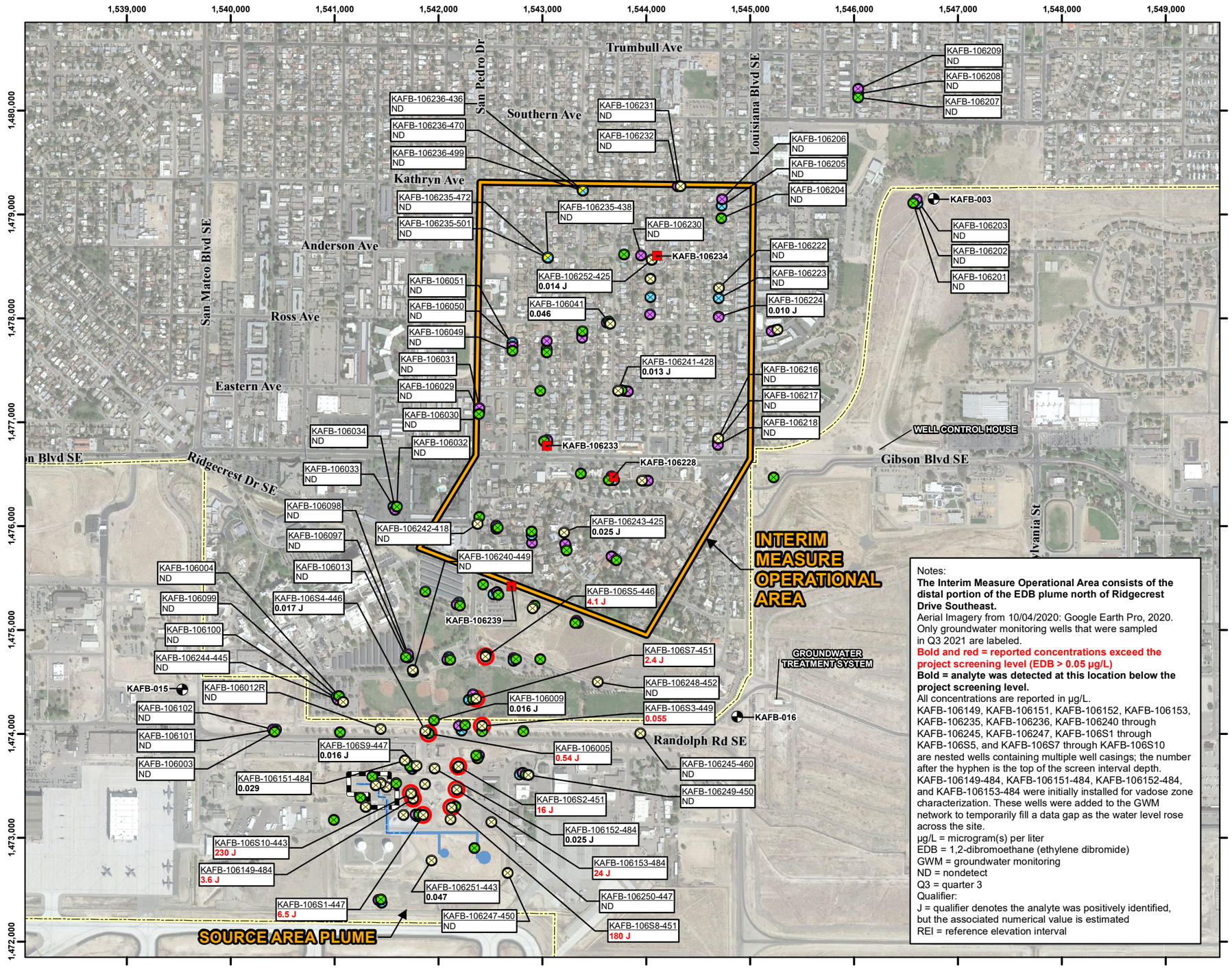
FIGURE 4-4

GROUNDWATER MONITORING WELLS WITH MEASURABLE LIGHT NON-AQUEOUS PHASE LIQUID, Q3 2021

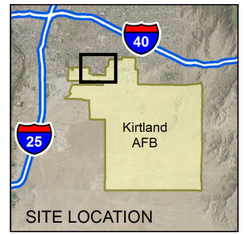
Y:\gis2\Federal\6360401_KAFB_BFF\4004_040000_Q321\03_Projects\4-4 GWM with Measurable LNAPL_Q321.mxd 1/4/2022 EA ecarpio




Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
Only groundwater monitoring wells that were sampled in Q3 2021 are labeled.
**Bold and red = reported concentrations exceed the project screening level (EDB > 0.05 µg/L)**
**Bold = analyte was detected at this location below the project screening level.**
All concentrations are reported in µg/L.
KAFB-106149, KAFB-106151, KAFB-106152, KAFB-106153, KAFB-106235, KAFB-106236, KAFB-106240 through KAFB-106245, KAFB-106247, KAFB-106S1 through KAFB-106S5, and KAFB-106S7 through KAFB-106S10 are nested wells containing multiple well casings; the number after the hyphen is the top of the screen interval depth. KAFB-106149-484, KAFB-106151-484, KAFB-106152-484, and KAFB-106153-484 were initially installed for vadose zone characterization. These wells were added to the GWM network to temporarily fill a data gap as the water level rose across the site.
µg/L = microgram(s) per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
GWM = groundwater monitoring
ND = nondetect
Q3 = quarter 3
Qualifier:
J = qualifier denotes the analyte was positively identified, but the associated numerical value is estimated
REI = reference elevation interval

## Legend

- REI 4857 Groundwater Monitoring Well with top of screen unsubmerged
- REI 4857 and REI 4857/4838 Groundwater Monitoring Well with fully submerged screens
- REI 4838 Groundwater Monitoring Well
- REI 4814 Groundwater Monitoring Well
- Nested Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Monitoring Well with Concentrations that Exceed the Project Screening Level (EDB > 0.05 µg/L)
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area




N

0 500 1,000 2,000
Feet
1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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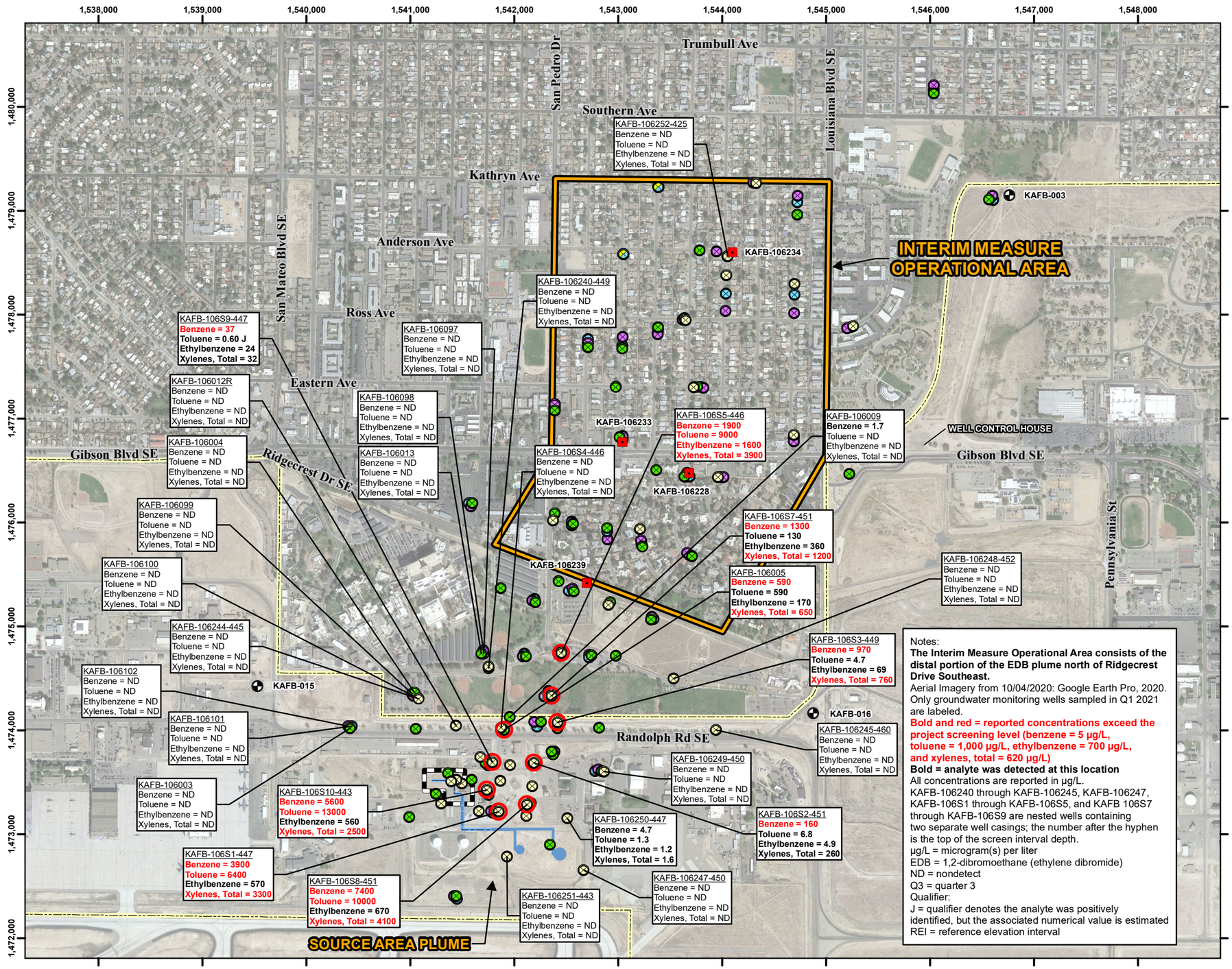
FIGURE 4-5

1,2-DIBROMOETHANE CONCENTRATIONS, Q3 2021

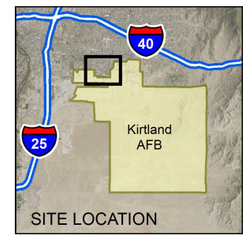
Y:\gis2\Federal\6360401_KAFB_BFF\4004_030000_Q321\03_Projects\4-5 EDB_Q321.mxd 12/1/2021 EA ecarpio




Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
Only groundwater monitoring wells sampled in Q1 2021 are labeled.
**Bold and red = reported concentrations exceed the project screening level (benzene = 5 µg/L, toluene = 1,000 µg/L, ethylbenzene = 700 µg/L, and xylenes, total = 620 µg/L)**
**Bold = analyte was detected at this location**
All concentrations are reported in µg/L.
KAFB-106240 through KAFB-106245, KAFB-106247, KAFB-106S1 through KAFB-106S5, and KAFB 106S7 through KAFB-106S9 are nested wells containing two separate well casings; the number after the hyphen is the top of the screen interval depth.
µg/L = microgram(s) per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
ND = nondetect
Q3 = quarter 3
Qualifier:
J = qualifier denotes the analyte was positively identified, but the associated numerical value is estimated
REI = reference elevation interval

## Legend

- REI 4857 Groundwater Monitoring Well with top of screen unsubmerged
- REI 4857 and REI 4857/4838 Groundwater Monitoring Well with fully submerged screens
- REI 4838 Groundwater Monitoring Well
- REI 4814 Groundwater Monitoring Well
- Nested Groundwater Monitoring Well
- Drinking Water Supply Well
- Extraction Well
- Monitoring Well with Concentrations that Exceed the Project Screening Level
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area




N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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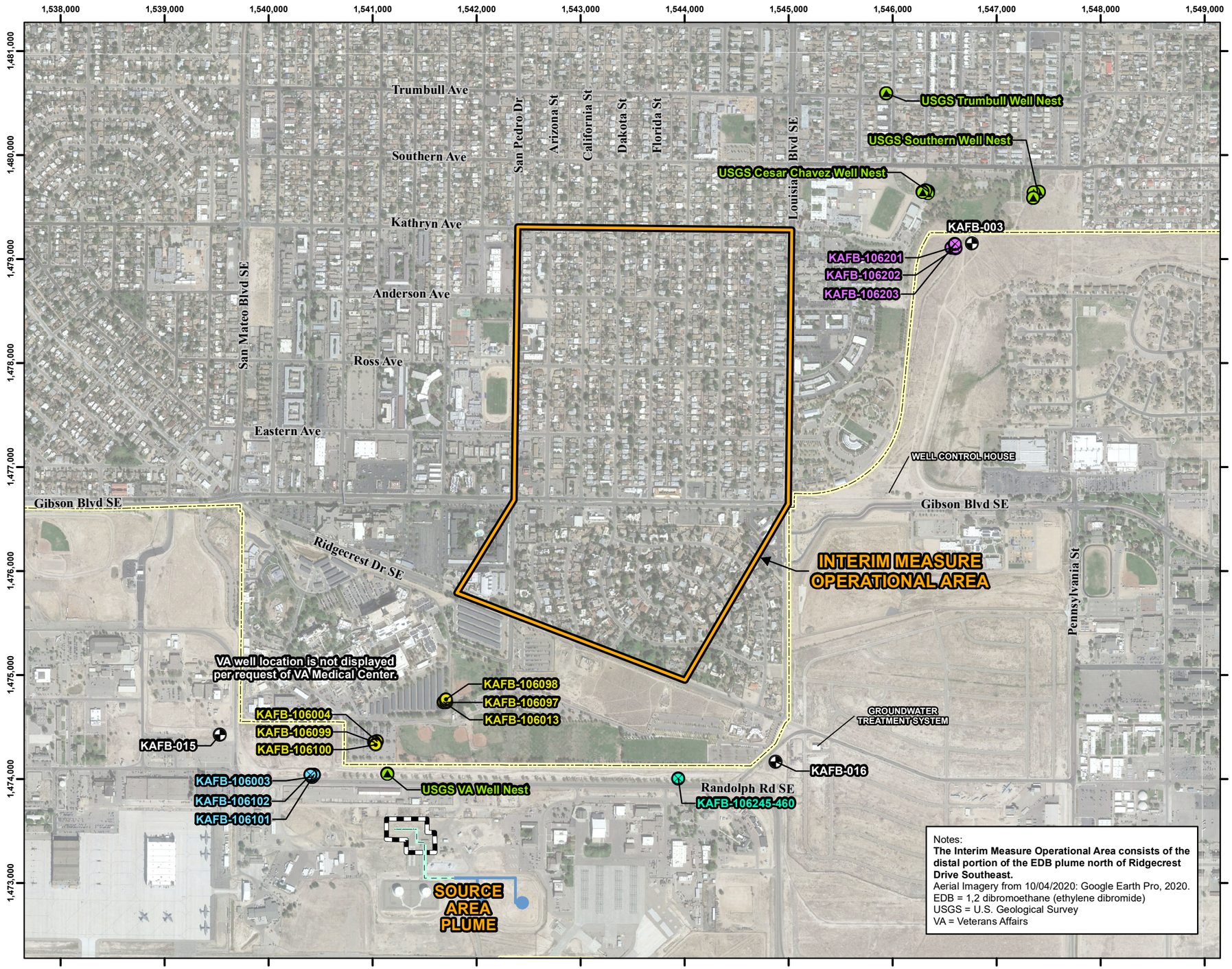
FIGURE 4-6

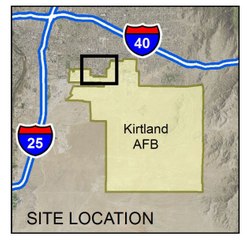
BENZENE, TOLUENE, ETHYLBENZENE, AND TOTAL XYLENES CONCENTRATIONS, Q3 2021

Y:\gis2\Federal\6360401_KAFB_BFF\4004_030000_Q321\03_Projects\4-6 BTEX_Q321.mxd 12/2/2021 EA ecarpio




## Legend

- KAFB-016 Sentinel
- KAFB-003 Sentinel
- VA Proximal and KAFB-015 Sentinel
- Drinking Water Supply Well
- USGS Sentinel
- VA Proximal
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area




N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
EDB = 1,2 dibromoethane (ethylene dibromide)
USGS = U.S. Geological Survey
VA = Veterans Affairs

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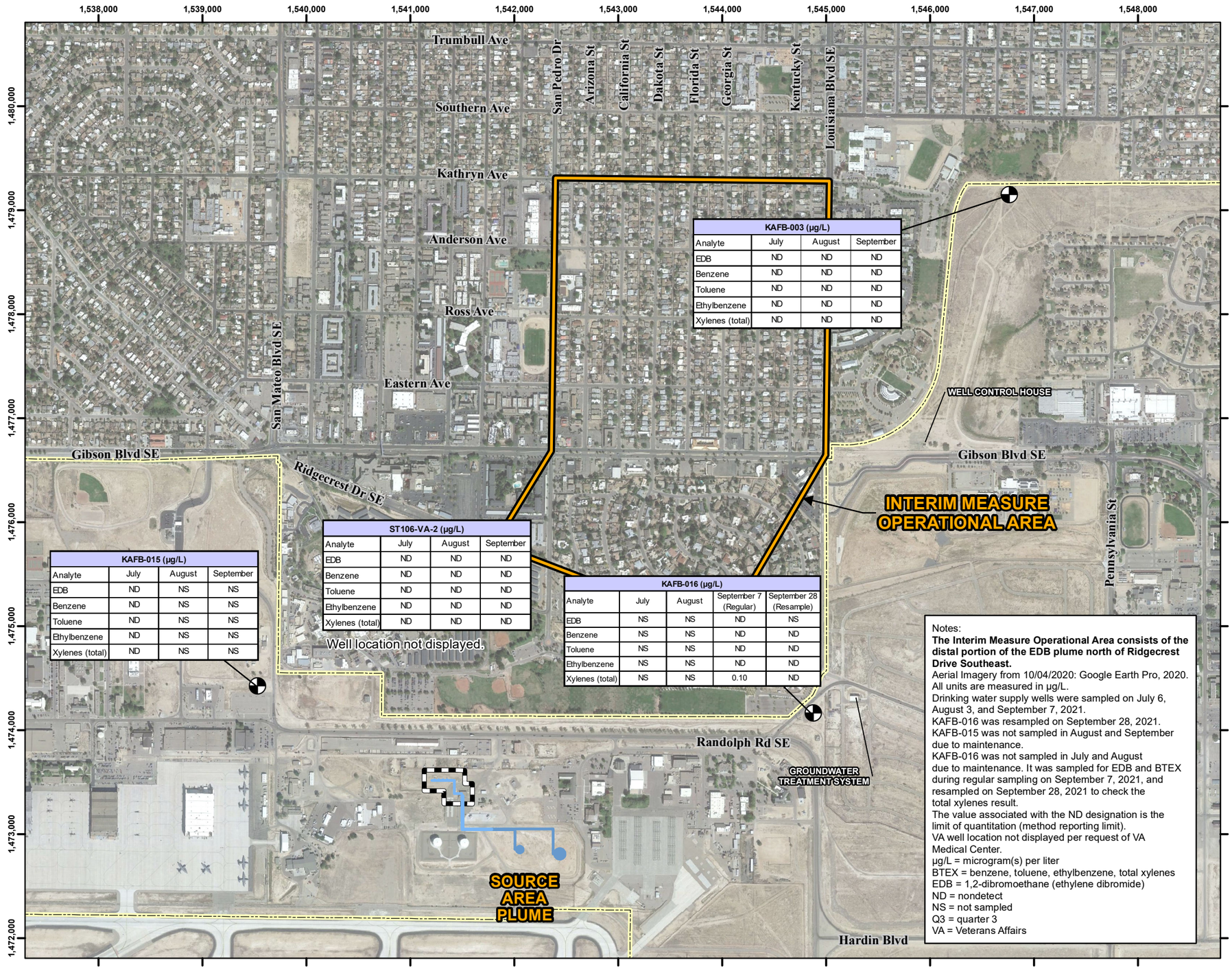
FIGURE 4-7

SENTINEL AND PROXIMAL WELL LOCATIONS

Y:\gis2\Federal\6360401_KAFB_BFF\4004_030000_Q321\03_Projects\4-7 Sentinel Well Locations_Q321.mxd 10/28/2021 EA ecarpio




| KAFB-003 (µg/L) | | | |
|---|---|---|---|
| Analyte | July | August | September |
| EDB | ND | ND | ND |
| Benzene | ND | ND | ND |
| Toluene | ND | ND | ND |
| Ethylbenzene | ND | ND | ND |
| Xylenes (total) | ND | ND | ND |

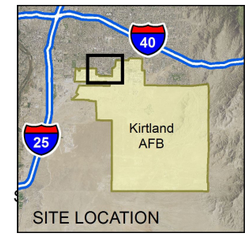
| ST106-VA-2 (µg/L) | | | |
|---|---|---|---|
| Analyte | July | August | September |
| EDB | ND | ND | ND |
| Benzene | ND | ND | ND |
| Toluene | ND | ND | ND |
| Ethylbenzene | ND | ND | ND |
| Xylenes (total) | ND | ND | ND |

| KAFB-015 (µg/L) | | | |
|---|---|---|---|
| Analyte | July | August | September |
| EDB | ND | NS | NS |
| Benzene | ND | NS | NS |
| Toluene | ND | NS | NS |
| Ethylbenzene | ND | NS | NS |
| Xylenes (total) | ND | NS | NS |

| KAFB-016 (µg/L) | | | | |
|---|---|---|---|---|
| Analyte | July | August | September 7 (Regular) | September 28 (Resample) |
| EDB | NS | NS | ND | NS |
| Benzene | NS | NS | ND | ND |
| Toluene | NS | NS | ND | ND |
| Ethylbenzene | NS | NS | ND | ND |
| Xylenes (total) | NS | NS | 0.10 | ND |

## Legend

- Drinking Water Supply Wells
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational Area
- Installation Fence Boundary
- Source




Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.**
Aerial Imagery from 10/04/2020: Google Earth Pro, 2020.
All units are measured in µg/L.
Drinking water supply wells were sampled on July 6, August 3, and September 7, 2021.
KAFB-016 was resampled on September 28, 2021.
KAFB-015 was not sampled in August and September due to maintenance.
KAFB-016 was not sampled in July and August due to maintenance. It was sampled for EDB and BTEX during regular sampling on September 7, 2021, and resampled on September 28, 2021 to check the total xylenes result.
The value associated with the ND designation is the limit of quantitation (method reporting limit).
VA well location not displayed per request of VA Medical Center.
µg/L = microgram(s) per liter
BTEX = benzene, toluene, ethylbenzene, total xylenes
EDB = 1,2-dibromoethane (ethylene dibromide)
ND = nondetect
NS = not sampled
Q3 = quarter 3
VA = Veterans Affairs

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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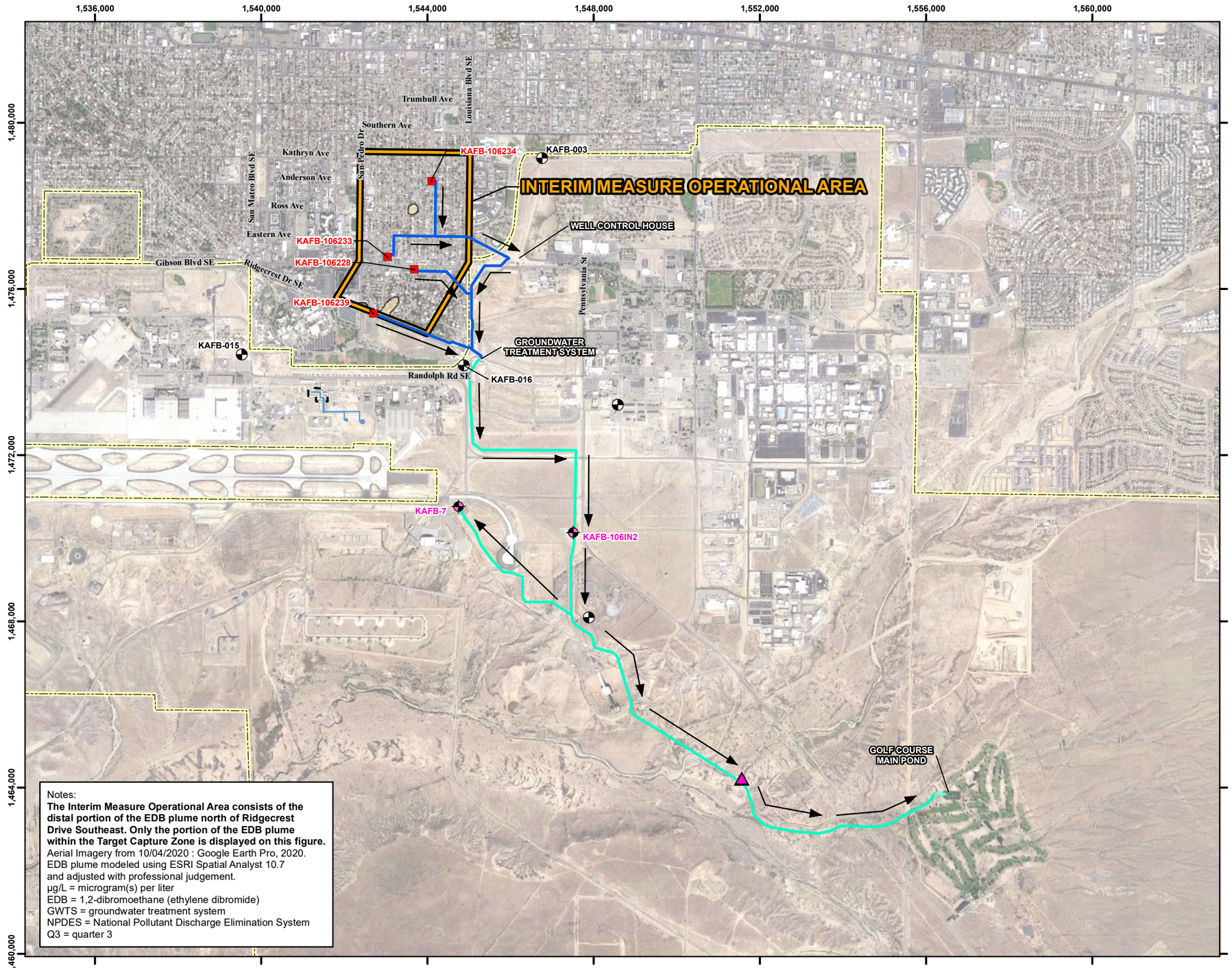
FIGURE 4-8

1,2-DIBROMOETHANE AND BENZENE, TOLUENE, ETHYLBENZENE, AND TOTAL XYLENES RESULTS IN DRINKING WATER SUPPLY WELLS, Q3 2021

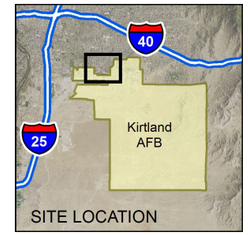
Y:\gis2\Federal\6360401_KAFB_BFF\4004_030000_Q321\03_Projects\4-8 EDB BTEX Drinking Water Supply Q321.mxd 11/30/2021 EA ecarpio




Notes:
**The Interim Measure Operational Area consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast. Only the portion of the EDB plume within the Target Capture Zone is displayed on this figure.**
Aerial Imagery from 10/04/2020 : Google Earth Pro, 2020.
EDB plume modeled using ESRI Spatial Analyst 10.7 and adjusted with professional judgement.
µg/L = microgram(s) per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
GWTS = groundwater treatment system
NPDES = National Pollutant Discharge Elimination System
Q3 = quarter 3

## Legend

- Injection Well
- Extraction Well
- Drinking Water Supply Well
- NPDES Outfall Location
- Former Aboveground Storage Tank
- Former Fuel Transfer Line
- GWTS Influent Piping
- GWTS Effluent Piping
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area
- EDB Plume within the Target Capture Zone Q2 2021 (> 0.05 µg/L)
- Influent/Effluent Flow Direction




N

0 1,250 2,500 5,000

Feet

1 inch = 2,500 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-1

GROUNDWATER EXTRACTION AND TREATMENT SYSTEM LOCATION

Y:\gis2\Federal\6360401_KAFB_BFF\4004_040000_Q321\03_Projects\5-1 Groundwater Extraction and Treatment System_Q321.mxd 1/21/2022 EA ecarpio

# TABLES

## Table 4-1
## Groundwater Monitoring Program

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| **Groundwater Monitoring Wells[b]** | | | | | | |
| KAFB-106001 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106002 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106003 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal, KAFB-015 Sentinel |
| KAFB-106004 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106005 | South | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106006 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106007 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106008 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106009 | South | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106010 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106011 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106012R | South | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, metals, anions, alkalinity, FP | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106013 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106014 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106015[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106016 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106017 | South | None | BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Signal |
| KAFB-106018 | South | None | BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Signal |
| KAFB-106019 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106020 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106021[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106022[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106023[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106024 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106025[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |

**Table 4-1**
**Groundwater Monitoring Program**

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106026[c,d] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106027 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106028 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106029[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106030[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106031[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106032[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106033[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106034[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106035[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well |
| KAFB-106036[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well |
| KAFB-106037[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well |
| KAFB-106038 | South | None | BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Signal |
| KAFB-106039 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106040 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106041[c] | North | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106042[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106043[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106044 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106045 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106046 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106047 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106048 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106049[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |

## Table 4-1
## Groundwater Monitoring Program

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106050[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106051[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106052[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106053[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106054[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106055[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106057[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106058[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106059 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106060 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106061 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106062 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106063 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106064 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106065 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106066 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106067 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106068 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106069 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106070[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106071[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106072[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106073 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106074 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106075 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106076 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |

**Table 4-1**
**Groundwater Monitoring Program**

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106077 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106078 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106079 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106080 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106081 | South | None | BTEX, EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Source Area |
| KAFB-106082 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106083 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106084 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106085[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106086[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106087[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106088[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106089[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106090[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106091[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106092[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106093[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106094 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106095 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106096 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106097 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106098 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106099 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106100 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal |
| KAFB-106101 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal, KAFB-015 Sentinel |
| KAFB-106102 | South | BTEX, EDB, FP | BTEX, EDB, metals, anions, alkalinity, FP | BTEX, EDB, FP | EDB, VOCs, metals, anions, alkalinity, FP | VA Proximal, KAFB-015 Sentinel |

**Table 4-1**
**Groundwater Monitoring Program**

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106103[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106104[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106105[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106106[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106107[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106149-484[c,e] | South | EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106151-484[c,e] | South | EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106152-484[c,e] | South | EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106153-484[c,e] | South | EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106201[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | KAFB-003 Sentinel |
| KAFB-106202[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | KAFB-003 Sentinel |
| KAFB-106203[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | KAFB-003 Sentinel |
| KAFB-106204[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106205[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106206[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106207[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106208[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106209[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106211[f] | South | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106212[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106213[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106214[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106215[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106216[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106217[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106218[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |

## Table 4-1
## Groundwater Monitoring Program

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106219[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106220[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106221[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106222[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106223[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106224[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |
| KAFB-106225[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106226[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106227[c] | North | None | EDB, metals, anions, alkalinity | None | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106229[c,g] | North | None | EDB | None | EDB | Groundwater well paired with KAFB-106233 extraction well |
| KAFB-106230[c,d] | North | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106231[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106232[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106235-438[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106235-472[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106235-501[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106236-436[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106236-470[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106236-499[c] | North | EDB | EDB, metals, anions, alkalinity | EDB | EDB, VOCs, metals, anions, alkalinity | Former Downgradient Proximal; Current Upgradient Well |
| KAFB-106240-449[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | VA Proximal |
| KAFB-106241-428[c] | North | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106242-418[c] | North | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106243-425[c] | North | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Groundwater Monitoring |
| KAFB-106244-445[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | VA Proximal |
| KAFB-106245-460[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | KAFB-016 Sentinel |
| KAFB-106247-450[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Downgradient Proximal (Seasonal) |

**Table 4-1**
**Groundwater Monitoring Program**

| Well Location ID | Well Location Relative to Ridgecrest Drive SE | 1st Quarter (January-March) | 2nd Quarter Semiannual (April-June) | 3rd Quarter (July-September) | 4th Quarter Annual (October-December) | Former Well Designation and Current Monitoring Well Objective[a] |
|---|---|---|---|---|---|---|
| KAFB-106248-452[h] | North | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106249-416[h] | South | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106250-413[h] | South | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106251-409[h] | South | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106252-425[h] | North | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Groundwater Monitoring |
| KAFB-106S1-447[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S2-451[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S3-449[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S4-446[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S5-446[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S7-451[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S8-451[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S9-447[c] | South | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | BTEX, EDB, metals, anions, alkalinity | EDB, VOCs, metals, anions, alkalinity | Source Area |
| KAFB-106S10-443[h] | South | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP | Source Area |
| KAFB-3411 | South | None | EDB, metals, anions, alkalinity, FP | None | EDB, VOCs, metals, anions, alkalinity, FP | Groundwater Monitoring |

## Table 4-1
## Groundwater Monitoring Program

[a] Monitoring Well Objective:

Downgradient Proximal (Seasonal) Wells—Primarily located north of Ridgecrest Drive SE surrounding the historical EDB plume to the north and east into the distal portion of the GWM network. One well located to the south and east of the benzene plume. Groundwater flow direction varies seasonally; these wells are downgradient of the EDB plume during part of each year. Analytical data for these wells have been historically below the MCL for EDB. Sampled every quarter. These wells assist in plume boundary definition.

Former Downgradient Proximal; Current Upgradient Wells—Primarily located north of Ridgecrest Drive SE to the west and north of the historical EDB plume. These wells were previously downgradient of the historical EDB plume, but as groundwater flow direction has shifted, they are currently upgradient. Sampled every quarter.

Groundwater Monitoring Wells—Primarily located north of Ridgecrest Drive SE within the historical footprint of the EDB plume. Analytical data from these wells help to estimate the volume and mass of the EDB plume throughout the GWM network. Sampled in Q2 and Q4 at a minimum, with wells previously designated as newly added sampled every quarter.

KAFB-003 Sentinel Wells—One set of nested wells located west of drinking water production well KAFB-003. Sampled every quarter. These wells help to assess any potential contaminant migration toward KAFB-003.

KAFB-015 Sentinel Wells—One set of nested wells located east of drinking water production well KAFB-015. Sampled every quarter. These wells help to assess any potential contaminant migration toward KAFB-015.

KAFB-016 Sentinel Well—One well located west of drinking water production well KAFB-016. Sampled every quarter. This well helps to assess the potential for contaminant migration toward KAFB-016.

Paired wells—Wells located near a GWM IM extraction well to assess the quality of the water entering the extraction well.

Signal Wells—Three wells located along the south side of Ridgecrest Drive SE to monitor BTEX and provide early indication if the benzene plume is migrating from the source area into the interim measure target area capture zone created by the groundwater extraction wells. Sampled during Q2 and Q4.

Source Area Wells—Primarily located in the Bulk Fuels Facility south of Randolph Road SE and proximal to the spill site on-Base. Sampled during Q2 and Q4 at a minimum, with some sampled every quarter. These wells monitor the higher concentrations of dissolved-phase plumes on-Base.

VA Proximal Wells—Three sets of nested wells located between the historical EDB plume south of Ridgecrest Drive SE and the Raymond G. Murphy VA Medical Center as a means to observe for potential contaminant migration toward the VA medical campus. Sampled every quarter. These wells provide additional wellhead protection monitoring for the VA supply well.

[b] The groundwater monitoring network consists of 163 wells, 162 wells that are currently sampled (see note "f", below), and one well which will be sampled once water level has risen sufficiently (note "e"). Select wells are identified for additional or more frequent monitoring of risk-driving constituents. Metals analysis consists of select total metals (arsenic, calcium, lead, potassium, magnesium, and sodium) and select dissolved metals (iron and manganese). Anions analysis consists of bromide, chloride, nitrate/nitrite nitrogen, and sulfate. Field parameters include pH, specific conductivity, dissolved oxygen, oxidation reduction potential, temperature, and turbidity.

Newly Added Wells—Newly added wells can include both existing wells that are added to the GWM network as well as newly installed wells. Newly added GWM wells require a minimum of four quarters of baseline full-suite analytical sampling. These wells have been added to assess the plume boundaries and provide additional water table monitoring due to the rising groundwater elevation.

Groundwater Monitoring Wells—Wells which have completed the minimum, baseline full-suite analytical sampling. These wells can have any of the objectives described above.

[c] Well sampled with passive sampling methodology; field parameter measurements are not representative and therefore are not collected.

[d] Well was removed from the groundwater monitoring network due to safety concerns after Q2 2016. These concerns were mitigated and sampling resumed in Q4 2019; sampling at this well is considered supplemental to the groundwater monitoring program.

[e] Wells initially installed for vadose zone characterization. These wells were added to the GWM network to temporarily fill a data gap as the water level rose across the site.

[f] KAFB-106211 will be included for sampling when it has enough saturated water column to deploy passive samplers (former air sparge well).

[g] KAFB-106229 is not formally part of the groundwater monitoring network. However, it gets sampled semiannually for EDB.

[h] Baseline analyses conducted for a total of eight quarters.

BTEX = benzene, toluene, ethylbenzene, and total xylenes

DRO = diesel range organics

EDB = 1,2-dibromoethane (ethylene dibromide)

FP = field parameter

GRO = gasoline range organics

GWM = groundwater monitoring

ID = identification

IM = interim measure

MCL = maximum contaminant level

Q2 = second quarter

Q4 = fourth quarter

SE = Southeast

SWMU = Solid Waste Management Unit

VA = Veterans Affairs

VOC = volatile organic compound

**Table 4-2**
**Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, Q3 2021**

| Well Location ID | Reference Elevation Interval (ft AMSL) | Measurement Date and Time | MRP Elevation (ft AMSL) | Well Depth[a] (ft MRP) | Screened Interval (ft AMSL) | Depth to LNAPL[b] (ft MRP) | Depth to Water[b] (ft MRP) | Screen Submergence Depth[c] (ft) | Measured LNAPL Thickness (ft) | LNAPL Elevation (ft AMSL) | Groundwater Elevation Corrected for LNAPL Thickness[d] (ft AMSL) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAFB-106001[e] | 4857/4838 | 7/2/2021, 10:07 AM | 5344.90 | 512.90 | 4859-4834 | — | 468.39 | 17.89 | — | — | 4876.51 |
| KAFB-106002[f] | 4857 | 7/1/2021, 3:20 PM | 5342.24 | 506.39 | 4861-4836 | — | 465.36 | 16.03 | — | — | 4876.88 |
| KAFB-106003 | 4857 | 7/2/2021, 10:29 AM | 5340.28 | 506.58 | 4861-4836 | — | 463.09 | 15.91 | — | — | 4877.19 |
| KAFB-106004 | 4857 | 7/2/2021, 8:43 AM | 5345.81 | 512.89 | 4859-4834 | — | 469.27 | 17.47 | — | — | 4876.54 |
| KAFB-106005 | 4857 | 7/1/2021, 3:07 PM | 5346.91 | 509.55 | 4865-4840 | 470.37 | 470.41 | 11.49 | 0.04 | 4876.54 | 4876.53 |
| KAFB-106006 | 4857 | 7/2/2021, 10:33 AM | 5351.48 | 514.78 | 4865-4840 | — | 475.17 | 11.51 | — | — | 4876.31 |
| KAFB-106007 | 4857 | 7/1/2021, 11:09 AM | 5349.60 | 516.25 | 4861-4836 | — | 473.19 | 15.47 | — | — | 4876.41 |
| KAFB-106008 | 4857 | 7/1/2021, 9:51 AM | 5351.77 | 513.25 | 4863-4838 | — | 475.47 | 13.45 | — | — | 4876.30 |
| KAFB-106009 | 4857 | 7/1/2021, 3:29 PM | 5348.55 | 510.14 | 4865-4840 | — | 472.12 | 11.57 | — | — | 4876.43 |
| KAFB-106010 | 4857 | 7/6/2021, 12:57 PM | 5343.26 | 510.24 | 4860-4835 | — | 467.30 | 15.70 | — | — | 4875.96 |
| KAFB-106011[f] | 4857 | 7/2/2021, 10:03 AM | 5353.15 | 519.05 | 4864-4839 | — | 477.15 | 11.90 | — | — | 4876.00 |
| KAFB-106012R | 4857 | 7/6/2021, 2:24 PM | 5345.00 | 502.87 | 4877-4847 | — | 468.67 | -0.18 | — | — | 4876.33 |
| KAFB-106013 | 4857 | 7/2/2021, 7:38 AM | 5350.62 | 519.39 | 4861-4836 | — | 474.61 | 15.04 | — | — | 4876.01 |
| KAFB-106014 | 4857 | 7/1/2021, 3:40 PM | 5350.22 | 519.53 | 4861-4836 | — | 473.92 | 15.27 | — | — | 4876.30 |
| KAFB-106015[e] | 4857/4838 | 7/1/2021, 8:50 AM | 5342.44 | 518.56 | 4855-4830 | — | 467.96 | 19.56 | — | — | 4874.48 |
| KAFB-106016[f] | 4857 | 7/2/2021, 7:37 AM | 5342.43 | 508.29 | 4864-4839 | — | 465.59 | 12.70 | — | — | 4876.84 |
| KAFB-106017[e,f] | 4857/4838 | 7/1/2021, 2:19 PM | 5342.52 | 515.61 | 4857-4832 | — | 467.06 | 18.55 | — | — | 4875.46 |
| KAFB-106018[e,f] | 4857/4838 | 7/1/2021, 2:42 PM | 5336.31 | 510.94 | 4857-4832 | — | 460.44 | 18.52 | — | — | 4875.87 |
| KAFB-106019[e] | 4857/4838 | 7/1/2021, 1:55 PM | 5354.62 | 525.90 | 4859-4834 | — | 479.23 | 16.68 | — | — | 4875.39 |
| KAFB-106020 | 4857/4838 | 7/2/2021, 6:35 AM | 5341.05 | 510.63 | 4859-4834 | — | 464.99 | 17.01 | — | — | 4876.06 |
| KAFB-106021 | 4838 | 7/1/2021, 12:42 PM | 5314.33 | 487.05 | 4856-4831 | — | 438.58 | -- | — | — | 4875.75 |
| KAFB-106022[e] | 4857/4838 | 7/2/2021, 12:20 PM | 5318.06 | 491.92 | 4856-4831 | — | 443.15 | 18.84 | — | — | 4874.91 |
| KAFB-106023 | 4857 | 7/6/2021, 9:30 AM | 5328.76 | 502.87 | 4856-4831 | — | 453.63 | 19.40 | — | — | 4875.13 |
| KAFB-106024[f] | 4857 | 7/1/2021, 2:53 PM | 5343.55 | 511.00 | 4863-4838 | — | 466.99 | 14.01 | — | — | 4876.56 |
| KAFB-106025[e] | 4857/4838 | 7/6/2021, 8:06 AM | 5317.28 | 494.75 | 4852-4827 | — | 442.00 | 23.00 | — | — | 4875.28 |
| KAFB-106026 | 4857 | 7/2/2021, 12:54 PM | 5322.68 | 491.28 | 4857-4837 | — | 447.41 | 18.60 | — | — | 4875.27 |
| KAFB-106027[f] | 4857 | 7/2/2021, 7:18 AM | 5348.62 | 509.16 | 4864-4844 | — | 471.81 | 12.35 | — | — | 4876.81 |
| KAFB-106028 | 4857 | 7/6/2021, 11:48 AM | 5348.89 | 516.75 | 4863-4838 | — | 472.82 | 13.18 | — | — | 4876.07 |
| KAFB-106029 | 4857 | 7/1/2021, 12:07 PM | 5310.94 | 476.83 | 4860-4840 | — | 435.17 | 15.63 | — | — | 4875.77 |
| KAFB-106030 | 4838 | 7/1/2021, 11:56 AM | 5311.03 | 490.97 | 4842-4827 | — | 435.25 | -- | — | — | 4875.78 |
| KAFB-106031 | 4814 | 7/1/2021, 11:46 AM | 5311.06 | 515.87 | 4815-4802 | — | 435.36 | -- | — | — | 4875.70 |
| KAFB-106032 | 4857 | 7/6/2021, 10:55 AM | 5317.60 | 480.40 | 4862-4842 | — | 441.36 | 14.64 | — | — | 4876.24 |
| KAFB-106033 | 4838 | 7/6/2021, 10:47 AM | 5317.76 | 497.16 | 4841-4826 | — | 441.49 | -- | — | — | 4876.27 |
| KAFB-106034 | 4814 | 7/6/2021, 10:38 AM | 5318.63 | 523.32 | 4817-4802 | — | 442.36 | -- | — | — | 4876.27 |
| KAFB-106035 | 4857 | 7/2/2021, 12:51 PM | 5321.58 | 486.92 | 4869-4839 | — | 446.98 | 5.15 | — | — | 4874.60 |
| KAFB-106036 | 4838 | 7/2/2021, 12:42 PM | 5321.85 | 501.36 | 4840-4825 | — | 447.41 | -- | — | — | 4874.44 |
| KAFB-106037 | 4838 | 7/2/2021, 12:34 PM | 5322.10 | 527.09 | 4815-4800 | — | 448.06 | -- | — | — | 4874.04 |
| KAFB-106038 | 4857 | 7/1/2021, 1:04 PM | 5351.61 | 515.19 | 4870-4840 | — | 476.12 | 5.14 | — | — | 4875.49 |
| KAFB-106039 | 4838 | 7/1/2021, 1:12 PM | 5351.32 | 530.25 | 4840-4825 | — | 475.95 | -- | — | — | 4875.37 |

**Table 4-2**
**Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, Q3 2021**

| Well Location ID | Reference Elevation Interval (ft AMSL) | Measurement Date and Time | MRP Elevation (ft AMSL) | Well Depth[a] (ft MRP) | Screened Interval (ft AMSL) | Depth to LNAPL[b] (ft MRP) | Depth to Water[b] (ft MRP) | Screen Submergence Depth[c] (ft) | Measured LNAPL Thickness (ft) | LNAPL Elevation (ft AMSL) | Groundwater Elevation Corrected for LNAPL Thickness[d] (ft AMSL) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAFB-106040 | 4814 | 7/1/2021, 1:23 PM | 5350.26 | 552.41 | 4817-4802 | — | 474.86 | -- | — | — | 4875.40 |
| KAFB-106041 | 4857 | 7/6/2021, 9:35 AM | 5324.35 | 473.48 | 4875-4855 | — | 449.16 | -0.16 | — | — | 4875.19 |
| KAFB-106042 | 4857 | 7/6/2021, 9:55 AM | 5324.07 | 488.39 | 4855-4841 | — | 448.91 | 20.09 | — | — | 4875.16 |
| KAFB-106043 | 4814 | 7/6/2021, 9:46 AM | 5324.30 | 561.90 | 4781-4767 | — | 449.16 | -- | — | — | 4875.14 |
| KAFB-106044[f] | 4838 | 7/2/2021, 7:12 AM | 5348.79 | 524.09 | 4841-4826 | — | 471.95 | -- | — | — | 4876.84 |
| KAFB-106045 | 4814 | 7/2/2021, 7:26 AM | 5348.52 | 551.04 | 4817-4802 | — | 471.66 | -- | — | — | 4876.86 |
| KAFB-106046[f] | 4857 | 7/2/2021, 9:33 AM | 5352.84 | 515.04 | 4863-4843 | — | 476.78 | 13.22 | — | — | 4876.06 |
| KAFB-106047[f] | 4838 | 7/2/2021, 9:44 AM | 5352.81 | 532.01 | 4841-4826 | — | 476.85 | -- | — | — | 4875.96 |
| KAFB-106048 | 4814 | 7/6/2021, 2:28 PM | 5352.58 | 556.26 | 4817-4802 | — | 476.47 | -- | — | — | 4876.11 |
| KAFB-106049 | 4857 | 7/6/2021, 7:29 AM | 5316.10 | 479.96 | 4859-4839 | — | 440.38 | 16.42 | — | — | 4875.72 |
| KAFB-106050 | 4838 | 7/6/2021, 7:50 AM | 5315.51 | 494.15 | 4841-4826 | — | 439.79 | -- | — | — | 4875.72 |
| KAFB-106051 | 4814 | 7/6/2021, 7:37 AM | 5315.78 | 520.50 | 4815-4800 | — | 440.09 | -- | — | — | 4875.69 |
| KAFB-106052 | 4857 | 7/6/2021, 8:18 AM | 5318.86 | 483.98 | 4869-4839 | — | 443.53 | 6.07 | — | — | 4875.33 |
| KAFB-106053 | 4838 | 7/6/2021, 8:30 AM | 5318.67 | 497.95 | 4840-4825 | — | 443.46 | -- | — | — | 4875.21 |
| KAFB-106054 | 4814 | 7/6/2021, 8:40 AM | 5318.38 | 523.25 | 4814-4799 | — | 443.09 | -- | — | — | 4875.29 |
| KAFB-106055 | 4857 | 7/6/2021, 11:18 AM | 5325.09 | 490.29 | 4859-4839 | — | 450.09 | 15.71 | — | — | 4875.00 |
| KAFB-106057 | 4838 | 7/6/2021, 11:10 AM | 5325.46 | 505.35 | 4841-4826 | — | 450.45 | -- | — | — | 4875.01 |
| KAFB-106058 | 4814 | 7/6/2021, 10:58 AM | 5326.05 | 530.73 | 4814-4799 | — | 450.80 | -- | — | — | 4875.25 |
| KAFB-106059 | 4857 | 7/1/2021, 9:06 AM | 5347.87 | 511.03 | 4861-4841 | 471.51 | 471.52 | 14.95 | 0.01 | 4876.36 | 4876.36 |
| KAFB-106060[f] | 4838 | 7/2/2021, 8:05 AM | 5345.32 | 523.12 | 4842-4827 | — | 469.10 | -- | — | — | 4876.22 |
| KAFB-106061 | 4814 | 7/2/2021, 8:17 AM | 5345.43 | 593.00 | 4772-4757 | — | 469.09 | -- | — | — | 4876.34 |
| KAFB-106062[f] | 4814 | 7/1/2021, 9:27 AM | 5351.20 | 598.10 | 4773-4758 | — | 475.09 | -- | — | — | 4876.11 |
| KAFB-106063[f] | 4838 | 7/6/2021, 2:11 PM | 5351.86 | 528.36 | 4844-4829 | — | 475.67 | -- | — | — | 4876.19 |
| KAFB-106064[f] | 4857 | 7/6/2021, 2:00 PM | 5351.08 | 513.18 | 4863-4843 | — | 474.87 | 13.19 | — | — | 4876.21 |
| KAFB-106065[f] | 4838 | 7/6/2021, 12:29 PM | 5348.76 | 528.06 | 4841-4826 | — | 472.79 | -- | — | — | 4875.97 |
| KAFB-106066[f] | 4814 | 7/6/2021, 12:17 PM | 5349.09 | 595.79 | 4773-4758 | — | 473.13 | -- | — | — | 4875.96 |
| KAFB-106067[f] | 4857 | 7/2/2021, 11:07 AM | 5347.50 | 509.90 | 4862-4842 | — | 471.88 | 13.12 | — | — | 4875.62 |
| KAFB-106068[f] | 4814 | 7/2/2021, 11:19 AM | 5347.23 | 600.03 | 4767-4752 | — | 471.79 | -- | — | — | 4875.44 |
| KAFB-106069 | 4838 | 7/2/2021, 11:31 AM | 5347.25 | 525.45 | 4841-4826 | — | 471.51 | -- | — | — | 4875.74 |
| KAFB-106070 | 4857 | 7/6/2021, 8:42 AM | 5318.54 | 483.75 | 4859-4839 | — | 443.42 | 16.58 | — | — | 4875.12 |
| KAFB-106071 | 4814 | 7/6/2021, 8:33 AM | 5320.90 | 567.30 | 4773-4758 | — | 445.67 | -- | — | — | 4875.23 |
| KAFB-106072 | 4838 | 7/2/2021, 2:19 PM | 5319.29 | 494.45 | 4844-4824 | — | 443.75 | -- | — | — | 4875.54 |
| KAFB-106073 | 4838 | 7/2/2021, 7:03 AM | 5339.87 | 519.16 | 4840-4825 | — | 463.91 | -- | — | — | 4875.96 |
| KAFB-106074 | 4814 | 7/2/2021, 6:55 AM | 5340.59 | 588.95 | 4771-4756 | — | 464.65 | -- | — | — | 4875.94 |
| KAFB-106075[f] | 4857 | 7/2/2021, 6:48 AM | 5340.50 | 505.00 | 4860-4840 | — | 464.60 | 15.40 | — | — | 4875.90 |
| KAFB-106076 | 4857 | 7/2/2021, 10:22 AM | 5344.92 | 499.75 | 4865-4845 | 468.64 | 468.66 | 11.36 | 0.02 | 4876.28 | 4876.28 |
| KAFB-106077 | 4838 | 7/1/2021, 12:34 PM | 5344.72 | 522.35 | 4841-4826 | — | 469.74 | -- | — | — | 4874.98 |

## Table 4-2
## Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, Q3 2021

| Well Location ID | Reference Elevation Interval (ft AMSL) | Measurement Date and Time | MRP Elevation (ft AMSL) | Well Depth[a] (ft MRP) | Screened Interval (ft AMSL) | Depth to LNAPL[b] (ft MRP) | Depth to Water[b] (ft MRP) | Screen Submergence Depth[c] (ft) | Measured LNAPL Thickness (ft) | LNAPL Elevation (ft AMSL) | Groundwater Elevation Corrected for LNAPL Thickness[d] (ft AMSL) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAFB-106078[f] | 4814 | 7/1/2021, 12:26 PM | 5344.60 | 593.50 | 4771-4756 | — | 468.90 | -- | — | — | 4875.70 |
| KAFB-106079 | 4857 | 7/1/2021, 3:21 PM | 5349.67 | 511.40 | 4863-4843 | — | 473.52 | 13.31 | — | — | 4876.15 |
| KAFB-106080[f] | 4838 | 7/1/2021, 3:39 PM | 5348.48 | 526.28 | 4843-4828 | — | 472.09 | -- | — | — | 4876.39 |
| KAFB-106081 | 4814 | 7/6/2021, 2:09 PM | 5349.48 | 596.23 | 4772-4757 | — | 473.40 | -- | — | — | 4876.08 |
| KAFB-106082 | 4857 | 7/2/2021, 8:03 AM | 5335.26 | 495.89 | 4863-4843 | — | 459.85 | 12.15 | — | — | 4875.41 |
| KAFB-106083 | 4838 | 7/2/2021, 7:54 AM | 5335.04 | 514.69 | 4840-4825 | — | 459.51 | -- | — | — | 4875.53 |
| KAFB-106084 | 4814 | 7/1/2021, 2:50 PM | 5337.94 | 587.92 | 4768-4753 | — | 462.11 | -- | — | — | 4875.83 |
| KAFB-106085 | 4857 | 7/6/2021, 8:55 AM | 5317.23 | 480.90 | 4871-4841 | — | 441.74 | 4.76 | — | — | 4875.49 |
| KAFB-106086 | 4838 | 7/6/2021, 9:04 AM | 5317.65 | 494.92 | 4842-4827 | — | 442.12 | -- | — | — | 4875.53 |
| KAFB-106087 | 4814 | 7/6/2021, 9:12 AM | 5316.87 | 565.43 | 4771-4756 | — | 441.36 | -- | — | — | 4875.51 |
| KAFB-106088 | 4857 | 7/2/2021, 2:03 PM | 5324.27 | 484.41 | 4864-4844 | — | 449.02 | 10.98 | — | — | 4875.25 |
| KAFB-106089 | 4838 | 7/6/2021, 8:18 AM | 5323.54 | 501.82 | 4842-4827 | — | 448.88 | -- | — | — | 4874.66 |
| KAFB-106090 | 4814 | 7/6/2021, 8:08 AM | 5322.85 | 524.65 | 4768-4753 | — | 447.76 | -- | — | — | 4875.09 |
| KAFB-106091 | 4857 | 7/2/2021, 11:49 AM | 5314.33 | 479.51 | 4860-4840 | — | 439.88 | 14.12 | — | — | 4874.45 |
| KAFB-106092 | 4838 | 7/2/2021, 11:14 AM | 5314.51 | 493.48 | 4841-4826 | — | 440.26 | -- | — | — | 4874.25 |
| KAFB-106093 | 4814 | 7/2/2021, 11:39 AM | 5314.62 | 563.00 | 4771-4756 | — | 439.66 | -- | — | — | 4874.96 |
| KAFB-106094[f] | 4857 | 7/6/2021, 11:31 AM | 5345.07 | 509.17 | 4861-4841 | — | 469.10 | 15.10 | — | — | 4875.97 |
| KAFB-106095 | 4838 | 7/6/2021, 11:19 AM | 5344.66 | 522.47 | 4841-4826 | — | 468.68 | -- | — | — | 4875.98 |
| KAFB-106096[f] | 4814 | 7/6/2021, 11:09 AM | 5345.31 | 595.08 | 4769-4754 | — | 469.30 | -- | — | — | 4876.01 |
| KAFB-106097 | 4838 | 7/2/2021, 7:32 AM | 5347.74 | 525.98 | 4842-4827 | — | 471.56 | -- | — | — | 4876.18 |
| KAFB-106098 | 4814 | 7/2/2021, 7:26 AM | 5347.83 | 550.78 | 4817-4802 | — | 471.65 | -- | — | — | 4876.18 |
| KAFB-106099 | 4838 | 7/2/2021, 8:28 AM | 5342.85 | 521.10 | 4842-4827 | — | 466.24 | -- | — | — | 4876.61 |
| KAFB-106100 | 4814 | 7/2/2021, 8:37 AM | 5342.85 | 546.55 | 4817-4802 | — | 466.26 | -- | — | — | 4876.59 |
| KAFB-106101 | 4838 | 7/2/2021, 10:36 AM | 5340.32 | 514.83 | 4842-4826 | — | 463.36 | -- | — | — | 4876.96 |
| KAFB-106102 | 4814 | 7/2/2021, 10:19 AM | 5340.32 | 539.80 | 4816-4803 | — | 463.47 | -- | — | — | 4876.85 |
| KAFB-106103 | 4838 | 7/6/2021, 9:40 AM | 5328.44 | 505.25 | 4843-4828 | — | 453.87 | -- | — | — | 4874.57 |
| KAFB-106104 | 4814 | 7/6/2021, 9:48 AM | 5328.08 | 528.30 | 4818-4803 | — | 453.31 | -- | — | — | 4874.77 |
| KAFB-106105 | 4838 | 7/6/2021, 9:09 AM | 5321.96 | 503.90 | 4838-4823 | — | 446.90 | -- | — | — | 4875.06 |
| KAFB-106106 | 4857 | 7/6/2021, 8:58 AM | 5321.80 | 483.04 | 4868-4838 | — | 446.77 | 6.83 | — | — | 4875.03 |
| KAFB-106107 | 4814 | 7/6/2021, 9:17 AM | 5322.12 | 529.15 | 4812-4797 | — | 447.00 | -- | — | — | 4875.12 |
| KAFB-106148-484[g] | 4857 | 7/1/2021, 2:32 PM | 5344.24 | 479.68 | 4990-4860 | — | 467.64 | -113.64 | — | — | 4876.60 |
| KAFB-106149-484[g] | 4857 | 7/1/2021, 1:47 PM | 5345.94 | 479.90 | 4992-4862 | — | 469.65 | -115.81 | — | — | 4876.29 |
| KAFB-106150-484[g] | 4857 | 7/1/2021, 11:59 AM | 5344.10 | 480.08 | 4989-4860 | 467.78 | 468.49 | -112.95 | 0.71 | 4876.32 | 4876.15 |
| KAFB-106151-484[g] | 4857 | 7/1/2021, 8:36 AM | 5345.49 | 480.10 | 4990-4861 | — | 469.57 | -114.57 | — | — | 4875.92 |
| KAFB-106152-484[g] | 4857 | 7/1/2021, 10:20 AM | 5347.68 | 482.60 | 4992-4863 | — | 471.43 | -116.43 | — | — | 4876.25 |
| KAFB-106153-484[g] | 4857 | 7/1/2021, 12:13 PM | 5348.99 | 480.49 | 4994-4865 | — | 472.80 | -117.51 | — | — | 4876.19 |
| KAFB-106154-484[g] | 4857 | 7/1/2021, 1:30 PM | 5347.34 | 481.15 | 4992-4863 | 470.84 | 471.26 | -115.94 | 0.42 | 4876.5 | 4876.40 |
| KAFB-106155-484[g] | 4857 | 7/1/2021, 11:40 AM | 5347.13 | 481.16 | 4992-4863 | — | 471.28 | -116.31 | — | — | 4875.85 |
| KAFB-106156-484[g] | 4857 | 7/1/2021, 8:16 AM | 5341.19 | 481.82 | 4996-4857 | — | 464.63 | -119.63 | — | — | 4876.56 |

**Table 4-2**
**Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, Q3 2021**

| Well Location ID | Reference Elevation Interval (ft AMSL) | Measurement Date and Time | MRP Elevation (ft AMSL) | Well Depth[a] (ft MRP) | Screened Interval (ft AMSL) | Depth to LNAPL[b] (ft MRP) | Depth to Water[b] (ft MRP) | Screen Submergence Depth[c] (ft) | Measured LNAPL Thickness (ft) | LNAPL Elevation (ft AMSL) | Groundwater Elevation Corrected for LNAPL Thickness[d] (ft AMSL) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAFB-106201 | 4857 | 7/1/2021, 7:58 AM | 5357.00 | 524.11 | 4867-4837 | — | 484.46 | 5.19 | — | — | 4872.54 |
| KAFB-106202 | 4838 | 7/1/2021, 8:09 AM | 5357.80 | 538.94 | 4838-4823 | — | 485.59 | -- | — | — | 4872.21 |
| KAFB-106203 | 4814 | 7/1/2021, 8:18 AM | 5357.52 | 642.02 | 4734-4719 | — | 486.15 | -- | — | — | 4871.37 |
| KAFB-106204 | 4857 | 7/6/2021, 10:39 AM | 5332.86 | 497.48 | 4870-4840 | — | 458.08 | 4.42 | — | — | 4874.78 |
| KAFB-106205 | 4838 | 7/6/2021, 10:29 AM | 5333.29 | 512.46 | 4841-4826 | — | 458.55 | -- | — | — | 4874.74 |
| KAFB-106206 | 4814 | 7/6/2021, 10:16 AM | 5333.46 | 613.58 | 4740-4725 | — | 458.76 | -- | — | — | 4874.70 |
| KAFB-106207 | 4857 | 7/1/2021, 9:55 AM | 5344.20 | 507.40 | 4871-4841 | — | 470.43 | 2.51 | — | — | 4873.77 |
| KAFB-106208 | 4838 | 7/1/2021, 10:04 AM | 5343.85 | 522.48 | 4841-4826 | — | 470.20 | -- | — | — | 4873.65 |
| KAFB-106209 | 4814 | 7/1/2021, 10:17 AM | 5343.38 | 623.85 | 4740-4726 | — | 469.75 | -- | — | — | 4873.63 |
| KAFB-106211 | 4857 | 7/1/2021, 2:25 PM | 5342.51 | 466.72 | 4903-4876 | — | 466.59 | -26.72 | — | — | 4875.92 |
| KAFB-106212 | 4814 | 7/2/2021, 1:02 PM | 5321.80 | 562.97 | 4779-4764 | — | 447.68 | -- | — | — | 4874.12 |
| KAFB-106213 | 4857 | 7/2/2021, 1:44 PM | 5325.19 | 482.79 | 4877-4847 | — | 450.39 | -2.48 | — | — | 4874.80 |
| KAFB-106214 | 4838 | 7/2/2021, 1:30 PM | 5325.45 | 497.80 | 4847-4833 | — | 450.58 | -- | — | — | 4874.87 |
| KAFB-106215 | 4814 | 7/2/2021, 1:18 PM | 5325.77 | 566.87 | 4779-4764 | — | 450.83 | -- | — | — | 4874.94 |
| KAFB-106216 | 4857 | 7/6/2021, 10:23 AM | 5333.91 | 489.80 | 4878-4848 | — | 459.19 | -3.69 | — | — | 4874.72 |
| KAFB-106217 | 4838 | 7/6/2021, 10:15 AM | 5333.85 | 505.47 | 4849-4834 | — | 459.13 | -- | — | — | 4874.72 |
| KAFB-106218 | 4814 | 7/6/2021, 10:06 AM | 5333.64 | 572.31 | 4782-4767 | — | 459.27 | -- | — | — | 4874.37 |
| KAFB-106219 | 4857 | 7/1/2021, 9:11 AM | 5340.41 | 498.78 | 4878-4848 | — | 465.84 | -3.14 | — | — | 4874.57 |
| KAFB-106220 | 4838 | 7/1/2021, 9:22 AM | 5340.34 | 513.50 | 4847-4832 | — | 465.76 | -- | — | — | 4874.58 |
| KAFB-106221 | 4814 | 7/1/2021, 9:32 AM | 5340.10 | 581.25 | 4779-4764 | — | 465.53 | -- | — | — | 4874.57 |
| KAFB-106222 | 4857 | 7/6/2021, 1:32 PM | 5333.24 | 493.33 | 4875-4845 | — | 458.58 | -0.78 | — | — | 4874.66 |
| KAFB-106223 | 4838 | 7/6/2021, 1:11 PM | 5333.96 | 506.71 | 4846-4831 | — | 459.23 | -- | — | — | 4874.73 |
| KAFB-106224 | 4814 | 7/6/2021, 12:48 PM | 5335.08 | 575.88 | 4780-4765 | — | 460.37 | -- | — | — | 4874.71 |
| KAFB-106225 | 4857 | 7/6/2021, 12:25 PM | 5326.36 | 482.88 | 4876-4846 | — | 451.79 | -1.79 | — | — | 4874.57 |
| KAFB-106226 | 4838 | 7/6/2021, 12:12 PM | 5327.31 | 500.10 | 4847-4832 | — | 452.40 | -- | — | — | 4874.91 |
| KAFB-106227 | 4814 | 7/6/2021, 11:59 AM | 5328.09 | 568.36 | 4780-4765 | — | 453.14 | -- | — | — | 4874.95 |
| KAFB-106229[e,g] | 4857/4838 | 7/2/2021, 11:01 AM | 5314.31 | 536.27 | 4883-4783 | — | 440.04 | -9.04 | — | — | 4874.27 |
| KAFB-106230 | 4814 | 7/2/2021, 1:04 PM | 5324.51 | 520.32 | 4824-4809 | — | 449.61 | -- | — | — | 4874.90 |
| KAFB-106231 | 4857 | 7/1/2021, 11:13 AM | 5327.56 | 479.89 | 4888-4853 | — | 452.42 | -12.42 | — | — | 4875.14 |
| KAFB-106232 | 4814 | 7/1/2021, 10:01 AM | 5327.20 | 523.10 | 4824-4809 | — | 452.02 | -- | — | — | 4875.18 |
| KAFB-106235-438 | 4857 | 7/2/2021, 11:51 AM | 5315.67 | 465.50 | 4878-4853 | — | 440.59 | -2.63 | — | — | 4875.08 |
| KAFB-106235-472 | 4838 | 7/2/2021, 11:57 AM | 5315.67 | 494.14 | 4844-4824 | — | 440.59 | -- | — | — | 4875.08 |
| KAFB-106235-501 | 4814 | 7/2/2021, 12:07 PM | 5315.67 | 522.48 | 4815-4795 | — | 440.67 | -- | — | — | 4875.00 |
| KAFB-106236-436 | 4857 | 7/2/2021, 12:26 PM | 5316.02 | 463.30 | 4880-4855 | — | 440.56 | -4.62 | — | — | 4875.46 |
| KAFB-106236-470 | 4838 | 7/2/2021, 12:33 PM | 5316.02 | 492.17 | 4846-4826 | — | 440.60 | -- | — | — | 4875.42 |
| KAFB-106236-499 | 4814 | 7/2/2021, 12:38 PM | 5316.02 | 519.94 | 4817-4797 | — | 440.65 | -- | — | — | 4875.37 |
| KAFB-106240-449 | 4857 | 7/2/2021, 9:13 AM | 5347.57 | 491.05 | 4899-4859 | — | 471.47 | -22.43 | — | — | 4876.10 |
| KAFB-106241-428 | 4857 | 7/6/2021, 11:28 AM | 5324.06 | 470.10 | 4896-4856 | — | 449.65 | -21.55 | — | — | 4874.41 |
| KAFB-106242-418 | 4857 | 7/1/2021, 12:30 PM | 5316.15 | 459.94 | 4898-4858 | — | 440.46 | -22.32 | — | — | 4875.69 |
| KAFB-106243-425 | 4857 | 7/6/2021, 7:55 AM | 5320.57 | 567.30 | 4896-4856 | — | 445.45 | -19.91 | — | — | 4875.12 |
| KAFB-106244-445 | 4857 | 7/2/2021, 8:55 AM | 5343.51 | 487.12 | 4898-4858 | — | 467.03 | -21.94 | — | — | 4876.48 |
| KAFB-106245-460 | 4857 | 7/2/2021, 9:41 AM | 5360.90 | 505.51 | 4897-4857 | — | 485.29 | -21.62 | — | — | 4875.61 |
| KAFB-106247-450 | 4857 | 7/1/2021, 10:40 AM | 5351.60 | 495.12 | 4901-4861 | — | 475.30 | -21.96 | — | — | 4876.30 |

## Table 4-2
## Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, Q3 2021

| Well Location ID | Reference Elevation Interval (ft AMSL) | Measurement Date and Time | MRP Elevation (ft AMSL) | Well Depth[a] (ft MRP) | Screened Interval (ft AMSL) | Depth to LNAPL[b] (ft MRP) | Depth to Water[b] (ft MRP) | Screen Submergence Depth[c] (ft) | Measured LNAPL Thickness (ft) | LNAPL Elevation (ft AMSL) | Groundwater Elevation Corrected for LNAPL Thickness[d] (ft AMSL) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KAFB-106248-452 | 4857 | 7/1/2021, 1:40 PM | 5356.34 | 494.50 | 4904-4864 | — | 480.93 | -25.40 | — | — | 4875.41 |
| KAFB-106249-450 | 4857 | 7/2/2021, 9:22 AM | 5353.27 | 492.10 | 4903-4863 | — | 477.48 | -27.35 | — | — | 4875.79 |
| KAFB-106250-447 | 4857 | 7/2/2021, 9:00 AM | 5349.55 | 489.70 | 4902-4862 | — | 474.10 | -26.45 | — | — | 4875.45 |
| KAFB-106251-443 | 4857 | 7/1/2021, 10:55 AM | 5348.06 | 485.60 | 4904-4854 | — | 471.76 | -25.16 | — | — | 4876.30 |
| KAFB-106252-425 | 4857 | 7/2/2021, 1:37 PM | 5325.47 | 467.00 | 4901-4861 | — | 452.54 | -27.64 | — | — | 4872.93 |
| KAFB-106252-515 | 4838 | 7/2/2021, 1:34 PM | 5325.47 | 525.00 | 4811-4801 | — | 452.14 | -- | — | — | 4873.33 |
| KAFB-106S1-447 | 4857 | 7/1/2021, 12:42 PM | 5345.22 | 489.53 | 4898-4858 | — | 468.68 | -21.66 | — | — | 4876.54 |
| KAFB-106S2-451 | 4857 | 7/1/2021, 9:39 AM | 5352.40 | 496.45 | 4898-4858 | — | 476.12 | -22.05 | — | — | 4876.28 |
| KAFB-106S3-449 | 4857 | 7/1/2021, 3:30 PM | 5351.01 | 493.62 | 4899-4859 | — | 475.23 | -23.06 | — | — | 4875.78 |
| KAFB-106S4-446 | 4857 | 7/6/2021, 2:19 PM | 5346.57 | 491.09 | 4898-4858 | — | 470.22 | -21.26 | — | — | 4876.35 |
| KAFB-106S5-446 | 4857 | 7/6/2021, 1:06 PM | 5343.58 | 488.18 | 4898-4858 | — | 467.55 | -21.49 | — | — | 4876.03 |
| KAFB-106S7-451 | 4857 | 7/6/2021, 12:03 PM | 5348.88 | 492.02 | 4898-4858 | — | 472.97 | -22.02 | — | — | 4875.91 |
| KAFB-106S8-451 | 4857 | 7/1/2021, 11:28 AM | 5351.45 | 491.42 | 4900-4860 | — | 475.10 | -20.88 | — | — | 4876.35 |
| KAFB-106S9-447 | 4857 | 7/1/2021, 8:50 AM | 5345.82 | 489.19 | 4899-4859 | — | 469.81 | -22.78 | — | — | 4876.01 |
| KAFB-106S10-443 | 4857 | 7/1/2021, 2:00 PM | 5348.73 | 472.14 | 4905-4865 | — | 472.07 | -26.04 | — | — | 4876.66 |
| KAFB-3411 | 4857 | 7/2/2021, 7:51 AM | 5343.49 | 504.68 | 4863-4838 | — | 466.91 | 13.16 | — | — | 4876.58 |

[a] Well depths were measured in Q4 2020 in wells without a dedicated pump. For wells with a dedicated pump, the total depth is based on the information provided in the well completion diagram.

[b] See Appendix C-2 for corrections to water level and LNAPL depths based on interface probe calibration.

[c] Screen submergence depth was calculated for wells which intersected the water table when they were installed; those are the wells located in REI 4857 and 4857/4838. This is calculated as the difference between the groundwater elevation corrected for LNAPL thickness and the top of screen elevation. Negative values reflect the length of screen remaining above the water table.

[d] When applicable, groundwater elevation corrected for LNAPL thickness was calculated by the following formula: MRP Elevation - Depth to LNAPL/water interface + (LNAPL Thickness * Specific Gravity of Weathered JP4/JP8 Fuel) where the specific gravity of JP4/JP8 fuel is 0.7592. The specific gravity is based on the December 13, 2018 site-specific fuel testing report from PTS Laboratories using LNAPL collected from wells KAFB-106014, KAFB-106059, and KAFB-106079.

[e] Well used in analyses for both REI 4857 and 4838.

[f] This well contains a dedicated pump; therefore, a sounder was not deployed to avoid entanglement and the total depth is based on the information provided in the well completion diagram.

[g] Well not permanently designated in REI listed.

-- = Well was designed with the screened interval fully submerged to capture conditions at depths below the water table

— = LNAPL not detected

AMSL = above mean sea level

ft = foot/feet

ID = identification

JP = jet propellant

LNAPL = light non-aqueous phase liquid

MRP = measurement reference point

Q3 = third quarter

Q4 = fourth quarter

REI = reference elevation interval

**Table 4-3**
**Status of Quarterly Baseline Sampling and Summary of Analytical Results, Q3 2021**

| Well Location ID | Reference Elevation Interval (ft AMSL) | Sample Dates | Remaining Quarters to Complete Baseline[a] | Summary of Analytical Results for Samples Collected During Q3 2021 |
|---|---|---|---|---|
| KAFB-106S10-443 | 4857 | 1/15/2021<br>4/19/2021<br>7/15/2021 | 5 | Benzene exceeded the PSL. EDB and remaining BTEX constituets were detected at concentrations below their respective PSLs. Dissolved iron and manganese exceeded their PSLs. |
| KAFB-106248-452 | 4857 | 4/5/2021<br>7/7/2021 | 6 | EDB and BTEX were not detected in collected laboratory samples. TPH-DRO, lead, arsenic, and anions were detected, but at concentrations below the PSL (where a PSL exists.) |
| KAFB-106249-450 | 4857 | 4/21/2021<br>7/7/2021 | 6 | EDB and BTEX were not detected in collected laboratory samples. TPH-DRO and anions were detected, but at concentrations below the PSL (where a PSL exists.) Dissolved manganese exceeded the PSL. |
| KAFB-106250-447 | 4857 | 4/22/2021<br>7/7/2021 | 6 | BTEX constituents and other VOCs were detected at concentrations below their PSLs. TPH-DRO and TPH-GRO were detected at concentrations exceeding their PSLs. Dissolved iron and manganese exceeded their PSLs. |
| KAFB-106251-443 | 4857 | 4/22/2021<br>7/7/2021 | 6 | BTEX constituents were not detected. EDB was detected slightly below the PSL. TPH-DRO, metals, and anions were detected, but at concentrations below the PSL (where a PSL exists.) Dissolved manganese exceeded the PSL. |
| KAFB-106252-425 | 4857 | 3/23/2021<br>7/7/2021 | 6 | BTEX constituents were not detected. EDB was detected below the PSL. Metals and anions were detected, but at concentrations below the PSL (where a PSL exists.) |

[a] Newly installed wells require a total of eight quarters of baseline sampling before they will be incorporated in the sampling regimen based on their objective.

AMSL = above mean sea level
BTEX = benzene, toluene, ethylbenzene, and total xylenes
EDB = 1,2-dibromoethane (ethylene dibromide)
ft = foot/feet
ID = identification
PSL = project screening level
Q3 = third quarter
TPH-DRO = total petroleum hydrocarbons - diesel range organics
TPH-GRO = total petroleum hydrocarbons - gasoline range organics

## Table 4-4
## Historical Light Non-Aqueous Phase Liquid Thickness

| Well ID[a] | KAFB-106005 | KAFB-106006 | KAFB-106008 | KAFB-106009 | KAFB-106010 | KAFB-106014 | KAFB-106028 | KAFB-106059 | KAFB-106064 | KAFB-106076 | KAFB-106079 | KAFB-106150-484 | KAFB-106154-484 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Quarter | LNAPL Thickness (feet) | | | | | | | | | | | | |
| Q1 2007 | 1.44 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Q1 2008 | NA | 0.58 | 0.99 | 1.39 | 0.61 | NA | NA | NA | NA | NA | NA | NA | NA |
| Q2 2008 | NA | NA | 1.03 | 1.48 | 0.73 | NA | NA | NA | NA | NA | NA | NA | NA |
| Q3 2008 | NA | 0.28 | 1.87 | 1.78 | 0.89 | NA | NA | NA | NA | NA | NA | NA | NA |
| Q4 2008 | NA | 0.82 | 1.65 | 1.92 | 0.89 | 1.55 | NA | NA | NA | NA | NA | NA | NA |
| Q1 2009 | NA | 0.73 | 1.26 | 1.42 | NA | 0.61 | NA | NA | NA | NA | NA | NA | NA |
| Q3 2009 | 3.01 | 1.47 | 2.71 | 1.77 | 0.89 | 1.07 | NA | NA | NA | NA | NA | NA | NA |
| Q1 2010 | 0.25 | 0.2 | 2.38 | 1.09 | 0.05 | 0.62 | NA | NA | NA | NA | NA | NA | NA |
| Q2 2010 | 3.33 | 2.45 | 3.8 | 0.79 | 1.18 | 0.23 | NA | NA | NA | NA | NA | NA | NA |
| Q3 2010 | 4.03 | 0.88 | 2.83 | 1.01 | 0.06 | 0.21 | 0.15 | NA | NA | NA | NA | NA | NA |
| Q4 2010 | 1.54 | 1.04 | 1.24 | 1.1 | 0.15 | 0.21 | 0.22 | NA | NA | NA | NA | NA | NA |
| Q1 2011 | 0.33 | 0.55 | 0.83 | 0.42 | -- | -- | 0.09 | NA | NA | NA | NA | NA | NA |
| Q2 2011 | 0.06 | 0.33 | 0.02 | -- | -- | -- | -- | 0.23 | -- | 0.26 | -- | NA | NA |
| Q3 2011 | 0.86 | 0.85 | 0.17 | 2.42 | -- | -- | 0.2 | 1.25 | 0.11 | 1.07 | -- | NA | NA |
| Q4 2011 | 0.26 | 0.88 | 0.44 | 0.33 | -- | -- | 0.38 | 0.94 | -- | 1.38 | -- | NA | NA |
| Q1 2012 | -- | -- | -- | -- | -- | -- | -- | 0.72 | -- | 0.46 | -- | NA | NA |
| Q2 2012 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.64 | -- | NA | NA |
| Q3 2012 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.55 | -- | NA | NA |
| Q4 2012 | -- | -- | -- | -- | -- | -- | -- | 0.14 | -- | 0.8 | -- | NA | NA |
| Q1 2013 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.04 | -- | NA | NA |
| Q2 2013 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q3 2013 | -- | -- | -- | -- | -- | -- | -- | 0.38 | -- | -- | -- | NA | NA |
| Q4 2013 | 0.03 | -- | -- | -- | -- | -- | -- | -- | -- | 0.25 | -- | NA | NA |
| Q1 2014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q2 2014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q3 2014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q4 2014 | -- | 0.06 | -- | 0.05 | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q1 2015 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q2 2015 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q3 2015 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q4 2015 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.02 | -- | NA | NA |
| Q1 2016 | 0.1 | NA | NA | -- | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Q2 2016 | 0.01 | -- | 0.05 | -- | -- | -- | -- | -- | -- | 0.01 | -- | NA | NA |
| Q3 2016 | 0.01 | -- | 0.04 | -- | -- | -- | -- | -- | -- | 0.01 | -- | NA | NA |
| Q4 2016 | -- | -- | 0.03 | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q1 2017 | -- | -- | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q2 2017 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | NA | NA |
| Q3 2017 | -- | -- | -- | -- | -- | -- | -- | -- | NA | -- | -- | NA | NA |
| Q4 2017 | -- | -- | -- | -- | -- | -- | -- | -- | NA | -- | -- | 0.03 | 0.03 |
| Q1 2018 | -- | -- | -- | -- | -- | -- | -- | -- | NA | 0.01 | 0.02 | 0.03 | 0.02 |
| Q2 2018 | -- | -- | -- | -- | -- | -- | -- | -- | NA | -- | 0.03 | 0.06 | 0.03 |
| Q3 2018 | -- | -- | -- | -- | -- | -- | -- | -- | NA | -- | 0.03 | 0.05 | 0.02 |
| Q4 2018 | -- | -- | -- | -- | -- | -- | -- | -- | NA | 0.01 | -- | 0.11 | 0.04 |
| Q1 2019 | -- | -- | -- | -- | -- | 0.11 | -- | 0.34 | NA | 0.02 | 0.18 | -- | 0.11 |
| Q2 2019 | -- | -- | -- | -- | -- | 0.10 | -- | 0.21 | NA | 0.01 | 0.14 | -- | -- |
| Q3 2019 | -- | -- | -- | -- | -- | 0.06 | -- | 0.21 | NA | 0.01 | 0.15 | -- | 0.21 |
| Q4 2019 | -- | -- | -- | -- | -- | -- | -- | -- | NA | 0.01 | -- | 0.04 | 0.16 |

## Table 4-4
## Historical Light Non-Aqueous Phase Liquid Thickness

| Well ID[a] | KAFB-106005 | KAFB-106006 | KAFB-106008 | KAFB-106009 | KAFB-106010 | KAFB-106014 | KAFB-106028 | KAFB-106059 | KAFB-106064 | KAFB-106076 | KAFB-106079 | KAFB-106150-484 | KAFB-106154-484 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sampling Quarter** | **LNAPL Thickness (feet)** | | | | | | | | | | | | |
| Q1 2020 | -- | -- | -- | -- | -- | -- | -- | 0.16 | -- | 0.04 | -- | 0.11 | -- |
| Q2 2020 | -- | -- | -- | -- | -- | -- | -- | 0.15 | -- | 0.01 | -- | 0.38 | -- |
| Q3 2020 | -- | -- | -- | -- | -- | -- | -- | 0.01 | -- | -- | -- | 0.27 | 0.02 |
| Q4 2020 | 0.01 | -- | -- | -- | -- | -- | -- | 0.01 | -- | -- | -- | 0.10 | 0.04 |
| Q1 2021 | -- | -- | -- | -- | -- | -- | -- | 0.01 | -- | 0.01 | -- | 0.33 | 0.22 |
| Q2 2021 | 0.01 | -- | -- | -- | -- | -- | -- | 0.01 | -- | 0.01 | -- | 0.39 | 0.03 |
| Q3 2021 | 0.04 | -- | -- | -- | -- | -- | -- | 0.01 | -- | 0.02 | -- | 0.71 | 0.42 |

[a] Wells are in reference elevation interval 4857.

-- = no LNAPL detected

ID = identification

LNAPL = light non-aqueous phase liquid

NA = not applicable (this well was not gauged in the sampling quarter)

Q1 = first quarter

Q2 = second quarter

Q3 = third quarter

Q4 = fourth quarter

## Table 4-5
## Groundwater Monitoring Wells Sampled, Q3 2021

| Location ID | Reference Elevation Interval (ft AMSL) | Well Installation Date[a] | Sample Date | Screen Interval[b] (ft bgs) | Screen Interval[b] (ft AMSL) | Sampling System | Screen Submerged[c] (Yes/No)? | Estimated Sample Depth[d,e,f] (ft bgs) | Analytical Suite[g] |
|---|---|---|---|---|---|---|---|---|---|
| KAFB-106003 | 4857 | 1/25/2003 | 7/8/2021 | 476-501 | 4861-4836 | Portable pump | Yes | 478 | BTEX, EDB, FP |
| KAFB-106004 | 4857 | 1/4/2006 | 7/12/2021 | 484-509 | 4859-4834 | Portable pump | Yes | 486 | BTEX, EDB, FP |
| KAFB-106005 | 4857 | 1/22/2007 | 7/15/2021 | 479-504 | 4865-4840 | Portable pump | Yes | 481 | BTEX, EDB, metals, anions, alkalinity,FP |
| KAFB-106009 | 4857 | 11/28/2007 | 7/14/2021 | 480-505 | 4865-4840 | Portable pump | Yes | 482 | BTEX, EDB, metals, anions, alkalinity, FP |
| KAFB-106012R | 4857 | 4/22/2014 | 7/8/2021 | 466-495 | 4877-4847 | Portable pump | Yes | 468 | BTEX, EDB, metals, anions, alkalinity, FP |
| KAFB-106013 | 4857 | 9/19/2008 | 7/9/2021 | 487-512 | 4861-4836 | Portable pump | Yes | 489 | BTEX, EDB, FP |
| KAFB-106029 | 4857 | 6/4/2011 | 7/9/2021 | 451-471 | 4860-4840 | Passive sampler | Yes | 452 | EDB |
| KAFB-106030 | 4838 | 5/25/2011 | 7/9/2021 | 470-485 | 4842-4827 | Passive sampler | -- | 470 | EDB |
| KAFB-106031 | 4814 | 5/25/2011 | 7/9/2021 | 496-510 | 4815-4802 | Passive sampler | -- | 497 | EDB |
| KAFB-106032 | 4857 | 6/24/2011 | 7/12/2021 | 456-476 | 4862-4842 | Passive sampler | Yes | 457 | EDB |
| KAFB-106033 | 4838 | 6/18/2011 | 7/12/2021 | 477-492 | 4841-4826 | Passive sampler | -- | 478 | EDB |
| KAFB-106034 | 4814 | 6/24/2011 | 7/12/2021 | 502-517 | 4817-4802 | Passive sampler | -- | 503 | EDB |
| KAFB-106041 | 4857 | 6/6/2011 | 7/12/2021 | 449-469 | 4875-4855 | Passive sampler | Yes | 450 | EDB, metals, anions, alkalinity |
| KAFB-106049 | 4857 | 5/13/2011 | 7/12/2021 | 457-477 | 4859-4839 | Passive sampler | Yes | 458 | EDB |
| KAFB-106050 | 4838 | 5/2/2011 | 7/12/2021 | 474-489 | 4841-4826 | Passive sampler | -- | 475 | EDB |
| KAFB-106051 | 4814 | 4/26/2011 | 7/12/2021 | 501-516 | 4815-4800 | Passive sampler | -- | 502 | EDB |
| KAFB-106097 | 4838 | 4/27/2011 | 7/9/2021 | 506-521 | 4842-4827 | Portable pump | -- | 508 | BTEX, EDB, FP |
| KAFB-106098 | 4814 | 4/17/2011 | 7/9/2021 | 531-546 | 4817-4802 | Portable pump | -- | 533 | BTEX, EDB, FP |
| KAFB-106099 | 4838 | 5/12/2011 | 7/12/2021 | 501-516 | 4842-4827 | Portable pump | -- | 503 | BTEX, EDB, FP |
| KAFB-106100 | 4814 | 5/3/2011 | 7/12/2021 | 526-541 | 4817-4802 | Portable pump | -- | 528 | BTEX, EDB, FP |
| KAFB-106101 | 4838 | 2/21/2011 | 7/8/2021 | 496-511 | 4842-4826 | Portable pump | -- | 498 | BTEX, EDB, FP |
| KAFB-106102 | 4814 | 3/3/2011 | 7/8/2021 | 521-535 | 4816-4803 | Portable pump | -- | 523 | BTEX, EDB, FP |
| KAFB-106149-484[h] | 4857 | 9/16/2011 | 7/12/2021 | 354-484 | 4992-4862 | Passive sampler | No | 472 | EDB, metals, anions, alkalinity |
| KAFB-106151-484[h] | 4857 | 9/30/2011 | 7/13/2021 | 355-484 | 4990-4861 | Passive sampler | No | 470 | EDB, metals, anions, alkalinity |
| KAFB-106152-484[h] | 4857 | 10/7/2011 | 7/13/2021 | 355-484 | 4993-4864 | Passive sampler | No | 472 | EDB, metals, anions, alkalinity |
| KAFB-106153-484[h] | 4857 | 10/27/2011 | 7/13/2021 | 355-484 | 4994-4865 | Passive sampler | No | 475 | EDB, metals, anions, alkalinity |
| KAFB-106201 | 4857 | 9/24/2012 | 7/8/2021 | 487-517 | 4867-4837 | Passive sampler | Yes | 490 | EDB |
| KAFB-106202 | 4838 | 9/23/2012 | 7/8/2021 | 517-532 | 4838-4823 | Passive sampler | -- | 521 | EDB |
| KAFB-106203 | 4814 | 9/9/2012 | 7/8/2021 | 620-635 | 4734-4719 | Passive sampler | -- | 624 | EDB |
| KAFB-106204 | 4857 | 8/22/2012 | 7/8/2021 | 463-493 | 4870-4840 | Passive sampler | Yes | 463 | EDB |
| KAFB-106205 | 4838 | 8/15/2012 | 7/8/2021 | 493-508 | 4841-4826 | Passive sampler | -- | 493 | EDB |
| KAFB-106206 | 4814 | 7/16/2012 | 7/8/2021 | 594-608 | 4740-4725 | Passive sampler | -- | 594 | EDB |
| KAFB-106207 | 4857 | 8/22/2012 | 7/7/2021 | 473-503 | 4871-4841 | Passive sampler | Yes | 474 | EDB |
| KAFB-106208 | 4838 | 8/16/2012 | 7/7/2021 | 503-518 | 4841-4826 | Passive sampler | -- | 504 | EDB |
| KAFB-106209 | 4814 | 8/7/2012 | 7/7/2021 | 603-617 | 4740-4726 | Passive sampler | -- | 604 | EDB |
| KAFB-106216 | 4857 | 2/17/2015 | 7/7/2021 | 456-486 | 4878-4848 | Passive sampler | No | 461 | EDB |
| KAFB-106217 | 4838 | 2/17/2015 | 7/7/2021 | 485-500 | 4849-4834 | Passive sampler | -- | 486 | EDB |
| KAFB-106218 | 4814 | 5/26/2015 | 7/7/2021 | 552-567 | 4782-4767 | Passive sampler | -- | 553 | EDB |
| KAFB-106222 | 4857 | 1/15/2015 | 7/22/2021 | 458-488 | 4875-4845 | Passive sampler | Yes | 461 | EDB |
| KAFB-106223 | 4838 | 2/17/2015 | 7/7/2021 | 488-503 | 4846-4831 | Passive sampler | -- | 489 | EDB |
| KAFB-106224 | 4814 | 5/22/2015 | 7/7/2021 | 555-570 | 4780-4765 | Passive sampler | -- | 556 | EDB |
| KAFB-106230 | 4814 | 9/1/2015 | 7/8/2021 | 501-516 | 4824-4809 | Passive sampler | -- | 502 | EDB, metals, anions, alkalinity |
| KAFB-106231 | 4857 | 9/15/2015 | 7/9/2021 | 440-475 | 4888-4853 | Passive sampler | No | 454 | EDB |
| KAFB-106232 | 4814 | 9/15/2015 | 7/9/2021 | 503-518 | 4824-4809 | Passive sampler | -- | 504 | EDB |
| KAFB-106235-438 | 4857 | 10/31/2016 | 7/9/2021 | 438-463 | 4878-4853 | Passive sampler | No | 441 | EDB |
| KAFB-106235-472 | 4838 | 10/31/2016 | 7/9/2021 | 472-492 | 4844-4824 | Passive sampler | -- | 473 | EDB |
| KAFB-106235-501 | 4814 | 10/31/2016 | 7/9/2021 | 501-521 | 4815-4795 | Passive sampler | -- | 502 | EDB |
| KAFB-106236-436 | 4857 | 11/23/2016 | 7/8/2021 | 436-461 | 4880-4855 | Passive sampler | No | 442 | EDB |
| KAFB-106236-470 | 4838 | 11/23/2016 | 7/8/2021 | 470-490 | 4846-4826 | Passive sampler | -- | 471 | EDB |
| KAFB-106236-499 | 4814 | 11/23/2016 | 7/8/2021 | 499-519 | 4817-4797 | Passive sampler | -- | 500 | EDB |
| KAFB-106240-449 | 4857 | 6/14/2018 | 7/12/2021 | 449-489 | 4899-4859 | Passive sampler | No | 473 | BTEX, EDB, metals, anions, alkalinity |

## Table 4-5
## Groundwater Monitoring Wells Sampled, Q3 2021

| Location ID | Reference Elevation Interval (ft AMSL) | Well Installation Date[a] | Sample Date | Screen Interval[b] (ft bgs) | Screen Interval[b] (ft AMSL) | Sampling System | Screen Submerged[c] (Yes/No)? | Estimated Sample Depth[d,e,f] (ft bgs) | Analytical Suite[g] |
|---|---|---|---|---|---|---|---|---|---|
| KAFB-106241-428 | 4857 | 8/16/2018 | 7/12/2021 | 428-468 | 4896-4856 | Passive sampler | No | 452 | EDB, metals, anions, alkalinity |
| KAFB-106242-418 | 4857 | 8/23/2018 | 7/9/2021 | 418-458 | 4898-4858 | Passive sampler | No | 442 | EDB, metals, anions, alkalinity |
| KAFB-106243-425 | 4857 | 7/27/2018 | 7/9/2021 | 426-465 | 4895-4856 | Passive sampler | No | 447 | EDB, metals, anions, alkalinity |
| KAFB-106244-445 | 4857 | 7/12/2018 | 7/12/2021 | 445-485 | 4898-4858 | Passive sampler | No | 469 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106245-460 | 4857 | 9/7/2018 | 7/13/2021 | 461-501 | 4897-4857 | Passive sampler | No | 485 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106247-450 | 4857 | 3/1/2019 | 7/13/2021 | 450-490 | 4898-4858 | Passive sampler | No | 477 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106248-452[i] | 4857 | 3/22/2021 | 7/7/2021 | 453-493 | 4901-4861 | Portable pump | No | 491 | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP |
| KAFB-106249-450[i] | 4857 | 2/10/2021 | 4/21/2021 | 450-490 | 4903-4863 | Dedicated pump | No | 470 | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP |
| KAFB-106250-447[i] | 4857 | 2/21/2021 | 4/22/2021 | 448-488 | 4902-4862 | Dedicated pump | No | 468 | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP |
| KAFB-106251-443[i] | 4857 | 1/21/2021 | 4/22/2021 | 444-484 | 4901-4861 | Dedicated pump | No | 464 | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP |
| KAFB-106252-425[i] | 4857 | 3/11/2021 | 7/7/2021 | 425-465 | 4901-4861 | Portable pump | No | 463 | VOCs, EDB, GRO, DRO, metals, anions, alkalinity, FP |
| KAFB-106S1-447 | 4857 | 2/18/2019 | 7/13/2021 | 447-487 | 4898-4858 | Passive sampler | No | 471 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S2-451 | 4857 | 11/21/2018 | 7/14/2021 | 451-491 | 4898-4858 | Passive sampler | No | 478 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S3-449 | 4857 | 11/29/2018 | 7/14/2021 | 449-489 | 4899-4859 | Passive sampler | No | 476 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S4-446 | 4857 | 11/16/2018 | 7/13/2021 | 446-486 | 4898-4858 | Passive sampler | No | 471 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S5-446 | 4857 | 11/5/2018 | 7/13/2021 | 446-486 | 4898-4858 | Passive sampler | No | 468 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S7-451 | 4857 | 2/4/2019 | 7/14/2021 | 451-491 | 4898-4858 | Passive sampler | No | 475 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S8-451 | 4857 | 3/1/2019 | 7/13/2021 | 451-491 | 4897-4857 | Passive sampler | No | 476 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S9-447 | 4857 | 11/8/2019 | 7/13/2021 | 447-487 | 4899-4859 | Passive sampler | No | 471 | BTEX, EDB, metals, anions, alkalinity |
| KAFB-106S10-443[i] | 4857 | 12/19/2020 | 7/15/2021 | 446-486 | 4905-4865 | Portable pump | No | 484 | Full suite VOCs, EDB, metals, anions, alkalinity |

[a] Well installation date is the date provided in ERPIMS, except where the date in ERPIMS is the start of drilling, in which case the well installation date is the date provided in the well completion diagram submitted to the NMOSE.

[b] Screen interval is rounded to the nearest foot.

[c] Well screens in REI 4857 wells intersected the water table when they were installed and current screen submergence is the result of the rise of the water table. Well screens in REI 4838 and 4814 wells were designed with the screened interval fully submerged to capture conditions at depths below the water table.

[d] Portable equipment sampling depths are estimated to the nearest foot as 2 ft below top of screen if submerged or 2 ft above bottom of screen if not submerged.

[e] Dedicated pump sampling depth is estimated as half-way between top and bottom of screen.

[f] Passive sampling depth is estimated to the nearest foot as the depth to the top of the highest sampler as recorded during passive sampler deployment. In wells where the screen is fully submerged, the midpoint of the highest sampler is 2 ft below the top of screen. In wells where the screen in not fully submerged, the highest sampler is placed on the highest ring that is expected to remain submerged until sampling is complete.

[g] The analytical methods for EDB and VOCs (including BTEX) are 8011 and 8260C, respectively. Metals analyses consisted of select total metals (arsenic, calcium, lead, potassium, magnesium, and sodium by analytical Method 6020A/6010C and select and dissolved metals (iron and manganese) (6010C). Anions analysis consisted of bromide by Method 300.0A, chloride by Method 300.0A, nitrate/nitrite nitrogen by Method 353.2, and sulfate by Method 300.0A. Field parameters include pH, specific conductivity, dissolved oxygen, oxidation reduction potential, temperature, and turbidity.

[h] Wells initially installed for vadose zone characterization. These wells were added to the GWM network to temporarily fill a data gap as the water level rose across the site.

[i] New wells will be sampled for eight quarters for baseline analyses.

-- = well was designed with the screened interval fully submerged to capture conditions at depths below the water table
AMSL = above mean sea level
bgs = below ground surface
BTEX = benzene, toluene, ethylbenzene, and total xylene
DRO = diesel range organics
EDB = 1,2-dibromoethane (ethylene dibromide)
ERPIMS = Environmental Resources Program Information Management System
FP = field parameters
ft = foot/feet
GWM = groundwater monitoring
GRO = gasoline range organics
ID = identification
NMOSE = New Mexico Office of the State Engineer
REI = reference elevation interval
VOC = volatile organic compound

## Table 4-6
## Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021

| | | | Well Location ID: | | | | KAFB-106248-452 | | | KAFB-106248-452 | | | KAFB-106249-450 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GW248-452-213 | | | GW248-452-613 | | | GW249-450-213 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | REG | | | Field Duplicate | | | REG | | |
| | | | Sample Depth (ft bgs): | | | | 493.53 | | | 493.53 | | | 488.1 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| VOCs | Method SW8260C (µg/L) | 1,1,1,2-Tetrachloroethane | NS | NS | 5.7 | 5.7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,1-Trichloroethane | 200 | 200 | 8,000 | 200 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2,2-Tetrachloroethane | 10 | NS | 0.76 | 10 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2-Trichloroethane | 5 | 5 | 2.8 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethane | 25 | NS | 28 | 25 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethene | 7 | 7 | 280 | 7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloropropene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,3-Trichlorobenzene | NS | NS | 7 | 7 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,3-Trichloropropane | NS | NS | 0.0075 | 0.05[e] | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,4-Trichlorobenzene | 70 | 70 | 12 | 70 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,4-Trimethylbenzene | NS | NS | 56 | 56 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | 1,2-Dibromo-3-chloropropane | NS | 0.2 | 0.0033 | 1[e] | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichlorobenzene | 600 | 600 | 300 | 600 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichloroethane | 5 | 5 | 1.7 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2-Dichloropropane | 5 | 5 | 8.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3,5-Trimethylbenzene | NS | NS | 60 | 60 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,3-Dichlorobenzene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3-Dichloropropane | NS | NS | 370 | 370 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,4-Dichlorobenzene | 75 | 75 | 4.8 | 75 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 2,2-Dichloropropane | NS | NS | NS | NS | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 2-Butanone | NS | NS | 5,600 | 5,600 | ND | U | 1 | ND | U | 1 | 0.6 | J | 1 |
| | | 2-Chlorotoluene | NS | NS | 240 | 240 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 2-Hexanone | NS | NS | 38 | 38 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 4-Chlorotoluene | NS | NS | 250 | 250 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 4-Isopropyltoluene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 4-Methyl-2-pentanone | NS | NS | 6,300 | 6,300 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | Acetone | NS | NS | 14,000 | 14,000 | ND | U | 2 | ND | U | 2 | 3.1 | J | 2 |
| | | Acrolein | NS | NS | 0.042 | 5[e] | ND | U | 5 | ND | U | 5 | ND | UJ | 5 |
| | | Acrylonitrile | NS | NS | 0.52 | 1[e] | ND | U | 1 | ND | U | 1 | ND | UJ | 1 |
| | | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Bromobenzene | NS | NS | 62 | 62 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Bromochloromethane | NS | NS | 83 | 83 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromodichloromethane | NS | 80 | 1.3 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromoform | NS | 80 | 33 | 80 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Bromomethane | NS | NS | 7.5 | 7.5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon disulfide | NS | NS | 810 | 810 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon tetrachloride | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chlorobenzene | NS | 100 | 78 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloroethane | NS | NS | 21,000 | 21,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Chloroform | 100 | 80 | 2.2 | 80 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloromethane | NS | NS | 190 | 190 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |

## Table 4-6
## Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021

| | | | Well Location ID: | | | | KAFB-106248-452 | | | KAFB-106248-452 | | | KAFB-106249-450 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GW248-452-213 | | | GW248-452-613 | | | GW249-450-213 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | REG | | | Field Duplicate | | | REG | | |
| | | | Sample Depth (ft bgs): | | | | 493.53 | | | 493.53 | | | 488.1 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| VOCs | Method SW8260C (µg/L) | cis-1,2-Dichloroethene | 70 | 70 | 36 | 70 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | cis-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Dibromochloromethane | NS | 80 | 8.7 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Dibromomethane | NS | NS | 8.3 | 8.3 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Dichlorodifluoromethane | NS | NS | 200 | 200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Hexachloro-1,3-butadiene | NS | NS | 1.4 | 4[e] | ND | UJ | 4 | ND | UJ | 4 | ND | U | 4 |
| | | Isopropylbenzene | NS | NS | 450 | 450 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | m- & p-Xylenes | NS | NS | NS | NS | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Methyl tert-butyl ether | 100 | NS | 140 | 100 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Methylene chloride | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Naphthalene | 30 | NS | 1.2 | 30 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | n-Butylbenzene | NS | NS | 1,000 | 1,000 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | n-Propylbenzene | NS | NS | 660 | 660 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | o-Xylene | NS | NS | 190 | 190 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | sec-Butylbenzene | NS | NS | 2,000 | 2,000 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Styrene | 100 | 100 | 1,200 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | tert-Butylbenzene | NS | NS | 690 | 690 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | Tetrachloroethene | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | trans-1,2-Dichloroethene | 100 | 100 | 68 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | trans-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Trichloroethene | 5 | 5 | 4.9 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Trichlorofluoromethane | NS | NS | 5,200 | 5,200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Vinyl acetate | NS | NS | 410 | 410 | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Vinyl chloride | 2 | 2 | 0.19 | 2 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| TPH | Method SW8015M (µg/L) | TPH-DRO (C10-C28) | NS | NS | 1,300 | 1,300 | 59 | J | 94 | 280 | J | 92 | 50 | J | 95 |
| | | TPH-GRO (C6-C10) | NS | NS | 550 | 550 | ND | U | 40 | ND | U | 40 | ND | U | 40 |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 38 | -- | 0.15 | 38 | -- | 0.15 | 46 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | ND | U | 0.1 | ND | U | 0.1 | 0.1 | J | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 5.4 | -- | 0.075 | 5.4 | -- | 0.075 | 7.3 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | **0.76** | -- | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 2.5 | -- | 0.45 | 2.6 | -- | 0.45 | 2.4 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 28 | -- | 0.5 | 29 | -- | 0.5 | 27 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.00079 | J | 0.0016 | ND | U | 0.0016 | 0.00083 | J | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.00017 | J | 0.00025 | 0.00015 | J | 0.00025 | 0.000092 | J | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 21 | -- | 1.5 | 20 | -- | 1.5 | 9.3 | J+ | 1.5 |
| | | Sulfate | 600 | 250 | NS | 250 | 35 | -- | 4.5 | 33 | -- | 4.5 | 16 | J | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[f] | 10[f] | NS | 10[f] | 0.2 | -- | 0.09 | 0.19 | -- | 0.09 | 0.046 | J | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 110 | -- | 6 | 110 | -- | 6 | 200 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 110 | -- | 6 | 110 | -- | 6 | 200 | -- | 6 |

## Table 4-6
## Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021

| | | | Well Location ID: | | | | KAFB-106249-450 | | | KAFB-106250-447 | | | KAFB-106251-443 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GW249-450-613 | | | GW250-447-213 | | | GW251-443-213 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | Field Duplicate | | | REG | | | REG | | |
| | | | Sample Depth (ft bgs): | | | | 488.1 | | | 485.7 | | | 481.6 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | 0.047 | -- | 0.019 |
| VOCs | Method SW8260C (µg/L) | 1,1,1,2-Tetrachloroethane | NS | NS | 5.7 | 5.7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,1-Trichloroethane | 200 | 200 | 8,000 | 200 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2,2-Tetrachloroethane | 10 | NS | 0.76 | 10 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2-Trichloroethane | 5 | 5 | 2.8 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethane | 25 | NS | 28 | 25 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethene | 7 | 7 | 280 | 7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloropropene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,3-Trichlorobenzene | NS | NS | 7 | 7 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,3-Trichloropropane | NS | NS | 0.0075 | 0.05[e] | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,4-Trichlorobenzene | 70 | 70 | 12 | 70 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,4-Trimethylbenzene | NS | NS | 56 | 56 | ND | U | 2 | 1 | J | 2 | ND | U | 2 |
| | | 1,2-Dibromo-3-chloropropane | NS | 0.2 | 0.0033 | 1[e] | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichlorobenzene | 600 | 600 | 300 | 600 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichloroethane | 5 | 5 | 1.7 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2-Dichloropropane | 5 | 5 | 8.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3,5-Trimethylbenzene | NS | NS | 60 | 60 | ND | U | 1 | 0.31 | J | 1 | ND | U | 1 |
| | | 1,3-Dichlorobenzene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3-Dichloropropane | NS | NS | 370 | 370 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,4-Dichlorobenzene | 75 | 75 | 4.8 | 75 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 2,2-Dichloropropane | NS | NS | NS | NS | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 2-Butanone | NS | NS | 5,600 | 5,600 | ND | U | 1 | 50 | -- | 1 | 1.3 | J | 1 |
| | | 2-Chlorotoluene | NS | NS | 240 | 240 | ND | U | 0.6 | 0.36 | J | 0.6 | ND | U | 0.6 |
| | | 2-Hexanone | NS | NS | 38 | 38 | ND | U | 1 | **49** | -- | 1 | ND | U | 1 |
| | | 4-Chlorotoluene | NS | NS | 250 | 250 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 4-Isopropyltoluene | NS | NS | NS | NS | ND | U | 0.6 | 87 | -- | 0.6 | ND | U | 0.6 |
| | | 4-Methyl-2-pentanone | NS | NS | 6,300 | 6,300 | ND | U | 1 | 28 | -- | 1 | ND | U | 1 |
| | | Acetone | NS | NS | 14,000 | 14,000 | 1.3 | J | 2 | 210 | -- | 2 | 11 | J | 2 |
| | | Acrolein | NS | NS | 0.042 | 5[e] | ND | UJ | 5 | ND | UJ | 5 | ND | UJ | 5 |
| | | Acrylonitrile | NS | NS | 0.52 | 1[e] | ND | UJ | 1 | ND | UJ | 1 | ND | UJ | 1 |
| | | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | 4.7 | -- | 0.6 | ND | U | 0.6 |
| | | Bromobenzene | NS | NS | 62 | 62 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Bromochloromethane | NS | NS | 83 | 83 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromodichloromethane | NS | 80 | 1.3 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromoform | NS | 80 | 33 | 80 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Bromomethane | NS | NS | 7.5 | 7.5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon disulfide | NS | NS | 810 | 810 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon tetrachloride | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chlorobenzene | NS | 100 | 78 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloroethane | NS | NS | 21,000 | 21,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Chloroform | 100 | 80 | 2.2 | 80 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloromethane | NS | NS | 190 | 190 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |

## Table 4-6
## Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021

| | | | Well Location ID: | | | | KAFB-106249-450 | | | KAFB-106250-447 | | | KAFB-106251-443 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GW249-450-613 | | | GW250-447-213 | | | GW251-443-213 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | Field Duplicate | | | REG | | | REG | | |
| | | | Sample Depth (ft bgs): | | | | 488.1 | | | 485.7 | | | 481.6 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| VOCs | Method SW8260C (µg/L) | cis-1,2-Dichloroethene | 70 | 70 | 36 | 70 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | cis-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Dibromochloromethane | NS | 80 | 8.7 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Dibromomethane | NS | NS | 8.3 | 8.3 | ND | U | 0.6 | 0.71 | J | 0.6 | ND | U | 0.6 |
| | | Dichlorodifluoromethane | NS | NS | 200 | 200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | 1.2 | -- | 0.8 | ND | U | 0.8 |
| | | Hexachloro-1,3-butadiene | NS | NS | 1.4 | 4[e] | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Isopropylbenzene | NS | NS | 450 | 450 | ND | U | 0.5 | 61 | -- | 0.5 | ND | U | 0.5 |
| | | m- & p-Xylenes | NS | NS | NS | NS | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Methyl tert-butyl ether | 100 | NS | 140 | 100 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Methylene chloride | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Naphthalene | 30 | NS | 1.2 | 30 | ND | U | 2 | 16 | -- | 2 | ND | U | 2 |
| | | n-Butylbenzene | NS | NS | 1,000 | 1,000 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | n-Propylbenzene | NS | NS | 660 | 660 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | o-Xylene | NS | NS | 190 | 190 | ND | U | 0.8 | 1.6 | -- | 0.8 | ND | U | 0.8 |
| | | sec-Butylbenzene | NS | NS | 2,000 | 2,000 | ND | U | 0.6 | 0.94 | J | 0.6 | ND | U | 0.6 |
| | | Styrene | 100 | 100 | 1,200 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | tert-Butylbenzene | NS | NS | 690 | 690 | ND | U | 1 | 0.34 | J | 1 | ND | U | 1 |
| | | Tetrachloroethene | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | 1.3 | -- | 0.5 | ND | U | 0.5 |
| | | trans-1,2-Dichloroethene | 100 | 100 | 68 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | trans-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Trichloroethene | 5 | 5 | 4.9 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Trichlorofluoromethane | NS | NS | 5,200 | 5,200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Vinyl acetate | NS | NS | 410 | 410 | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Vinyl chloride | 2 | 2 | 0.19 | 2 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | 1.6 | -- | 0.8 | ND | U | 0.8 |
| TPH | Method SW8015M (µg/L) | TPH-DRO (C10-C28) | NS | NS | 1,300 | 1,300 | 69 | J | 96 | **73,000** | -- | 1,800 | **4,100** | -- | 92 |
| | | TPH-GRO (C6-C10) | NS | NS | 550 | 550 | ND | U | 40 | **6,500** | -- | 200 | 130 | -- | 40 |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 55 | -- | 0.15 | 110 | -- | 0.15 | 74 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | 0.1 | J | 0.1 | **10** | -- | 0.1 | 0.28 | -- | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 8.4 | -- | 0.075 | 19 | -- | 0.075 | 12 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | **0.75** | -- | 0.0052 | **4.1** | -- | 0.0052 | **0.95** | -- | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 2.5 | -- | 0.45 | 3.5 | -- | 0.45 | 3.3 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 29 | -- | 0.5 | 40 | -- | 0.5 | 35 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.0026 | -- | 0.0016 | 0.0058 | -- | 0.0016 | 0.0012 | J | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | ND | U | 0.00025 | 0.00062 | -- | 0.00025 | ND | U | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 9.1 | J+ | 1.5 | 11 | J+ | 1.5 | 10 | -- | 1.5 |
| | | Sulfate | 600 | 250 | NS | 250 | 8 | J | 4.5 | ND | U | 4.5 | 30 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[f] | 10[f] | NS | 10[f] | ND | U | 0.09 | ND | U | 0.09 | ND | U | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 210 | -- | 6 | 380 | J- | 6 | 250 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | UJ | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 210 | -- | 6 | 380 | J- | 6 | 250 | -- | 6 |

**Table 4-6**
**Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021**

| | | | Well Location ID: | | | | KAFB-106252-425 | | | KAFB-106S10-443 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GW252-425-213 | | | GWS10-443-213 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/15/2021 | | |
| | | | Sample Type: | | | | REG | | | REG | | |
| | | | Sample Depth (ft bgs): | | | | 463 | | | 484.03 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | 0.014 | J | 0.019 | **230** | J | 19 |
| VOCs | Method SW8260C (µg/L) | 1,1,1,2-Tetrachloroethane | NS | NS | 5.7 | 5.7 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1,1-Trichloroethane | 200 | 200 | 8,000 | 200 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1,2,2-Tetrachloroethane | 10 | NS | 0.76 | 10 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1,2-Trichloroethane | 5 | 5 | 2.8 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1-Dichloroethane | 25 | NS | 28 | 25 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1-Dichloroethene | 7 | 7 | 280 | 7 | ND | U | 0.6 | ND | U | 6 |
| | | 1,1-Dichloropropene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 6 |
| | | 1,2,3-Trichlorobenzene | NS | NS | 7 | 7 | ND | U | 1 | ND | U | 10 |
| | | 1,2,3-Trichloropropane | NS | NS | 0.0075 | 0.05[e] | ND | U | 0.6 | ND | U | 6 |
| | | 1,2,4-Trichlorobenzene | 70 | 70 | 12 | 70 | ND | U | 1 | ND | U | 10 |
| | | 1,2,4-Trimethylbenzene | NS | NS | 56 | 56 | ND | U | 2 | **200** | -- | 20 |
| | | 1,2-Dibromo-3-chloropropane | NS | 0.2 | 0.0033 | 1[e] | ND | U | 1 | ND | U | 10 |
| | | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.5 | **210** | -- | 5 |
| | | 1,2-Dichlorobenzene | 600 | 600 | 300 | 600 | ND | U | 0.5 | ND | U | 5 |
| | | 1,2-Dichloroethane | 5 | 5 | 1.7 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | 1,2-Dichloropropane | 5 | 5 | 8.5 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | 1,3,5-Trimethylbenzene | NS | NS | 60 | 60 | ND | U | 1 | **67** | -- | 10 |
| | | 1,3-Dichlorobenzene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 6 |
| | | 1,3-Dichloropropane | NS | NS | 370 | 370 | ND | U | 0.6 | ND | U | 6 |
| | | 1,4-Dichlorobenzene | 75 | 75 | 4.8 | 75 | ND | U | 0.6 | ND | U | 6 |
| | | 2,2-Dichloropropane | NS | NS | NS | NS | ND | U | 0.5 | ND | U | 5 |
| | | 2-Butanone | NS | NS | 5,600 | 5,600 | ND | U | 1 | 1,300 | -- | 10 |
| | | 2-Chlorotoluene | NS | NS | 240 | 240 | ND | U | 0.6 | ND | U | 6 |
| | | 2-Hexanone | NS | NS | 38 | 38 | ND | U | 1 | **1,200** | -- | 10 |
| | | 4-Chlorotoluene | NS | NS | 250 | 250 | ND | U | 0.6 | ND | U | 6 |
| | | 4-Isopropyltoluene | NS | NS | NS | NS | ND | U | 0.6 | 7.2 | J | 6 |
| | | 4-Methyl-2-pentanone | NS | NS | 6,300 | 6,300 | ND | U | 1 | 300 | -- | 10 |
| | | Acetone | NS | NS | 14,000 | 14,000 | ND | U | 2 | 10,000 | -- | 200 |
| | | Acrolein | NS | NS | 0.042 | 5[e] | ND | U | 5 | ND | U | 50 |
| | | Acrylonitrile | NS | NS | 0.52 | 1[e] | ND | U | 1 | ND | U | 10 |
| | | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | **5,600** | -- | 60 |
| | | Bromobenzene | NS | NS | 62 | 62 | ND | U | 0.6 | ND | U | 6 |
| | | Bromochloromethane | NS | NS | 83 | 83 | ND | U | 0.5 | ND | U | 5 |
| | | Bromodichloromethane | NS | 80 | 1.3 | 80 | ND | U | 0.5 | ND | U | 5 |
| | | Bromoform | NS | 80 | 33 | 80 | ND | U | 2 | ND | U | 20 |
| | | Bromomethane | NS | NS | 7.5 | 7.5 | ND | U | 0.6 | ND | U | 6 |
| | | Carbon disulfide | NS | NS | 810 | 810 | ND | U | 0.6 | ND | U | 6 |
| | | Carbon tetrachloride | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | Chlorobenzene | NS | 100 | 78 | 100 | ND | U | 0.6 | ND | U | 6 |
| | | Chloroethane | NS | NS | 21,000 | 21,000 | ND | U | 0.5 | ND | U | 5 |
| | | Chloroform | 100 | 80 | 2.2 | 80 | ND | U | 0.6 | ND | U | 6 |
| | | Chloromethane | NS | NS | 190 | 190 | ND | U | 0.5 | ND | U | 5 |

**Table 4-6**
**Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | KAFB-106252-425 | | | KAFB-106S10-443 | | |
| | | | | | | **Field Sample ID:** | GW252-425-213 | | | GWS10-443-213 | | |
| | | | | | | **Sample Date:** | 7/7/2021 | | | 7/15/2021 | | |
| | | | | | | **Sample Type:** | REG | | | REG | | |
| | | | | | | **Sample Depth (ft bgs):** | 463 | | | 484.03 | | |
| | | | | | | **Reference Elevation Interval (ft AMSL):** | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| VOCs | Method SW8260C (µg/L) | cis-1,2-Dichloroethene | 70 | 70 | 36 | 70 | ND | U | 0.6 | ND | U | 6 |
| | | cis-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 5 |
| | | Dibromochloromethane | NS | 80 | 8.7 | 80 | ND | U | 0.5 | ND | U | 5 |
| | | Dibromomethane | NS | NS | 8.3 | 8.3 | ND | U | 0.6 | ND | U | 6 |
| | | Dichlorodifluoromethane | NS | NS | 200 | 200 | ND | U | 0.5 | ND | U | 5 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | 560 | -- | 8 |
| | | Hexachloro-1,3-butadiene | NS | NS | 1.4 | 4[e] | ND | UJ | 4 | ND | U | 40 |
| | | Isopropylbenzene | NS | NS | 450 | 450 | ND | U | 0.5 | 44 | J | 5 |
| | | m- & p-Xylenes | NS | NS | NS | NS | ND | U | 4 | 1,700 | -- | 40 |
| | | Methyl tert-butyl ether | 100 | NS | 140 | 100 | ND | U | 0.5 | ND | U | 5 |
| | | Methylene chloride | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | Naphthalene | 30 | NS | 1.2 | 30 | ND | U | 2 | **130** | -- | 20 |
| | | n-Butylbenzene | NS | NS | 1,000 | 1,000 | ND | U | 0.6 | 4.9 | J | 6 |
| | | n-Propylbenzene | NS | NS | 660 | 660 | ND | U | 0.6 | 44 | J | 6 |
| | | o-Xylene | NS | NS | 190 | 190 | ND | U | 0.8 | **830** | -- | 8 |
| | | sec-Butylbenzene | NS | NS | 2,000 | 2,000 | ND | U | 0.6 | 9.7 | J | 6 |
| | | Styrene | 100 | 100 | 1,200 | 100 | ND | U | 0.6 | ND | U | 6 |
| | | tert-Butylbenzene | NS | NS | 690 | 690 | ND | U | 1 | ND | U | 10 |
| | | Tetrachloroethene | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | **13,000** | -- | 50 |
| | | trans-1,2-Dichloroethene | 100 | 100 | 68 | 100 | ND | U | 0.6 | ND | U | 6 |
| | | trans-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 5 |
| | | Trichloroethene | 5 | 5 | 4.9 | 5 | ND | U | 0.6 | ND | U | 6 |
| | | Trichlorofluoromethane | NS | NS | 5,200 | 5,200 | ND | U | 0.5 | ND | U | 5 |
| | | Vinyl acetate | NS | NS | 410 | 410 | ND | U | 4 | ND | U | 40 |
| | | Vinyl chloride | 2 | 2 | 0.19 | 2 | ND | U | 0.5 | ND | U | 5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | **2,500** | -- | 8 |
| TPH | Method SW8015M (µg/L) | TPH-DRO (C10-C28) | NS | NS | 1,300 | 1,300 | ND | U | 93 | **270,000** | J | 4,600 |
| | | TPH-GRO (C6-C10) | NS | NS | 550 | 550 | ND | U | 40 | **66,000** | J | 1,000 |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 59 | -- | 0.15 | 160 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | ND | U | 0.1 | 0.66 | -- | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 8.2 | -- | 0.075 | 25 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | ND | U | 0.0052 | **4.6** | -- | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 3.2 | -- | 0.45 | 4.9 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 28 | -- | 0.5 | 41 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.001 | J | 0.0016 | 0.0022 | -- | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.000096 | J | 0.00025 | ND | U | 0.00047 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | 1.9 | J | 2 |
| | | Chloride | 250 | NS | NS | 250 | 49 | -- | 15 | 25 | -- | 1.5 |
| | | Sulfate | 600 | 250 | NS | 250 | 71 | -- | 4.5 | 9.7 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[f] | 10[f] | NS | 10[f] | 2.2 | J | 0.09 | ND | U | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 94 | -- | 6 | 450 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 94 | -- | 6 | 450 | -- | 6 |

## Table 4-6
## Groundwater Analytical Results for Newly Installed Wells (in the Baseline Period), Q3 2021

[a] NM WQCC 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 2018). For metals, the NM WQCC numeric standard applies to dissolved metals.

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40 CFR Part 141, 143 (May 2018).

[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level is the EPA RSL.

[e] The project screening level has been raised to the laboratory LOD for this analyte since the laboratory is unable to achieve the EPA tapwater RSL due to method limitations. This analyte is not considered to be a site constituent of concern.

[f] Based on the geochemical equilibrium of the site groundwater and previous site data analyses, nitrate/nitrite results represent nitrate concentrations.

-- = Validation qualifier not assigned.
µg/L = microgram per liter
AMSL = above mean sea level
bgs = below ground surface
CFR = Code of Federal Regulations
DRO = diesel range organics
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = U.S. Environmental Protection Agency
ft = foot/feet
GRO = gasoline range organics
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L = milligram(s) per liter
ND = not detected
NM = New Mexico
NMAC = New Mexico Administrative Code
NS = not specified
Q3 = second quarter
REG = normal field sample
RSL = regional screening level
TPH = Total petroleum hydrocarbons
Val Qual = validation qualifier
VOCs = Volatile organic compounds
WQCC = Water Quality Control Commission
Shading = detected concentrations
**Bold** = concentrations exceed the project screening level
Val Quals based on independent data validation
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
J+ = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated, biased high.
J- = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated, biased low.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106003 | | | KAFB-106004 | | | KAFB-106005 | | | KAFB-106009 | | | KAFB-106012R | | |
| | | **Field Sample ID:** | | | | | GW003-213 | | | GW004-213 | | | GW005-213 | | | GW009-213 | | | GW012R-213 | | |
| | | **Sample Date:** | | | | | 7/8/2021 | | | 7/12/2021 | | | 7/15/2021 | | | 7/14/2021 | | | 7/8/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 481 | | | 488.74 | | | 483.87 | | | 485.69 | | | 495.74 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | **0.54** | J | 0.098 | 0.016 | J | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.60 | ND | U | 0.60 | **590** | -- | 12 | 1.7 | -- | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.80 | ND | U | 0.80 | 170 | -- | 1.6 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.50 | ND | U | 0.50 | 590 | -- | 1 | ND | U | 0.5 | 0.76 | J | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.80 | ND | U | 0.80 | **650** | -- | 1.6 | ND | U | 0.8 | ND | U | 0.8 |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106013 | | | KAFB-106029 | | | KAFB-106030 | | | KAFB-106031 | | | KAFB-106032 | | |
| | | **Field Sample ID:** | | | | | GW013-213 | | | GW029-213 | | | GW030-213 | | | GW031-213 | | | GW032-213 | | |
| | | **Sample Date:** | | | | | 7/9/2021 | | | 7/9/2021 | | | 7/9/2021 | | | 7/9/2021 | | | 7/12/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 491.65 | | | 451.5 | | | 470.2 | | | 496.5 | | | 456.7 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4838 | | | 4814 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106033 | | | KAFB-106034 | | | KAFB-106041 | | | KAFB-106041 | | | KAFB-106049 | | |
| | | **Field Sample ID:** | | | | | GW033-213 | | | GW034-213 | | | GW041-213 | | | GW041-613 | | | GW049-213 | | |
| | | **Sample Date:** | | | | | 7/12/2021 | | | 7/12/2021 | | | 7/12/2021 | | | 7/12/2021 | | | 7/12/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | Field Duplicate | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 477.7 | | | 502.7 | | | 452.3 | | | 452.3 | | | 457.5 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4838 | | | 4814 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | 0.036 | -- | 0.019 | 0.046 | -- | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106050 | | | KAFB-106051 | | | KAFB-106051 | | | KAFB-106097 | | | KAFB-106098 | | |
| | | **Field Sample ID:** | | | | | GW050-213 | | | GW051-213 | | | GW051-613 | | | GW097-213 | | | GW098-213 | | |
| | | **Sample Date:** | | | | | 7/12/2021 | | | 7/12/2021 | | | 7/12/2021 | | | 7/9/2021 | | | 7/9/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 475.1 | | | 501.5 | | | 501.5 | | | 508.04 | | | 533.02 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4838 | | | 4814 | | | 4814 | | | 4838 | | | 4814 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | ND | U | 0.8 | ND | U | 0.8 |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106099 | | | KAFB-106100 | | | KAFB-106101 | | | KAFB-106102 | | | KAFB-106102 | | |
| | | **Field Sample ID:** | | | | | GW099-213 | | | GW100-213 | | | GW101-213 | | | GW102-213 | | | GW102-613 | | |
| | | **Sample Date:** | | | | | 7/12/2021 | | | 7/12/2021 | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | Field Duplicate | | |
| | | **Sample Depth (ft bgs):** | | | | | 503 | | | 528 | | | 500.81 | | | 525.98 | | | 525.98 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4838 | | | 4814 | | | 4838 | | | 4814 | | | 4814 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106149-484 | | | KAFB-106151-484 | | | KAFB-106152-484 | | | KAFB-106153-484 | | | KAFB-106201 | | |
| | | **Field Sample ID:** | | | | | GW149-484-213 | | | GW151-484-213 | | | GW152-484-213 | | | GW153-484-213 | | | GW201-213 | | |
| | | **Sample Date:** | | | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/8/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 474.6 | | | 474.79 | | | 474.88 | | | 474.89 | | | 490.35 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | **3.6** | J | 0.38 | 0.029 | -- | 0.019 | 0.025 | J | 0.019 | **24** | J | 1.9 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106202 | | | KAFB-106203 | | | KAFB-106204 | | | KAFB-106205 | | | KAFB-106206 | | |
| | | **Field Sample ID:** | | | | | GW202-213 | | | GW203-213 | | | GW204-213 | | | GW205-213 | | | GW206-213 | | |
| | | **Sample Date:** | | | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 520.6 | | | 623.78 | | | 463.2 | | | 493.2 | | | 594.2 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4838 | | | 4814 | | | 4857 | | | 4838 | | | 4814 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106206 | | | KAFB-106207 | | | KAFB-106208 | | | KAFB-106209 | | | KAFB-106216 | | |
| | | **Field Sample ID:** | | | | | GW206-613 | | | GW207-213 | | | GW208-213 | | | GW209-213 | | | GW216-213 | | |
| | | **Sample Date:** | | | | | 7/8/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | **Sample Type:** | | | | | Field Duplicate | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 594.2 | | | 473.7 | | | 503.7 | | | 603.7 | | | 458.8 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4814 | | | 4857 | | | 4838 | | | 4814 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106217 | | | KAFB-106218 | | | KAFB-106222 | | | KAFB-106223 | | | KAFB-106224 | | |
| | | **Field Sample ID:** | | | | | GW217-213 | | | GW218-213 | | | GW222-213 | | | GW223-213 | | | GW224-213 | | |
| | | **Sample Date:** | | | | | 7/7/2021 | | | 7/7/2021 | | | 7/22/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 485.7 | | | 552.7 | | | 461.1 | | | 488.5 | | | 555.7 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4838 | | | 4814 | | | 4857 | | | 4838 | | | 4814 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | 0.01 | J | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106230 | | | KAFB-106231 | | | KAFB-106232 | | | KAFB-106235-438 | | | KAFB-106235-472 | | |
| | | **Field Sample ID:** | | | | | GW230-213 | | | GW231-213 | | | GW232-213 | | | GW235-438-213 | | | GW235-472-213 | | |
| | | **Sample Date:** | | | | | 7/8/2021 | | | 7/9/2021 | | | 7/9/2021 | | | 7/9/2021 | | | 7/9/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 501.7 | | | 453.7 | | | 503.7 | | | 443.9 | | | 472.7 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4814 | | | 4857 | | | 4814 | | | 4857 | | | 4838 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106235-501 | | | KAFB-106236-436 | | | KAFB-106236-436 | | | KAFB-106236-470 | | | KAFB-106236-499 | | |
| | | **Field Sample ID:** | | | | | GW235-501-213 | | | GW236-436-213 | | | GW236-436-613 | | | GW236-470-213 | | | GW236-499-213 | | |
| | | **Sample Date:** | | | | | 7/9/2021 | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | | 7/8/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 501.7 | | | 444.5 | | | 444.5 | | | 470.7 | | | 499.7 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4814 | | | 4857 | | | 4857 | | | 4838 | | | 4814 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106240-449 | | | KAFB-106241-428 | | | KAFB-106242-418 | | | KAFB-106243-425 | | | KAFB-106244-445 | | |
| | | **Field Sample ID:** | | | | | GW240-449-213 | | | GW241-428-213 | | | GW242-418-213 | | | GW243-425-213 | | | GW244-445-213 | | |
| | | **Sample Date:** | | | | | 7/12/2021 | | | 7/12/2021 | | | 7/9/2021 | | | 7/9/2021 | | | 7/12/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 473.14 | | | 452.2 | | | 442.24 | | | 449.14 | | | 469.19 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | 0.013 | J | 0.019 | ND | U | 0.019 | 0.025 | J | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | — | — | — | — | — | — | — | — | — | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | — | — | — | — | — | — | — | — | — | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | — | — | — | — | — | — | — | — | — | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | — | — | — | — | — | — | — | — | — | ND | U | 0.8 |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106245-460 | | | KAFB-106247-450 | | | KAFB-106247-450 | | | KAFB-106S1-447 | | | KAFB-106S2-451 | | |
| | | **Field Sample ID:** | | | | | GW245-460-213 | | | GW247-450-213 | | | GW247-450-613 | | | GWS1-447-213 | | | GWS2-451-213 | | |
| | | **Sample Date:** | | | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/14/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 487.77 | | | 477.42 | | | 477.42 | | | 471.1 | | | 478.33 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | **6.5** | J | 0.94 | **16** | J | 1.9 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | **3,900** | -- | 60 | **160** | -- | 1.2 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | 570 | -- | 8 | 4.9 | -- | 1.6 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | **6,400** | -- | 50 | 6.8 | -- | 1 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | **3,300** | -- | 8 | 260 | -- | 1.6 |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Well Location ID:** | | | | | KAFB-106S3-449 | | | KAFB-106S4-446 | | | KAFB-106S5-446 | | | KAFB-106S7-451 | | | KAFB-106S8-451 | | |
| | | **Field Sample ID:** | | | | | GWS3-449-213 | | | GWS4-446-213 | | | GWS5-446-213 | | | GWS7-451-213 | | | GWS8-451-213 | | |
| | | **Sample Date:** | | | | | 7/14/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/14/2021 | | | 7/13/2021 | | |
| | | **Sample Type:** | | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| | | **Sample Depth (ft bgs):** | | | | | 478.88 | | | 473.33 | | | 470.18 | | | 475.1 | | | 483.52 | | |
| | | **Reference Elevation Interval (ft AMSL):** | | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | **0.055** | -- | 0.019 | 0.017 | J | 0.019 | **4.1** | J | 0.38 | **2.4** | J | 0.19 | **180** | J | 19 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | **970** | -- | 6 | ND | U | 0.6 | **1,900** | -- | 30 | **1,300** | -- | 6 | **7,400** | -- | 60 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | 69 | -- | 0.8 | ND | U | 0.8 | **1,600** | -- | 40 | 360 | -- | 8 | 670 | -- | 8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | 4.7 | -- | 0.5 | ND | U | 0.5 | **9,000** | -- | 25 | 130 | -- | 0.5 | **10,000** | -- | 50 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | **760** | -- | 8 | ND | U | 0.8 | **3,900** | -- | 4 | **1,200** | -- | 8 | **4,100** | -- | 8 |

**Table 4-7**
**Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | KAFB-106S9-447 | | | KAFB-106S9-447 | | |
| | | | | | | **Field Sample ID:** | GWS9-447-213 | | | GWS9-447-613 | | |
| | | | | | | **Sample Date:** | 7/13/2021 | | | 7/13/2021 | | |
| | | | | | | **Sample Type:** | REG | | | Field Duplicate | | |
| | | | | | | **Sample Depth (ft bgs):** | 471.22 | | | 471.22 | | |
| | | | | | | **Reference Elevation Interval (ft AMSL):** | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | 0.014 | J | 0.019 | 0.016 | J | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.6 | 5 | **37** | -- | 0.6 | **35** | -- | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | 24 | -- | 0.8 | 23 | -- | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | 0.6 | J | 0.5 | 0.6 | J | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | 32 | -- | 0.8 | 31 | -- | 0.8 |

## Table 4-7
## Groundwater Analytical Results for 1,2-Dibromoethane and Benzene, Toluene, Ethylbenzene, and Total Xylenes for Groundwater Monitoring Wells, Q3 2021

[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 2018). For metals, the NM WQCC numeric standard applies to dissolved metals.

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40CFR Part 141, 143 (May 2018).

[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level is the EPA RSL.

µg/L = microgram per liter
— = Compound not analyzed.
AMSL = above mean sea level
bgs = below ground surface
BTEX = benzene, toluene, ethylbenzene, and total xylenes
CFR = Code of Federal Regulations
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = U.S. Environmental Protection Agency
ft = foot/feet
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L = milligram(s) per liter
ND = not detected
NM = New Mexico
NMAC = New Mexico Administrative Code
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
Val Qual = validation qualifier
WQCC = Water Quality Control Commission
Shading = detected concentrations
**Bold = concentrations exceed the project screening level**
Val Quals based on independent data validation
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

**Table 4-8**
**Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Well Location ID:** | | | | KAFB-106005 | | | KAFB-106009 | | | KAFB-106012R | | | KAFB-106041 | | |
| | | | **Field Sample ID:** | | | | GW005-213 | | | GW009-213 | | | GW012R-213 | | | GW041-213 | | |
| | | | **Sample Date:** | | | | 7/15/2021 | | | 7/14/2021 | | | 7/8/2021 | | | 7/12/2021 | | |
| | | | **Sample Type:** | | | | REG | | | REG | | | REG | | | REG | | |
| | | | **Sample Depth (ft bgs):** | | | | 483.87 | | | 485.69 | | | 495.74 | | | 452.3 | | |
| | | | **Reference Elevation Interval (ft AMSL):** | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 170 | -- | 0.15 | 170 | -- | 0.15 | 170 | -- | 0.15 | 71 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | 0.28 | -- | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 30 | -- | 0.075 | 26 | -- | 0.075 | 24 | -- | 0.075 | 9.1 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | **2.1** | J | 0.0052 | **2.2** | J | 0.0052 | 0.0041 | J | 0.0052 | ND | U | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 4.6 | -- | 0.45 | 4.9 | -- | 0.45 | 5.1 | -- | 0.45 | 3.4 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 69 | -- | 0.5 | 52 | -- | 0.5 | 71 | -- | 0.5 | 28 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.00086 | J | 0.0016 | ND | U | 0.0016 | ND | U | 0.0016 | 0.00075 | J | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.0001 | J | 0.00025 | 0.000098 | J | 0.00025 | 0.00024 | J | 0.00025 | ND | U | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | 3.1 | -- | 2 | 2.9 | -- | 2 | 2 | J | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 190 | -- | 15 | 170 | -- | 15 | 160 | -- | 15 | 71 | -- | 7.5 |
| | | Sulfate | 600 | 250 | NS | 600 | 4.6 | J | 4.5 | 280 | -- | 45 | 300 | -- | 45 | 89 | -- | 45 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | 0.044 | J | 0.09 | 2.6 | J | 0.09 | 4.2 | -- | 0.09 | 2.1 | J | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 410 | -- | 6 | 150 | -- | 6 | 110 | -- | 6 | 93 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 410 | J | 6 | 150 | -- | 6 | 110 | -- | 6 | 93 | -- | 6 |

**Table 4-8**
**Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Well Location ID:** | | | | KAFB-106041 | | | KAFB-106149-484 | | | KAFB-106151-484 | | | KAFB-106152-484 | | |
| | | | **Field Sample ID:** | | | | GW041-613 | | | GW149-484-213 | | | GW151-484-213 | | | GW152-484-213 | | |
| | | | **Sample Date:** | | | | 7/12/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | |
| | | | **Sample Type:** | | | | Field Duplicate | | | REG | | | REG | | | REG | | |
| | | | **Sample Depth (ft bgs):** | | | | 452.3 | | | 474.6 | | | 474.79 | | | 474.88 | | |
| | | | **Reference Elevation Interval (ft AMSL):** | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 77 | -- | 0.15 | 170 | -- | 0.15 | 170 | -- | 0.15 | 150 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | ND | U | 0.1 | **5.7** | -- | 0.1 | 0.95 | -- | 0.1 | **4.6** | -- | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 9.9 | -- | 0.075 | 27 | -- | 0.075 | 26 | -- | 0.075 | 25 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | ND | U | 0.0052 | **5.6** | -- | 0.0052 | **2.5** | -- | 0.0052 | **6.7** | -- | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 3.7 | -- | 0.45 | 4.6 | -- | 0.45 | 4.3 | -- | 0.45 | 4.1 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 31 | -- | 0.5 | 42 | -- | 0.5 | 45 | -- | 0.5 | 42 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.00086 | J | 0.0016 | 0.0092 | -- | 0.0016 | ND | U | 0.0016 | 0.004 | -- | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | ND | U | 0.00025 | 0.0015 | -- | 0.00025 | 0.00015 | J | 0.00025 | 0.0012 | -- | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | ND | U | 2 | ND | U | 2 | 1.8 | J | 2 |
| | | Chloride | 250 | NS | NS | 250 | 68 | J | 6 | 12 | -- | 1.5 | 61 | -- | 15 | 18 | J | 1.5 |
| | | Sulfate | 600 | 250 | NS | 600 | 84 | -- | 45 | ND | U | 4.5 | 280 | -- | 45 | 1.7 | J | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | 1.8 | -- | 0.09 | ND | U | 0.18 | ND | U | 0.09 | ND | U | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 94 | -- | 6 | 480 | -- | 6 | 280 | -- | 6 | 490 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 94 | -- | 6 | 480 | -- | 6 | 280 | -- | 6 | 490 | -- | 6 |

## Table 4-8
## Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Well Location ID:** | | | | KAFB-106153-484 | | | KAFB-106230 | | | KAFB-106240-449 | | | KAFB-106241-428 | | |
| | | | **Field Sample ID:** | | | | GW153-484-213 | | | GW230-213 | | | GW240-449-213 | | | GW241-428-213 | | |
| | | | **Sample Date:** | | | | 7/13/2021 | | | 7/8/2021 | | | 7/12/2021 | | | 7/12/2021 | | |
| | | | **Sample Type:** | | | | REG | | | REG | | | REG | | | REG | | |
| | | | **Sample Depth (ft bgs):** | | | | 474.89 | | | 501.7 | | | 473.14 | | | 452.2 | | |
| | | | **Reference Elevation Interval (ft AMSL):** | | | | 4857 | | | 4814 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 160 | -- | 0.15 | 44 | -- | 0.15 | 170 | -- | 0.15 | 48 | J | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | **2.8** | -- | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 26 | -- | 0.075 | 6 | -- | 0.075 | 25 | -- | 0.075 | 6.5 | J | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | **4.7** | -- | 0.0052 | 0.014 | -- | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 4.3 | -- | 0.45 | 2.6 | -- | 0.45 | 4.2 | -- | 0.45 | 2.7 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 44 | -- | 0.5 | 25 | -- | 0.5 | 46 | -- | 0.5 | 26 | J | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.0046 | -- | 0.0016 | 0.00087 | J | 0.0016 | 0.0008 | J | 0.0016 | 0.0011 | J | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.0003 | J | 0.00025 | ND | U | 0.00025 | ND | U | 0.00025 | ND | U | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | ND | U | 2 | 2.4 | J | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 11 | -- | 1.5 | 26 | -- | 1.5 | 140 | -- | 15 | 38 | -- | 15 |
| | | Sulfate | 600 | 250 | NS | 600 | ND | U | 4.5 | 49 | -- | 4.5 | 280 | -- | 45 | 40 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | ND | U | 0.09 | 0.66 | -- | 0.09 | 6.8 | -- | 0.18 | 1.5 | J | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 460 | -- | 6 | 93 | -- | 6 | 100 | -- | 6 | 110 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 460 | J | 6 | 93 | -- | 6 | 100 | -- | 6 | 110 | -- | 6 |

## Table 4-8
## Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Well Location ID:** | | | | KAFB-106242-418 | | | KAFB-106243-425 | | | KAFB-106244-445 | | | KAFB-106245-460 | | |
| | | | **Field Sample ID:** | | | | GW242-418-213 | | | GW243-425-213 | | | GW244-445-213 | | | GW245-460-213 | | |
| | | | **Sample Date:** | | | | 7/9/2021 | | | 7/9/2021 | | | 7/12/2021 | | | 7/13/2021 | | |
| | | | **Sample Type:** | | | | REG | | | REG | | | REG | | | REG | | |
| | | | **Sample Depth (ft bgs):** | | | | 442.24 | | | 449.14 | | | 469.19 | | | 487.77 | | |
| | | | **Reference Elevation Interval (ft AMSL):** | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 150 | -- | 0.15 | 47 | -- | 0.15 | 140 | -- | 0.15 | 82 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 22 | -- | 0.075 | 6.2 | -- | 0.075 | 21 | -- | 0.075 | 11 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 4.7 | -- | 0.45 | 2.5 | -- | 0.45 | 4.6 | -- | 0.45 | 3.1 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 50 | -- | 0.5 | 26 | -- | 0.5 | 58 | -- | 0.5 | 30 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.00069 | J | 0.0016 | 0.0012 | J | 0.0016 | 0.00073 | J | 0.0016 | 0.00089 | J | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | ND | U | 0.00025 | 0.00015 | J | 0.00025 | ND | U | 0.00025 | ND | U | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | 2 | J | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 130 | -- | 15 | 22 | -- | 1.5 | 94 | -- | 15 | 58 | -- | 15 |
| | | Sulfate | 600 | 250 | NS | 600 | 140 | -- | 45 | 36 | -- | 4.5 | 230 | -- | 45 | 68 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | 4.4 | -- | 0.09 | 0.12 | -- | 0.09 | 3.3 | -- | 0.09 | 2 | -- | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 120 | -- | 6 | 120 | -- | 6 | 99 | -- | 6 | 100 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 120 | -- | 6 | 120 | -- | 6 | 99 | -- | 6 | 100 | -- | 6 |

**Table 4-8**
**Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021**

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Well Location ID:** | | | | KAFB-106247-450 | | | KAFB-106247-450 | | | KAFB-106S1-447 | | | KAFB-106S2-451 | | |
| | | | **Field Sample ID:** | | | | GW247-450-213 | | | GW247-450-613 | | | GWS1-447-213 | | | GWS2-451-213 | | |
| | | | **Sample Date:** | | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/14/2021 | | |
| | | | **Sample Type:** | | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| | | | **Sample Depth (ft bgs):** | | | | 477.42 | | | 477.42 | | | 471.1 | | | 478.33 | | |
| | | | **Reference Elevation Interval (ft AMSL):** | | | | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 58 | -- | 0.15 | 55 | -- | 0.15 | 200 | -- | 0.15 | 150 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | ND | U | 0.1 | ND | U | 0.1 | **5.5** | -- | 0.1 | **4.5** | -- | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 7.9 | -- | 0.075 | 7.5 | -- | 0.075 | 34 | -- | 0.075 | 25 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | **8.8** | -- | 0.0052 | **6.2** | J | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 2.8 | -- | 0.45 | 2.6 | -- | 0.45 | 4.9 | -- | 0.45 | 3.5 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 31 | -- | 0.5 | 29 | -- | 0.5 | 56 | -- | 0.5 | 42 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | ND | U | 0.0016 | ND | U | 0.0016 | 0.0085 | -- | 0.0016 | 0.002 | -- | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | ND | U | 0.00025 | ND | U | 0.00025 | 0.00037 | J | 0.00025 | 0.00092 | -- | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | ND | U | 2 | 4.1 | -- | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 7.9 | -- | 1.5 | 10 | -- | 1.5 | 68 | -- | 15 | 82 | -- | 15 |
| | | Sulfate | 600 | 250 | NS | 600 | 19 | -- | 4.5 | 27 | -- | 4.5 | 2 | J | 4.5 | 2.9 | J | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | ND | U | 0.09 | ND | U | 0.09 | ND | U | 0.09 | ND | U | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 180 | -- | 6 | 180 | -- | 6 | 550 | -- | 6 | 380 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 180 | -- | 6 | 180 | -- | 6 | 550 | -- | 6 | 380 | -- | 6 |

## Table 4-8
## Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | KAFB-106S3-449 | | | KAFB-106S4-446 | | | KAFB-106S5-446 | | | KAFB-106S7-451 | | |
| | | | | | | **Field Sample ID:** | GWS3-449-213 | | | GWS4-446-213 | | | GWS5-446-213 | | | GWS7-451-213 | | |
| | | | | | | **Sample Date:** | 7/14/2021 | | | 7/13/2021 | | | 7/13/2021 | | | 7/14/2021 | | |
| | | | | | | **Sample Type:** | REG | | | REG | | | REG | | | REG | | |
| | | | | | | **Sample Depth (ft bgs):** | 478.88 | | | 473.33 | | | 470.18 | | | 475.1 | | |
| | | | | | | **Reference Elevation Interval (ft AMSL):** | 4857 | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 190 | -- | 0.15 | 190 | -- | 0.15 | 61 | -- | 0.15 | 110 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | **7.9** | -- | 0.1 | ND | U | 0.1 | **1.1** | -- | 0.1 | 0.044 | J | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 32 | -- | 0.075 | 28 | -- | 0.075 | 9.9 | -- | 0.075 | 17 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | **5.2** | J | 0.0052 | ND | U | 0.0052 | **2** | -- | 0.0052 | **2.2** | J | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 4.6 | -- | 0.45 | 4.9 | -- | 0.45 | 2.7 | -- | 0.45 | 3.6 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 47 | -- | 0.5 | 66 | -- | 0.5 | 29 | -- | 0.5 | 40 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.0068 | -- | 0.0016 | ND | U | 0.0016 | 0.0021 | -- | 0.0016 | 0.0045 | -- | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.0014 | -- | 0.00025 | ND | U | 0.00025 | 0.00025 | J | 0.00025 | 0.00025 | J | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | 2.3 | J | 2 | ND | U | 2 | 2.3 | J | 2 |
| | | Chloride | 250 | NS | NS | 250 | 100 | -- | 15 | 150 | -- | 15 | 26 | -- | 1.5 | 47 | -- | 6 |
| | | Sulfate | 600 | 250 | NS | 600 | ND | U | 4.5 | 280 | -- | 45 | ND | U | 4.5 | 8.1 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | ND | U | 0.09 | 9.4 | -- | 0.45 | ND | U | 0.09 | ND | U | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 410 | -- | 6 | 92 | -- | 6 | 220 | -- | 6 | 320 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 410 | -- | 6 | 92 | -- | 6 | 220 | -- | 6 | 320 | -- | 6 |

**Table 4-8**
**Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021**

| | | | Well Location ID: | | | | KAFB-106S8-451 | | | KAFB-106S9-447 | | | KAFB-106S9-447 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GWS8-451-213 | | | GWS9-447-213 | | | GWS9-447-613 | | |
| | | | Sample Date: | | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | |
| | | | Sample Type: | | | | REG | | | REG | | | Field Duplicate | | |
| | | | Sample Depth (ft bgs): | | | | 483.52 | | | 471.22 | | | 471.22 | | |
| | | | Reference Elevation Interval (ft AMSL): | | | | 4857 | | | 4857 | | | 4857 | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| Metals | Method SW6010C (mg/L) | Calcium | NS | NS | NS | NS | 150 | -- | 0.15 | 190 | -- | 0.15 | 180 | -- | 0.15 |
| | | Iron, dissolved | 1.0 | NS | 14 | 1.0 | **2.7** | -- | 0.1 | **1.4** | J | 0.1 | **9.4** | J | 0.1 |
| | | Magnesium | NS | NS | NS | NS | 24 | -- | 0.075 | 30 | -- | 0.075 | 29 | -- | 0.075 |
| | | Manganese, dissolved | 0.2 | NS | 0.43 | 0.2 | **6** | -- | 0.0052 | **1.3** | -- | 0.0052 | **1.3** | -- | 0.0052 |
| | | Potassium | NS | NS | NS | NS | 3.7 | -- | 0.45 | 4.8 | -- | 0.45 | 4.5 | -- | 0.45 |
| | | Sodium | NS | NS | NS | NS | 44 | -- | 0.5 | 47 | -- | 0.5 | 44 | -- | 0.5 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.00052 | 0.01 | 0.003 | -- | 0.0016 | 0.0013 | J | 0.0016 | 0.002 | -- | 0.0016 |
| | | Lead | 0.015 | 0.015 | 0.015 | 0.015 | 0.000089 | J | 0.00025 | 0.00061 | -- | 0.00025 | 0.00068 | -- | 0.00025 |
| Anions | Method E300.0 (mg/L) | Bromide | NS | NS | NS | NS | ND | U | 2 | 1.5 | J | 2 | ND | U | 2 |
| | | Chloride | 250 | NS | NS | 250 | 8.9 | J | 1.5 | 52 | -- | 15 | 54 | -- | 15 |
| | | Sulfate | 600 | 250 | NS | 600 | ND | U | 4.5 | 300 | -- | 45 | 260 | -- | 45 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10[e] | 10[e] | NS | 10[e] | ND | U | 0.09 | ND | U | 0.18 | 0.059 | J | 0.09 |
| Alkalinity | Method SM2320B (mg/L) | Alkalinity, bicarbonate (as $CaCO_3$) | NS | NS | NS | NS | 440 | -- | 6 | 350 | -- | 6 | 350 | -- | 6 |
| | | Alkalinity, carbonate (as $CaCO_3$) | NS | NS | NS | NS | ND | U | 6 | ND | U | 6 | ND | U | 6 |
| | | Alkalinity, total (as $CaCO_3$) | NS | NS | NS | NS | 440 | -- | 6 | 350 | -- | 6 | 350 | -- | 6 |

## Table 4-8
## Groundwater Analytical Results for Inorganic Compounds for Groundwater Monitoring Wells, Q3 2021

[a] NM WQCC 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 2018). For metals, the NM WQCC numeric standard applies to dissolved metals.

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40CFR Part 141, 143 (May 2018).

[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level is the EPA RSL.

[e] Based on the geochemical equilibrium of the site groundwater and previous site data analyses, nitrate/nitrite results represent nitrate concentrations.

AMSL = above mean sea level
bgs = below ground surface
$CaCO_3$ = calcium carbonate
CFR = Code of Federal Regulations
EPA = U.S. Environmental Protection Agency
ft = foot/feet
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/l = milligrams per liter
ND = not detected
NM = New Mexico
NMAC = New Mexico Administrative Code
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
Val Qual = validation qualifier
WQCC = Water Quality Control Commission
Shading = detected concentrations
**Bold** = concentrations exceed the project screening level
Val Quals based on independent data validation
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

## Table 4-9
## Historical 1,2-Dibromoethane Concentrations

| | | | Analyte: | EDB (1,2-dibromoethane) | |
|---|---|---|---|---|---|
| | | | EPA MCL[a]: | 0.05 µg/L | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD |
| KAFB-106003 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/14/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106004 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106005 | 7/15/2021 | Q3 2021 | **0.54** | J | 0.098 |
| | 4/21/2021 | Q2 2021 | **0.33** | J | 0.02 |
| | 1/15/2021 | Q1 2021 | **0.99** | -- | 0.096 |
| | 10/23/2020 | Q4 2020 | **0.4** | -- | 0.096 |
| KAFB-106009 | 7/14/2021 | Q3 2021 | 0.016 | J | 0.019 |
| | 4/28/2021 | Q2 2021 | 0.022 | J | 0.019 |
| | 1/11/2021 | Q1 2021 | **0.086** | -- | 0.019 |
| | 10/12/2020 | Q4 2020 | 0.017 | J | 0.019 |
| KAFB-106012R | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/14/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/11/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/2/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106013 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/12/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106029 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106030 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106031 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106032 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/8/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106033 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/8/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106034 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/8/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106041 | 7/12/2021 | Q3 2021 | 0.036 | -- | 0.019 |
| | 4/5/2021 | Q2 2021 | **0.098** | -- | 0.019 |
| | 1/6/2021 | Q1 2021 | **0.098** | J | 0.019 |
| | 10/8/2020 | Q4 2020 | **0.074** | -- | 0.019 |
| KAFB-106049 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/12/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106050 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/12/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106051 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/15/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106097 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/12/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106098 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/12/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106099 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106100 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |

## Table 4-9
## Historical 1,2-Dibromoethane Concentrations

| | | | Analyte: | EDB (1,2-dibromoethane) | |
|---|---|---|---|---|---|
| | | | EPA MCL[a]: | 0.05 µg/L | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD |
| KAFB-106101 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/13/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106102 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/14/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/15/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106149-484[c] | 7/13/2021 | Q3 2021 | **3.6** | J | 0.38 |
| | 4/14/2021 | Q2 2021 | **36** | -- | 4 |
| | 1/7/2021 | Q1 2021 | **120** | -- | 19 |
| | 10/21/2020 | Q4 2020 | **17** | -- | 3.8 |
| KAFB-106151-484[c] | 7/13/2021 | Q3 2021 | 0.029 | -- | 0.019 |
| | 4/14/2021 | Q2 2021 | **0.21** | -- | 0.02 |
| | 1/8/2021 | Q1 2021 | 0.039 | J | 0.019 |
| | 10/21/2020 | Q4 2020 | 0.030 | -- | 0.019 |
| KAFB-106152-484[c] | 7/13/2021 | Q3 2021 | 0.025 | J | 0.019 |
| | 4/14/2021 | Q2 2021 | ND | U | 0.033 |
| | 1/8/2021 | Q1 2021 | **0.12** | J | 0.019 |
| | 10/21/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106153-484[c] | 7/13/2021 | Q3 2021 | **24** | J | 1.9 |
| | 4/26/2021 | Q2 2021 | **21** | J | 3.9 |
| | 1/7/2021 | Q1 2021 | **27** | -- | 3.8 |
| | 10/21/2020 | Q4 2020 | **35** | -- | 3.8 |
| KAFB-106201 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106202 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106203 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106204 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106205 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | 0.028 | J | 0.019 |
| | 1/4/2021 | Q1 2021 | 0.014 | J | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106206 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/12/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106207 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | UJ | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106208 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | UJ | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106209 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/1/2021 | Q2 2021 | ND | UJ | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106216 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106217 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.020 |
| KAFB-106218 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/7/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106222 | 7/22/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106223 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |

## Table 4-9
## Historical 1,2-Dibromoethane Concentrations

| Analyte: | | | EDB (1,2-dibromoethane) | | |
|---|---|---|---|---|---|
| EPA MCL[a]: | | | 0.05 µg/L | | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD |
| KAFB-106224 | 7/7/2021 | Q3 2021 | 0.010 | J | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/4/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106230 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/2/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/6/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/12/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106231 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106232 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106235-438 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106235-472 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/5/2020 | Q4 2020 | 0.015 | J | 0.02 |
| KAFB-106235-501 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106236-436 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106236-470 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106236-499 | 7/8/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/5/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106240-449 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/15/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106241-428 | 7/12/2021 | Q3 2021 | 0.013 | J | 0.019 |
| | 4/5/2021 | Q2 2021 | 0.017 | J | 0.019 |
| | 1/6/2021 | Q1 2021 | 0.029 | J | 0.019 |
| | 10/12/2020 | Q4 2020 | 0.023 | J | 0.019 |
| KAFB-106242-418 | 7/9/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/5/2021 | Q1 2021 | ND | UJ | 0.019 |
| | 10/6/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106243-425 | 7/9/2021 | Q3 2021 | 0.025 | J | 0.019 |
| | 4/12/2021 | Q2 2021 | 0.03 | -- | 0.019 |
| | 1/7/2021 | Q1 2021 | 0.023 | J | 0.019 |
| | 10/13/2020 | Q4 2020 | 0.042 | -- | 0.019 |
| KAFB-106244-445 | 7/12/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106245-460 | 7/13/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.02 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106247-450 | 7/13/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.019 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.019 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.019 |
| KAFB-106248-452 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.019 |
| KAFB-106249-450 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/21/2021 | Q2 2021 | ND | UJ | 0.019 |
| KAFB-106250-447 | 7/7/2021 | Q3 2021 | ND | U | 0.019 |
| | 4/22/2021 | Q2 2021 | 0.0098 | J- | 0.019 |
| KAFB-106251-443 | 7/7/2021 | Q3 2021 | 0.047 | -- | 0.019 |
| | 4/22/2021 | Q2 2021 | 0.019 | J- | 0.019 |
| KAFB-106252-425 | 7/7/2021 | Q3 2021 | 0.014 | J | 0.019 |
| | 3/23/2021 | Q2 2021 | ND | U | 0.019 |
| KAFB-106S1-447 | 7/13/2021 | Q3 2021 | **6.5** | J | 0.94 |
| | 4/14/2021 | Q2 2021 | **68** | J | 4 |
| | 1/7/2021 | Q1 2021 | **120** | -- | 19 |
| | 10/21/2020 | Q4 2020 | **5.3** | -- | 0.96 |

## Table 4-9
## Historical 1,2-Dibromoethane Concentrations

| Analyte: | | | EDB (1,2-dibromoethane) | | |
|---|---|---|---|---|---|
| EPA MCL[a]: | | | 0.05 µg/L | | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD |
| KAFB-106S2-451 | 7/14/2021 | Q3 2021 | **16** | J | 1.9 |
| | 4/14/2021 | Q2 2021 | **11** | -- | 1 |
| | 1/7/2021 | Q1 2021 | **24** | J | 3.8 |
| | 10/22/2020 | Q4 2020 | **37** | -- | 3.9 |
| KAFB-106S3-449 | 7/14/2021 | Q3 2021 | **0.055** | -- | 0.019 |
| | 4/14/2021 | Q2 2021 | **5.8** | J | 0.39 |
| | 1/8/2021 | Q1 2021 | **1.7** | J | 0.19 |
| | 10/22/2020 | Q4 2020 | **1.6** | -- | 3.8 |
| KAFB-106S4-446 | 7/13/2021 | Q3 2021 | 0.017 | J | 0.019 |
| | 4/13/2021 | Q2 2021 | 0.021 | J | 0.019 |
| | 1/7/2021 | Q1 2021 | 0.026 | J | 0.019 |
| | 10/22/2020 | Q4 2020 | 0.021 | J | 0.019 |
| KAFB-106S5-446 | 7/13/2021 | Q3 2021 | **4.1** | J | 0.38 |
| | 4/13/2021 | Q2 2021 | **8.2** | J | 0.97 |
| | 1/8/2021 | Q1 2021 | **11** | J | 0.95 |
| | 10/22/2020 | Q4 2020 | **8.9** | -- | 0.97 |
| KAFB-106S7-451 | 7/14/2021 | Q3 2021 | **2.4** | J | 0.19 |
| | 4/13/2021 | Q2 2021 | **5.7** | J | 0.39 |
| | 1/8/2021 | Q1 2021 | **10** | J | 0.96 |
| | 10/22/2020 | Q4 2020 | **23** | -- | 3.8 |
| KAFB-106S8-451 | 7/13/2021 | Q3 2021 | **180** | J | 19 |
| | 4/14/2021 | Q2 2021 | **380** | -- | 40 |
| | 1/7/2021 | Q1 2021 | **350** | -- | 96 |
| | 10/21/2020 | Q4 2020 | **28** | J | 3.8 |
| KAFB-106S9-447 | 7/13/2021 | Q3 2021 | 0.014 | J | 0.019 |
| | 4/14/2021 | Q2 2021 | **18** | -- | 1.9 |
| | 1/8/2021 | Q1 2021 | **3.1** | J | 0.39 |
| | 10/21/2020 | Q4 2020 | 0.018 | J | 0.019 |
| KAFB-106S10-443 | 7/15/2021 | Q3 2021 | **230** | J | 19 |
| | 4/19/2021 | Q2 2021 | **290** | J | 39 |
| | 1/15/2021 | Q1 2021 | **200** | -- | 39 |

[a] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level is the EPA RSL. For EDB, the EPA MCL and the NM WQCC numeric standard are both 0.05 µg/L.

[b] Data presented includes results from the current quarter along with the three most recent historical results. Where wells do not have at least three historical results, the results from each quarter of sampling are provided.

[c] Wells initially installed for vadose zone characterization. These wells were added to the GWM network to temporarily fill a data gap as the water level rose across the site.

µg/L = microgram per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = U.S. Environmental Protection Agency
GWM = groundwater monitoring
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
ND = not detected
NM = New Mexico
Q1 = first quarter
Q2 = second quarter
Q3 = third quarter
Q4 = fourth quarter
RSL = regional screening level
Val Qual = validation qualifier
WQCC = Water Quality Control Commission
Shading = detected concentrations.
**Bold**/Shading = concentrations exceed the project screening level.
Val Quals based on independent data validation.
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
J- = Qualifier denotes the analyte was postively identified, but the associated numerical value is estimated, biased low.
U = Qualifier denotes the analyte was analyzed but not detected above LOD.

## Table 4-10
## Historical Benzene, Toluene, Ethylbenzene, and Total Xylenes Concentrations

| Analyte: | | | Benzene | | | Ethylbenzene | | | Toluene | | | Xylenes, Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Screening Level[a]: | | | 5 µg/L | | | 700 µg/L | | | 1,000 µg/L | | | 620 µg/L | | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD |
| KAFB-106003 | 7/8/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/14/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/12/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106004 | 7/12/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106005 | 7/15/2021 | Q3 2021 | **590** | -- | 12 | 170 | -- | 1.6 | 590 | -- | 1 | **650** | -- | 1.6 |
| | 4/21/2021 | Q2 2021 | **1,600** | -- | 10 | 180 | -- | 1.6 | 840 | -- | 10 | **670** | -- | 5.6 |
| | 1/15/2021 | Q1 2021 | **700** | -- | 5 | 170 | -- | 0.8 | 710 | -- | 5 | **620** | -- | 2.8 |
| | 10/23/2020 | Q4 2020 | **860** | -- | 2.5 | 230 | -- | 4 | **1,000** | -- | 2.5 | **880** | -- | 10 |
| KAFB-106009 | 7/14/2021 | Q3 2021 | 1.7 | -- | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/28/2021 | Q2 2021 | 1.7 | -- | 0.5 | ND | U | 0.8 | 0.25 | J | 0.5 | ND | U | 2.8 |
| | 1/11/2021 | Q1 2021 | 3.3 | -- | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/12/2020 | Q4 2020 | ND | U | 5 | ND | U | 8 | ND | U | 5 | ND | U | 20 |
| KAFB-106012R | 7/8/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | 0.76 | J | 0.5 | ND | U | 0.8 |
| | 4/14/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | 0.25 | J | 0.5 | ND | U | 2.8 |
| | 1/11/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | 0.59 | J | 0.5 | ND | U | 2.8 |
| | 10/2/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106013 | 7/9/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/12/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106097 | 7/9/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/7/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/12/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106098 | 7/9/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/6/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/12/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/13/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106099 | 7/12/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106100 | 7/12/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/8/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106101 | 7/8/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/13/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |

## Table 4-10
## Historical Benzene, Toluene, Ethylbenzene, and Total Xylenes Concentrations

| Analyte: | | | Benzene | | | Ethylbenzene | | | Toluene | | | Xylenes, Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Screening Level[a]: | | | 5 µg/L | | | 700 µg/L | | | 1,000 µg/L | | | 620 µg/L | | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD |
| KAFB-106102 | 7/8/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/14/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/15/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106240-449 | 7/12/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/15/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106244-445 | 7/12/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106245-460 | 7/13/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106247-450 | 7/13/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/13/2021 | Q2 2021 | ND | U | 2.5 | ND | U | 4 | ND | U | 2.5 | ND | U | 14 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/14/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106248-452 | 7/7/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/5/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| KAFB-106249-450 | 7/7/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/21/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | 0.31 | J | 0.5 | ND | U | 2.8 |
| KAFB-106250-447 | 7/7/2021 | Q3 2021 | 4.7 | -- | 0.6 | 1.2 | -- | 0.8 | 1.3 | -- | 0.5 | 1.6 | -- | 0.8 |
| | 4/22/2021 | Q2 2021 | **5.8** | -- | 0.5 | 1.4 | -- | 0.8 | 0.62 | J | 0.5 | 2.5 | J | 2.8 |
| KAFB-106251-443 | 7/7/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/22/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | 0.2 | J | 0.5 | ND | U | 2.8 |
| KAFB-106252-425 | 7/7/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 3/23/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| KAFB-106S1-447 | 7/13/2021 | Q3 2021 | **3,900** | -- | 60 | 570 | -- | 8 | **6,400** | -- | 50 | **3,300** | -- | 8 |
| | 4/14/2021 | Q2 2021 | **5,900** | -- | 25 | 520 | -- | 4 | **6,900** | -- | 25 | **2,400** | -- | 14 |
| | 1/7/2021 | Q1 2021 | **5,400** | -- | 50 | 500 | -- | 8 | **5,900** | -- | 50 | **2,300** | -- | 28 |
| | 10/21/2020 | Q4 2020 | **1,700** | -- | 50 | 590 | -- | 80 | **4,000** | -- | 50 | **3,000** | -- | 200 |
| KAFB-106S2-451 | 7/14/2021 | Q3 2021 | **160** | -- | 1.2 | 4.9 | -- | 1.6 | 7 | -- | 1 | 260 | -- | 1.6 |
| | 4/14/2021 | Q2 2021 | **670** | -- | 5 | 88 | -- | 0.8 | 29 | -- | 0.5 | 540 | -- | 28 |
| | 1/7/2021 | Q1 2021 | **1,300** | -- | 10 | 65 | J | 1.6 | 70 | J | 1 | **820** | J | 5.6 |
| | 10/22/2020 | Q4 2020 | **730** | -- | 2.5 | 18 | -- | 4 | 54 | -- | 2.5 | 550 | -- | 10 |
| KAFB-106S3-449 | 7/14/2021 | Q3 2021 | **970** | -- | 6 | 69 | -- | 0.8 | 4.7 | -- | 0.5 | **760** | -- | 8 |
| | 4/14/2021 | Q2 2021 | **3,300** | -- | 10 | **830** | -- | 16 | 77 | -- | 1 | **2,600** | -- | 56 |
| | 1/8/2021 | Q1 2021 | **1,800** | -- | 5 | 240 | -- | 0.8 | 38 | -- | 0.5 | **1,100** | -- | 28 |
| | 10/22/2020 | Q4 2020 | **540** | -- | 1 | 12 | -- | 1.6 | 5.1 | -- | 1 | **730** | -- | 40 |

## Table 4-10
## Historical Benzene, Toluene, Ethylbenzene, and Total Xylenes Concentrations

| Analyte: | | | Benzene | | | Ethylbenzene | | | Toluene | | | Xylenes, Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Screening Level[a]: | | | 5 µg/L | | | 700 µg/L | | | 1,000 µg/L | | | 620 µg/L | | |
| Well Location ID | Sample Date | Sampling Quarter[b] | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD | Result | Val Qual | LOD |
| KAFB-106S4-446 | 7/13/2021 | Q3 2021 | ND | U | 0.6 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 0.8 |
| | 4/13/2021 | Q2 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 1/7/2021 | Q1 2021 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2.8 |
| | 10/22/2020 | Q4 2020 | ND | U | 0.5 | ND | U | 0.8 | ND | U | 0.5 | ND | U | 2 |
| KAFB-106S5-446 | 7/13/2021 | Q3 2021 | **1,900** | -- | 30 | **1,600** | -- | 40 | **9,000** | -- | 25 | **3,900** | -- | 4 |
| | 4/13/2021 | Q2 2021 | **1,900** | -- | 25 | **1,800** | -- | 40 | **10,000** | -- | 25 | **4,300** | -- | 14 |
| | 1/8/2021 | Q1 2021 | **2,100** | -- | 25 | **1,700** | -- | 40 | **10,000** | -- | 25 | **4,000** | -- | 140 |
| | 10/22/2020 | Q4 2020 | **1,300** | -- | 5 | **1,200** | -- | 8 | **7,000** | -- | 50 | **2,700** | -- | 20 |
| KAFB-106S7-451 | 7/14/2021 | Q3 2021 | **1,300** | -- | 6 | 360 | -- | 8 | 130 | -- | 0.5 | **1,200** | -- | 8 |
| | 4/13/2021 | Q2 2021 | **650** | -- | 5 | 310 | -- | 8 | 180 | -- | 0.5 | **980** | -- | 28 |
| | 1/8/2021 | Q1 2021 | **190** | -- | 0.5 | 450 | -- | 8 | 350 | -- | 5 | **1,500** | -- | 28 |
| | 10/22/2020 | Q4 2020 | **310** | -- | 2.5 | **700** | -- | 4 | **1,600** | -- | 25 | **2,100** | -- | 10 |
| KAFB-106S8-451 | 7/13/2021 | Q3 2021 | **7,400** | -- | 60 | 670 | -- | 8 | **10,000** | -- | 50 | **4,100** | -- | 8 |
| | 4/14/2021 | Q2 2021 | **7,900** | -- | 25 | 520 | -- | 4 | **8,700** | -- | 25 | **3,900** | -- | 14 |
| | 1/7/2021 | Q1 2021 | **4,800** | -- | 50 | 100 | -- | 8 | **1,100** | -- | 5 | **1,600** | -- | 28 |
| | 10/21/2020 | Q4 2020 | **770** | J | 2.5 | 15 | -- | 4 | 390 | J | 2.5 | 130 | -- | 10 |
| KAFB-106S9-447 | 7/13/2021 | Q3 2021 | **37** | -- | 0.6 | 24 | -- | 0.8 | 0.6 | J | 0.5 | 32 | -- | 0.8 |
| | 4/14/2021 | Q2 2021 | **7,400** | -- | 25 | **790** | -- | 4 | **3,600** | -- | 25 | **1,800** | -- | 14 |
| | 1/8/2021 | Q1 2021 | **3,600** | -- | 25 | 500 | -- | 4 | 350 | -- | 2.5 | **920** | -- | 14 |
| | 10/21/2020 | Q4 2020 | **36** | -- | 0.5 | 52 | -- | 0.8 | 2 | -- | 0.5 | 65 | -- | 2 |
| KAFB-106S10-443 | 7/15/2021 | Q3 2021 | **5,600** | -- | 60 | 560 | -- | 8 | **13,000** | -- | 50 | **2,500** | -- | 8 |
| | 4/19/2021 | Q2 2021 | **12,000** | -- | 50 | 650 | J | 8 | **17,000** | -- | 50 | **2,700** | -- | 28 |
| | 1/15/2021 | Q1 2021 | **11,000** | -- | 25 | 670 | -- | 4 | **17,000** | -- | 250 | **3,000** | -- | 14 |

**Table 4-10**
**Historical Benzene, Toluene, Ethylbenzene, and Total Xylenes Concentrations**

[a] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level will be the EPA Tapwater RSL. For benzene, ethylbenzene, and toluene, the project screening level is the EPA MCL. For total xylenes, the project screening level is the NM WQCC numeric standard.

[b] Data presented include results from the current quarter along with the three most recent historical results. Where wells do not have at least three historical results, the results from each quarter of sampling are provided.

µg/L = microgram(s) per liter
EPA = U.S. Environmental Protection Agency
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
ND = not detected
NM = New Mexico
Q1 = first quarter
Q2 = second quarter
Q3 = third quarter
Q4 = fourth quarter
RSL = regional screening level
Val Qual = validation qualifier
WQCC = Water Quality Control Commission
Shading = detected concentrations
**Bold** = concentrations exceed the project screening level
Val Quals based on independent data validation:
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected.

**Table 4-11**
**Drinking Water Supply Well Analytical Results, Q3 2021**

| | | Well Location ID: | | KAFB-003 | | | KAFB-015 | | | ST106-VA2 | | | ST106-VA2 | | | KAFB-003 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Field Sample ID: | | GWK003-2131 | | | GWK015-2131 | | | GWVA2-2123 | | | GWVA2-6123 | | | GWK003-2132 | | |
| | | Sample Date: | | 7/6/2021 | | | 7/6/2021 | | | 7/6/2021 | | | 7/6/2021 | | | 8/3/2021 | | |
| | | Sample Type: | | REG | | | REG | | | REG | | | Field Duplicate | | | REG | | |
| **Parameter** | **Analytical Method** | **Analyte** | **EPA MCL** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method E504.1 (µg/L) | 1,2-Dibromoethane | 0.05 | ND | U | 0.018 | ND | U | 0.018 | ND | U | 0.018 | ND | U | 0.018 | ND | U | 0.018 |
| BTEX | Method E524.2 (µg/L) | Benzene | 5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Toluene | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 10,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| Field Parameters | | Temperature (°C) | NA | 21.0 | | | 26.5 | | | 22.7 | | | 22.7 | | | 20.5 | | |
| | | Specific Conductance (µS/cm) | NA | 586.0 | | | 644.0 | | | 539.0 | | | 539.0 | | | 356.2 | | |
| | | pH (S.U.) | NA | 7.75 | | | 7.88 | | | 7.66 | | | 7.66 | | | 7.47 | | |
| | | ORP (mV) | NA | 240.7 | | | 276.4 | | | 175.6 | | | 175.6 | | | 315.3 | | |
| | | DO (mg/L) | NA | 4.95 | | | 1.29 | | | 2.37 | | | 2.37 | | | 4.26 | | |
| | | Turbidity (NTU) | NA | 0.27 | | | 0.13 | | | 0.16 | | | 0.16 | | | 0.23 | | |

**Table 4-11**
**Drinking Water Supply Well Analytical Results, Q3 2021**

| | | Well Location ID: | | ST106-VA2 | | | KAFB-003 | | | KAFB-016[a] | | | ST106-VA2 | | | ST106-VA2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Field Sample ID: | | GWVA2-2132 | | | GWK003-2133 | | | GWK016-2133 | | | GWVA2-2133 | | | GWVA2-6133 | | |
| | | Sample Date: | | 8/3/2021 | | | 9/7/2021 | | | 9/7/2021 | | | 9/7/2021 | | | 9/7/2021 | | |
| | | Sample Type: | | REG | | | REG | | | REG | | | REG | | | Field Duplicate | | |
| **Parameter** | **Analytical Method** | **Analyte** | **EPA MCL** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOQ** | **Result** | **Val Qual** | **LOQ** | **Result** | **Val Qual** | **LOQ** | **Result** | **Val Qual** | **LOQ** |
| EDB | Method E504.1 (µg/L) | 1,2-Dibromoethane | 0.05 | ND | U | 0.018 | ND | U | 0.018 | ND | U | 0.018 | ND | U | 0.019 | ND | U | 0.018 |
| BTEX | Method E524.2 (µg/L) | Benzene | 5 | ND | U | 0.5 | ND | U | 0.5 | ND | — | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | ND | U | 0.5 | ND | U | 0.5 | ND | — | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Toluene | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | — | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 10,000 | ND | U | 0.5 | ND | U | 0.5 | 0.10 | J | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| Field Parameters | | Temperature (°C) | NA | 21.7 | | | 21.2 | | | 27.5 | | | 21.5 | | | 21.5 | | |
| | | Specific Conductance (µS/cm) | NA | 351.9 | | | 374.3 | | | 433.9 | | | 176.7 | | | 176.7 | | |
| | | pH (S.U.) | NA | 7.60 | | | 7.74 | | | 7.96 | | | 7.7 | | | 7.7 | | |
| | | ORP (mV) | NA | 282.5 | | | 197.1 | | | 234.8 | | | 177.5 | | | 177.5 | | |
| | | DO (mg/L) | NA | 3.34 | | | 5.37 | | | 0.58 | | | 4.07 | | | 4.07 | | |
| | | Turbidity (NTU) | NA | 0.15 | | | 0.22 | | | 0.12 | | | 0.41 | | | 0.41 | | |

**Table 4-11**
**Drinking Water Supply Well Analytical Results, Q3 2021**

| | | Well Location ID: | | KAFB-016[a] | | | KAFB-016[a] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Field Sample ID: | | GWK016-2133b | | | GWK016-6133b | | |
| | | Sample Date: | | 9/28/2021 | | | 9/28/2021 | | |
| | | Sample Type: | | REG | | | Field Duplicate | | |
| **Parameter** | **Analytical Method** | **Analyte** | **EPA MCL** | **Result** | **Val Qual** | **LOQ** | **Result** | **Val Qual** | **LOQ** |
| EDB | Method E504.1 (µg/L) | 1,2-Dibromoethane | 0.05 | — | — | — | — | — | — |
| BTEX | Method E524.2 (µg/L) | Benzene | 5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | ND | U | 0.5 | ND | U | 0.5 |
| | | Toluene | 1,000 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 10,000 | ND | U | 0.5 | ND | U | 0.5 |
| Field Parameters | | Temperature (°C) | NA | 25.5 | | | 25.5 | | |
| | | Specific Conductance (µS/cm) | NA | 803 | | | 803 | | |
| | | pH (S.U.) | NA | 7.89 | | | 7.89 | | |
| | | ORP (mV) | NA | 297.5 | | | 297.5 | | |
| | | DO (mg/L) | NA | 0.47 | | | 0.47 | | |
| | | Turbidity (NTU) | NA | 0.41 | | | 0.41 | | |

**Table 4-11**
**Drinking Water Supply Well Analytical Results, Q3 2021**

[a] An historically anomalous concentration of total xylenes was detected in the original sample; well KAFB-016 was resampled and analyzed for BTEX.
µg/L = microgram(s) per liter
µS/cm = micro siemen(s) per centimeter
— = Not analyzed for.
ºC = degrees Celsius
BTEX = benzene, toluene, ethylbenzene, and total xylenes
DO = dissolved oxygen
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = U.S. Environmental Protection Agency
GW = groundwater
ID = identification
LOD = limit of detection
LOQ = limit of quantitation
MCL = maximum contaminant level
mg/L = milligram per liter
mV = millivolt
NA = not applicable
ND = nondetect
NTU = nephelometric turbidity unit
ORP = oxidation reduction potential
Q3 = third quarter
REG = normal field sample
S.U. = standard unit
Val Qual = validation qualifier
Val Quals based on independent data validation:
U = Qualifier denotes the analyte was analyzed but not detected above the LOQ.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.

## Table 5-1
## Wells Sampled in the Vicinity of Injection Well KAFB-7

| | | | Well Location ID: | | | KAFB-0505 | | | ST105MW507R | | | ST105MW507R | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | GW0505-213 | | | GW0507R-213 | | | GW0507R-613 | | |
| | | | Sample Date: | | | 7/13/2021 | | | 7/13/2021 | | | 7/13/2021 | | |
| | | | Sample Type: | | | REG | | | REG | | | Field Duplicate | | |
| | | | Sample Depth (ft bgs): | | | 501.24 | | | 496.75 | | | 496.75 | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **Project Screening Level[c]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 10 | 5 | 5 | ND | U | 0.60 | ND | U | 0.60 | ND | U | 0.60 |
| | | Ethylbenzene | 750 | 700 | 700 | ND | U | 0.80 | ND | U | 0.80 | ND | U | 0.80 |
| | | Toluene | 750 | 1,000 | 750 | 0.61 | J | 0.50 | 0.26 | J | 0.50 | 0.26 | J | 0.50 |
| | | Xylenes, total | 620 | 10,000 | 620 | ND | U | 0.80 | ND | U | 0.80 | ND | U | 0.80 |
| Metals, dissolved | Method SW6010C (mg/L) | Aluminum | 5.0 | NS | 5.0 | ND | U | 0.31 | ND | U | 0.31 | ND | U | 0.31 |
| | | Barium | 2 | 2 | 2 | 0.076 | -- | 0.0026 | 0.070 | -- | 0.0026 | 0.068 | -- | 0.0026 |
| | | Calcium | NS | NS | NS | 75 | -- | 0.15 | 74 | -- | 0.15 | 72 | -- | 0.15 |
| | | Iron | 1.0 | NS | 1.0 | ND | U | 0.10 | ND | U | 0.10 | ND | U | 0.10 |
| | | Magnesium | NS | NS | NS | 13 | -- | 0.077 | 11 | -- | 0.077 | 11 | -- | 0.077 |
| | | Manganese | 0.2 | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| | | Potassium | NS | NS | NS | 2.8 | -- | 0.46 | 2.5 | -- | 0.46 | 2.2 | -- | 0.46 |
| | | Sodium | NS | NS | NS | 30 | -- | 0.52 | 31 | -- | 0.52 | 29 | -- | 0.52 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.01 | ND | U | 0.0016 | ND | U | 0.0016 | ND | U | 0.0016 |
| | | Strontium | NS | NS | NS | 0.49 | -- | 0.00082 | 0.44 | -- | 0.00082 | 0.44 | -- | 0.00082 |
| Silicia | Method SM4500SIO2C (mg/L) | Silica | NS | NS | NS | 25 | -- | 0.90 | 27 | -- | 0.90 | 27 | -- | 0.90 |

## Table 5-1
## Wells Sampled in the Vicinity of Injection Well KAFB-7

| | | | Well Location ID: | | | KAFB-0508-MW | | | KAFB-2628 | | | KAFB-2629 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | GW0508-213 | | | GW2628-213 | | | GW2629-213 | | |
| | | | Sample Date: | | | 7/14/2021 | | | 7/13/2021 | | | 7/13/2021 | | |
| | | | Sample Type: | | | REG | | | REG | | | REG | | |
| | | | Sample Depth (ft bgs): | | | 485.03 | | | | | | | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **Project Screening Level[c]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 10 | 5 | 5 | ND | U | 0.60 | ND | U | 0.60 | ND | U | 0.60 |
| | | Ethylbenzene | 750 | 700 | 700 | ND | U | 0.80 | ND | U | 0.80 | ND | U | 0.80 |
| | | Toluene | 750 | 1,000 | 750 | 1.9 | -- | 0.50 | 0.72 | J | 0.50 | 1.7 | -- | 0.50 |
| | | Xylenes, total | 620 | 10,000 | 620 | ND | U | 0.80 | ND | U | 0.80 | ND | U | 0.80 |
| Metals, dissolved | Method SW6010C (mg/L) | Aluminum | 5.0 | NS | 5.0 | ND | U | 0.31 | ND | U | 0.31 | ND | U | 0.31 |
| | | Barium | 2 | 2 | 2 | 0.12 | -- | 0.0026 | 0.071 | -- | 0.0026 | 0.052 | -- | 0.0026 |
| | | Calcium | NS | NS | NS | 46 | -- | 0.15 | 76 | -- | 0.15 | 76 | -- | 0.15 |
| | | Iron | 1.0 | NS | 1.0 | ND | U | 0.10 | ND | U | 0.10 | ND | U | 0.10 |
| | | Magnesium | NS | NS | NS | 6.9 | -- | 0.077 | 13 | -- | 0.077 | 13 | -- | 0.077 |
| | | Manganese | 0.2 | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| | | Potassium | NS | NS | NS | 2.2 | -- | 0.46 | 2.6 | -- | 0.46 | 2.7 | -- | 0.46 |
| | | Sodium | NS | NS | NS | 25 | -- | 0.52 | 29 | -- | 0.52 | 29 | -- | 0.52 |
| | Method SW6020A (mg/L) | Arsenic | 0.01 | 0.01 | 0.01 | 0.00092 | J | 0.0016 | ND | U | 0.0016 | ND | U | 0.0016 |
| | | Strontium | NS | NS | NS | 0.31 | -- | 0.00082 | 0.49 | -- | 0.00082 | 0.46 | -- | 0.00082 |
| Silicia | Method SM4500SIO2C (mg/L) | Silica | NS | NS | NS | 30 | -- | 0.90 | 27 | -- | 0.90 | 28 | -- | 0.90 |

**Table 5-1**
**Wells Sampled in the Vicinity of Injection Well KAFB-7**

[a] NM WQCC 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 2018). For metals, the NM WQCC numeric standard applies to dissolved metals.

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40CFR Part 141, 143 (May 2018).

[c] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for an analyte, then the project screening level is the EPA RSL.

µg/L = microgram per liter
bgs = below ground surface
CFR = Code of Federal Regulations
EDB = ethylene dibromide (1,2-dibromoethane)
EPA = U.S. Environmental Protection Agency
ft = foot/feet
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L = milligrams per liter
ND = not detected
NM = New Mexico
NMAC = New Mexico Administrative Code
NS = not sampled
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
VOC = Volatile organic compound
WQCC = Water Quality Control Commission
Val Qual = validation qualifier
Shading = detected concentrations
**Bold** = concentrations exceed the pr
Val Quals based on independent data validation
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

**Table 5-2**
**DP-1839 Discharge Permit Terms and Conditions, Operations and Maintenance Plan Cross References**

| Condition No. | Terms and Conditions | Reference Location in Quarterly Report |
|---|---|---|
| 15 | The Permittee shall ensure the treated effluent conveyance system, i.e., piping, between the GWTS and the UIC well(s) does not leak and shall report any such leakage to the NMED GWQB in accordance with 20.6.2.1203(A) NMAC and copy the NMED HWB. | Not applicable in Q3 2021 |
| | Within 1 year of the effective date of this Discharge Permit, the Permittee shall demonstrate the structural integrity of the treated effluent conveyance system between the GWTS and KAFB-7. | Not applicable in Q3 2021 |
| | Prior to testing, the Permittee shall propose for NMED approval the test method to be used. | Not applicable in Q3 2021 |
| | The results of the mechanical integrity testing shall be submitted to NMED within 60 days of test completion. | Not applicable in Q3 2021 |
| | The Permittee shall integrity test the treated effluent conveyance system between GWTS and the UIC well(s) prior to submitting a permit renewal application. [20.6.2.3106(C) NMAC, 20.6.2.3107(A) NMAC] | Not applicable in Q3 2021 |
| 17 | The Permittee shall conduct the monitoring, operations, and reporting listed below. | Section 5.1 Groundwater Treatment System Operation |
| | Unless otherwise specified, all periodic monitoring results or general information obtained shall be reported in the forthcoming quarterly report. [20.6.2.3107 NMAC] | Section 5.1 Groundwater Treatment System Operation |
| 18 | Unless otherwise approved by NMED, the Permittee shall conduct sampling in accordance with standard industry practice. | Section 5.2 Groundwater Treatment System Performance Monitoring |
| | Sampling in accordance with the most current version of the GWTS Sampling and Analysis Plan (Appendix L of the O&M Plan), which includes sampling locations, procedures, field measurements, quality control samples, handling and custody, analytical methods, quality control, analytical validation, and reporting requirements, satisfies this Condition. [20.6.2.3107(B) NMAC] | Section 5.2 Groundwater Treatment System Performance Monitoring and 1,2-Dibromoethane Removal |
| 19 | The Permittee shall submit quarterly and annual reports to NMED pursuant to the most recent NMED HWB approved Work Plans. | Section 5.2 Groundwater Treatment System Performance Monitoring and 1,2-Dibromoethane Removal |
| | The Permittee shall identify the portions of these reports pertaining to this Discharge Permit with a table in the reports that identifies those portions. | Table 5-1 DP-1839 Discharge Permit Terms and Conditions, Operations and Maintenance Plan Cross References |
| | Quarterly reports shall be submitted as specified below unless otherwise authorized by NMED:<br>• January 1st through March 31st - due by June 30th<br>• April 1st through June 30th - due by September 30th<br>• July 1st through September 30th - due by December 31st<br>• October 1st through December 31st - due by March 31st | Noted |
| | Annual reporting requirements for the previous year, i.e., January 1 through December 31, shall be reported in the March 31 quarterly report. [20.6.2.3107(A) NMAC] | Noted |
| 20 | The Permittee shall monitor the concentration of all COCs listed on Table 2 in GWTS treated effluent. Associated sampling and analysis shall be performed monthly at a minimum. | Section 5.2 Groundwater Treatment System Performance Monitoring and 1,2-Dibromoethane Removal<br>Table 5-6 Monthly GWTS Performance Analytical Results for Train 1, Q3 2021<br>Table 5-7 Monthly GWTS Performance Analytical Results for Train 2, Q3 2021 |
| | When groundwater from a new extraction well is first introduced to the GWTS, COC monitoring of the GWTS treated effluent shall occur daily for the first week of treatment, weekly for the first month of treatment, and monthly thereafter. | Not applicable in Q3 2021 |
| | If alterations to, or conditions at, the GWTS result in a potential impact to effluent quality, the Permittee will repeat this sampling sequence as directed by NMED. | No effluent quality impacts Q3 2021 |
| 20 | A representative sample of GWTS influent and effluent shall be analyzed annually for the constituents identified in Table 3. | Table 5-8 GWTS Annual Sample Analytical Results |
| | A representative sample of GWTS influent and effluent shall be analyzed every 5 years for the constituents identified in Table 4 | Performed in Q3 2017; last reported in Q3 2017; Not applicable to Q3 2021 |
| | The first analysis of the 7-year constituent list shall occur in July 2017. Any newly identified constituents detected during the 7-year sampling events will be added to the annual sampling constituent list in Table 3. | Performed in Q3 2017; last reported in Q3 2017; Not applicable to Q3 2021 |
| | All analysis of GWTS influent and effluent shall utilize analytical methods with detection limits that are sufficiently low to allow comparison to the standards included in the above referenced state and federal regulations. | Section 3.5.4 Interim Measure<br>Table 5-6 Monthly GWTS Performance Analytical Results for Train 1, Q3 2021<br>Table 5-7 Monthly GWTS Performance Analytical Results for Train 2, Q3 2021 |
| | All sampling, analysis, and reporting shall comply with the most recent approved Work Plans. [20.6.2.3107(A) NMAC and 20.6.2.3107(B) NMAC] | Section 3.4 Interim Measure |

**Table 5-2**
**DP-1839 Discharge Permit Terms and Conditions, Operations and Maintenance Plan Cross References**

| Condition No. | Terms and Conditions | Reference Location in Quarterly Report |
|---|---|---|
| 21 | The Permittee shall report the volume of treated GWTS effluent discharged to each UIC well each quarter. This report shall include the following: | See Below |
| | a. Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well | Table 5-4 Groundwater Treatment System Injection Well Performance, Q3 2021 |
| | b. The totalized monthly volume of treated effluent transferred to all UIC wells | Table 5-3 Quantities of Groundwater Treated and Discharged, Q3 2021 |
| | c. Monthly average, maximum, and minimum head values of injection water for each UIC well. | Table 5-4 Groundwater Treatment System Injection Well Performance, Q3 2021 |
| | The Permittee shall monitor the GWTS effluent volume utilizing an effluent flow meter installed on the effluent pump skid after the GAC units. Each UIC well shall have a dedicated flowmeter. Flowmeters shall be inspected and calibrated in accordance with the associated manufacturer's recommendations. [20.6.2.3107 NMAC] | Table 5-4 Groundwater Treatment System Injection Well Performance, Q3 2021<br>Table 5-9 GWTS Routine Maintenance (Monthly Flowmeter Inspection and Annual Calibration Verification) |
| 22 | The Permittee shall include the following results and general information in quarterly reports to NMED: | See Below |
| | a. Any mechanical integrity (tests) conducted on either the GWTS or a UIC well | Section 5.4.3 Non-Routine Maintenance<br>Table 5-10 GWTS Non-Routine Maintenance Items, Q3 2021 |
| | b. Any replacement of GAC media and the associated data that initiated the decision to replace the media | Section 5.4.3 Non-Routine Maintenance<br>Table 5-10 GWTS Non-Routine Maintenance Items, Q3 2021 |
| | c. Any UIC well rehabilitation conducted | Section 5.4.3 Non-Routine Maintenance<br>Table 5-10 GWTS Non-Routine Maintenance Items, Q3 2021 |
| | d. Any malfunction, repair, or replacement of a flowmeter | Section 5.4.3 Non-Routine Maintenance<br>Table 5-10 GWTS Non-Routine Maintenance Items, Q3 2021 |
| | e. Any additional operational changes with the potential to affect the discharge. [20.6.2.3107 NMAC] | Section 5.4.3 Non-Routine Maintenance<br>Table 5-10 GWTS Non-Routine Maintenance Items, Q3 2021 |
| 23 | The Permittee shall monitor the groundwater wells in the vicinity of KAFB-7 and in the vicinity of any newly installed UIC well(s) to determine any change to aquifer chemistry that may be the result of injection. | Not applicable in Q3 2021 |
| | This monitoring shall be performed annually, shall conform to the procedures of the most current approved Work Plan, and shall measure the COCs listed in Table 2. This chemistry will be reported in the Annual Report for the Bulk Fuels Facility. | Provided in the Q4 2020 Report; Section 6.2.1.1 |
| | ST-105 Annual Report includes elevation contour mapping and analytical parameters identified in the Stage 2 Abatement Plan. | Reported annually in the ST-105 Annual Report |
| | The Permittee shall develop a groundwater elevation contour map depicting the groundwater flow direction in the vicinity of each UIC well and report it in the ST-105 Annual Report. | Reported annually in the ST-105 Annual Report<br>Also reported in Q4 of each year, last reported in Q4 2020 |
| | If the chemical quality of the treated groundwater being injected changes over time, NMED may require the Permittee to repeat geochemical modeling (numeric or analytical) to predict the interaction between the treated effluent and receiving groundwater. [20.6.2.3107 NMAC] | Not applicable in Q3 2021 |
| 24 | The Permittee shall post all reports required by this Discharge Permit on Kirtland AFB's most current website (e.g., https://kirtlandafb.tlisolutions.com/main.aspx.) [20.6.2.3107(A) NMAC] | http://afcec.publicadmin-record.us.af.mil/search.aspx |
| 34 | In the event the Permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated, or discharged by the facility that differs from the terms and conditions in this Discharge Permit, the Permittee shall notify NMED prior to implementing such changes. | Noted |
| | The Permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes. [20.6.2.7(P) NMAC, 20.6.2.3107(C) NMAC, 20.6.2.3109(E) and (G) NMAC] | Noted |

**Table 5-2**
**DP-1839 Discharge Permit Terms and Conditions, Operations and Maintenance Plan Cross References**

| Condition No. | Terms and Conditions | Reference Location in Quarterly Report |
|---|---|---|
| 35 | In the event the Permittee proposes to construct or change an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the Permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction. | Noted |
| | In the event the Permittee implements changes to an existing system authorized by this Discharge Permit which will result in only a minor effect on the quality of the discharge, the Permittee shall report such changes (including the submission of record drawings, where applicable) in the next quarterly report to NMED. [20.6.2.1202(A) and (C) NMAC, New Mexico Statutes Annotated 1978, §§ 61-23-1 through 61-23-32] | Not applicable in Q3 2021 |

COC = contaminant of concern
GAC = granular activated carbon
GWTS = groundwater treatment system
GWQB = Groundwater Quality Bureau
HWB = Hazardous Waste Bureau
NMAC = New Mexico Administrative Code
NMED = New Mexico Environment Department
No. = number
O&M = operation and maintenance
Q3 = third quarter
Q4 = fourth quarter
UIC = underground injection control

**Table 5-3**
**Groundwater Treatment System Extraction Well Performance, Q3 2021**

| Well ID | Well Parameter | July | August | September | Q3 (Average) |
|---|---|---|---|---|---|
| KAFB-106228 | Average Operational Flow Rate[a] (gpm) | 132.1 | 132.5 | 131.3 | 132.0 |
| | Flow Rate Range[b] (gpm; min-max) | 131.4 - 132.6 | 131.5 - 135.4 | 130.0 - 131.9 | 130.0 - 135.4 |
| | Average Drawdown[c] (ft) | 21.1 | 20.2 | 21.5 | 20.9 |
| | Water Level Elevation Range[b] (ft AMSL; min-max) | 4856.0 - 4857.2 | 4856.3 - 4860.4 | 4855.7 - 4857.1 | 4855.7 - 4860.4 |
| | Average Specific Capacity[d] (gpm/ft) | 6.3 | 6.6 | 6.1 | 6.3 |
| | Average Transmissivity[d] (gpd/ft) | 9,382 | 9,877 | 9,142 | 9,467 |
| | Run Time Percentage[e] | 97.2% | 96.7% | 96.7% | 96.9% |
| | Notes | NA | NA | NA | NA |
| KAFB-106233 | Average Operational Flow Rate[a] (gpm) | 158.9 | 158.7 | 158.4 | 158.7 |
| | Flow Rate Range[b] (gpm; min-max) | 158.6 - 159.5 | 158.2 - 159.1 | 157.9 - 158.8 | 157.9 - 159.5 |
| | Average Drawdown[c] (ft) | 8.2 | 8.9 | 9.5 | 8.9 |
| | Water Level Elevation Range[b] (ft AMSL; min-max) | 4869.2 - 4869.9 | 4868.8- 4869.3 | 4867.8 - 4868.7 | 4867.8 - 4869.9 |
| | Average Specific Capacity[d] (gpm/ft) | 19.3 | 17.9 | 16.7 | 18.0 |
| | Average Transmissivity[d] (gpd/ft) | 29,022 | 26,893 | 24,982 | 26,966 |
| | Run Time Percentage[e] | 98.8% | 97.1% | 96.5% | 97.5% |
| | Notes | NA | NA | NA | NA |
| KAFB-106234 | Average Operational Flow Rate[a] (gpm) | 170.4 | 170.2 | 170.1 | 170.3 |
| | Flow Rate Range[b] (gpm; min-max) | 169.3 - 171.1 | 169.0 - 170.8 | 169.7 - 170.6 | 169.0 - 171.1 |
| | Average Drawdown[c] (ft) | 8.0 | 8.9 | 9.8 | 8.9 |
| | Water Level Elevation Range[b] (ft AMSL; min-max) | 4868.1 - 4869.3 | 4867.3 - 4868.4 | 4866.6 - 4867.4 | 4866.6 - 4869.3 |
| | Average Specific Capacity[d] (gpm/ft) | 21.2 | 19.1 | 17.4 | 19.2 |
| | Average Transmissivity[d] (gpd/ft) | 31,828 | 28,627 | 26,155 | 28,870 |
| | Run Time Percentage[e] | 98.8% | 97.1% | 96.5% | 97.5% |
| | Notes | NA | NA | NA | NA |
| KAFB-106239 | Average Operational Flow Rate[a] (gpm) | 73.7 | 73.4 | 75.5 | 74.1 |
| | Flow Rate Range[b] (gpm; min-max) | 72.5 - 75.5 | 70.1 - 76.0 | 75.0 - 75.8 | 70.1 - 76.0 |
| | Average Drawdown[c] (ft) | 12.6 | 11.4 | 10.3 | 11.5 |
| | Water Level Elevation Range[b] (ft AMSL; min-max) | 4871.8 - 4872.9 | 4871.6 - 4875.4 | 4874.0 - 4875.1 | 4871.6 - 4875.4 |
| | Average Specific Capacity[d] (gpm/ft) | 5.9 | 6.6 | 7.3 | 6.6 |
| | Average Transmissivity[d] (gpd/ft) | 8,776 | 9,870 | 10,969 | 9,872 |
| | Run Time Percentage[e] | 98.9% | 92.4% | 96.7% | 96.0% |
| | Notes | NA | NA | NA | NA |
| Combined Extraction Well Totals | Combined Average Operational Flow Rate[f] (gpm) | 535.2 | 534.8 | 535.3 | 535.1 |
| | Combined Flow Rate Range (gpm) | 533.9 - 536.9 | 531.5 - 540.4 | 533.3 - 536.8 | 531.5 - 540.4 |
| | Run Time Percentage[g] | 98.9%[h] | 97.1%[h] | 96.7%[h] | 97.5% |

**Table 5-3**
**Groundwater Treatment System Extraction Well Performance, Q3 2021**

[a] Flow rate calculation is an average rate that only includes time while the pump was operational; average values were computed from daily values throughout Q3 2021.

[b] Ranges are provided from daily values throughout Q3 2021.

[c] Average drawdown is calculated from the approximate static water elevation in Q3 2021, only includes time while the pump was operational and does not account for dynamic water elevation increases in the aquifer; average values were computed from daily values throughout Q3 that were obtained from the SCADA for all the extraction wells.

[d] Specific capacity and transmissivity average values only include pump run time (i.e., pump down time is not factored into the calculation); average values were computed from daily values throughout Q3.

[e] Percent run time is calculated when the given well is running at a minimum of 50 gpm; dataset includes readings for every minute throughout Q3.

[f] Combined Average Operation Flow Rate is the average influent flow rate to the GWTS.

[g] The combined extraction well percent run time is based on the percentage of time that water is entering the GWTS from any combination of extraction wells.

[h] Run time percentages for the combined extraction wells are recognized as the maximum extraction well run (from any given extraction well) time for that month.

% = percent

AMSL = above mean sea level

ft = foot/feet

gpd = gallon per day

gpm = gallon per minute

GWTS = groundwater treatment system

ID = identification

max = maximum

min = minimum

NA = not applicable

Q3 = third quarter

SCADA = supervisory control and data acquisition

## Table 5-4
## Cumulative Quantities of Groundwater Treated and Discharged through Q3 2021

| GWTS Operating Month | Train 1 Total Groundwater Treated (gallons) | Train 2 Total Groundwater Treated (gallons) | Total Groundwater Extracted (gallons) | Treated Groundwater Injected to Injection Well KAFB-7 (gallons) | Treated Groundwater Injected to Injection Well KAFB-106IN2[a] (gallons) | Treated Groundwater Discharged to the GCMP[b] (gallons) |
|---|---|---|---|---|---|---|
| Totalizing Flow Meter[c] | FE/FIT-3108 | FE/FIT-3208 | FE/FIT-3108 + FE/FIT-3208 | FE/FIT-3108 + FE/FIT-3208 | KAFB-106IN2 Flowmeter | FE/FIT-3108 + FE/FIT-3208 |
| December 2015[d] | 17,664,900 | 0 | 17,664,900 | 0 | -- | 17,664,900 |
| **2015 Total** | **17,664,900** | **0** | **17,664,900** | **0** | -- | **17,664,900** |
| January 2016 | 1,777,200 | 0 | 1,777,200 | 0 | -- | 1,777,200 |
| February 2016 | 881,000 | 0 | 881,000 | 181,300 | -- | 699,700 |
| March 2016 | 22,168,080 | 0 | 22,168,080 | 1,231,350 | -- | 20,936,730 |
| April 2016 | 12,649,920 | 0 | 12,649,920 | 582,570 | -- | 12,067,350 |
| May 2016 | 12,090,000 | 0 | 12,090,000 | 0 | -- | 12,090,000 |
| June 2016 | 8,850,000 | 0 | 8,850,000 | 0 | -- | 8,850,000 |
| July 2016 | 9,940,000 | 0 | 9,940,000 | 0 | -- | 9,940,000 |
| August 2016 | 9,400,000 | 0 | 9,400,000 | 0 | -- | 9,400,000 |
| September 2016 | 12,980,000 | 0 | 12,980,000 | 0 | -- | 12,980,000 |
| October 2016 | 8,300,000 | 0 | 8,300,000 | 0 | -- | 8,300,000 |
| November 2016 | 7,200,000 | 0 | 7,200,000 | 2,970,000 | -- | 4,230,000 |
| December 2016 | 14,570,100 | 0 | 14,570,100 | 14,501,190 | -- | 68,910 |
| **2016 Total** | **120,806,300** | **0** | **120,806,300** | **19,466,410** | -- | **101,339,890** |
| January 2017 | 6,089,700 | 87,300 | 6,177,000 | 5,877,600 | -- | 299,400 |
| February 2017 | 1,637,100 | 2,357,400 | 3,994,500 | 2,216,600 | -- | 1,777,900 |
| March 2017 | 5,551,200 | 5,705,400 | 11,256,600 | 5,172,800 | -- | 6,083,800 |
| April 2017 | 7,269,000 | 6,712,700 | 13,981,700 | 2,248,062 | -- | 11,733,638 |
| May 2017 | 9,234,900 | 9,453,700 | 18,688,600 | 4,722,563 | -- | 13,966,037 |
| June 2017 | 9,706,100 | 9,055,100 | 18,761,200 | 1,592,700 | -- | 17,168,500 |
| July 2017 | 13,260,800 | 10,875,200 | 24,136,000 | 3,023,500 | -- | 21,112,500 |
| August 2017 | 9,461,200 | 8,999,500 | 18,460,700 | 4,847,500 | -- | 13,613,200 |
| September 2017 | 9,734,500 | 9,227,600 | 18,962,100 | 6,752,400 | -- | 12,209,700 |
| October 2017 | 8,684,700 | 12,941,900 | 21,626,600 | 14,775,800 | -- | 6,850,800 |
| November 2017 | 0 | 12,513,400 | 12,513,400 | 3,734,900 | -- | 8,778,500 |
| December 2017 | 0 | 13,304,300 | 13,304,300 | 10,724,700 | -- | 2,579,600 |
| **2017 Total** | **80,629,200** | **101,233,500** | **181,862,700** | **65,689,125** | -- | **116,173,575** |

## Table 5-4
## Cumulative Quantities of Groundwater Treated and Discharged through Q3 2021

| GWTS Operating Month | Train 1 Total Groundwater Treated (gallons) | Train 2 Total Groundwater Treated (gallons) | Total Groundwater Extracted (gallons) | Treated Groundwater Injected to Injection Well KAFB-7 (gallons) | Treated Groundwater Injected to Injection Well KAFB-106IN2[a] (gallons) | Treated Groundwater Discharged to the GCMP[b] (gallons) |
|---|---|---|---|---|---|---|
| January 2018 | 9,865,000 | 5,497,700 | 15,362,700 | 13,887,700 | -- | 1,475,000 |
| February 2018 | 10,785,300 | 6,786,100 | 17,571,400 | 13,765,300 | -- | 3,806,100 |
| March 2018 | 11,006,000 | 7,092,900 | 18,098,900 | 9,235,300 | -- | 8,863,600 |
| April 2018 | 7,468,200 | 5,800,700 | 13,268,900 | 0[e] | -- | 13,268,900 |
| May 2018 | 11,238,400 | 8,061,600 | 19,300,000 | 0[e] | -- | 19,300,000 |
| June 2018 | 14,746,800 | 10,186,400 | 24,933,200 | 0[e] | -- | 24,933,200 |
| July 2018 | 12,038,500 | 7,901,100 | 19,939,600 | 0[e] | -- | 19,939,600 |
| August 2018 | 14,973,100 | 9,583,900 | 24,557,000 | 0[e] | -- | 24,557,000 |
| September 2018 | 9,516,900 | 7,509,600 | 17,026,500 | 0[e] | -- | 17,026,500 |
| October 2018 | 1,572,600 | 7,288,500 | 8,861,100 | 0[e] | -- | 8,861,100 |
| November 2018 | 7,788,300 | 4,682,900 | 12,471,200 | 7,517,100 | -- | 4,954,100 |
| December 2018 | 15,521,500 | 10,282,100 | 25,803,600 | 23,080,800 | -- | 2,722,800 |
| **2018 Total** | **126,520,600** | **90,673,500** | **217,194,100** | **67,486,200** | -- | **149,707,900** |
| January 2019 | 13,105,900 | 8,431,000 | 21,536,900 | 19,494,500 | -- | 2,042,400 |
| February 2019 | 12,821,800 | 8,443,300 | 21,265,100 | 13,624,600 | -- | 7,640,500 |
| March 2019 | 16,066,200 | 10,450,300 | 26,516,500 | 13,435,900 | -- | 13,080,600 |
| April 2019 | 12,729,900 | 8,472,000 | 21,201,900 | 7,170,800 | -- | 14,031,100 |
| May 2019 | 10,781,700 | 8,610,700 | 19,392,400 | 5,779,900 | -- | 17,091,400 |
| June 2019 | 11,576,800 | 9,269,600 | 20,846,400 | 1,512,500 | -- | 15,855,000 |
| July 2019 | 9,153,800 | 8,748,700 | 17,902,500 | 551,100 | -- | 17,351,400 |
| August 2019 | 13,222,400 | 8,198,000 | 21,420,400 | 5,494,800 | -- | 22,177,400 |
| September 2019 | 16,768,300 | 9,679,900 | 26,448,200 | 2,916,700 | -- | 17,279,700 |
| October 2019 | 11,340,300 | 8,223,800 | 19,564,100 | 17,177,900 | -- | 6,326,400 |
| November 2019 | 7,064,500 | 8,577,500 | 15,642,000 | 14,525,700 | -- | 1,081,700 |
| December 2019 | 9,098,700 | 10,636,700 | 19,735,400 | 15,695,800 | -- | 134,000 |
| **2019 Total** | **143,730,300** | **107,741,500** | **251,471,800** | **117,380,200** | -- | **134,091,600** |

**Table 5-4**
**Cumulative Quantities of Groundwater Treated and Discharged through Q3 2021**

| GWTS Operating Month | Train 1 Total Groundwater Treated (gallons) | Train 2 Total Groundwater Treated (gallons) | Total Groundwater Extracted (gallons) | Treated Groundwater Injected to Injection Well KAFB-7 (gallons) | Treated Groundwater Injected to Injection Well KAFB-106IN2[a] (gallons) | Treated Groundwater Discharged to the GCMP[b] (gallons) |
|---|---|---|---|---|---|---|
| January 2020 | 9,025,600 | 10,401,500 | 19,427,100 | 18,919,600 | -- | 507,500 |
| February 2020 | 6,985,200 | 8,249,600 | 15,234,800 | 12,237,600 | -- | 2,997,200 |
| March 2020 | 7,280,800 | 8,168,800 | 15,449,600 | 4,246,900 | -- | 11,202,700 |
| April 2020 | 9,547,500 | 10,804,400 | 20,351,900 | 5,110,300 | -- | 15,241,600 |
| May 2020 | 10,550,000 | 8,680,400 | 19,230,400 | 395,600 | -- | 18,834,800 |
| June 2020 | 12,585,900 | 7,964,600 | 20,550,500 | 0 | -- | 20,550,500 |
| July 2020 | 15,683,800 | 7,048,500 | 22,732,300 | 1,550,800 | -- | 21,181,500 |
| August 2020 | 12,873,600 | 8,529,500 | 21,403,100 | 3,737,000 | -- | 17,666,100 |
| September 2020 | 12,823,300 | 8,452,900 | 21,276,200 | 4,711,800 | -- | 16,564,400 |
| October 2020 | 15,250,400 | 9,773,900 | 25,024,300 | 14,033,400 | -- | 10,990,900 |
| November 2020 | 12,505,600 | 8,260,300 | 20,765,900 | 11,704,300 | 83,100 | 8,978,500 |
| December 2020 | 16,478,900 | 10,121,600 | 26,600,500 | 23,482,400 | 57,600 | 3,060,500 |
| **2020 Total** | **141,590,600** | **106,456,000** | **248,046,600** | **100,129,700** | **140,700** | **147,776,200** |

## Table 5-4
## Cumulative Quantities of Groundwater Treated and Discharged through Q3 2021

| GWTS Operating Month | Train 1 Total Groundwater Treated (gallons) | Train 2 Total Groundwater Treated (gallons) | Total Groundwater Extracted (gallons) | Treated Groundwater Injected to Injection Well KAFB-7 (gallons) | Treated Groundwater Injected to Injection Well KAFB-106IN2[a] (gallons) | Treated Groundwater Discharged to the GCMP[b] (gallons) |
|---|---|---|---|---|---|---|
| January 2021 | 12,203,700 | 4,799,200 | 17,002,900 | 15,148,600 | 0 | 1,854,300 |
| February 2021 | 11,610,900 | 6,821,600 | 18,432,500 | 15,949,500 | 147,700 | 2,335,300 |
| March 2021 | 13,525,300 | 6,642,500 | 20,167,800 | 4,352,000 | 4,664,600 | 11,151,200 |
| April 2021 | 16,015,900 | 9,984,500 | 26,000,400 | 5,658,700 | 4,833,100 | 15,508,600 |
| May 2021 | 13,745,400 | 8,492,200 | 22,237,600 | 1,609,200 | 2,970,100 | 17,658,300 |
| June 2021 | 12,556,300 | 7,744,300 | 20,300,600 | 0 | 2,520,500 | 17,780,100 |
| July 2021 | 16,406,600 | 9,940,900 | 26,347,500 | 2,719,700 | 1,175,100 | 22,452,700 |
| August 2021 | 12,778,500 | 7,681,600 | 20,460,100 | 826,700 | 4,285,500 | 15,347,900 |
| September 2021 | 12,781,400 | 7,908,300 | 20,689,700 | 1,313,000 | 5,070,600 | 14,306,100 |
| **Q3 2021 Total** | **41,966,500** | **25,530,800** | **67,497,300** | **4,859,400** | **10,531,200** | **52,106,700** |
| **2021 Total[f]** | **121,624,000** | **70,015,100** | **191,639,100** | **47,577,400** | **25,667,200** | **118,394,500** |
| **Cumulative Total** | **752,565,900** | **476,119,600** | **1,228,685,500** | **417,729,035** | **25,807,900** | **785,148,565** |

[a] Injection well KAFB-106IN2 became active on November 13, 2020.

[b] Corrected volumes from human machine interface datasets.

[c] Flow meters are inspected monthly, see Appendix I-1.

[d] Train 1 treatment volume for December 2015 includes all water treated by the temporary treatment system and water treated by Train 1 during December

[e] On March 14, 2018, at 0206, the KAFB-7 V-Smart valve hydraulic assembly failed downhole. Repairs to KAFB-7 were completed on November 14, 2018. All treated water between March 14, 2018 and November 15, 2018 was discharged to the GCMP.

[f] Cumulative 2021 treated volume calculated through September 27, 2021.

FE/FIT-3208 = Flow meter/flow meter transmitter (followed by the component designation)

GCMP = Golf Course Main Pond

GWTS = groundwater treatment system

Q3 = third quarter

-- = not applicable. Injection began at KAFB-106IN2 in November 2020.

## Table 5-5
## Groundwater Treatment System Injection Well Performance, Q3 2021

| Well ID | Well Parameter | July | August | September | Q3 (average) |
|---|---|---|---|---|---|
| KAFB-7 | Average Operational Flow Rate[a] (gpm) | 598.6 | 595.1 | 598.7 | 597.8 |
| | Flow Rate Range[b] (gpm; min-max) | 597.1 - 600.1 | 551.7 - 633.3 | 596.0 - 601.9 | 551.7 - 633.3 |
| | Volume Injected[c] (gal) | 2,719,700 | 826,700 | 1,313,000.0 | 1,619,800 |
| | Average Water Level Elevation[d] (ft AMSL) | 4887.5 | 4884.1 | 4,886.6 | 4886.1 |
| | Water Level Elevation Range[d] (ft AMSL; min-max) | 4881.9 - 4925.0 | 4881.5 - 4910.2 | 4881.1 - 4917.5 | 4881.1 - 4925.0 |
| | Run Time %[e] | 11.9% | 3.7% | 6.3% | 7.3% |
| | Notes | NA | NA | NA | NA |
| KAFB-106IN2 | Average Operational Flow Rate[a] (gpm) | 564.3 | 558.0 | 555.7 | 558.4 |
| | Flow Rate Range[b] (gpm; min-max) | 553.8 - 599.8 | 554.0-568.1 | 554.4 - 557.9 | 553.8 - 599.8 |
| | Volume Injected[c] (gal) | 1,175,100 | 4,285,500 | 5,070,600 | 3,510,400 |
| | Average Water Level Elevation[d] (ft AMSL) | 4885.7 | 4888.7 | 4889.6 | 4887.8 |
| | Water Level Elevation Range[d] (ft AMSL; min-max) | 4875.7 - 4963.4 | 4875.2 - 4927.1 | 4862.3 - 4940.4 | 4862.3 - 4963.4 |
| | Run Time %[e] | 5.1% | 18.2% | 24.9% | 16.1% |
| | Notes | NA | NA | NA | NA |

## Table 5-5
## Groundwater Treatment System Injection Well Performance, Q3 2021

| Well ID | Well Parameter | July | August | September | Q3 (average) |
|---|---|---|---|---|---|
| GWTS Effluent | Average Operational Flow Rate[a] (gpm) | 556.0 | 558.3 | 556.9 | 557.1 |
| | Flow Rate Range[b] (gpm; min-max) | 548.1 - 564.4 | 554.7 - 592.9 | 553.4 - 570.5 | 548.1 - 592.9 |

[a] Flow rate calculation is an average rate that only includes time while the system was operational; average values were computed from SCADA values throughout Q3 2021.

[b] Ranges are provided from SCADA values throughout Q3 2021. KAFB-7 and KAFB-106IN2 flow rates fluctuate due to surging, etc. and are not consistent with GWTS effluent flow rates.

[c] Volume injected is calculated using totalizer readings from flow meters installed on the GWTS effluent skids. June injection volume calculated through September 27, 2021.

[d] Water level elevation averages and ranges include times when injection wells are not being utilized and data was collected from the SCADA for Q3 2021.

[e] Percent run time is calculated when the given well is running at a minimum of 50 gpm; dataset includes readings for every minute throughout Q3.

% = percent
AMSL = above mean sea level
ft = foot/feet
gal = gallon(s)
gpm = gallons per minute
GWTS = groundwater treatment system
ID = identification
max = maximum
min = minimum
NA = not applicable
Q3 = third quarter
SCADA = supervisory control and data acquisition

**Table 5-6**
**Groundwater Treatment System 1,2-Dibromoethane Removal, Q3 2021**

| Treatment Train | Month | Date[a] | Cumulative Volume Extracted (gal) | Monthly Volume Treated (gal) | Influent EDB Concentration (µg/L)[b] | Cumulative Mass of EDB Extracted (mg) | Mass of EDB Removed (mg)[c] |
|---|---|---|---|---|---|---|---|
| Train 1 | July | 6/28/2021 | 710,599,400 | 16,406,600 | ND < 0.019 | 82,023 | 0 |
| | | 7/6/2021 | 714,384,500 | | ND < 0.019 | 82,023 | |
| | | 7/12/2021 | 717,191,400 | | ND < 0.019 | 82,023 | |
| | | 7/19/2021 | 720,489,700 | | ND < 0.019 | 82,023 | |
| | | 7/26/2021 | 723,709,900 | | ND < 0.019 | 82,023 | |
| | August | 8/2/2021 | 727,006,000 | 12,778,500 | ND < 0.019 | 82,023 | 0 |
| | | 8/9/2021 | 729,969,800 | | ND < 0.019 | 82,023 | |
| | | 8/16/2021 | 733,191,100 | | ND < 0.019 | 82,023 | |
| | | 8/23/2021 | 736,480,300 | | ND < 0.019 | 82,023 | |
| | September | 8/30/2021 | 739,784,500 | 12,781,400 | ND < 0.019 | 82,023 | 0 |
| | | 9/7/2021 | 743,551,500 | | ND < 0.019 | 82,023 | |
| | | 9/13/2021 | 746,386,100 | | ND < 0.019 | 82,023 | |
| | | 9/20/2021 | 749,258,900 | | ND < 0.019 | 82,023 | |
| | | 9/27/2021 | 752,565,900 | | ND < 0.019 | 82,023 | |
| Train 2 | July | 6/28/2021 | 450,588,800 | 9,940,900 | 0.013 J | 53,933 | 547 |
| | | 7/6/2021 | 452,911,800 | | 0.013 J | 54,047 | |
| | | 7/12/2021 | 454,640,000 | | 0.015 J | 54,146 | |
| | | 7/19/2021 | 456,666,900 | | 0.015 J | 54,261 | |
| | | 7/26/2021 | 458,536,500 | | 0.015 J | 54,367 | |
| | August | 8/2/2021 | 460,529,700 | 7,681,600 | 0.015 J | 54,480 | 727 |
| | | 8/9/2021 | 462,306,700 | | 0.015 J | 54,581 | |
| | | 8/16/2021 | 464,259,700 | | 0.028 J | 54,788 | |
| | | 8/23/2021 | 466,164,400 | | 0.028 J | 54,990 | |
| | September | 8/30/2021 | 468,211,300 | 7,908,300 | 0.028 J | 55,207 | 542 |
| | | 9/7/2021 | 470,537,700 | | 0.028 J | 55,453 | |
| | | 9/13/2021 | 472,291,900 | | 0.014 J | 55,546 | |
| | | 9/20/2021 | 474,077,100 | | 0.014 J | 55,641 | |
| | | 9/27/2021 | 476,119,600 | | 0.014 J | 55,749 | |
| Q3 2021 Train 1 Total | | | | 41,966,500 | | | 0 |
| Q3 2021 Train 2 Total | | | | 25,530,800 | | | 1,816 |
| Q3 2021 Total | | | | 67,497,300 | | | 1,816 |

## Table 5-6
## Groundwater Treatment System 1,2-Dibromoethane Removal, Q3 2021

[a] Monthly date ranges may include dates falling outside of the actual month as weekly human machine interface data retrievals occur every Monday.

[b] The analytical result from the most recent monthly sample is used for the influent EDB concentration (Tables 7-5 and 7-6). Where EDB is non-detect, a concentration of 0 is used for the purpose of mass calculation and is displayed in this table as ND < [LOD].

[c] The mass of EDB removed is the sum of the weekly mass of EDB removed, which is the influent EDB concentration multiplied by the weekly treated volume, which is calculated each Monday from the difference in effluent totalizer readings since the previous Monday.

< = less than
µg/L = microgram(s) per liter
EDB = 1,2-dibromomethane (ethylene dibromide)
gal = gallon(s)
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
LOD = limit of detection
mg = milligram(s)
ND = non-detect
Q3 = third quarter

## Table 5-7
## Monthly Groundwater Treatment System Performance Analytical Results for Train 1, Q3 2021

| | | | Well Location ID: | | | | GWTS-BFF-INF1 | | | GWTS-BFF-GAC1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GWTS-INF1-070721 | | | GWTS-GAC1-070721 | | | GWTS-EFF1-070721 | | | GWTS-EFF1DUP-070721 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | REG | | | REG | | | REG | | | Field Duplicate | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.3 | | | 20.3 | | | 20.3 | | | 20.3 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 532.5 | | | 532.4 | | | 531.6 | | | 531.6 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.69 | | | 7.39 | | | 7.23 | | | 7.23 | | |
| | | ORP (mV) | NS | NS | NS | NS | 159.2 | | | 135.7 | | | 338.5 | | | 338.5 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 6.49 | | | 4.62 | | | 6.16 | | | 6.16 | | |

## Table 5-7
## Monthly Groundwater Treatment System Performance Analytical Results for Train 1, Q3 2021

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | GWTS-BFF-INF1 | | | GWTS-BFF-GAC1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-INF1 | | |
| | | | | | | **Field Sample ID:** | GWTS-INF1-081121 | | | GWTS-GAC1-081121 | | | GWTS-EFF1-081121 | | | GWTS-INF1-090821 | | |
| | | | | | | **Sample Date:** | 8/11/2021 | | | 8/11/2021 | | | 8/11/2021 | | | 9/8/2021 | | |
| | | | | | | **Sample Type:** | REG | | | REG | | | REG | | | REG | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.3 | | | 20.4 | | | 20.4 | | | 20.3 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 467.4 | | | 467.3 | | | 467.7 | | | 607 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.61 | | | 7.36 | | | 7.21 | | | 7.64 | | |
| | | ORP (mV) | NS | NS | NS | NS | 231.8 | | | 197 | | | 370.7 | | | 130.4 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 6.42 | | | 4.35 | | | 6.26 | | | 7.16 | | |

## Table 5-7
## Monthly Groundwater Treatment System Performance Analytical Results for Train 1, Q3 2021

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | GWTS-BFF-GAC1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF1 | | |
| | | | | | | **Field Sample ID:** | GWTS-GAC1-090821 | | | GWTS-EFF1-090821 | | | GWTS-EFF1DUP-090821 | | |
| | | | | | | **Sample Date:** | 9/8/2021 | | | 9/8/2021 | | | 9/8/2021 | | |
| | | | | | | **Sample Type:** | REG | | | REG | | | Field Duplicate | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.4 | | | 20.4 | | | 20.4 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 507.1 | | | 505.2 | | | 505.2 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.4 | | | 7.27 | | | 7.27 | | |
| | | ORP (mV) | NS | NS | NS | NS | 147.4 | | | 251 | | | 251 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 4.62 | | | 6.69 | | | 6.69 | | |

**Table 5-7**
**Monthly Groundwater Treatment System Performance Analytical Results for Train 1, Q3 2021**

[a] NM WQCC numeric standards per the NMAC Title 20.6.2.3101A, Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC, 2018).
[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40 CFR Part 141, 143 (May 2018).
[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.
[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC numeric standard or MCL exists for an analyte, then the project screening level will be the EPA RSL.

µg/L = microgram(s) per liter
µS/cm = microSiemens per centimeter
ºC = degree Celsius
DO = dissolved oxygen
EDB = ethylene dibromide (1,2-dibromoethane)
EPA = U.S. Environmental Protection Agency
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L= milligram(s) per liter
mV = millivolt(s)
ND = nondetect
NM = New Mexico
NMAC = New Mexico Administrative Code
NS = not specified
ORP = oxidation reduction potential
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
Spec Cond = specific conductivity
S.U. = standard unit
WQCC = Water Quality Control Commission
Val Qual = validation qualifier
VOC = volatile organic compound
Val Quals based on independent data validation:
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

## Table 5-8
## Monthly Groundwater Treatment System Performance Analytical Results for Train 2, Q3 2021

| | | | **Well Location ID:** | | | | GWTS-BFF-INF2 | | | GWTS-BFF-GAC2 | | | GWTS-BFF-EFF2 | | | GWTS-BFF-INF2 | | | GWTS-BFF-GAC2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Field Sample ID:** | | | | GWTS-INF2-070721 | | | GWTS-GAC2-070721 | | | GWTS-EFF2-070721 | | | GWTS-INF2-081121 | | | GWTS-GAC2-081121 | | |
| | | | **Sample Date:** | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 8/11/2021 | | | 8/11/2021 | | |
| | | | **Sample Type:** | | | | REG | | | REG | | | REG | | | REG | | | REG | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | 0.015 | J | 0.019 | ND | U | 0.019 | ND | U | 0.019 | 0.028 | J | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | 0.0056 | J | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | 0.0051 | J | 0.0052 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.6 | | | 20.6 | | | 20.7 | | | 20.6 | | | 20.7 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 408.1 | | | 406.6 | | | 406.5 | | | 358.7 | | | 357.2 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.67 | | | 7.27 | | | 7.29 | | | 7.5 | | | 7.2 | | |
| | | ORP (mV) | NS | NS | NS | NS | 111.9 | | | 95 | | | 101.8 | | | 193.7 | | | 185.3 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 5.22 | | | 0.56 | | | 3.84 | | | 5.06 | | | 0.62 | | |

## Table 5-8
## Monthly Groundwater Treatment System Performance Analytical Results for Train 2, Q3 2021

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Well Location ID:** | GWTS-BFF-EFF2 | | |
| | | | | | | **Field Sample ID:** | GWTS-EFF2-081121 | | |
| | | | | | | **Sample Date:** | 8/11/2021 | | |
| | | | | | | **Sample Type:** | REG | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.9 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 358.4 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.25 | | |
| | | ORP (mV) | NS | NS | NS | NS | 193.8 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 4.09 | | |

## Table 5-8
## Monthly Groundwater Treatment System Performance Analytical Results for Train 2, Q3 2021

| | | | Well Location ID: | | | | GWTS-BFF-EFF2 | | | GWTS-BFF-INF2 | | | GWTS-BFF-GAC2 | | | GWTS-BFF-EFF2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GWTS-EFF2DUP-081121 | | | GWTS-INF2-090821 | | | GWTS-GAC2-090821 | | | GWTS-EFF2-090821 | | |
| | | | Sample Date: | | | | 8/11/2021 | | | 9/8/2021 | | | 9/8/2021 | | | 9/8/2021 | | |
| | | | Sample Type: | | | | Field Duplicate | | | REG | | | REG | | | REG | | |
| **Parameter** | **Analytical Method** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.1 | 0.05 | 0.075 | 0.05 | ND | U | 0.02 | 0.014 | J | 0.019 | ND | U | 0.019 | ND | U | 0.019 |
| BTEX | Method SW8260C (µg/L) | Benzene | 5 | 5 | 4.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | UJ | 0.6 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | UJ | 0.8 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | UJ | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | UJ | 0.8 |
| Dissolved Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 | 0.034 | -- | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 |
| Field Parameters | | Temperature (°C) | NS | NS | NS | NS | 20.9 | | | 20.6 | | | 20.7 | | | 20.7 | | |
| | | Spec Cond (µS/cm) | NS | NS | NS | NS | 358.4 | | | 357.8 | | | 389.2 | | | 389.6 | | |
| | | pH (S.U.) | NS | NS | NS | NS | 7.25 | | | 7.6 | | | 7.6 | | | 7.17 | | |
| | | ORP (mV) | NS | NS | NS | NS | 193.8 | | | 224 | | | 224 | | | 246.3 | | |
| | | DO (mg/L) | NS | NS | NS | NS | 4.09 | | | 5.47 | | | 0.53 | | | 4.05 | | |

## Table 5-8
## Monthly Groundwater Treatment System Performance Analytical Results for Train 2, Q3 2021

[a] NM WQCC numeric standards per the New Mexico Administrative Code Title 20.6.2.3101A, Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC, 2018).

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40 CFR Part 141, 143 (May 2018).

[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC numeric standard or MCL exists for any analyte, then the project screening level will be the EPA RSL.

µg/L = microgram(s) per liter
µS/cm = microSiemen(s) per centimeter
ºC = degree Celsius
DO = dissolved oxygen
EDB = ethylene dibromide (1,2-dibromoethane)
EPA = U.S. Environmental Protection Agency
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L= milligram(s) per liter
mV = millivolt(s)
ND = nondetect
NM = New Mexico
NMAC = New Mexico Administrative Code
NS = not specified
ORP = oxidation reduction potential
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
Spec Cond = specific conductivity
S.U. = standard unit
VOC = volatile organic compound
WQCC = Water Quality Control Commission
Val Qual = validation qualifier
Shading = detected concentrations above the detection limit
**Bold**/Shading = reported concentrations exceed the project screening level
Val Quals based on independent data validation:
-- = Validation qualifier not assigned.
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.

## Table 5-9
## Groundwater Treatment System Annual Sample Analytical Results

| | | | Well Location ID: | | | | GWTS-BFF-INF1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF2 | | | GWTS-BFF-INF2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GWTS-INF1-070721 | | | GWTS-EFF1-070721 | | | GWTS-EFF1DUP-070721 | | | GWTS-EFF2-070721 | | | GWTS-INF2-070721 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | REG | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| EDB | Method SW8011 (µg/L) | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | ND | U | 0.019 | 0.015 | J | 0.019 |
| VOCs | Method SW8260C (µg/L) | 1,1,1,2-Tetrachloroethane | NS | NS | 5.7 | 5.7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,1-Trichloroethane | 200 | 200 | 8,000 | 200 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2,2-Tetrachloroethane | 10 | NS | 0.76 | 10 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1,2-Trichloroethane | 5 | 5 | 2.8 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethane | 25 | NS | 28 | 25 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloroethene | 7 | 7 | 280 | 7 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,1-Dichloropropene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,3-Trichlorobenzene | NS | NS | 7 | 7 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,3-Trichloropropane | NS | NS | 0.0075 | 0.05[e] | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2,4-Trichlorobenzene | 70 | 70 | 12 | 70 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2,4-Trimethylbenzene | NS | NS | 56 | 56 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | 1,2-Dibromo-3-chloropropane | NS | 0.2 | 0.0033 | 1[e] | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,2-Dibromoethane | 0.05 | 0.05 | 0.075 | 0.05 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichlorobenzene | 600 | 600 | 300 | 600 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 1,2-Dichloroethane | 5 | 5 | 1.7 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,2-Dichloropropane | 5 | 5 | 8.5 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3,5-Trimethylbenzene | NS | NS | 60 | 60 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 1,3-Dichlorobenzene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,3-Dichloropropane | NS | NS | 370 | 370 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 1,4-Dichlorobenzene | 75 | 75 | 4.8 | 75 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 2,2-Dichloropropane | NS | NS | NS | NS | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | 2-Butanone | NS | NS | 5,600 | 5,600 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 2-Chlorotoluene | NS | NS | 240 | 240 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 2-Hexanone | NS | NS | 38 | 38 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | 4-Chlorotoluene | NS | NS | 250 | 250 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 4-Isopropyltoluene | NS | NS | NS | NS | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | 4-Methyl-2-pentanone | NS | NS | 6,300 | 6,300 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | Acetone | NS | NS | 14,000 | 14,000 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Acrolein | NS | NS | 0.042 | 5[e] | ND | U | 5 | ND | U | 5 | ND | U | 5 | ND | U | 5 | ND | U | 5 |
| | | Acrylonitrile | NS | NS | 0.52 | 1[e] | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | Benzene | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Bromobenzene | NS | NS | 62 | 62 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Bromochloromethane | NS | NS | 83 | 83 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromodichloromethane | NS | 80 | 1.3 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Bromoform | NS | 80 | 33 | 80 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | Bromomethane | NS | NS | 7.5 | 7.5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon disulfide | NS | NS | 810 | 810 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Carbon tetrachloride | 5 | 5 | 4.6 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chlorobenzene | NS | 100 | 78 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloroethane | NS | NS | 21,000 | 21,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Chloroform | 100 | 80 | 2.2 | 80 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Chloromethane | NS | NS | 190 | 190 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | cis-1,2-Dichloroethene | 70 | 70 | 36 | 70 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | cis-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |

## Table 5-9
## Groundwater Treatment System Annual Sample Analytical Results

| | | | Well Location ID: | | | | GWTS-BFF-INF1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF1 | | | GWTS-BFF-EFF2 | | | GWTS-BFF-INF2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Field Sample ID: | | | | GWTS-INF1-070721 | | | GWTS-EFF1-070721 | | | GWTS-EFF1DUP-070721 | | | GWTS-EFF2-070721 | | | GWTS-INF2-070721 | | |
| | | | Sample Date: | | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | | 7/7/2021 | | |
| | | | Sample Type: | | | | REG | | | REG | | | Field Duplicate | | | REG | | | REG | | |
| **Parameter** | **Analytical Method (units)** | **Analyte** | **NMAC NM WQCC[a]** | **EPA MCL[b]** | **EPA RSL[c]** | **Project Screening Level[d]** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** | **Result** | **Val Qual** | **LOD** |
| VOCs | Method SW8260C (µg/L) | Dibromochloromethane | NS | 80 | 8.7 | 80 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Dibromomethane | NS | NS | 8.3 | 8.3 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Dichlorodifluoromethane | NS | NS | 200 | 200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Ethylbenzene | 700 | 700 | 15 | 700 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | Hexachloro-1,3-butadiene | NS | NS | 1.4 | 4[e] | ND | UJ | 4 | ND | UJ | 4 | ND | UJ | 4 | ND | UJ | 4 | ND | UJ | 4 |
| | | Isopropylbenzene | NS | NS | 450 | 450 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | m- & p-Xylenes | NS | NS | NS | NS | ND | U | 4 | ND | U | 4 | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Methyl tert-butyl ether | 100 | NS | 140 | 100 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Methylene chloride | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Naphthalene | 30 | NS | 1.2 | 30 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 | ND | U | 2 |
| | | n-Butylbenzene | NS | NS | 1,000 | 1,000 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | n-Propylbenzene | NS | NS | 660 | 660 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | o-Xylene | NS | NS | 190 | 190 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| | | sec-Butylbenzene | NS | NS | 2,000 | 2,000 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Styrene | 100 | 100 | 1,200 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | tert-Butylbenzene | NS | NS | 690 | 690 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 | ND | U | 1 |
| | | Tetrachloroethene | 5 | 5 | 110 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Toluene | 1,000 | 1,000 | 1,100 | 1,000 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | trans-1,2-Dichloroethene | 100 | 100 | 68 | 100 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | trans-1,3-Dichloropropene | NS | NS | 4.7 | 4.7 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Trichloroethene | 5 | 5 | 4.9 | 5 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 | ND | U | 0.6 |
| | | Trichlorofluoromethane | NS | NS | 5,200 | 5,200 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Vinyl acetate | NS | NS | 410 | 410 | ND | U | 4 | ND | U | 4 | ND | U | 4 | ND | U | 4 | ND | U | 4 |
| | | Vinyl chloride | 2 | 2 | 0.19 | 2 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 | ND | U | 0.5 |
| | | Xylenes, total | 620 | 10,000 | 190 | 620 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 | ND | U | 0.8 |
| PAHs | Method SW8270D (µg/L) | 1-Methylnaphthalene | NS | NS | NS | NS | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.2 | ND | U | 0.21 |
| | | 2-Methylnaphthalene | NS | NS | NS | NS | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.2 | ND | U | 0.21 |
| | | Bis(2-ethylhexyl) phthalate | NS | NS | NS | NS | ND | U | 4.2 | ND | U | 4.3 | ND | U | 4.3 | ND | U | 4.1 | ND | U | 4.2 |
| | | Naphthalene | NS | NS | NS | NS | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.2 | ND | U | 0.21 |
| | | Pyrene | NS | NS | NS | NS | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.21 | ND | U | 0.2 | ND | U | 0.21 |
| Phenols | Method SW9066 (mg/L) | Phenols | NS | NS | NS | NS | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.015 | ND | U | 0.015 |
| Metals | Method SW6010C (mg/L) | Iron, dissolved | 1.0 | NS | NS | 1.0 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 | ND | U | 0.1 |
| | | Manganese, dissolved | 0.2 | NS | NS | 0.2 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | ND | U | 0.0052 | 0.0056 | J | 0.0052 |
| Anions | Method E300.0 (mg/L) | Chloride | NS | NS | NS | NS | 41 | -- | 15 | 41 | -- | 15 | 41 | -- | 3 | 20 | -- | 1.5 | 20 | -- | 1.5 |
| | | Sulfate | NS | NS | NS | NS | 72 | -- | 4.5 | 71 | -- | 4.5 | 70 | -- | 4.5 | 38 | -- | 4.5 | 38 | -- | 4.5 |
| | Method E353.2 (mg/L) | Nitrate/Nitrite Nitrogen | 10 | 10 | NS | 10[f] | 1.1 | -- | 0.09 | 1.2 | -- | 0.09 | 1 | -- | 0.09 | 0.14 | -- | 0.09 | 0.18 | -- | 0.09 |

**Table 5-9**
**Groundwater Treatment System Annual Sample Analytical Results**

[a] NM WQCC numeric standards per the New Mexico Administrative CodeTitle 20.6.2.3101A, Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (NMAC, 2018).

[b] EPA National Primary Drinking Water Regulations, MCLs and Secondary MCLs, Title 40CFR Part 141, 143 (May 2018).

[c] EPA Region 6 RSL for Tapwater (May 2021) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland Air Force Base Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC numeric standard or MCL exists for an analyte, then the project screening level will be the EPA RSL.

[e] EPA Region 6 RSL for Tapwater (May 20201) for hazard index = 1.0 for noncarcinogens and a 10-5 cancer risk level for carcinogens.

[f] Based on the geochemical equilibrium of the site groundwater and previous site data analyses, nitrate/nitrite results represent nitrate concentrations.

µg/L = microgram(s) per liter
µS/cm = microSiemen(s) per centimeter
ºC = degree Celsius
DO = dissolved oxygen
EDB = ethylene dibromide (1,2-dibromoethane)
EPA = U.S. Environmental Protection Agency
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
mg/L= milligram(s) per liter
mV = millivolt(s)
ND = nondetect
NM = New Mexico
NMAC = New Mexico Administrative Code
NS = not specified
ORP = oxidation reduction potential
PAHs = Polycyclic Aromatic Hydrocarbons
Q3 = third quarter
REG = normal field sample
RSL = regional screening level
Spec Cond = specific conductivity
S.U. = standard unit
VOC = volatile organic compound
WQCC = Water Quality Control Commission
Val Qual = validation qualifier
Shading = detected concentrations above the detection limit
**Bold**/Shading = reported concentrations exceed the project screening level
Val Quals based on independent data validation:
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.
-- = Validation qualifier not assigned.

**Table 5-10**
**Groundwater Treatment System Routine Maintenance Schedule, Q3 2021**

| | Frequency | | | |
|---|---|---|---|---|
| **Maintenance Activity** | **Daily** | **Weekly** | **Monthly** | **As Needed** |
| Recording and inspecting influent, GAC vessel, and effluent skid pressure, flow rate, and totalizer readings from their respective gauges and the human machine interface | X | | | |
| Recording extraction well pressure, flow rate, and totalizer readings from the human machine interface | X | | | |
| Recording extraction well pressure, flow rate, and totalizer readings from the gauges at the well vaults | | X | | |
| Inspecting well control house and recording well control house pressure, flow rate, and totalizer readings | | X | | |
| Recording totalizer reading at KAFB-7 and KAFB-106IN2 | | X | | |
| Running and inspecting the GWTS air compressor | | X | | |
| Inspecting extraction well, conveyance line, and air release valve vaults | | | X | |
| Inspecting wellhead and associated equipment of injection well KAFB-7 and KAFB-106IN2 | | | X | |
| Inspecting and performing maintenance of flowmeters throughout the system | | | X | |
| Inspecting and performing maintenance on actuating valves throughout the system | | | X | |
| Performing confined space entries | | | X | |
| Gauging extraction well filter pack | | | X | |
| Testing of uninterruptible power supplies | | | X | |
| Semiannual inspections and maintenance of Tijeras Arroyo Golf Course ponds | | | | X |
| Logging lockout-tagout entries | | | | X |
| Logging system shutdowns | | | | X |
| Emptying stormwater runoff flooded vaults | | | | X |
| Performing air compressor maintenance | | | | X |
| Cleaning GWTS sumps | | | | X |
| Draining air release valve containment vessels | | | | X |
| Grounds keeping including vegetation control | | | | X |
| Inspecting and cleaning the GWTS Wye-strainer/basket strainer | | | | X |
| Performing flow meter calibration | | | | X[a] |
| Greasing pump bearings | | | | X[b] |
| Changing process pump oil | | | | X[b] |
| Changing air filter on control room air conditioner | | | | X[b] |
| Changing bag filters | | | | X[c] |
| Changing out GAC | | | | X[d] |
| Disinfection of extraction wells and conveyance lines | | | | X[e] |
| Testing of alarms and interlocks | | | | X[f] |
| Cleaning coils and replacing air filter for the Well Control House air conditioner | | | | X[g] |
| GAC skimming of the lead GAC vessel | | | | X[h] |

## Table 5-10
## Groundwater Treatment System Routine Maintenance Schedule, Q3 2021

[a] Flowmeters are calibrated at a minimum of once per year, but may be calibrated more often as needed.

[b] Changing of process pump oil, greasing pump bearings, and replacing the air filter in the air conditioning unit are required every 3 months, but may be changed more often as needed.

[c] Bag filters are scheduled for change out when the pressure differential across a bag filter vessel exceeds 4 psid

[d] GAC is scheduled for change out when any regulated constituent leaving the lead GAC vessel reaches 90% of the discharge limit.

[e] Disinfection of extraction wells and conveyance lines occurs on an as needed basis.

[f] Testing of alarms and interlocks occurs semi-annually or more often as needed.

[g] Cleaning of the coil and replacing of the air filter are scheduled as quarterly activities, but frequency may be adjusted as necessary.

[h] GAC skimming is performed when the differential pressure in the lead GAC vessel has increased from the operational differential pressure by at least 10 psid.

% = percent
GAC = granular activated carbon
GWTS = groundwater treatment system
psid = pound per square inch differential
Q3 = third quarter

## Table 5-11
## Groundwater Treatment System Non-Routine Maintenance Items, Q3 2021

| Date | Extent of Shutdown | Approximate Downtime (hours) | Cause of Shutdown |
|---|---|---|---|
| 7/9/2021 | KAFB-106233, KAFB-106234 | 0.52 | Sump pump testing |
| 7/22/2021 | KAFB-106228 | 14.53 | Level transducer malfunction |
| 7/26/2021 | KAFB-106228 | 1.13 | Replace level transducer |
| 7/27/2021 | GWTS | 1.15 | UPS testing |
| 8/2/2021-8/4/2021 | GWTS | 21.23 | Conditioning of injection well KAFB-106IN2 |
| 8/3/2021 | KAFB-106239 | 10.25 | Slime production in extraction well |
| 8/12/2021 | GWTS | 2.95 | Effluent line pressure testing |
| 8/16/2021 | KAFB-106239 | 22.70 | Well disinfection |
| 8/19/2021 | KAFB-106228 | 3.27 | Fence installed at electrical shed |
| 8/30/2021 | GWTS | 1.00 | UPS testing |
| 9/13/2021 | GWTS | 0.18 | Internal sump pump failure |
| 9/14/2021-9/16/2021 | GWTS | 19.00 | Conditioning of injection well KAFB-106IN2 |
| 9/20/2021 | KAFB-106233, KAFB-106234 | 0.97 | VFD fans maintenance |
| 9/20/2021 | KAFB-106228, KAFB-106239 | 0.52 | VFD fans maintenance |
| 9/24/201 | GWTS | 1.25 | UPS testing |

GWTS = groundwater treatment system
Q3 = third quarter
UPS = uninterrupted power supply
VFD = variable frequency drive

# LIST OF APPENDICES

H Waste Disposal Documentation

H-1 Non-Hazardous Liquid Investigation-Derived Waste Profiling and Disposal Documentation

H-2 Hazardous Investigation-Derived Waste Profiling and Disposal Documentation

# APPENDIX A-1

# Regulatory Correspondence

**NEW MEXICO**
**ENVIRONMENT DEPARTMENT**

**Hazardous Waste Bureau**

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*James C. Kenney*
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Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

July 11, 2019

Colonel David S. Miller
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117

Lt. Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil engineer Division
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117

**RE: QUARTERLY MONITORING REPORT FOR APRIL-JUNE 2019**
**BULK FUELS FACILITY SOLID WASTE MANAGEMENT UNITS ST-106/SS-111**
**KIRTLAND AIR FORCE BASE, NEW MEXICO**
**EPA ID# NM6213820974**
**HWB-KAFB-19-017**

Dear Colonel Miller and Lt. Colonel Acosta:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (Permittee) *Quarterly Monitoring Report for April-June 2019, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-11* (Report), dated September 2019 and received September 27, 2019.

No revision to the Report is required. NMED's attached comments are intended to provide direction to the Permittee in the preparation of future quarterly monitoring reports. Necessary changes based upon NMED's comments should be incorporated into future reports. The Permittee must ensure that future monitoring reports fully comply with Kirtland Air Force Base KAFB) Hazardous Waste Facility Permit (Permit) Section 6.1.6. Quarterly Progress Reports, Section 6.2.4.1. Quarterly Reporting, and Section 6.2.4.4. Periodic Monitoring Reports. Additional guidance on preparing groundwater monitoring reports can be found in NMED's *General Reporting Requirements for Routine Groundwater Monitoring at RCRA Sites.*

Should you have any questions please Rob Murphy of my staff at robert.murphy@state.nm.us or (505) 476-6022.

Sincerely,

Kevin Pierard

Digitally signed by Kevin Pierard
Date: 2020.07.11 08:25:15 -06'00'

Kevin M. Pierard, Chief
Hazardous Waste Bureau

Attachments I

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
L. Andress, NMED HWB
R. Murphy, NMED HWB
L. King EPA Region 6 (6LCRRC)
S. Clark, KAFB
K. Lynnes, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

# Attachment

Col. Miller and Lt. Acosta
Quarterly Monitoring Report for April-June 2019
Attachment, Page 1 of 4

**GENERAL COMMENTS:**

**1. Monitoring Report Contents**

**NMED Comment:**

Based on issues identified in this Report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:

a. The response to NMED's comments must be included as Appendix A of each document revision.
b. All field methods for the project must be documented in an appendix, as required by Permit Section 6.2.4.4.11. The documentation must be specific to each monitoring activity, such as soil vapor monitoring, groundwater monitoring, or operation and maintenance of the groundwater treatment system. References to quality assurance project plans (QAPPs), standard operating procedures (SOPs), or work plans are not acceptable. All deviations from approved work plans must be discussed and explained in a Deviations section.
c. Wells must be consistently referred to by the same name/designation in all periodic reports, sections of the text, tables, and figures. The designations must match those provided in the digital analytical data files.
d. Sampling data tables must include the practical quantitation limit (PQL) and listed laboratory report detection limit (RDL) for each analysis.
e. Sampling data tables must include the appropriate screening levels for data comparison.
f. Analytical data tables in digital format must include a column that indicates which analytical data report the specific sample information can be found. This link must correspond to the analytical data report file name.
g. Data quality exceptions, such as when the PQL exceeds the corresponding screening level, must be identified as such in all tables and figures (see Permit Section 6.5.18).
h. Analytical data provided in digital format such as Microsoft Excel or Access files must be provided in a sortable, searchable format. Previous reports have provided digital data in the same format as the printed tables. These tables are not sortable or searchable. Provide the tables in a standard database format.
i. Analytical data packages must be submitted in accordance with KAFB Permit Section 6.5.18.2, Laboratory Deliverables.
j. All tables, figures, and appendices must be appropriately numbered and titled.
k. Every page of every submittal, including all pages within all sections and appendices, must be numbered either sequentially or in some other format acceptable to NMED.

**2. Analytical Data Detection and Quantitation Limits**

**NMED Comment:** Many of the analytical data tables presented in the Report list the limit of detection (LOD) for each sample analysis; however, it is not clear if this value represents the laboratory method detection limit or reporting detection limit. Some tables list the LOD and some the limit of quantification (LOQ). The permittee must provide the method detection limit (MDL) in the data tables. In addition, the Permittee must include the reporting detection limit (assuming this is the Permittee's "LOD") and the PQL (assuming this is the Permittee's "LOQ") for each sample analyzed in the data tables.

The Permittee's Quality Assurance Project Plans (QAPPs) indicate that the Permittee is using three different variations of terminology for method reporting limits, including one which seems to be backwards. The Permittee's QAPP for Vadose Zone Treatability Studies Attachment 1, Tables 1-1a, Method Reporting Limits – Drinking Water, 1-1b, Method Report Limits – Soil and Investigation Derived Waste, and 1-1c, Method Reporting Limits – Volatile Organic Compounds in Air, all seemingly use LOQ appropriately (as the PQL), but there is a lack of consistency between the method detection limit and reporting detection limit.

In Table 1-1a, Drinking Water, "MDL" appears to equate to the method detection limit, and "LOD" appears to equate to the reporting detection limit. In Table 1-1b, Soil, "LOD" appears to equate to the method detection limit and "DL" appears to equate to the reporting detection limit. In Table 1-1c, Air, "DL" appears to equate to the method detection limit and "LOD" appears to equate to the reporting detection limit. Based on the fact that the PQL must be greater than the reporting detection limit and the reporting detection limit must be greater than the method detection limit, Table 1-1b, Soil, appears to be wrong. NMED is assuming that similar tables appear in the QAPP for quarterly monitoring.

These issues cause confusion for the reviewer, community stakeholders, and the public, and increases the time required to review submittals from the Permittee. The Permittee must use appropriate and consistent terms for Quality Assurance /Quality Control in all periodic reporting submittals and for all media (e.g., use MDL consistently instead of DL). While NMED does not review or approve QAPPs, the Permittee must assure that they are providing their contractors with the appropriate information to provide appropriate, consistent, and accurate information to NMED. Consistency in reporting by the Permittee will reduce both agency and Air Force internal review times.

**SPECIFIC COMMENTS:**

**3. Table of Contents, Appendix B, page iv:**

**NMED Comment:** Appendix B, New Activities Supporting Information, contains well completion reports for four new wells installed and developed in accordance with the NMED-approved 2017 *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling*. KAFB Permit Section 6.2.2.1.2, Site Investigations-Investigation Reports,

and Section 6.2.4.3, Reporting Requirements-Investigation Reports, require that the information and data collected from all investigation activities conducted during the quarter be submitted to NMED as separate, stand-alone reports. The Permittee must submit individual reports for all investigation activities conducted in support of the ongoing investigation of the bulk fuels facility spill, rather than submit the information as appendices in quarterly reports.

4. **Section 2.5 Q2 2019 Soil Vapor Data, page 2-4:**

**Permittee Statement:** "The RCRA permit does not specify cleanup levels for soil vapor. The quarterly reports are not intended to assess risk; the vapor data are used to assess concentration trends. The risk assessment (USACE,2017e) compares vapor concentrations to the vapor intrusion screening levels in the NMED Risk Assessment Guidance for Site Investigations and Remediation. All EDB and benzene concentrations are compared against 3,800 and 3,200 micrograms per cubic meter (µg/m3), respectively. HC concentrations are compared against 1,000 parts per million by volume (ppmv). The comparison concentrations used in this report were determined by historical maximum and minimum soil vapor results to show which SVMPs had relatively high or low concentrations."

**NMED Comment:** The Permittee must clarify if the comparison values for EDB, benzene, and HC represent the historical maximum or minimum, or some other calculated value so that changes relative to the values can be evaluated. The Permittee must also provide a reference for the historical soil vapor values. The Permittee accurately states that quarterly reports are not intended to assess risk; however, the Permittee must provide a comparison of detected concentrations to a regulatory standard for the purpose of assessing the presence and location of contaminants of concern. NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2019 and as updated) vapor intrusion screening levels (VISLs) must be used as a first-tier screening assessment.

5. **Section 2.2 Bioventing Pilot Test, page 2-2:**

**Permittee Statement:** "A bioventing report will be submitted on January 31, 2020 as requested by NMED in a letter dated February 25, 2019 (NMED, 2019). This report will include data collected up to Q4 2019. Data collected after Q4 2019 will be provided in the relevant quarterly monitoring reports. The Q4 2020 Quarterly and Annual Monitoring Report will include results to date, and the final results of the bioventing pilot test will be provided in the Q4 2021 Quarterly and Annual Monitoring Report."

**NMED Comment:** Bioventing pilot test data is collected each quarter; therefore, the Permittee must provide quarterly data updates in separate quarterly status reports specific to the bioventing pilot study to allow NMED to provide timely adjustment and inputs to the bioventing system. The final results of the bioventing pilot test must be submitted as a stand-alone document rather than as an appendix to the Q4 2021 Quarterly and Annual

Monitoring Report.

**6. Section 3.3.1 Sampling Deviations, page 3-3:**

**Permittee Statement:** "Groundwater samples were not obtained from seven wells in Q2 2019. Three wells (KAFB-106001, KAFB-106008, and KABF-106079) could not be sampled due to suspected biofouling. These wells will be sampled using passive sampling techniques in the future after well rehabilitation is evaluated."

**NMED Comment:** The Permittee must provide additional information in a subsequent quarterly report on suspected biofouling of wells KAFB-106001, KAFB-106008, and KABF-106079, such as evidence for biofouling, the source of biofouling, and the date when biofouling was first suspected. Well KABF-106079 is less than 1000ft from interim measure extraction well KAFB-106239. Provide information on the potential for suspected biofouling at KAFB-106079 to impact KAFB-106239 and the Groundwater Treatment System. The Permittee must also submit a work plan for evaluating and conducting rehabilitation of the three wells. Use of passive sampling techniques for wells KAFB-106001 and KABF-106079 is contingent upon NMED approval. Because LNAPL was previously detected in well KAFB-106008, use of passive sampling is not appropriate.

**7. Section 3.6.1.1 EDB Analytical Results, page 3-5:**

**Permittee Statement:** *Five EDB exceedances were from wells north of Ridgecrest Drive SE but none were north of Gibson Boulevard SE.*

**NMED Comment:** Figures 3-5 and 3-6 present EDB concentrations in groundwater for reference elevation 4857 and 4838, respectively. Both figures depict the northern extent of the EDB plume as being north of Gibson Boulevard SE. The Permittee must revise the statement and figures for accuracy if they are included in future periodic reports.

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**ENVIRONMENT DEPARTMENT**

**Hazardous Waste Bureau**

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Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

September 2, 2020

Colonel David S. Miller
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117

Lt. Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil engineer Division
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117

**RE: REPORTING REQUIREMENTS FOR ALL DOCUMENT SUBMITTALS**
**KIRTLAND AIR FORCE BASE, NEW MEXICO**
**EPA ID# NM6213820974**
**HWB-KAFB-20-MISC**

Dear Colonel Miller and Lt. Colonel Acosta:

In our discussions with Kirtland Air Force Base (KAFB or Permittee) staff, a concern was raised that New Mexico Environment Department (NMED) comments on specific submittals contained direction that more broadly applies to various activities conducted at KAFB. Your staff indicated that this creates difficulty for them in tracking directions provided by NMED. To respond to such concerns, NMED is providing the following compilation to clarify requirements for all documents submitted to NMED by the Permittee.

In general, many KAFB submittals to NMED consistently contain a substantial number of errors that should be identified during quality assurance and quality control reviews prior to submittal. In discussions with KAFB staff, NMED staff was assured that steps are being taken to review and enhance document quality control and address these recurring issues to assist NMED in expediting document reviews and to assist the public in better understanding the documents that are submitted by the Permittee.

1. **Laboratory Deliverables:** Section 6.5.18.2, Laboratory Deliverables, of the KAFB Resource Conservation and Recovery Act (RCRA) Permit (KAFB Permit), states the requirements for analytical laboratory reporting. The section states, "[l]aboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols." The final paragraph of the permit section goes on to state, "[t]he Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request." Therefore, for purposes of reporting, Level II QC results are necessary. Level III and IV data must be maintained by the Permittee to be made available upon request.

2. **General Guidelines:** NMED has included an attachment titled *General Reporting Guidelines* that provides guidance regarding its expectations of submittals to the Hazardous Waste Bureau. The Permittee must consult the guidance during document preparation.

3. **Document Scopes of Work:** In order to avoid confusion, all work plans must be written for one specific scope of work.

4. **Document Titles vs. Content:** All future document titles on cover pages must include all major scope activities incorporated within that document, including those presented in appendices. The names of all future documents and scopes of work must not change during the RCRA corrective action process (i.e., work plans through reports).

5. **Responses to NMED Comments:** Responses to NMED comments must be included as Appendix A of every document revision. Redline-strikeout versions must include <u>all</u> changes made to the corresponding revised document.

6. **Field Methods:** All field methods for the project must be documented in the text of the document or an appendix. The documentation must be specific to each monitoring activity, such as soil vapor monitoring, groundwater monitoring, or operation and maintenance of the groundwater treatment system. References to quality assurance project plans (QAPPs), standard operating procedures (SOPs), previous work plans, or other documents are not acceptable. All deviations from approved work plans must be discussed and explained in a Deviations section.

7. **Well Designations:** Wells must be consistently referred to by the same name/designation in all sections of the text, all tables, and all figures. The designation must also match that provided in the digital analytical data files.

8. **Data Tables, Figures, and Appendices:**
   - **a.** Sampling data tables must be logically arranged, either chronologically or by investigation, to facilitate location of information.
   - **b.** Sampling data tables must include the practical quantitation limit (PQL) and reporting detection limit for each analysis. Method detection limits must also be provided for each analytical method.
   - **c.** Sampling data tables must include the appropriate screening levels for data comparison.
   - **d.** Analytical data tables in digital format must include a column that indicates which analytical data report the specific sample information can be found. This link must correspond to the analytical data report file name.
   - **e.** Data from analyses where the PQL (or LOQ) exceeds 20% of the screening level are data quality exceptions and must be identified as such in all tables and figures.
   - **f.** Analytical data provided in digital format such as Excel files must be provided in a sortable, searchable format that can be uploaded into a database. Previous reports have provided digital data in the same format as the tables in the text which are not sortable or searchable.
   - **g.** Data in tables and figures must be presented with a consistent and appropriate number of significant figures.
   - **h.** All points (wells), structures, infrastructure, roads, etc. depicted on figures must be labeled.
   - **i.** All tables, figures, and appendices must be appropriately numbered and titled.
   - **j.** All figures must include a scale and a north arrow.
   - **k.** Data tables and figures must undergo quality assurance and quality control review prior to submittal to NMED.

9. **Document organization:** Every page of each submittal, including all pages within all sections and appendices, must be numbered either sequentially or in some other logical format.

Many of the issues listed above were discussed during a conference call between NMED and KAFB that was held on May 7, 2020; KAFB staff stated that they understood these issues and agreed to correct these problems. While NMED made every attempt to be comprehensive, other issues may arise. If NMED identifies further issues that occur in multiple submittals, NMED will contact KAFB staff informally to discuss the issues and follow up with further correspondence and direction.

Should you have any questions or wish to meet with us to discuss these comments, please contact me at (505) 476-6035 or your staff may contact Ben Wear at (505) 476-6041.

Sincerely,

Kevin M. Pierard, Chief
Hazardous Waste Bureau

Attachment

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
L. Andress, NMED HWB
M. Suzuki, NMED HWB
R. Murphy, NMED HWB
L. King EPA Region 6 (6LCRRC)
C. Cash, KAFB
S. Kottkamp, KAFB
K. Lynnes, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

# Attachment

# GENERAL REPORTING GUIDELINES

## 1. Overview

The purpose of this guidance document is to provide the general requirements and formats for documents related to corrective action activities required under the Resource Conservation and Recovery Act (RCRA). This guidance is not intended to provide document requirements for every potential corrective action conducted at the facility. Therefore, the formats for all types of documents are not presented below. The formats described include the general reporting requirements and formats for site-specific investigation work plans, investigation reports, routine monitoring reports, risk assessment reports, and corrective measures evaluations. Permittees should generally consider the documents to be the equivalents of RCRA facility investigation (RFI) work plans, RFI reports, periodic monitoring reports, risk assessments, and corrective measures study (CMS) reports, respectively, for the purposes of RCRA compliance. Permittees must include detailed, site-specific requirements in all interim status unit, solid waste management unit (SWMU), and Area of Concern (AOC) investigation work plans, investigation reports, monitoring reports, and corrective measures evaluations. All plans and reports should be prepared with technical and regulatory input from the NMED. All work plans and reports must be submitted to the NMED in the form of two paper copies and an electronic copy.

The document requirements listed do not include all sections that may be necessary to complete each type of document listed. A permittee or the NMED may determine that additional sections are required to address additional site-specific issues or information collected during corrective action or monitoring activities not listed below. However, permittees must submit variations of the general report format and the formats for documents not listed in this guidance in outline form to the NMED for approval prior to submittal of the documents. The NMED will approve or disapprove, in writing, the proposed document outline after receipt of the outline. If the NMED disapproves the report outline, the NMED will notify the permittee, in writing, of the outline's deficiencies and will specify a date for submittal of a revised report outline. All documents submitted by the Permittee must follow the general approach and limitations for data presentation described in this guidance document. If in conflict with a facilities RCRA Permit, the Permit condition should be followed.

## 2. Investigation Work Plan

Permittees must fulfill the requirements for preparation of work plans for unit-specific or corrective action activities at the facility using the general outline below. The minimum requirements for describing proposed activities within each section are included. All research, locations, depths and methods of exploration, field procedures, analytical analyses, data collection methods, and schedules must be included in each work plan. In general, interpretation of data acquired during previous investigations must be presented only in the background sections of the work plans. The other text sections of the work plans must be reserved for presentation of anticipated site-specific activities and procedures relevant to the project. The general work plan outline is provided below.

### 2.1 Title Page

The title page must include the type of document, facility name and the unit, SWMU, or AOC name(s) and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

### 2.2 Executive Summary (Abstract)

The executive summary (or abstract) must provide a brief summary of the purpose and scope of the investigation to be conducted at the subject site. The facility, unit, SWMU, or AOC name, revision number if applicable, and location must be included in the executive summary.

### 2.3 Table of Contents

The table of contents must list all text sections and subsections, tables, figures, and appendices or attachments included in the work plan. The corresponding page numbers for the titles of each section of the work plan must be included in the table of contents.

### 2.4 Introduction

The introduction must include the facility name, unit name and location, and unit status (e.g., active operations, closed, corrective action). General information on the current site usage and status must be included in this section. A brief description of the purpose of the investigation and the type of site investigation to be conducted must be provided in this section.

### 2.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background summary and labeled on the site plan.

This section must identify potential receptors, including groundwater, and include a brief summary of the type and characteristics of all waste and all contaminants, the known and possible sources of contamination, the history of releases or discharges of contamination, and the known extent of contamination. This section must include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. At a minimum, detections of contaminants encountered during previous investigations must be presented in table format, with an accompanying figure showing sample locations. References to previous reports must include page, table, and figure numbers for referenced information. Summary data tables and site plans showing relevant investigation locations must be included in the Tables and Figures sections of the document, respectively.

## 2.6 Site Conditions

### 2.6.1 Surface Conditions

A section on surface conditions must provide a detailed description of current site topography, features, and structures including a description of drainages, vegetation, erosional features, and a detailed description of current site uses and operations at the site. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport must be included in this section.

### 2.6.2 Subsurface Conditions

A section on subsurface conditions must provide a brief, detailed description of the site conditions observed during previous subsurface investigations, including relevant soil horizons, stratigraphy, presence of vadose zone fluids and groundwater, and other relevant information. A site plan showing the locations of all borings and excavations advanced during previous investigations must be included in the Figures section of the work plan. A brief description of the anticipated stratigraphic units that may be encountered during the investigation may be included in this section, if no previous investigations have been conducted at the site.

## 2.7 Scope of Activities

A section on the scope of activities must briefly describe a list of all anticipated activities to be performed during the investigation, including background information research, health and safety requirements that may affect or limit the completion of tasks, drilling, test pit or other excavations, well construction, field data collection, survey data collection, chemical analytical testing, aquifer testing, and IDW storage, disposal, and reporting.

## 2.8 Investigation Methods

A section on investigation methods must provide a description of all anticipated locations and methods for conducting the activities to be performed during the investigation. This section must include, but is not limited to, research methods, health and safety practices that may affect the completion of tasks, drilling methods, test pit or other excavation methods, sampling intervals and methods, well construction methods, field data collection methods, geophysical and land survey methods, field screening methods, chemical analytical testing, materials testing, aquifer testing, pilot testing, and other proposed investigation and testing methods. This information may also be summarized in table format, if appropriate.

## 2.9 Monitoring and Sampling Program

A section on monitoring and sampling must describe the anticipated monitoring and sampling program to be implemented after the initial investigation activities are completed. This section must provide a description of the anticipated vadose zone fluids, groundwater, vadose zone vapor, vadose zone moisture, and other monitoring and sampling programs to be implemented at the unit.

### 2.10 Schedule

A section must provide the anticipated schedule for completion of field investigation, pilot testing, and monitoring/sampling activities. In addition, this section must provide a schedule for submittal of reports and data to the NMED, including a schedule for submitting status reports, preliminary data, and the final investigation report.

### 2.11 Tables

The following summary tables may be included in the investigation work plans if previous investigations have been conducted at the unit. Data presented in the tables must include information on dates of data collection, analytical methods, detection limits, and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included in investigation work plans, as applicable;

a. summaries of regulatory criteria, background, and applicable cleanup levels (may be included in the analytical data tables instead of as separate tables);

b. summaries of historical field survey location data;

c. summaries of historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality;

d. summaries of historical soil, rock, or sediment laboratory analytical data must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

e. summaries of historical groundwater elevation and depth to groundwater data. The table must include the monitoring well depths, the screened intervals in each well, and the dates and times measurements were taken;

f. summaries of historical groundwater laboratory analytical data. The analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

g. summary of historical surface water laboratory analytical data. The analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

h. summary of historical air sample screening and chemical analytical data. The data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data; and

i. summary of historical pilot test or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.

### 2.12 Figures

The following figures must be included with each investigation work plan for each site, including presentation of data where previous investigations have been conducted. All figures must include an accurate bar scale and a north arrow. An explanation must be included on each figure for all abbreviations, symbols, acronyms, and qualifiers. The following figures must be included in investigation work plans, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features and properties;

b. a unit site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan, if appropriate; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures showing historical and proposed soil boring locations, excavation locations, and sampling locations;

d. figures presenting historical soil sample field screening and laboratory analytical data;

e. figures presenting the locations of all existing and proposed borings and vapor monitoring point locations,

f. figures presenting historical vadose zone organic vapor data;

g. figures showing all existing and proposed monitoring wells and piezometers;

h. figures presenting historical groundwater and vadose zone fluid elevation data, and indicating groundwater and vadose zone fluid flow directions;

i. figures presenting historical groundwater and vadose zone fluid laboratory analytical data, if applicable; the chemical analytical data corresponding to each sampling location can be presented in tabular form on the figure or as an isoconcentration map;

j. figures presenting historical and proposed vadose zone fluid neutron probe access tube locations and field measurement data for soil moisture, if applicable;

k. figures presenting historical surface water laboratory analytical data, if applicable;

l. figures showing historical and proposed air sampling locations and presenting historical air quality data, if applicable;

m. figures presenting historical pilot testing locations and data, where applicable, including site plans and graphic data presentation; and

n. figures presenting geologic cross-sections based on outcrop and borehole data acquired during previous investigations, if applicable.

### 2.13 Appendices

An IDW management plan must be included as an appendix to the investigation work plan. Additional appendices may be necessary to present additional data or documentation not listed above.

## 3. Investigation Report

Permittees must prepare investigation reports at the facility using the general outline below. Investigation Reports are the reporting mechanism for presenting the results of completed Investigation Work Plans. This section describes the minimum requirements for reporting on site investigations. All data collected during each site investigation event in the reporting period must be included in the reports. In general, interpretation of data must be presented only in the background, conclusions, and recommendations sections of the reports. The other text sections of the reports must be reserved for presentation of facts and data without interpretation or qualifications. The general report outline is provided below.

### 3.1 Title Page

The title page must include the type of document and version number, the facility name, the unit, SWMU, or AOC, and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible facility representative must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

### 3.2 Executive Summary

The executive summary must provide a brief summary of the purpose, scope, and results of the investigation conducted at the subject site during the reporting period. In addition, this section must include a brief summary of conclusions based on the investigation data collected and recommendations for future investigation, monitoring, remedial action, or site closure.

### 3.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

### 3.4 Introduction

The introduction section must include the facility name, unit name and location, and unit status (e.g., active operations, closed, corrective action). General information on the site usage and status must be included in this section. A brief description of the purpose of the investigation, the type of site investigation conducted, and the type of results presented in the report also must be provided in this section.

### 3.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background summary and labeled on the figure. In addition, this section must include a brief summary of the possible sources of contamination, the history of releases or discharges of contamination, the known extent of contamination, and the results of previous investigations including references to previous reports. The references to previous reports must include page, table, and figure numbers for referenced information. A site plan showing relevant investigation locations and summary data tables must be included in the Figures and Tables sections of the document, respectively.

### 3.6 Scope of Activities

This section on the scope of activities must briefly describe all activities performed during the investigation event including background information research, implemented health and safety measures that affected or limited the completion of tasks, drilling, test pit or other excavation methods, well construction methods, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot testing, and IDW storage or disposal.

### 3.7 Field Investigation Results

A section must provide a summary of the procedures used and the results of all field investigation activities conducted at the site including, but not limited to, the dates that investigation activities were conducted, the type and purpose of field investigation activities performed, field screening measurements, logging and sampling results, pilot test results, construction details, and conditions observed. Field observations or conditions that altered the planned work or may have influenced the results of sampling, testing, and logging must be reported in this section. At a minimum, the following subsections must be included, where appropriate.

#### 3.7.1 Surface Conditions

A section on surface conditions must describe current site topography, features, and structures including topographic drainages, man-made drainages, vegetation, and erosional features. It must also include a description of current site uses and any operations at the site. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site

regarding sediment transport, surface water runoff, or contaminant transport must be included in this section.

### 3.7.2 Exploratory Drilling or Excavation Investigations

A section must describe the locations, methods, and depths of subsurface explorations. The description must include the types of equipment used, the logging procedures, exploration equipment, decontamination procedures, and conditions encountered that may have affected or limited the investigation. Samples obtained from all exploratory borings and excavations must be visually inspected and the soil or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and D2488, or AGI Methods for soil and rock classification. Detailed logs of each boring must be completed in the field by a qualified engineer or geologist.

A description of the site conditions observed during subsurface investigation activities must be included in this section, including soil horizon and stratigraphic information. Site plans showing the locations of all borings and excavations must be included in the Figures section of the report. Boring and test pit logs for all exploratory borings and test pits must be presented in an appendix or attachment to the report.

### 3.7.3 Subsurface Conditions

A section on subsurface conditions must describe known subsurface lithology and structures based on observations made during the current and previous subsurface investigations, including interpretation of geophysical logs and as-built drawings of man-made structures. A description of the known locations of pipelines, utility lines, and observed geologic structures must also be included in this section. A site plan showing boring and excavation locations and the locations of the site's above- and below-ground structures must be included in the Figures section of the report. In addition, cross-sections must be constructed, if appropriate, to provide additional visual presentation of site or regional subsurface conditions.

### 3.7.4 Monitoring Well Construction, Boring, or Excavation Abandonment

A section must describe the methods and details of monitoring well construction and the methods used to abandon or backfill exploratory borings and excavations. The description must include the dates of well construction, boring abandonment, or excavation backfilling. In addition, boring logs, test pit logs, and well construction diagrams must be included in an attachment or appendix. Well construction diagrams must be included with the associated boring logs for borings that are converted to monitoring wells.

### 3.7.5 Groundwater Conditions

A section must describe groundwater conditions observed beneath the subject site and relate local groundwater conditions to regional groundwater conditions. A description of the depths to water, aquifer thickness, and groundwater flow directions must be included in this section for alluvial groundwater, shallow perched groundwater, intermediate perched groundwater, and regional groundwater, as appropriate to the investigation. Figures showing well locations,

surrounding area, groundwater elevations, and flow directions for each hydrologic zone must be included in the Figures section of the report.

### 3.7.6 Surface Water Conditions

A section must describe surface water conditions and include a description of surface water runoff, surface water drainage, surface water sediment transport, and contaminant transport in surface water as suspended load and as a dissolved phase in surface water via natural and man-made drainages, if applicable. A description of contaminant fate and transport must be included, if appropriate.

### 3.7.7 Subsurface Air and Soil Moisture Conditions

A section must describe subsurface air monitoring and sampling methods used during the site investigation. It must also describe observations made during the site investigation regarding subsurface flow pathways and the subsurface air-flow regime.

### 3.7.8 Materials Testing Results

A section must discuss the materials testing results, such as core permeability testing, grain size analysis, or other materials testing results. Sample collection methods, locations, and depths must also be included. Corresponding summary tables must be included in the Tables section of the report.

### 3.7.9 Pilot Testing Results

A section must discuss the results of any pilot testing. Pilot testing is typically conducted after initial subsurface investigations are completed and the need for additional investigation or remediation has been evaluated. Pilot testing, including aquifer testing and remediation system pilot testing, must be addressed through separate pilot test work plans and reports. The format for pilot test work plans and reports must be approved by the NMED prior to submittal.

## 3.8 Regulatory Criteria

A section must set forth the applicable cleanup standards, screening levels, and risk-based cleanup goals for each pertinent medium at the subject site. The appropriate cleanup levels for each site must be included if site-specific levels have been established at separate facility sites or units. A table summarizing the applicable cleanup standards must be included as part of the document. Alternately, the report may include applicable cleanup standards as a column in the data tables. Risk-based evaluation procedures, if used to calculate cleanup levels, must be presented in a separate document or in an appendix to this report. If cleanup levels calculated in a risk evaluation are employed, the risk evaluation document must be referenced and must include pertinent page numbers for referenced information.

### 3.9 Site Contamination

A section must provide a description of sampling intervals and methods for detection of surface and subsurface contamination in soils, rock, sediments, groundwater, surface water, and as vapor-phase contamination. Only factual information must be included in this section. Interpretation of the data must be reserved for the summary and conclusions sections of the report. Tables summarizing all sampling, testing, and screening results for detected contaminants must be prepared in a format approved by the NMED. The tables must be presented in the Tables section of the report.

#### 3.9.1 Soil, Rock, and Sediment Sampling

A section must describe the sampling of soil, rock and sediment. It must include the dates, locations, and methods of sample collection, sampling intervals, sample logging methods, screening sample selection methods, and laboratory sample selection methods including the collection depths for samples submitted for laboratory analyses. A site plan showing the sample locations must be included in the Figures section of the report.

#### 3.9.2 Sample Field Screening Results

A section must describe the field screening methods used during the investigation and the field screening results. Field screening results also must be presented in summary tables in the Tables section of the document. The limitations of field screening instrumentation and any conditions that influenced the results of field screening must be discussed in this subsection.

#### 3.9.3 Soil, Rock, and Sediment Sampling Chemical Analytical Results

A section must briefly summarize the laboratory analyses conducted, the analytical methods and results and provide a comparison of the data to cleanup standards or established cleanup levels for the site. The laboratory results also must be presented in summary tables in the Tables section of the document. Field conditions and sample collection methods that could potentially affect the analytical results must be described in this section. If appropriate, soil analytical data must be presented with sample locations on a site plan and included in the Figures section of the report.

#### 3.9.4 Subsurface Vapor Sampling

A section must describe the air and subsurface vapor sampling. It must describe the dates, locations, methods of sample collection, methods for sample logging, and methods for laboratory sample selection. A site plan showing all air and subsurface vapor sampling locations must be provided in the Figures section of the report.

#### 3.9.5 Subsurface Vapor Field Screening Results

A section must describe the subsurface vapor field screening results. It must describe the field screening methods used for ambient air and subsurface vapors during the investigation and the field screening results. Field screening results must also be presented in summary tables in the Tables section of the report. The locations of ambient air and subsurface vapor screening sample

collection must be presented on a site plan included in the Figures section of the report. The limitations of field screening instrumentation and any conditions that influenced the results of field screening must be discussed in this section.

#### 3.9.6 Air and Subsurface Vapor Laboratory Analytical Results

This section must describe the results of air and subsurface vapor laboratory analyses. It must describe the air sampling laboratory analytical methods and results and provide a comparison of the data to applicable cleanup levels for the site. The rationale or purpose for altering or modifying the subsurface vapor sampling program outlined in the site investigation work plan also must be provided in this section. Field conditions that may have affected the analytical results during sample collection must be described in this section. Tables summarizing the air sample laboratory, field, and analytical QA/QC data; applicable cleanup levels; and modifications to the air sampling program must be provided in the Tables section of the report. Contaminant concentrations must be presented as data tables or as isoconcentration contours on a map included in the Figures section of the report.

### 3.10 Conclusions

A conclusions section must provide a brief summary of the investigation activities and a discussion of the conclusions of the investigation conducted at the site. In addition, this section must provide a comparison of the results to applicable cleanup levels, and to relevant historical investigation results and analytical data. Potential receptors, including groundwater, must be identified and discussed. An explanation must be provided with regard to data gaps. A risk assessment may be included as an appendix to the investigation report; however, the risk analysis must be presented in the risk assessment format described in Permit Section 6.5. References to the risk analysis must be presented only in the summary and conclusions sections of the Investigation Report.

### 3.11 Recommendations

A section must discuss the need for further investigation, corrective measures, risk assessment and monitoring, or recommendations for corrective action completed based on the conclusions provided in the Conclusions section. It must include explanations regarding additional sampling, monitoring, and site closure. A corresponding schedule for further action regarding the site must also be provided.

### 3.12 Tables

This section must provide the following summary tables. Data presented in the tables must include the current data, dates of data collection, analytical methods, detection limits, and significant data quality exceptions. All summary data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included in investigation reports, as applicable:

a. tables summarizing regulatory criteria, background levels, and applicable cleanup levels; this information may be included in the analytical data tables instead of as separate tables;

b. tables summarizing field survey location data; separate tables must be prepared for well locations and individual medium sampling locations except where the locations are the same for more than one medium;

c. tables summarizing field screening and field parameter measurements of soil, sediment, vadose zone fluid, vadose zone vapor, vadose zone moisture, and groundwater, surface water, and air quality;

d. a table summarizing soil laboratory analytical data; it must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

e. a table summarizing the groundwater elevations and depth-to-water data; the table must include the monitoring well depths and the screened intervals in each well;

f. a table summarizing the groundwater laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

g. a table summarizing the surface water laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

h. A table summarizing the air sample screening and laboratory analytical data; the data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

i. tables summarizing the pilot testing data, if applicable, including units of measurement and types of instruments used to obtain measurements; and

j. a table summarizing the materials testing data, if applicable.

### 3.13 Figures

All figures must be included with each investigation report, as appropriate. All figures must include a scale and a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps must have a date. A section must provide the following figures:

a. a vicinity map showing topography and the general location of the site relative to surrounding features and properties;

b. a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan; additional site plans may be required to present the locations of relevant off-site well locations, structures and features;

c. figures showing boring, excavation, and sampling locations;

d. figures presenting soil sample field screening and laboratory analytical data;

e. figures displaying the locations of all newly installed and existing wells and borings;

f. figures presenting monitoring well locations, groundwater elevation data, and groundwater flow directions;

g. figures presenting groundwater laboratory analytical data, including any past data requested by the NMED; the chemical analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map;

h. figures presenting surface water sample locations and field measurement data including any past data requested by the NMED;

i. figures presenting surface water laboratory analytical data including any past data, if applicable; the laboratory analytical data corresponding to each sampling location may be presented in tabular form on the figure;

j. figures showing air and subsurface vapor sampling locations and presenting air and subsurface vapor quality data; the field screening or laboratory analytical data corresponding to each sampling location may be presented in tabular form on the figure or as an isoconcentration map;

k. figures presenting geologic cross-sections based on outcrop and borehole data; and

l. figures presenting pilot testing locations and data, where applicable, including site plans or graphic data presentation.

## 3.14 Appendices

Each investigation report must include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

### 3.14.1 Field Methods

An appendix must provide detailed descriptions of the methods used to acquire field measurements of each media that was surveyed or tested during the investigation. Methods must include, but are not limited to, exploratory drilling or excavation methods, the methods and types

of instruments used to obtain field screening, field analytical or field parameter measurements, instrument calibration procedures, sampling methods for each medium investigated, decontamination procedures, sample handling procedures, documentation procedures, and a description of field conditions that affected procedural or sample testing results. Methods of measuring and sampling during pilot testing must be reported in this appendix, if applicable. Copies of IDW disposal documentation must be provided in a separate appendix.

### 3.14.2 Boring/Test Pit Logs and Well Construction Diagrams

An appendix must provide boring logs, test pit or other excavation logs, and well construction details. In addition, a key to symbols and a soil or rock classification system must be included in this appendix. Geophysical logs must be provided in a separate section of this appendix.

### 3.14.3 Chemical Analytical Program

Chemical analytical methods, a summary of data quality objectives, and a summary of data quality review procedures must be reported in an appendix. A summary of data quality exceptions and their effect on the acceptability of the field and laboratory analytical data with regard to the investigation and the site status must be included in this appendix, along with references to case narratives provided in the laboratory reports.

### 3.14.4 Chemical Analytical Reports

A section must include all laboratory chemical analytical data generated for the reporting period. The reports must include all chain-of-custody records and QA/QC results provided by the laboratory. The laboratory reports may be provided electronically in a format approved by the NMED and must be in the form of a final laboratory report. Laboratory report data tables may be submitted in Microsoft Excel format. Hard (paper) copies of the chain-of-custody forms must be submitted with the reports regardless of whether the final laboratory report is submitted electronically or in hard copy.

### 3.14.5 Other Appendices

Other appendices containing additional information must be included as required by the NMED or as otherwise appropriate.

## 4. Periodic Monitoring Report

The Permittee must use the following guidance for preparing periodic monitoring reports. The reports must present the results of periodic groundwater, surface water, vapor, and remediation system monitoring at the facility. The following sections provide a general outline for monitoring reports and the minimum requirements for reporting of periodic monitoring conducted at the facility. All data collected during each monitoring or sampling event in the reporting period must be included in the reports. In general, interpretation of data must be presented only in the background, conclusions, and recommendations sections of the reports. The other text sections of the reports must be reserved for presentation of facts and data without interpretation or qualifications.

### 4.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

### 4.2 Executive Summary

The executive summary must provide a brief summary of the purpose, scope, and results of the monitoring conducted at the subject site during the reporting period. The facility, unit, SWMU, and AOC name(s) and location(s) must be included in the executive summary. In addition, this section must include a brief summary of conclusions based on the monitoring data collected.

### 4.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

### 4.4 Introduction

The introduction section must include the facility name and the unit name(s), location(s), and status (e.g. active operations, closed, corrective action). General information on the site usage and status must be included in this section. A brief description of the purpose of the monitoring, type of monitoring conducted, and the type of results presented in the report also must be provided in this section.

### 4.5 Scope of Activities

A section on the scope of activities must briefly describe all activities performed during the monitoring event or reporting period including field data collection, analytical testing, if applicable, and purge/decontamination water storage and disposal.

### 4.6 Regulatory Criteria

A section on regulatory criteria must provide information regarding applicable cleanup standards, risk-based screening levels, and risk-based cleanup goals for the site. A table summarizing the applicable cleanup standards, or inclusion of applicable cleanup standards as a column in the data tables, can be substituted for this section. The appropriate cleanup levels for each site must be included if site-specific levels have been established at separate sites. Risk-based evaluation procedures, if used to calculate cleanup levels, must either be included as an attachment or submitted as a separate document and referenced. The specific document and page numbers must be included for all referenced materials.

### 4.7 Monitoring Results

A section must provide a summary of the results of monitoring conducted at the site. This section must include the dates and times that monitoring was conducted, the measured depths to groundwater, directions of groundwater and vadose zone fluids flow, field air and water quality measurements, static pressures, field measurements, and a comparison to previous monitoring results. Field observations or conditions that may influence the results of monitoring must be reported in this section. Tables summarizing leachate and vapor-monitoring parameters, groundwater and vadose zone fluid elevations, depth-to-water measurements, and other field measurements may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

### 4.8 Chemical Analytical Data Results

A section must discuss the results of the chemical analyses. It must provide the dates of sampling and the analytical results. It must also provide a comparison of the data to previous results and to any cleanup standards or established cleanup levels for the site. The rationale or purpose for altering or modifying the sampling program must be provided in this section. A table summarizing the laboratory analytical data, QA/QC data, applicable cleanup levels, and modifications to the sampling program may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

### 4.9 Remediation System Monitoring

A section must discuss remediation system monitoring. It must summarize the remediation system's capabilities and performance. It must also provide monitoring data, treatment system discharge sampling requirements, and system influent and effluent sample analytical results. The dates of operation, system failures, and modifications made to the remediation system during the reporting period must also be included in this section. A summary table may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

### 4.10 Summary

A summary section must provide a discussion and conclusions of the monitoring conducted at the site. In addition, this section must provide a comparison of the results to applicable cleanup levels and to relevant historical monitoring and chemical analytical data. An explanation must be provided with regard to data gaps. A discussion of remediation system performance, monitoring results, modifications if applicable, and compliance with discharge requirements must be provided in this section. Recommendations and explanations regarding future monitoring, remedial actions, or site closure must also be included in this section.

### 4.11 Tables

A section must provide the following summary tables for the media sampled. With prior approval from the NMED, the Permittee may combine one or more of the tables. Data presented in the tables must include the current sampling and monitoring data, as well as data from the three previous monitoring events or, if data from less than three monitoring events is available, data

acquired during previous investigations. Remediation system monitoring data also must be presented. The dates of data collection must be included in the tables. Summary tables may be substituted for portions of the text. The analytical data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included, as applicable:

a. a table summarizing the regulatory criteria (a regulatory criteria text section may be substituted for this table or the applicable cleanup levels may be included in the analytical data tables);

b. a table summarizing groundwater and vadose zone fluid elevations, and depths to water data; the table must include the monitoring well depths, casing elevations, the screened intervals in each well, and the dates and times of measurements;

c. a table summarizing field measurements of surface water quality data, if applicable;

d. a table summarizing field measurements of subsurface vapor monitoring and soil moisture data (including historical vapor monitoring data as described above);

e. a table summarizing field measurements of groundwater and vadose zone fluid quality data (including historical water quality data as described above);

f. a table summarizing subsurface vapors chemical analytical data, if applicable (including historical analytical data as described above);

g. a table summarizing surface water chemical analytical data, if applicable (including historical surface water analytical data as described above);

h. a table summarizing groundwater and vadose zone fluid chemical analytical data (including historical groundwater analytical data as described above); and

i. a table summarizing remediation system monitoring data, if applicable (including historical remediation system monitoring data as described above).

### 4.12 Figures

A section must include the following figures. All figures must include a scale and north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures must have a date. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features or properties;

b. a facility site plan that presents pertinent site features and structures, well and piezometer

neutron probe access tubes locations and remediation system location(s) and features; off-site well locations and pertinent features must be included on the site plan, if practical; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures presenting the locations of neutron probe access tubes, monitoring and other well locations, groundwater and vadose zone fluid elevation data, and groundwater and vadose zone fluid flow directions;

d. figures presenting groundwater and vadose zone fluid analytical data for the current monitoring event; the analytical data corresponding to each sampling location may be presented in tabular form on the figure or as an isoconcentration map;

e. figures presenting surface water sampling locations and analytical data for the current monitoring period;

f. figures presenting vertical profiles of soil moisture content for neutron probe measurements for the current monitoring period;

g. figures presenting subsurface vapor sampling locations and analytical data for the current monitoring event; the analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map; and

h. figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.

### 4.13 Appendices

Each monitoring report must include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

#### 4.13.1 Field Methods

The report must include a section that outlines the methods used to acquire field measurements of groundwater and vadose zone fluid elevations, subsurface vapor, soil moisture, water quality data, subsurface vapor samples, vadose zone fluid samples, and groundwater samples. It must include the methods and types of instruments used to measure depths to water, air, headspace, or subsurface vapor parameters, soil moisture information, and water quality parameters. In addition, decontamination, well purging techniques, well sampling techniques, and sample handling procedures must be provided in this appendix. Methods of measuring and sampling remediation systems must be reported in this section, if applicable. Purge and decontamination water storage and disposal methods must also be presented in this appendix. Copies of purge and decontamination water disposal documentation must be provided in a separate appendix.

#### 4.13.2 Chemical Analytical Program

An appendix must discuss the analytical program. It must include the analytical methods, a summary of data quality objectives, and data quality review procedures. A summary of data quality exceptions and their effect on the acceptability of the analytical data with regard to the monitoring event and the site status must be included in this appendix along with references to case narratives provided in the laboratory reports.

#### 4.13.3 Chemical Analytical Reports

An appendix must include all laboratory chemical analytical data generated for the reporting period. The data may be submitted electronically on a compact disc in Microsoft Excel or other format acceptable to the NMED. The reports must include all chain-of-custody records and QA/QC results provided by the laboratory. Hard (paper) copies of all chain-of-custody records must be submitted as part of this appendix.

## 5. Risk Assessment Report

The Permittee must prepare risk assessment reports for sites requiring corrective action at the facility using the format described below. This section provides a general outline for risk assessments and also sets forth the minimum requirements for describing risk assessment elements. In general, interpretation of data must be presented only in the background, conceptual site model, and conclusions and recommendations sections of the reports. The other text sections of the risk assessment report must be reserved for presentation of sampling results from all investigations, conceptual and mathematical elements of the risk assessment, and presentations of toxicity information and screening values used in the risk assessment. The human health and ecological risk assessments must be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below.

### 5.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

### 5.2 Executive Summary

The executive summary section must provide a brief summary of the purpose and scope of the risk assessment of the subject site. The executive summary must also briefly summarize the conclusions of the risk assessment. The facility, unit, SWMU, or AOC name(s) and location(s) must be included in the executive summary.

### 5.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the risk assessment. The corresponding page numbers for the titles of each unit of the report must be included in the table of contents.

### 5.4 Introduction

The introduction section must include the facility name, unit name(s) and location(s), and unit status (e.g., active operations, closed, corrective action). General information on the current site usage and status must be included in this section.

### 5.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features.

#### 5.5.1 Site Description

A section must provide a description of current site topography, features, and structures including a description of drainages, erosional features, current site uses, and other data relevant to assessing risk at the site. Depth to groundwater, vadose zone fluids, and directions of groundwater and vadose zone fluids flow must be included in this section. The presence and location of surface water bodies such as springs or wetlands must be noted in this section. Photos of the site may be incorporated into this section, if desired. Ecological features of the site must be described here, including type and amount of vegetative cover, observed and expected wildlife receptors, and level of disturbance of the site. A topographical map of the site and general vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features must be included in the Figures section of the document.

#### 5.5.2 Sampling Results

A section must include a summary of the history of releases of contaminants, known and possible sources of contamination, and the vertical and lateral extent of contamination present in each media. This section must include summaries of sampling results of all investigations, including site plans (included in the Figures section of the document), showing locations of detected contaminants. This section must reference pertinent figures, data summary tables, and citations for references to previous reports. References to previous reports must include page, table, and figure numbers for referenced information. Summaries of sampling data for each constituent must include the maximum value detected, the detection limit, the 95% UCL of the mean value detected (if applicable to the data set) and whether that 95% UCL of the mean was calculated based on a normal or lognormal distribution. Background values used for comparison to inorganic constituents at the site must be presented in this subsection. The table of background values must appear in the Tables section of the document and include actual values used as well as the origin

of the values (facility-wide, site-specific, UCL, UTL). This section must also include a discussion of how “non-detect” sample results were handled in the averaging of data.

### 5.6 Conceptual Site Model

A section must present the conceptual site model. It must include information on the expected fate and transport of contaminants detected at the site. This section must provide a list of all sources of contamination at the site. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations must be included. The discussion of fate and transport must address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site model must appear in the Figures section of the document.

For human health risk assessments, the conceptual site model must include residential land use as the future land use for all risk assessments. In addition, site-specific future land use may be included, provided that written approval to consider a site-specific future land use has been obtained from the NMED prior to inclusion in the risk assessment. If a site-specific future land use scenario appears in the risk assessment, all values for exposure parameters and the source of those values must be included in table format and presented in the Tables section of the document.

Conceptual site models presented for ecological risk assessments must identify assessment endpoints and measurement receptors for the site. The discussion of the model must explain how the measurement receptors for the site are protective of wildlife receptors.

### 5.7 Risk Screening Levels

A section must present the actual screening values used for each contaminant for comparison to all human health and ecological risk screening levels. A discussion of the methods used to calculate the screening levels in accordance with Permit Section 3.5 and any variances from those procedures must be included in this Section. If no valid toxicological studies exist for the receptor or contaminant, the contaminant and receptor combination must be addressed using qualitative methods. If an approved site-specific risk scenario is used for the human health risk assessment, this section must include all toxicity information and exposure assessment equations used for the site-specific scenario, as well as the sources for that information. Other regulatory levels applicable to screening the site, such as drinking water MCLs, must also be included in this section.

### 5.8 Risk Assessment Results

This section must present all risk values, Hazard Quotients (HQs), and Hazard Indices (HIs) for human health under projected future residential scenario and any site-specific scenarios. This section must also present the HQ and HI for each contaminant for each ecological receptor. IN

addition, this section must include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties.

### 5.9 Conclusions and Recommendations

This section must include an interpretation of the results of the risk assessment and any recommendations for future disposition of the site. This section may include additional information and considerations that the Permittee believes are relevant to the analysis of the site.

### 5.10 Tables

Data presented in the summary tables must include information on detection limits and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. A section must provide the following summary tables, as appropriate. With prior approval from the NMED, the Permittee may combine one or more of the tables:

a. a table presenting background values used for comparison to inorganic constituents at the site; the table must include actual values used as well as the origin of the values (facility-wide, site-specific, UCL, UTL, or maximum);

b. a table summarizing sampling data must include, for each constituent, all detected values above background, the maximum value detected, the 95 percent UCL of the mean value detected (if applicable to the data set), and whether that 95 percent UCL of the mean was calculated based on a normal or lognormal distribution;

c. a table of all screening values used and the sources of those values;

d. a table presenting all risk values, HQs, and HIs under projected future residential scenario;

e. a table presenting all risk values, HQs, and HIs under approved additional site- specific future land use scenario; and

f. a table presenting the HQ and HI for each contaminant for each ecological receptor.

### 5.11 Figures

This section must present the following figures for each site, as appropriate. With prior approval from the NMED, the Permittee may combine one or more of the figures. All figures must include a scale and a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features or properties;

b. for human health risk assessments, a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and its details; off-site well locations and other relevant features must be included on the site plan if practical; additional site plans may be required to present the locations of relevant off-site wells, structures, and features;

c. for ecological risk assessments, a topographical map of the site and general vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features; and

d. conceptual site model diagrams for both human health and ecological risk assessments.

### 5.12 Appendices

Appendices may be included to present additional relevant information for the risk analysis such as the results of statistical analyses of data sets and comparisons of data, ecological checklists for the site, full sets of results of all sampling investigations at the site, or other data as appropriate.

## 6. Corrective Measures Evaluation

The Permittee must prepare corrective measures evaluations for sites requiring corrective measures using the format described below. This section provides a general outline for corrective measures evaluations and sets forth the minimum requirements for describing corrective measures when preparing these documents. All investigation summaries, site condition descriptions, corrective action goals, corrective action options, remedial options selection criteria, and schedules must be included in the corrective measures evaluations. In general, interpretation of historical investigation data must be presented only in the background sections of the corrective measures evaluations. At a minimum, detections of contaminants encountered during previous site investigations must be presented in the corrective measures evaluations in table format with an accompanying site plan depicting sample locations. The other text sections of the corrective measures evaluations must be reserved for presentation of corrective action-related information regarding anticipated or potential site-specific corrective action options and methods relevant to the project. The general corrective measures evaluation outline is provided below.

### 6.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible facility representative must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

### 6.2 Executive Summary

The executive summary must provide a brief summary of the purpose and scope of the corrective measures evaluation to be conducted at the site. The executive summary or abstract must also

briefly summarize the conclusions of the evaluation. The facility, unit, SWMU, or AOC name(s) and location(s) must be included in the executive summary.

### 6.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

### 6.4 Introduction

The introduction section must include the facility name, unit name(s) and location(s) and unit status (e.g., active operations, closed, corrective action). General information on the current site use and status must be included in this section. A brief description of the purpose of the corrective measures evaluation and the corrective action objectives for the project also must be provided in this section.

### 6.5 Background

The background section must describe the relevant background information. This section must briefly summarize historical site activities including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background section and labeled on the site plan.

This section must include contaminant and waste characteristics, a brief summary of the history of contaminant releases, known and possible sources of contamination, and the vertical and lateral extent of contamination present in each medium. This section must include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. References to previous reports must include page, table, and figure numbers for referenced information. Summary tables and site plans showing relevant investigation locations must be referenced and included in the Tables and Figures sections of the document, respectively.

### 6.6 Site Conditions

#### 6.6.1 Surface Conditions

A section on surface conditions must describe current and historic site topography, features, and structures, including a description of topographic drainages, man-made drainages, vegetation, and erosional features. It must also include a description of current uses of the site and any current operations at the site. This section must also include a description of those features that could potentially influence corrective action option selection or implementation such as archeological sites, wetlands, or other features that may affect remedial activities. In addition, descriptions of features located in surrounding sites that may have an effect on the subject site regarding sediment transport, surface water runoff, or contaminant transport must be included in

this section. A site plan displaying the locations of all pertinent surface features and structures must be included in the Figures section of the corrective measures evaluation.

#### 6.6.2 Subsurface Conditions

A section on subsurface conditions must describe the site conditions observed during previous subsurface investigations. It must include relevant soil horizon and stratigraphic information, groundwater and vadose zone fluid conditions, fracture data, and subsurface vapor information. A site plan displaying the locations of all borings and excavations advanced during previous investigations must be included in the Figures section of the corrective measures evaluation.

### 6.7 Potential Receptors

#### 6.7.1 Sources

A section must provide a list of all sources of contamination at the site where corrective measures are to be considered or are required. Sources that are no longer considered to be releasing contaminants at the site, but may be the point of origination for contaminants transported to other locations, must be included in this section.

#### 6.7.2 Pathways

A section must describe potential migration pathways that could result in either acute or chronic exposures to contaminants. It must include such pathways as utility trenches, paleochannels, surface exposures, surface drainages, stratigraphic units, fractures, structures, and other features. The migration pathways for each contaminant and each medium must be tied to the potential receptors for each pathway. A discussion of contaminant characteristics relating to fate and transport of contaminants through each pathway must also be included in this section.

#### 6.7.3 Receptors

A section must provide a listing and description of all anticipated potential receptors that could possibly be affected by the contamination present at the site. Potential receptors must include human and ecological receptors, groundwater, and other potential receptors. This section must identify relevant pathways, such as pathways that could divert or accelerate the transport of contamination to human receptors, ecological receptors, and/or groundwater.

### 6.8 Regulatory Criteria

A section must set forth the applicable cleanup standards, risk-based screening levels, and risk-based cleanup goals for each medium at the site. The appropriate cleanup levels for each site must be included, if site-specific levels have been established. A table summarizing the applicable cleanup standards must be included as part of the document. Alternately, the report may include applicable cleanup standards as a column in the data tables. If cleanup levels calculated in a risk evaluation are employed, the risk evaluation document must be referenced including pertinent page numbers for referenced information.

### 6.9 Identification of Corrective Measures Options

A section must identify and describe potential corrective measures for source, pathway, and receptor controls. Corrective measures options must include the range of available options including, but not limited to, a no action alternative, institutional controls, engineering controls, in-situ and onsite remediation alternatives, complete removal, and any combination of alternatives that would potentially achieve cleanup goals.

### 6.10 Evaluation of Corrective Measures Options

A section must provide an evaluation of the corrective measures options identified in Section 6.6.9 above. The evaluation must be based on the applicability, technical feasibility, effectiveness, implementability, impacts to human health and the environment, and cost of each option. A table summarizing the corrective measures alternatives and the criteria listed below must be included in the Tables section of this document. The general basis for evaluation of corrective measures options is described below.

#### 6.10.1 Applicability

Applicability addresses the overall suitability for the corrective action option for containment or remediation of the contaminants in the relevant media with regard to protection of human health and the environment.

#### 6.10.2 Technical Feasibility

Technical feasibility describes the uncertainty in designing, constructing, and operating a specific remedial alternative. The description must include an evaluation of historical applications of the remedial alternative including performance, reliability, and minimization of hazards.

#### 6.10.3 Effectiveness

Effectiveness assesses the ability of the corrective measure to mitigate the measured or potential impact of contamination in a medium under the current and projected site conditions. The assessment also must include the anticipated duration for the technology to attain regulatory compliance. In general, all corrective measures described above will have the ability to mitigate the impacts of contamination at the site, but not all remedial options will be equally effective at achieving the desired cleanup goals to the degree and within the same time frame as other options. Each remedy must be evaluated for both short-term and long-term effectiveness.

#### 6.10.4 Implementability

Implementability characterizes the degree of difficulty involved during the installation, construction, and operation of the corrective measure. Operation and maintenance of the alternative must be addressed in this section.

#### 6.10.5 Human Health and Ecological Protectiveness

This category evaluates the short-term (remedy installation-related) and long-term (remedy operation-related) hazards to human health and the environment of implementing the corrective measure. The assessment must include whether the technology will create a hazard or increase existing hazards and the possible methods of hazard reduction.

#### 6.10.6 Cost

A section must discuss the anticipated cost of implementing the corrective measure. The costs must be divided into: 1) capital costs associated with construction, installation, pilot testing, evaluation, permitting, and reporting of the effectiveness of the alternative; and 2) continuing costs associated with operating, maintaining, monitoring, testing, and reporting on the use and effectiveness of the technology.

### 6.11 Selection of Preferred Corrective Measure

The Permittee must propose the preferred corrective measures at the site and provide a justification for the selection in this section. The proposal must be based upon the ability of the remedial alternative to: 1) achieve cleanup standard objectives in a timely manner; 2) protect human and ecological receptors; 3) control or eliminate the sources of contamination; 4) control migration of released contaminants; and 5) manage remediation waste in accordance with State and Federal regulations. The justification must include the supporting rationale for the remedy selection, based on the factors listed in Permit Section 6.6.10, and a discussion of short- and long-term objectives for the site. The benefits and possible hazards of each potential corrective measure alternative must be included in this section.

### 6.12 Design Criteria to Meet Cleanup Objectives

The Permittee must present descriptions of the preliminary design for the selected corrective measures in this section. The description must include appropriate preliminary plans and specifications to effectively illustrate the technology and the anticipated implementation of the remedial option at the site. The preliminary design must discuss the design life of the alternative and provide engineering calculations for proposed remediation systems.

### 6.13 Schedule

A section must set forth a proposed schedule for completion of remedy-related activities such as bench testing, pilot testing, construction, installation, remedial excavation, cap construction, installation of monitoring points, and other remedial actions. The anticipated duration of corrective action operations and the schedule for conducting monitoring and sampling activities must also be presented. In addition, this section must provide a schedule for submittal of reports and data to the NMED, including a schedule for submitting all status reports and preliminary data.

### 6.14 Tables

A section must present the following summary tables, as appropriate. Data presented in the summary tables must include information on dates of sample collection, analytical methods, detection limits, and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following summary tables must be included in the corrective measures evaluations, as appropriate:

a. a table summarizing regulatory criteria, background, and the applicable cleanup standards;

b. a table summarizing historical field survey location data;

c. tables summarizing historical field screening and field parameter measurements for each media;

d. tables summarizing historical soil, rock, or sediment laboratory analytical data; the summary tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

e. a table summarizing historical groundwater elevation and depth to water data; the table must include the monitoring well depths and the screened intervals in each well;

f. tables summarizing historical groundwater and vadose zone laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

g. tables summarizing historical surface water laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

h. tables summarizing historical air sample screening and analytical data; the data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

i. tables summarizing historical pilot or other testing data, if applicable, including units of measurement and types of instruments used to obtain measurements;

j. a table summarizing the corrective measures alternatives and evaluation criteria; and

k. a table presenting the schedule for installation, construction, implementation, and reporting of selected corrective measures.

### 6.15 Figures

This section must present the following figures for each site, as appropriate. All figures must include a scale. All plan view figures must include a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures must contain a date. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the subject site relative to surrounding features or properties;

b. a unit site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan if practical; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures showing historical soil boring locations, excavation locations, and sampling locations;

d. figures presenting historical soil sample field screening and laboratory analytical data, if appropriate;

e. figures showing all existing wells including vapor monitoring wells and piezometers; the figures must present historical groundwater elevation data and indicate groundwater flow directions;

f. figures presenting historical groundwater laboratory analytical data including past data, if applicable; the analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map;

g. figures presenting historical surface water sample locations and analytical data including past data, if applicable; the laboratory analytical data corresponding to each sampling location may be presented as individual concentrations or in table form on the figure;

h. figures presenting historical air sampling locations and presenting air quality data; the field screening or laboratory analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map;

i. figures presenting historical pilot or other test locations and data, where applicable, including site plans or graphic data presentation;

j. figures presenting geologic cross-sections based on outcrop and borehole data, if applicable;

k. figures presenting the locations of existing and proposed remediation systems;

l. figures presenting existing remedial system design and construction details; and

m. figures presenting preliminary design and construction details for preferred corrective measures.

### 6.16 Appendices

Each corrective measures evaluation must include, as appropriate, as an appendix, the management plan for waste, including investigation derived waste, generated as a result of construction, installation, or operation of remedial systems or activities conducted. Each corrective measures evaluation must include additional appendices presenting relevant additional data, such as pilot or other test or investigation data, remediation system design specifications, system performance data, or cost analyses as necessary.

**DEPARTMENT OF THE AIR FORCE**
**377TH AIR BASE WING (AFGSC)**

12 July 2021

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

Mr. Ricardo Maestas
Acting Hazardous Waste Bureau (HWB) Chief
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6303

Dear Mr. Maestas

Attached, please find the *Periodic Monitoring Report for January – March 2021 for the Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, Kirtland Air Force Base, New Mexico,* dated July 2021. This report summarizes groundwater monitoring and interim measure activities associated with the distal plume capture and treatment system at Solid Waste Management Units ST-106/SS-111.

If you have any questions or concerns, please contact Mr. Ryan Wortman at commercial line (505) 853-3484 or email ryan.wortman.3@us.af.mil.

Sincerely

JASON F. VATTIONI, Colonel, USAF
Commander

Attachments:
Periodic Monitoring Report for January – March 2021, Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, Kirtland Air Force Base, New Mexico, dated July 2021

cc:
NMED HWB (Maestas, Andress), two hard copies and two CDs
NMED HWB (Cobrain, Wear), letter and CD
NMED RPD (Catechis), letter and CD
NMED GWQB (Hunter, Romero), letter and CD
EPA Region 6 (King, Ellinger), letter and CD
COA (Ziegler), electronic only
ABCWUA (Agnew), electronic only
AFCEC/CZ (Clark, Kottkamp, Segura), electronic only
USACE-ABQ District Office (Moayyad, Phaneuf, Dreeland, Kunkel, Hernandez), electronic only
Public Info Repository, Administrative Record/Information Repository (AR/IR) and File

# APPENDIX A-2

# Response to Regulatory Comments

| Common Comment and Response Worksheet (Version 3) | | | | |
|---|---|---|---|---|
| **Date** | **Reviewer** | | **Document Title (version)** | **Contract/TO Number** |
| **7/11/2020[a]** | **NMED HWB** | | **Quarterly Monitoring Report for April-June 2019<br>Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111<br>Kirtland Air Force Base, New Mexico** | **NMED Permit No. NM9570024423** |
| **Item** | **Section** | **Page** | **Comment** | **Response** |
| 1 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**a.** The response to NMED's comments must be included as Appendix A of each document revision. | The response to New Mexico Environment Department's (NMED's) comments are included as Appendix A-2 beginning with the Quarter 2 (Q2) 2020 Quarterly Report and going forward. |
| 2 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**b.** All field methods for the project must be documented in an appendix, as required by Permit Section 6.2.4.4.11. The documentation must be specific to each monitoring activity, such as soil vapor monitoring, groundwater monitoring, or operation and maintenance of the groundwater treatment system. References to quality assurance project plans (QAPPs), standard operating procedures (SOPs), or work plans are not acceptable. All deviations from approved work plans must be discussed and explained in a Deviations section. | Field methods for the project are included as Appendix B-1 beginning with the Quarter 3 (Q3) 2020 Quarterly Report and going forward. References to QAPPs and SOPs were not included in the field methods appendix. Deviations are discussed in the main text. |
| 3 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**c.** Wells must be consistently referred to by the same name/designation in all periodic reports, sections of the text, tables, and figures. The designations must match those provided in the digital analytical data files. | Wells are referred to consistently throughout this document. A table listing any historical changes to well designations that can be used for cross reference purposes is provided as Appendix B-2 beginning with the Q3 2020 Quarterly Report and going forward. |
| 4 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**d.** Sampling data tables must include the practical quantitation limit (PQL) and listed laboratory report detection limit (RDL) for each analysis. | In accordance with Department of Defense (DoD) quality management policy, the laboratory is required to use specific DoD Quality Systems Manual (QSM) reporting limit nomenclature when reporting data. However, the DoD nomenclature is comparable to U. S. Environmental Protection Agency (EPA) method reporting nomenclature. To clarify, beginning with the Q2 2020 Report and going forward, an analytical data Excel flat file is being provided in an appendix with each sample matrix type to include the PQL (limit of quantification [LOQ] per DoD), RDL (limit of detection [LOD] per DoD) and method detection limit (MDL) (detection limit [DL] per DoD). See response to Comment 8 below. |
| 5 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**e.** Sampling data tables must include the appropriate screening levels for data comparison. | Sampling data tables will include the relevant appropriate screening levels. As discussed in Section 2, soil vapor results were compared to vapor intrusion screening levels (VISLs) at the 25-foot depth interval. Soil vapor data tables listing results for deeper soil vapor monitoring points (SVMPs) are not compared to VISLs. |
| 6 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**f.** Analytical data tables in digital format must include a column that indicates which analytical data report the specific sample information can be found. This link must correspond to the analytical data report file name. | Analytical data flat files in Excel are being provided in the appendices (see response to Comment 8 below) and include a column which identifies the analytical laboratory data report file name where the specific sample information can be located. |
| 7 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**g.** Data quality exceptions, such as when the PQL exceeds the corresponding screening level, must be identified as such in all tables and figures (see Permit Section 6.5.18). | Exceedances of the PQL are provided in the sortable, searchable Excel tables provided as appendices in the Q2 2020 Report and future reports (see response to Comment 8 below). Beginning in the Q3 2020 Report, a discussion and table of PQL exceedances above the corresponding screening level where the analytical result is estimated (J-flagged) are included in the Data Quality Evaluation Report appendices to the report. The exceptions will also be noted on figures beginning in the Q3 2020 Report. |
| 8 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**h.** Analytical data provided in digital format such as Microsoft Excel or Access files must be provided in a sortable, searchable format. Previous reports have provided digital data in the same format as the printed tables. These tables are not sortable or searchable. Provide the tables in a standard database format. | Beginning in the Q2 2020 Report and going forward, analytical data tables provided as appendices will be provided in the sortable, searchable Excel standard database format. The tables being provided can be found in appendices titled:<br>• Soil Vapor Analytical Data (Q2 and Q4 Reports only)<br>• Groundwater Analytical Data<br>• Drinking Water Supply Well Analytical Data<br>• Groundwater Treatment System Performance Analytical Data |

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| **Item** | **Section** | **Page** | **Comment** | **Response** |
| 9 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**i.** Analytical data packages must be submitted in accordance with KAFB Permit Section 6.5.18.2, Laboratory Deliverables. | Beginning in the Q3 2020 Report and going forward, EPA Level II data packages will be provided with the report, and EPA Levels III and IV will be maintained and available to NMED upon request in accordance with Resource Conservation and Recovery Act (RCRA) Permit Section 6.5.18.2 (see response to Item 20 below). |
| 10 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment:** Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable**:**<br>**j.** All tables, figures, and appendices must be appropriately numbered and titled. | Tables, figures, and appendices will be appropriately numbered and titled in this document. Headers and footers with appropriate page numbering and titles will be applied to all figures, tables, and appendices. |
| 11 | General Comments | 1 | **1. Monitoring Report Contents**<br>**NMED Comment**: Based on the issues identified in this report and other periodic reports, NMED is providing the following reporting requirements which the Permittee must incorporate into future reports. Permittee is required to include the following as applicable:<br>**k.** Every page of every submittal, including all pages within all sections and appendices, must be numbered either sequentially or in some other format acceptable to NMED. | See Comment 10 above. |
| 12 | General Comments | 2 | **2. Analytical Data Detection and Quantitation Limits**<br>**NMED Comment:** (Paragraph 1)<br>Many of the analytical data tables presented in the Report list the limit of detection (LOD) for each sample analysis, however, it is not clear if this value represents the laboratory method detection limit or reporting detection limit. Some tables list the LOD and some the limit of quantification (LOQ). The permittee must provide the method detection limit (MDL) in the data tables. In addition, the Permittee must include the reporting detection limit (assuming this is the Permittee's "LOD") and the PQL (assuming this is the Permittee's "LOQ") for each sample analyzed in the data tables. | As noted in Comment 4 above, the required laboratory reporting is per DoD QSM reporting requirements. For clarification, the DoD DL is equivalent to the EPA MDL, the DoD LOD is equivalent to the EPA RDL, and the DoD LOQ is equivalent to the EPA PQL. To further clarify this, we have included an analytical data Excel flat file in an appendix with each sample matrix type to show the specific PQL, RDL, and MDL for each sample analyte. |
| 13 | General Comments | 2 | **2. Analytical Data Detection and Quantitation Limits**<br>**NMED Comment:** (Paragraphs 2 and 3)<br>The Permittee's Quality Assurance Project Plans (QAPPs) indicate that the Permittee is using three different variations of terminology for method reporting limits, including one which seems to be backwards. The Permittee's QAPP for Vadose Zone Treatability Studies Attachment 1, Tables 1-1a, Method Reporting Limits – Drinking Water, 1-1b, Method Report Limits – Soil and Investigation Derived Waste, and 1-1c, Method Reporting Limits – Volatile Organic Compounds in Air, all seeming use the LOQ appropriately (as the PQL), but there is a lack of consistency between the method detection limit and reporting detection limit.<br><br>In Table 1-1a, Drinking Water, "MDL" appears to equate to the method detection limit, and "LOD" appears to equate to the reporting detection limit. In Table 1-1b, Soil, "LOD" appears to equate to the method detection limit and "DL" appears to equate to the reporting detection limit. Based on the fact that the PQL must be greater than the reporting detection limit and the reporting detection limit must be greater than the method detection limit, Table 1-1b, Soil, appears to be wrong. NMED is assuming that similar tables appear in the QAPP for quarterly monitoring. | The Vadose Zone Treatability QAPP includes method reporting limit tables for TestAmerica, Inc. Laboratories for drinking water, soil coring and investigation-derived waste, and soil vapor. It appears on the reporting limit table 1-1b, Soil, the values in the LOD and DL columns were inadvertently switched. It is correct that the LOQ/PQL is greater than the LOD/RDL, which is greater than the DL/MDL.<br><br>The reporting limit tables in the QAPP for the Dissolved-Phase Plume and Groundwater Treatment System Design (quarterly groundwater monitoring), Attachment 1 (Eurofins Lancaster Laboratories) are confirmed to be correct. |
| 14 | General Comments | 2 | **2. Analytical Data Detection and Quantitation Limits**<br>**NMED Comment:** (Paragraph 4)<br>These issues [items 12 and 13 above] cause confusion for the reviewer, community stakeholders, and the public, and increases the time required to review submittals from the Permittee. The Permittee must use appropriate and consistent terms for Quality Assurance/Quality Control in all periodic reporting submittals and for all media (e.g., use MDL consistently instead of DL). While NMED does not review or approve QAPPs, the Permittee must assure that they are providing their contractors with the appropriate information to provide appropriate, consistent, and accurate information to NMED. Consistency in reporting by the Permittee will reduce both agency and Air Force internal review times. | See Comment 12 and 13 above. |

| Common Comment and Response Worksheet (Version 3) | | | | |
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| **Item** | **Section** | **Page** | **Comment** | **Response** |
| 15 | Specific Comments | 2/3 | **3. Table of Contents, Appendix B, page iv:**<br>**NMED Comment:** Appendix B, New Activities Supporting Information, contains well completion reports for four new wells installed and developed in accordance with the NMED-approved 2017 Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling. KAFB Permit Section 6.2.2.1.2, Site Investigations – Investigation Reports, and Section 6.2.4.3, Reporting Requirements – Investigation Reports, require that the information and data collected from all investigation activities conducted during the quarter be submitted to NMED as separate, stand-alone reports. The Permittee must submit individual reports for all investigation activities conducted in support of the ongoing investigation of the Bulk Fuels Facility spill, rather than submit the information as appendices in quarterly reports. | The information and data collected from investigation activities, such as well completion reports, will be provided as stand-alone reports or as otherwise required by NMED and will not be provided as appendices to quarterly reports. |
| 16 | Specific Comments | 3 | **4. Section 2.5 Q2 2019 Soil Vapor Data, page 2-4:**<br>**Permittee Statement:** "The RCRA permit does not specify cleanup levels for soil vapor. The quarterly reports are not intended to assess risk; the vapor data are used to assess concentration trends. The risk assessment (USACE, 2017e) compares vapor concentrations to the vapor intrusion screening levels in the NMED Risk Assessment Guidance for Site Investigations and Remediation. All EDB and benzene concentrations are compared against 3,800 and 3,200 micrograms per cubic meter (µg/m3), respectively. HC concentrations are compared against 1,000 parts per million by volume (ppmv). The comparison concentrations used in this report were determined by historical maximum and minimum soil vapor results to show which SVMPs had relatively high or low concentrations."<br><br>**NMED Comment:** The Permittee must clarify if the comparison values for EDB, benzene, and HC represent the historical maximum or minimum, or some other calculated value so that changes relative to the values can be evaluated. The Permittee must also provide a reference for the historical soil vapor values. The Permittee accurately states that quarterly reports are not intended to assess risk; however, the Permittee must provide a comparison of detected concentrations to a regulatory standard for the purpose of assessing the presence and location of contaminants of concern. NMED's Risk Assessment Guidance for Site Investigations and Remediation (2019 and as updated) vapor intrusion screening levels (VISLs) must be used a first-tier screening assessment. | In the Q2 2020 Report, language was revised to clarify that the comparison values were set based on a qualitative analysis of soil vapor data in Q2 2016 to help the reader distinguish areas of relatively high or low soil vapor concentrations (Section 2.3). They were not intended to be screening levels, rather their purpose is as a helpful tool for the reader to evaluate trends. Comparison levels were removed from the report beginning in Q4 2020.<br><br>Beginning in Q4 2020, NMED's Risk Assessment Guidance for Site Investigations and Remediation (2019 and as updated) VISLs were used as a first-tier screening assessment. NMED VISLs were calculated utilizing EPA default attenuation factors that are based on conservative assumptions and empirical data. VISLs are intended to be screened against soil vapor samples collected from below building foundations (sub slab samples). However, the shallowest SVMPs at SWMUs ST-106/SS-111 are screened from 15 to 25 feet (ft) below ground surface. Therefore, using NMED VISLs as a first-tier screening level for soil vapor concentrations at the 25-ft horizon provides a conservative estimate. NMED VISLs are not appropriate screening levels for deeper SVMPs. Kirtland AFB is currently in coordination with USACE-Albuquerque District to determine the most appropriate screening criteria for evaluating soil vapor at depth at the Kirtland Bulk Fuels Facility. Pending resolution, data will be screened in the manner indicated above in future reports. Table 3-6 includes the results of screening the 25-ft horizon against residential soil gas VISLs. This screening is for comparison purposes only and should not be considered an evaluation of exposure or risk. |
| 17 | Specific Comments | 3 | **5. Section 2.2. Bioventing Pilot Test, page 2-2**<br>**Permittee Statement:** "A bioventing report will be submitted on January 31, 2020 as requested by NMED in a letter dated February 25, 2019 (NMED, 2019). This report will include data collected up to Q4 2019. Data collected after Q4 2019 will be provided in the relevant quarterly monitoring reports. The Q4 2020 Quarterly and Annual Monitoring Report will include results to date, and the final results of the bioventing pilot test will be provided in the Q4 2021 Quarterly and Annual Monitoring Report."<br><br>**NMED Comment:** Bioventing pilot test data is collected each quarter; therefore, the Permittee must provide quarterly data updates in separate quarterly status reports specific to the bioventing pilot study to allow NMED to provide timely adjustment and inputs to the bioventing system. The final results of the bioventing pilot test must be submitted as a stand-alone document rather than as an appendix to the Q4 2021 Quarterly and Annual Monitoring Report. | Future bioventing reports will be removed from quarterly reports. The final results of the bioventing pilot test will be submitted as a stand-alone document. |

| Common Comment and Response Worksheet (Version 3) | | | | |
|---|---|---|---|---|
| **Date** | **Reviewer** | | **Document Title (version)** | **Contract/TO Number** |
| **7/11/2020[a]** | **NMED HWB** | | **Quarterly Monitoring Report for April-June 2019<br>Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111<br>Kirtland Air Force Base, New Mexico** | **NMED Permit No. NM9570024423** |
| **Item** | **Section** | **Page** | **Comment** | **Response** |
| 18 | Specific Comments | 3 | **6. Section 3.3.1 Sampling Deviations, page 3-3**<br>**Permittee Statement:** "Groundwater samples were not obtained from seven wells in Q2 2019. Three wells (KAFB-106001, KAFB-106008, and KAFB-106079) could not be sampled due to suspected biofouling. These wells will be sampled using passive sampling techniques in the future after well rehabilitation is evaluated."<br><br>**NMED Comment:** The Permittee must provide additional information in a subsequent quarterly report on suspected biofouling of wells KAFB-106001, KAFB-106008, and KAFB-106079, such as evidence for biofouling, the source of biofouling, and the date when biofouling was first suspected. Well KAFB-106079 is less than 1000 ft from interim measure extraction well KAFB-106239. Provide information on the potential for suspected biofouling at KAFB-106079 to impact KAFB-106239 and the Groundwater Treatment System. The Permittee must also submit a work plan for evaluating and conducting rehabilitation of the three wells. Use of passive sampling techniques for wells KAFB-106001 and KAFB-106079 is contingent upon NMED approval. Because LNAPL was previously detected in well KAFB-106008, use of passive sampling is not appropriate. | The following additional information on suspected biofouling of wells KAFB-106001, KAFB-106008, and KAFB-106079, along with a discussion of the potential for biofouling at KAFB-106239, is provided only in this response to comments table, as this was not part of Q3 2020 groundwater monitoring activities discussed in the main text of this quarterly report. A similar discussion will be included in future quarterly reports for wells suspected of biofouling during the relevant quarter.<br><br>During the Q2 2019 groundwater sampling event, the sampling team was unable to purge wells KAFB-106001, KAFB-106008, and KAFB-106079. Sampling was attempted at these three wells on May 1, April 23, and April 26, 2019, respectively. The pumps were removed, and biologic films were observed on the pump screens. The biologic films were thick enough to prevent water from entering the screens. The screens were cleaned, and another attempt to pump was made; however, the biologic material occluded the screens again, preventing water from entering the pump. These wells were disinfected in Q3 2019 in accordance with the approved procedures (see paragraph below), and disinfection was reported in the Q3 2019 Report. These three wells are in areas with historically high benzene, toluene, ethylbenzene, and total xylenes concentrations and anaerobic conditions. As discussed in Section 7 of the Phase I RCRA Facility Investigation Report (Kirtland AFB, 2018, *Phase I RCRA Facility Investigation Report, Bulk Fuels Facility Releases, Solid Waste Management Unit ST-106/SS-111*, prepared by Sundance Consulting, Inc. for Kirtland AFB under USACE-Albuquerque District Contract No. W912PP-16-C-0002. August), concentrations of microbial indicator compounds suggest that microbial degradation is occurring in this area. KAFB-106239 experiences a periodic decrease in pumping rates, which is an indicator of biofouling. When this occurs, it is disinfected in accordance with approved procedures (see paragraph below), and disinfection is discussed in the relevant quarterly report.<br><br>Standard well disinfection procedures were provided in the Operation and Maintenance Plan (Kirtland AFB. 2016. Operation and Maintenance Plan, Groundwater Treatment System, Bulk Fuels Facility, SWMUs ST-106/SS-111, Kirtland Air Force Base, New Mexico.), which was approved by NMED in a letter dated December 12, 2016 (Correspondence from Kathryn Roberts, Director, Resource Protection Division to Colonel Eric H. Froehlich, Base Commander, Kirtland AFB, New Mexico, and Mr. John Pike, Director, Environmental Management Division, 377 MSG, Kirtland AFB, New Mexico, re: Operation and Maintenance Plan, Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111, Kirtland Air Force Base, EPA ID No. NM9570024423, HWB-KAFB-13-MISC.). Disinfection of these wells took place in September 2019 and was reported on in the Q3 2019 Report.<br><br>Wells KAFB-106001, KAFB-106079, and KAFB-106008 will be sampled using portable pumps in future monitoring quarters until such time as passive sampling is approved by NMED. |
| 19 | Specific Comments | 4 | **7. Section 3.6.1.1 EDB Analytical Results, page 3-5**<br>**Permittee Statement:** "Five EDB exceedances were from wells north of Ridgecrest Drive SE but none were north of Gibson Boulevard SE."<br><br>**NMED Comment:** Figures 3-5 and 3-6 present EDB concentrations in groundwater for reference elevation 4857 and 4838, respectively. Both figures depict the northern extent of the EDB plume as being north of Gibson Boulevard SE. The Permittee must revise the statement and figures for accuracy if they are included in future periodic reports. | The Permittee statement from the Q2 2019 Report was verified as accurate. While some wells north of Gibson Boulevard SE (Gibson) had EDB detections, there were no EDB exceedances above the EPA MCL of 0.05 micrograms per liter in wells sampled north of Gibson in Q2 2019. Because some of the wells with exceedances were immediately south of Gibson, interpolation of the plume boundary shows the northern boundary extending approximately 100 ft to the north of Gibson. However, no wells located north of Gibson are included within the plume boundary. |

[a]The date was incorrectly recorded as 7/11/2019 on the letter.

| Date | Reviewer | Document Title (version) | Contract/TO Number |
|---|---|---|---|
| 9/2/2020 | NMED HWB | **Reporting Requirements for All Document Submittals<br>Kirtland Air Force Base, New Mexico<br>EPA ID # NM6213820974<br>HWB-KAFB-20-MISC** | **NMED Permit No. NM9570024423** |
| The following items address comments provided in the September 2, 2020 letter that were not addressed by the July 11, 2020 letter.<br>Comments 3 and 4 did not require edits to Periodic Monitoring Reports.<br>Comments 5, 6, 7, 8a through 8f, 8i through 8k, and 9 were addressed by the July 11, 2020 letter. | | | |

| Item | Section | Page | Comment | Response |
|---|---|---|---|---|
| 1 | Letter | 2 | **1. Laboratory Deliverables:** Section 6.5.18.2, Laboratory Deliverables, of the KAFB Resource Conservation and Recovery Act (RCRA) Permit (KAFB Permit), states the requirements for analytical laboratory reporting. The section states, "[l]aboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols." The final paragraph of the permit section goes on to state, "[t]he Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request."<br>Therefore, for purposes of reporting, Level II Qc results are necessary. Level III and IV data must be maintained by the Permittee to be made available upon request. | This comment clarifies Comment 9 above. Beginning with the Q3 2020 Report and going forward, Level II rather than Level IV data packages will be provided with the report, and Level III and Level IV will be available upon request. |
| 2 | Letter | 2 | **2. General Guidelines:** NMED has included an attachment titled *General Reporting Guidelines* that provides guidance regarding its expectations of submittals to the Hazardous Waste Bureau. The Permittee must consult the guidance during document preparation. | Section 4 of the *General Reporting Guidelines*, Periodic Monitoring Report, was consulted during the preparation of the Q3 2020 Report, and revisions were made as discussed in Comments 7 and 8 below. |
| 5 | Letter | 3 | **8. Data Tables, Figures, and Appendices**<br>**g.** Data in tables and figures must be presented with a consistent and appropriate number of significant figures. | Significant figures provided are reviewed to ensure they are appropriate to the task and the level of precision attainable by the instruments used. |
| 6 | Letter | 3 | **8. Data Tables, Figures, and Appendices**<br>**h.** All points (wells), structures, infrastructure, roads, etc. depicted on figures must be labeled. | Figures are reviewed to ensure that the relevant wells, structures, infrastructure, roads, etc. are labeled or described in the legend. |
| 7 | General Reporting Guidelines | 17 | **Section 4.11 Tables** The following tables must be included, as applicable:<br>**b**. a table summarizing groundwater and vadose zone fluid elevations, and depths to water data; the table must include the monitoring well depths, casing elevations, the screened intervals in each well, and the dates and times of measurements. | Beginning in Q3 2020, Table 3-2, Groundwater Elevation and Light Non-Aqueous Phase Liquid Thickness, was revised to include well depth, bottom of screen, and measurement times. The other required information, including top of screen, was already present in the table. |
| 8 | General Reporting Guidelines | 17 | **Section 4.11 Tables** The following tables must be included, as applicable:<br>**e.** a table summarizing field measurements of groundwater and vadose zone fluid quality data (including historical water quality data as described above). | A table summarizing field measurements, including historical water quality data, was added to Appendix E-3. In Q2 and Q4 of each year, a table summarizing field measurements from the current sampling event will continue to be provided (Table 3-5 in the Q2 2020 report). |

**Notes:**

| | |
|---|---|
| µg/m$^3$ | micrograms per cubic meter |
| AFB | Air Force Base |
| DL | detection limit |
| DoD | Department of Defense |
| EDB | 1,2-dibromoethane (ethylene dibromide) |
| EPA | U.S. Environmental Protection Agency |
| ft | foot/feet |
| HC | hydrocarbons |
| HWB | Hazardous Waste Bureau |
| ID | Identification |
| LNAPL | light non-aqueous phase liquid |
| LOD | limit of detection |
| LOQ | limit of quantitation |
| MCL | maximum contaminant level |
| MDL | method detection limit |
| NMED | New Mexico Environment Department |
| ppmv | parts per million by volume |
| PQL | practical quantitation limit |
| Q1 | first quarter |
| Q2 | second quarter |
| Q3 | third quarter |
| Q4 | fourth quarter |
| QAPP | quality assurance project plan |

| | |
|---|---|
| QSM | Quality Systems Manual |
| RCRA | Resource Conservation and Recovery Act |
| RDL | report detection limit |
| SE | southeast |
| SOP | standard operating procedure |
| SVMP | soil vapor monitoring point |
| SWMU | solid waste management unit |
| TO | task order |
| USACE | U.S. Army Corps of Engineers |
| VISL | vapor intrusion screening level |

# APPENDIX A-3

# Crosswalk Table Between RCRA Permit Requirements and the Periodic Monitoring Report

| The Permit Requirement | Report Location |
|---|---|
| **RCRA Permit No. NM9570024423– Section 6.2.4.4, Periodic Monitoring Reports** | |
| 1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative) | Following the cover page. |
| 2. Executive Summary (Abstract) | Abstract provided on Report Documentation Page. Executive Summary provided as pages ES-1 and ES-2. |
| 3. Table of Contents | Pages i through vi |
| 4. Introduction | Section 1 |
| 5. Scope of Activities | Section 3 |
| 6. Regulatory Criteria | Section 2 |
| 7. Monitoring Results | Section 4 |
| 8. Conclusions and Recommendations | Section 7 |
| 9. Tables - include explanation for all abbreviations, symbols, acronyms, and qualifiers | Tables section follows the Figures section, with explanations provided for each table. Each table includes notes which provide explanations of the abbreviations, symbols, acronyms, and qualifiers used. |
| 10. Figures (1) - map figures include accurate bar scale and north arrow | Figures section follows the report text. Map figures include accurate bar scales and north arrows. |
| 10. Figures (2) - non-map figures include a bar scale if appropriate | Non-map figures include a bar scale where appropriate. |
| 10. Figures (3) - all figures include an explanation for abbreviations, symbols, acronyms and qualifiers | Figures include explanations and notes for abbreviations, symbols, acronyms, and qualifiers. |
| 11. Appendices (1) - field methods | Appendix B-1. |
| 11. Appendices (2) - boring/test pit logs and well construction diagrams | Not applicable to third quarter (Q3) 2021. |
| 11. Appendices (3) - chemical analytical reports | Groundwater Monitoring (GWM): Appendix D-3<br>Drinking Water Supply Wells: Appendix F-2<br>Groundwater Treatment System (GWTS) Operation and Performance: Appendix G-5 |
| 11. Appendices (4) - Other appendices as required by NMED | Other Appendices required by NMED are provided. |
| **Discharge Permit DP-1839** | |
| Terms and Conditions #17 – 24 | Table 5-1 gives the relevant text references where each of these conditions is addressed. |
| **RCRA Permit No. NM9570024423– Section 6.2.4.1, Quarterly Reporting** | |
| 1. A description of the work completed and an estimate of the percentage of total planned work completed. | Section 3 |
| 2. Summaries of all findings, including summaries of laboratory data. | Provided for each task:<br>GWM: Section 4.1, Tables 4-2 through 4-10<br>Drinking Water Supply Well Monitoring: Section 4.2, Table 4-11<br>GWTS Operation and Performance: Section 5, Tables 5-2 through 5-10. |
| 3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems. | Provided for each task:<br>Gauging deviations: Section 4.1.2.2<br>Groundwater sampling deviations: Section 4.1.3.1.<br>Drinking water supply well sampling deviations: Section 4.2.1.1.<br>GWTS sampling deviations: Section 5.2.1.1. |
| 4. Planned work for the next reporting period. | Section 7.3 |
| 5. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period. | Regulatory correspondence is provided in Appendix A-1, and response to regulator comments is provided in Appendix A-2. |
| 6. Changes in key project personnel during the reporting period. | Not applicable in Q3 2021. |
| 7. Summaries of any variances from approved investigation or remediation work plans. | Provided for each task:<br>Deviation sections noted above. |

| The Permit Requirement | Report Location |
|---|---|
| 8. Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4. | Executive Summary<br>Section 1<br>Section 7. |

# APPENDIX B-1

# Field Methods

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| % | Percent |
| AFB | Air Force Base |
| CFR | Code of Federal Regulations |
| DMS | dual membrane sampler |
| DO | dissolved oxygen |
| ft | foot/feet |
| GWM | groundwater monitoring |
| GWTS | groundwater treatment system |
| IDW | investigation-derived waste |
| LNAPL | light non-aqueous phase liquid |
| NMED | New Mexico Environment Department |
| ORP | oxidation reduction potential |
| PID | photoionization detector |
| ppmv | parts per million by volume |
| QAPP | Quality Assurance Project Plan |
| RCRA | Resource Conservation and Recovery Act |
| RCRA Permit | RCRA Hazardous Waste Treatment Facility Operating Permit No. NM9570024423 |
| VOC | volatile organic compound |

# B-1.1 FIELD MEASUREMENTS

The field methods described below were followed when performing field operations at the Solid Waste Management Units ST-106/ST-111 at Kirtland Air Force Base (AFB) in Albuquerque, New Mexico.

Work was performed in accordance with the Part 6.5.4 of Resource Conservation and Recovery Act (RCRA) Hazardous Waste Treatment Facility Operating Permit No. NM9570024423 (RCRA Permit) (New Mexico Environment Department [NMED] 2010).

## B-1.1.1 Air Quality

Headspace air quality measurements were collected each time a groundwater monitoring (GWM) well was opened to ensure a safe working environment. Headspace was monitored using a photoionization detector (PID) reading total volatile organic compounds (VOCs) in parts per million by volume (ppmv). During use, each PID was calibrated in accordance with the manufacturer's instructions weekly and bump tested daily. The PID was calibrated when the results of the bump test were outside of the accepted range. The PID was used to determine the total VOCs at the top of the well to ensure a safe working environment. If the headspace reading was greater than 5.0 ppmv in the breathing zone, the field team ventilated the well vault.

## B-1.1.2 Water Quality

Water quality measurements were collected as part of multiple sampling events including GWM, drinking water production well monitoring, and sampling at the groundwater treatment system (GWTS). Two types of instruments were used: a multiparameter meter and a turbidity meter.

A multiparameter meter was used to measure the following parameters: temperature, dissolved oxygen (DO), specific conductance, pH, and oxidation reduction potential (ORP). Turbidity was measured using a turbidity meter. The multiparameter meter can be used in two manners: either equipped with a flow-through cell or by being submerged in water collected from the flow in a cup. Multiparameter meters were calibrated in accordance with the manufacturer's instructions at the inception of a field sampling event and weekly thereafter. A bump test was performed daily. If the results of the bump test were outside of the accepted range, the instrument was calibrated.

The turbidity meter was calibrated at the beginning of the sampling event and bump tested weekly. If the results of the bump test were outside of the accepted range, the instrument was calibrated. Water was collected in a clear glass jar that was inserted into the instrument for the turbidity measurement.

# B-1.2 SYNOPTIC GAUGING

## B-1.2.1 OPENING GROUNDWATER MONITORING WELLS

GWM wells were opened during synoptic gauging, groundwater sampling, and in conjunction with other periodic activities as needed (i.e., well rehabilitation). Field teams don Level D personal protective equipment prior to opening well vaults. Field teams then removed the bolts and placed the vault lid to the side. In wells without dedicated equipment, the well cap was unscrewed and set to the side. In wells with dedicated equipment, the stopper was removed from the drop pipe and set to the side.

## B-1.2.2 GAUGING LIQUID LEVELS

Groundwater and light non-aqueous phase liquid (LNAPL) gauging was conducted in accordance with Part 6.5.17.2 of the RCRA Permit (NMED, 2010) and the approved work plans (Section B-1.1). While the RCRA Permit does not specify technical requirements for LNAPL gauging, the measurements were collected concurrent with groundwater gauging and therefore follow the same procedure. Groundwater and LNAPL gauging were conducted quarterly at each of the wells in the GWM program. Monitoring wells were gauged within a synoptic period of no more than 5 consecutive days (Kirtland AFB, 2017).

Prior to gauging, the interface probes designated for use were used to measure depths to water in three GWM wells to quantify any measurement difference from a control probe. If a probe consistently measured greater than 0.03 foot (ft) different from the control probe, water levels taken using that probe were corrected by the value of the difference. Over a 5-day period, barometric pressure changes at the site can cause water levels in a given well to vary by up to 0.15 ft, even after diurnal variations are taken into account. This was determined by observing the change in water levels due to barometric pressure at three wells during a 7-day background monitoring period prior to aquifer testing at KAFB-106228 (Kirtland AFB, 2016). Therefore, a measurement difference between probes of up to 0.03 ft, or less than 20 percent (%) of 0.15 ft, was considered negligible as compared to these naturally occurring changes. Water level corrections are applied when the difference between probes is greater than 0.03 ft.

The sequence of procedures used when measuring depth to water was as follows:

Step 1. Wells that required barricading for access were identified and the required barricade permits were obtained. As soon as was practicable, gauging was scheduled in conjunction with sampling to minimize disruption of traffic and access for residents.

Step 2. Wells were segregated based on known status of contamination. Wells were gauged with interface probes designated for “clean” or “contaminated” wells. Although interface probes were decontaminated between wells, this approach further minimized the potential for cross-contamination.

Step 3. Samplers donned new sampling gloves at each well before beginning gauging.

Step 4. Operation of measurement equipment was checked aboveground.

Step 5. The exterior of the monitoring well was examined for signs of damage or tampering, and observations were recorded on the Monitoring Well Gauging Form.

Step 6. The well cap or outer steel casing lid was unlocked. The interior of the monitoring well was visually examined for signs of damage or tampering, and observations were recorded on the Monitoring Well Gauging Form.

Step 7. Immediately upon opening the cap, VOC vapor readings were obtained with a PID at the well head and information was recorded on the Monitoring Well Gauging Form. If concentrations greater than 5 ppmv were detected, the well vault was ventilated.

Step 8. The interface probe was lowered into the GWM well, and the depth to LNAPL, if any, was noted along with the depth to groundwater. Measurements were taken from a reference mark located on either the top of the protective casing for wells with aboveground completion or from the top of the vault for wells with flush completion. Measurements were made to the nearest 0.01 ft.

Step 9. Gauging information was recorded on the field form.

Step 10. The time and day of the measurement were recorded on the field form.

Step 11. The interface probe was decontaminated before and after each use to prevent potential cross-contamination of wells.

If a well was found to contain more than 0.02 ft of LNAPL, it was bailed with a disposable bailer prior to sampling. The removed LNAPL was disposed of as hazardous waste at an offsite facility. Bailing was not performed for wells that were only gauged and not sampled.

# B-1.3 GROUNDWATER SAMPLING

Groundwater was sampled in accordance with the requirements in Part 6.5.17.3 of the RCRA Permit (NMED, 2010) and the approved work plans (Section B-1.1). Groundwater samples were collected using either a passive sampling device or low-flow techniques.

Following removal of the passive sampling device or the completion of purging, samples were collected into appropriate clean containers with the relevant preservatives. Sample aliquots that were sent to the laboratory for dissolved metals analysis were filtered in the field immediately after collection through a disposable filter with a 0.45-micron nominal pore size, in accordance with the requirements in Part 6.5.17.5 of the RCRA Permit (NMED, 2010).

## B-1.3.1 PASSIVE SAMPLING

GWM wells located north of Ridgecrest Drive SE were approved by NMED to utilize passive sampling technologies (NMED, 2017a) following sampling evaluations that showed comparable analytical results in samples collected using passive and low-flow technologies. In addition, regardless of location, wells that are less than 4 inches in diameter were sampled using passive technologies as the diameter is too small to accept a low-flow pump. The approval of passive sampling (NMED, 2017a) meets the requirement in Part 6.5.17.4 of the RCRA Permit (NMED, 2010) that states, "The Permittee may submit to the department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled sampling activities."

Because passive sampling is not discussed in the RCRA Permit (NMED, 2010), it was performed in accordance with the methods described in the Work Plan for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2 (Kirtland AFB, 2017). These methods consisted of:

- Samplers donned new sampling gloves at each well before beginning sampling.
- Passive samplers were deployed prior to sampling on a timeline in accordance with manufacturer and analyte-specific requirements to allow for adequate equilibration between the passive sampler and the groundwater. Deployments used dedicated passive deployment equipment, including tethers.
- If the top of water measured was within the screened interval, the midpoint of the uppermost passive sampler was set 2 ft below the water level. If the top of the water was above the screened interval, the midpoint of the topmost passive sampler was set 2 ft below the top of the screened interval.
- Passive samplers were retrieved from the wells and groundwater samples were collected per the manufacturer's specifications. The required sample aliquots were collected from their respective passive samplers. Samples collected for metals analysis using passive methods were filtered directly into proper containers using new, disposable, clean 0.45-micron nominal pore size filters.
- Dedicated deployable equipment was either retained in sealed, non-reactive containers or was stored down well between sampling events.

#### B-1.3.1.1 Equipment Used

Passive sampling was conducted using dual membrane samplers (DMSs) attached to a tether dedicated to the individual well. Each tether was equipped with a series of rings that the DMSs were attached to beginning at the top of screen depth and continuing every 2.6 ft, with the lowest ring positioned 2.6 ft above the bottom of the screen. Interface probes and PIDs were also used during passive sampling.

#### B-1.3.1.2 Methods

##### Deployment

Each DMS was deployed a minimum of 3 weeks prior the planned sampling date. If the screened interval of the well was partially submerged or submerged by less than 5 ft, the depth to water was measured using an interface probe. The number of DMSs deployed in each well was based on the water volume needed for the required samples. Each sampler was filled with deionized water and attached to a ring on the sampler. The DMSs were deployed within the screened interval of each well and below the water table to ensure that they were fully submerged and within the well screen. The tether was secured to the well cap, and the well and well vault were sealed until sampling.

##### Sampling

As the tether was reeled up, each DMS was removed from the well and the contents were decanted into the required laboratory supplied sample bottles. Sample bottles were immediately placed on ice pending shipping. After sample bottles were filled, any remaining water was transferred into the required storage container and was held in the appropriate investigation-derived waste (IDW) yard pending disposal or analysis, based on the historical analytical results from the GWM well. If it was not redeployed, the dedicated tether was placed in a labeled, protective bag for storage until the next sampling event.

### B-1.3.2 LOW-FLOW SAMPLING

Low-flow purging and sampling was conducted in accordance with the requirements of Parts 6.5.17.4 and 6.5.17.5 of the RCRA Permit (NMED, 2010) and approved work plans (Section B-1.1). Low-flow sampling was conducted using either portable or dedicated pumps. If dedicated Bennett pumps fail, they will not be replaced. Instead, the well will be sampled using a portable pump.

Low-flow sampling was conducted in order of clean to increasing contamination based on historical analytical data. When portable low-flow pumps were used, separate pumps were used to sample clean wells versus intermediate or expected hazardous wells in order to decrease the possibility of cross-contamination.

#### B-1.3.2.1 Instruments and Equipment Used

Low-flow sampling was conducted using either a portable or dedicated Bennett pump. Interface probes, PIDs, multiparameter meters with a flow-through cell attached, and turbidity meters were also used during low-flow sampling. Wells without a dedicated pump were designated, based on historical analytical data, as either clean, intermediate, or expected hazardous. Decontaminated, non-dedicated tubing and portable low-flow pumps were used to sample wells designated as clean, with the sampling assembly decontaminated following use at each well. Dedicated tubing specific to a given well was used for wells designated as intermediate or expected hazardous.

#### B-1.3.2.2 Methods

Where a portable pump was required, the pump was lowered into the GWM well to a depth of approximately 2 ft below the top of screen for wells where the screened interval was fully submerged. Where the screened interval was partially submerged, the pump intake was placed approximately 2 ft above the bottom of the screen.

Monitoring wells were purged in accordance with the requirements of Part 6.5.17.4 of the RCRA Permit (NMED, 2010) and the approved work plans (Section B-1.1). Groundwater was purged continuously at a flow rate between 0.5 and 1 liter per minute, while field parameters (turbidity, temperature, DO, specific conductivity, pH, and ORP) were measured and recorded every 5 minutes. Purging was considered complete when the groundwater quality parameters stabilized for three consecutive readings. Stability was defined as measurements within 10% of each other for specific conductivity, DO, and temperature; within 0.5 standard units for pH; and turbidity either below 10 nephelometric turbidity units or measurements within 10% of each other. This was a variance from the RCRA Permit, which stipulates that three quarters of a well volume be purged from the well prior to sampling. This variance was presented in the Work Plan for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design (Kirtland AFB, 2017), which was approved by NMED on May 31, 2017 (NMED, 2017a). The approval meets the requirement in Part 6.5.17.4 of the RCRA Permit (NMED, 2010) that states, "The Permittee may submit to the department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled sampling activities." Purge information and field parameters were recorded on the field forms.

Where a dedicated sampling pump was present, an air compressor and tubing for the purge water were connected to the dedicated equipment. The pump intake was approximately in the middle of the screened interval in wells with dedicated pumps. Note that there are no dedicated pumps in wells with partially submerged screened intervals.

Wells sampled using a portable low-flow system were designated, based on historical analytical data, as either clean, intermediate, or hazardous. Decontaminated non-dedicated tubing and portable low-flow pumps were used to sample wells designated as clean. Dedicated tubing specific to a given well was used for wells designated as intermediate or hazardous. The following procedures were applied when sampling wells using a portable low-flow system:

- Samplers donned new sampling gloves at each well before beginning sampling.
- Prior to deployment, the pump and the associated tubing was decontaminated, or dedicated tubing was used.
- An equipment blank was collected from non-dedicated equipment with the frequency specified in Part 6.5.17.6 of the RCRA Permit (NMED, 2010).
- If the top of water measured during the preparation for purging was within the screened interval, the pump intake was set 2 ft below the water table. If the top of the water was above the screened interval, the pump intake was set 2 ft above the bottom of the screened interval.
- The entire sampling assembly was decontaminated following use at each well.

The water sample containers were filled in accordance with the Quality Assurance Project Plan (QAPP). Samples for VOC analysis were collected first. The sample vials were carefully filled to avoid overflow and potential loss of preservative, and gently tapped so entrapment of air was minimized and no head space existed. If bubbles appeared, the vial was refilled or a new vial was used if a sample preservative (e.g., hydrochloric acid) was present.

# B-1.4 WATER SUPPLY WELL SAMPLING

Three drinking water supply wells were sampled monthly as part of the ST-106/SS-111 investigation to confirm that they have not been impacted by groundwater contaminants. These wells included ST106-VA2 on Veterans Affairs Medical Center property, and KAFB-003, KAFB-015, and KAFB-016 on Kirtland AFB property.

## B-1.4.1 INSTRUMENTS USED

Drinking water sampling was conducted using a multiparameter meter with a sample cup and a turbidity meter.

## B-1.4.2 METHODS

Because the wells were actively producing water during sampling, water levels at these wells were not measured prior to sampling. In addition, one well volume was not purged prior to sampling. Sampling at the drinking water supply wells was performed in accordance with the following steps:

Step 1. A water quality instrument(s) was used to collect field readings for DO, pH, ORP, conductivity, turbidity, and temperature during sampling. The multi-parameter instrument was calibrated per the manufacturer's instructions for DO, pH, ORP, conductivity, and turbidity. The readings were recorded in a calibration log.

Step 2. The multi-parameter instrument was decontaminated before use at each water supply well location.

Step 3. A bucket was placed underneath the sample port at the wellhead and the sample port was opened. Any water in the sample port was purged for 30 seconds to ensure removal of potentially accumulated sediment.

Step 4. The sample cups were filled from the sample port for the water quality instruments(s) to take a baseline reading of DO, pH, ORP, conductivity, turbidity, and temperature. These parameters were recorded on the sample collection log.

Step 5. The water sample containers were filled in accordance with requirements of the QAPP. Samples for VOC analysis were collected first. The sample bottles were carefully filled to avoid overflow and potential loss of preservative, and tapped so entrapment of air was minimized and no head space existed. If bubbles appeared, the vial was refilled or a new vial was used if a sample preservative (e.g., hydrochloric acid) was present.

# B-1.5 GROUNDWATER TREATMENT SYSTEM

The GWTS was sampled in accordance with the requirements in the Class V Underground Injection Well Discharge Permit No. 1839 (NMED, 2017b).

## B-1.5.1 SAMPLING

### *B-1.5.1.1 Instruments Used*

GWTS sampling was conducted using a multiparameter meter with a flow-through cell and a turbidity meter.

### *B-1.5.1.2 Methods*

Samples were collected from their respective sampling ports by opening the port and discharging process water into the sampling containers. The port was opened in such a way that it did not readily cause entraining of air and subsequent off-gassing of the samples and did not cause loss of sample preservatives from sample containers. Waste containers were placed under sampling ports prior to sampling to ensure capture of all process water. Excess water collected in the waste containers were emptied into the GWTS building sump for treatment. GWTS samples were collected from ports located before the influent skid pumps, between the granular activated carbon vessels, and after the effluent skid pumps. Prior to sampling, the port was flushed for a minimum of 1 minute. Field parameters including temperature, specific conductance, pH, ORP, DO, and turbidity were measured using a multiparameter meter with a flow-through cell and a turbidity meter. Values were recorded on a sample collected log as a snapshot of water quality at the time of sampling.

Field filtering for dissolved metals was performed by affixing a clean piece of poly tubing onto the sampling port. The inline 0.45-micron field filter was attached to the open end of the poly tubing. The port was then opened so as to condition the poly tubing and filter with process water for approximately 30 seconds. Samples were then collected from the process water flowing through the filter. All process water not collected in the sample container was collected into an appropriate waste container and was discharged to the GWTS building sump for treatment.

After purging was completed, samples were collected and handled in accordance with Part 6.5.5 of the RCRA Permit (NMED, 2010). The required sampling containers were filled and placed on ice pending shipping.

## B-1.5.2 EXTRACTION WELL DISINFECTION

### *B-1.5.2.1 Methods*

Extraction wells were not disinfected in the third quarter of 2021. The general procedure for disinfection is discussed below.

If extraction wells are disinfected during a quarter, a pre-disinfection sample will be taken before disinfection occurs. Sodium hypochlorite solution will be added to 500 gallons of water to provide a concentration of at least 50 ppmv free chlorine when added to an extraction well. The extraction well will be shut down, and the diluted sodium hypochlorite solution will be gravity-fed down the well. The extraction well is kept offline for approximately 24 hours. The well is then turned back online, and then the water is pumped down through the conveyance line to the GWTS. This water is discharged to an external sump, bypassing the carbon canisters, where any remaining free chlorine in the well water is allowed to evaporate. A post-disinfection sample will be taken after pumping the well free of remaining

free chlorine. Pre- and post-disinfection samples are collected from a sample port in the well vault. Prior to sampling, the pump will run for a minimum of 30 minutes and the sample ports are open for a minimum of 10 seconds to flush any entrained sediment. Samples are analyzed for chlorite, bromate, and perchlorate.

# B-1.6 SAMPLE HANDLING, SHIPPING, AND CUSTODY

Sample handling, shipping, and custody requirements were designed to maintain sample integrity from the time a sample is collected until it is received at the analytical laboratory. Samples were handled and shipped in accordance with Part 6.5.5 of the RCRA Permit (NMED, 2010) and approved work plans (Section B-1.1).

## B-1.6.1 SAMPLE HANDLING

Samples were handled in accordance with the requirements in Part 6.5.5.1 of the RCRA Permit (NMED, 2010). The procedures below were followed:

- Protective gloves, such as nitrile gloves, were worn while collecting samples. New disposable gloves were worn for each sample.
- Samples were collected in new laboratory-provided glass or plasticware containing the required preservatives for the analytical method.
- Samples were immediately placed on ice where required by the analytical method.
- Sample labels were completed and applied, field documentation was completed, and sample custody was maintained.
- Samples were placed in appropriate protective bags (i.e., bubble bags) to prevent breakage or puncture during shipping.

## B-1.6.2 SAMPLE SHIPMENT

Sample packing and shipping was conducted in accordance with the requirements in Part 6.5.5.2 of the RCRA Permit (NMED, 2010). Specific procedures for packaging and shipping of environmental samples are presented below:

- New disposable nitrile gloves were worn when preparing samples for shipping.
- A sample label, completed with indelible ink, was attached to the sample bottle.
- A cooler was used as a shipping container.
- In preparation for shipping samples, the drain plug was taped shut so that no fluids (i.e., melted ice) could drain out of the cooler during shipment. A large plastic bag was used as a liner for the cooler. Packing material (i.e., bubble wrap) was placed in the bottom of the liner and ice was placed at the bottom of the cooler.
- The containers were placed in the lined cooler. Bubble wrap or carboard separators were placed between the containers at the discretion of the shipper.
- All samples for chemical analysis must be shipped cooled to ≤6 degrees Celsius with ice. All samples required icing before shipment. A temperature blank was included in each shipment of water samples.

- The liner was taped closed, if used, and sufficient packing material was used to prevent sample containers from making contact or rolling around during shipment.

- The chain-of-custody form, including the analytical request form, was placed inside a resealable plastic bag inside of the cooler.

- The cooler was closed and taped shut with packing tape.

- Custody seals were placed on the cooler. Clear tape was placed over the custody seals to help prevent them from being accidentally torn or ripped off.

- The cooler of samples was submitted to the laboratory in an appropriate timeframe based on the hold time and temperature requirements (i.e., shipped via an overnight carrier). A copy of the shipping bill was retained for the field records and sent electronically to the project chemist.

### B-1.6.3 SAMPLE CUSTODY

Sample custody was maintained in accordance with the requirements in Part 6.5.5.3 of the RCRA Permit (NMED, 2010). Samples collected for analysis were recorded on field sample collection logs and chain-of-custody forms. Chain-of-custody forms were placed in the cooler or other shipping container. Custody seals were applied to the cooler or other shipping container. Upon receipt of the samples at the laboratory, custody seals were broken, the chain-of-custody forms were signed as received by laboratory personnel, and the conditions of the samples were recorded on the form. Chain-of-custody form copies were returned, which Kirtland AFB maintains.

At a minimum, chain-of-custody forms included the following:

- Sample Identification number
- Signature of sample collector
- Date and time of sample collection
- Location at which the sample was collected
- Type of media sampled
- Preservatives used
- Analysis required
- Signature of all persons that had custody of the samples
- Dates and times of possession
- Signature, date, and time of breaking the custody seal by the laboratory

### B-1.6.4 SAMPLE LABELS

Sample labels were prepared in accordance with the requirements in Part 6.5.5.4 of the RCRA Permit (NMED, 2010). Labels were affixed to each sample container and were completed immediately following sampling using indelible ink. Labels were covered by transparent waterproof tape to maintain legibility. At a minimum, labels included the following:

- Sample identification number
- Name or initials of sample collector
- Sample location
- Sample date and time
- Analytical parameter and method requested
- Preservation method

# B-1.7 PURGE AND DECONTAMINATION WATER MANAGEMENT AND DISPOSAL

Purge and decontamination water was managed and disposed of in accordance with the requirements in Part 6.5.7 of the RCRA Permit (NMED, 2010). Prior to GWM sampling for the quarter, historical data from each monitoring well was evaluated to determine how purge or well maintenance water was initially managed. IDW purge water was managed in one of three categories: (1) non-hazardous water that meets GWTS discharge criteria, (2) non-hazardous water that requires evaluation/approval prior to discharge to the GWTS, and (3) hazardous or suspected hazardous water managed as hazardous waste. In addition, ancillary fluids (i.e., decontamination water and calibration fluids) were managed and, if appropriate, discharged at the GWTS after review/approval of analytical data.

## B-1.7.1 NON-HAZARDOUS PURGE WATER MANAGEMENT

Non-hazardous IDW purge water collected during sampling of the GWM wells was placed in 55-gallon poly drums. The drums were sealed with matching plastic lids with steel, locking-ring collars, labeled with vinyl non-hazardous waste labels, and transferred to the designated non-hazardous IDW yard located on Kirtland AFB. Small volumes of IDW water, typically generated from the sampling of passive sampling devices or sampling of drinking water wells, were placed in labeled, 5-gallon plastic buckets (pails) with sealing lids.

Eligibility for discharge of non-hazardous liquid IDW to the GWTS was determined by comparing historical, well-specific data from the previous two quarters to the acceptance criteria of the GWTS. Liquid IDW from monitoring wells that had historically met the GWTS acceptance criteria was placed on an Auto-Approval List that authorizes discharge to the facility without further review. Any liquid IDW on the Auto-Approval List that was collected, but not yet processed through the GWTS, was temporarily held in the "Pending Disposal" area of the IDW yard.

Liquid IDW sourced from wells with historical data from the previous two quarters that exceeded the GWTS acceptance criteria was held for further evaluation in the "Pending Analysis" area of the IDW yard. Upon receipt of the laboratory analytical data for each well, the data were evaluated against GWTS acceptance criteria. If the data were within GWTS acceptance criteria, the purge water was approved for GWTS discharge. If the data indicated that one or more constituents were outside GWTS parameters, the purge water was processed for offsite disposal at a permitted facility.

## B-1.7.2 HAZARDOUS PURGE WATER MANAGEMENT

All liquid hazardous waste (purge or well development water) was placed in 55-gallon steel drums with steel tops and locking rings (UN designation 1A2/Y1.2/100/**). When small volumes (less than 5 gallons) of waste were generated at a well, a plastic container with a threaded top (jerrican) was used to contain the liquid. The jerrican was then placed in a steel, 55-gallon drum for more secure storage. All waste containers were properly labeled, sealed, and placed on secondary containment pallets located within the appropriate less than 90-day accumulation area. The accumulation areas and waste containers were inspected on a weekly basis by trained personnel as required under 40 Code of Federal Regulations (CFR) 262.34.

Hazardous or suspected hazardous IDW was accumulated in one of two RCRA less than 90-day accumulation areas associated with the Kirtland AFB Bulk Fuels Facility Project. Hazardous waste generated from routine GWM sampling or well maintenance activities (purge, well development, or well rehabilitation water) was placed in the Kirtland AFB Bulk Fuels Facility RCRA less than 90-day

accumulation area. Hazardous or suspected hazardous waste generated during drilling activities was held in the Kirtland AFB Zia Park temporary RCRA less than 90-day accumulation area.

Prior to the start of each quarterly GWM sampling event, a preliminary evaluation was made to identify monitoring wells that were anticipated to generate characteristically hazardous liquid IDW for initial waste segregation purposes. Based on historical analytical data available for each well, the water was suspected to be characteristically hazardous if the concentration of benzene exceeded 500 micrograms per liter (per 40 CFR Part 261.24) in either of the previous two sampling events. Liquid IDW from these wells was managed as potentially characteristically hazardous waste pending confirmation from laboratory analytical results.

For monitoring wells located in the source area of the groundwater plume that have historically shown consistent data that indicate purge water was hazardous, "Generator Knowledge" was used for hazardous waste determination. Use of generator knowledge to determine if solid waste is hazardous is permitted under RCRA regulation 40 CFR 262.11(d)(1).

Upon receipt of analytical data, the IDW remained in the less than 90-day accumulation area if confirmed to be a hazardous waste. If the IDW was determined to not meet hazardous criteria based on analytical data, the non-hazardous waste was transferred to the "Pending Disposal" area of the non-hazardous IDW yard.

All hazardous waste was removed from Kirtland AFB and properly disposed of off-Base within the required 90-day accumulation time limit. Hazardous waste was transported off Kirtland AFB after it was properly profiled, manifested, and approved for transport by the Kirtland AFB Hazardous Waste Management Group. Waste was transported by a licensed hazardous waste hauler to a permitted treatment, storage, and disposal facility.

# B-1.8 REFERENCES

Kirtland AFB. 2016. *Aquifer Test Report for Groundwater Extraction Well KAFB-106228, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base, New Mexico.* Prepared by CB&I Federal Services for Kirtland AFB under USACE–Albuquerque District Contract No. W912DY-10-D-0014. July.

Kirtland AFB. 2017. *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2, Solid Waste Management Unit ST-106/SS-111*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE–Albuquerque District Contract No. W912DR-12-D-0006. January.

New Mexico Environment Department (NMED). 2010. Hazardous Waste Treatment Facility Operating Permit, EPA ID No. NM9570024423, issued to U.S. Air Force for the Open Detonation Unit Located at Kirtland Air Force Base, Bernalillo County, New Mexico, by the NMED Hazardous Waste Bureau. July.

NMED. 2017a. Correspondence from Juan Carlos Borrego, Deputy Secretary, Environment Department to Colonel Eric H. Froehlich, Base Commander, Kirtland AFB, New Mexico, and Lieutenant Colonel Wayne J. Acosta, Civil Engineer Office, Kirtland AFB, New Mexico, *re: Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2, Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base*. EPA ID No. NM9570024423, HWB-KAFB-13-MISC. May 31.

NMED. 2017b. *Discharge Permit Issuance DP-1839, Kirtland Air Force Base, Bernalillo County, New Mexico*. By the New Mexico Environment Department Groundwater Quality Bureau. April.

# APPENDIX B-2

## Current and Former Well Identification

## Table B-2
## Current and Former Well Identification

| Current Well ID | Previous Well ID | REI Assignment | Previous Aquifer Assignment |
|---|---|---|---|
| KAFB-003 | KAFB-3, KAFB003 | — | Regional Deep |
| KAFB-015 | KAFB-15, KAFB015 | — | Regional Deep |
| KAFB-016 | KAFB-16, KAFB016 | — | Regional Deep |
| KAFB-106001 | KAFB-1061 | 4857 & 4838 | Shallow |
| KAFB-106002 | KAFB-1062 | 4857 | Shallow |
| KAFB-106003 | KAFB-1063 | 4857 | Shallow |
| KAFB-106004 | KAFB-1064 | 4857 | Shallow |
| KAFB-106005 | KAFB-1065 | 4857 | Shallow |
| KAFB-106006 | KAFB-1066 | 4857 | Shallow |
| KAFB-106007 | KAFB-1067 | 4857 | Shallow |
| KAFB-106008 | KAFB-1068 | 4857 | Shallow |
| KAFB-106009 | KAFB-1069 | 4857 | Shallow |
| KAFB-106010 | KAFB-10610 | 4857 | Shallow |
| KAFB-106011 | KAFB-10611 | 4857 | Shallow |
| KAFB-106012R | KAFB-10612R | 4857 | Shallow |
| KAFB-106013 | KAFB-10613 | 4857 | Shallow |
| KAFB-106014 | KAFB-10614 | 4857 | Shallow |
| KAFB-106015 | KAFB-10615 | 4857 & 4838 | Shallow |
| KAFB-106016 | KAFB-10616 | 4857 | Shallow |
| KAFB-106017 | KAFB-10617 | 4857 & 4838 | Shallow |
| KAFB-106018 | KAFB-10618 | 4857 & 4838 | Shallow |
| KAFB-106019 | KAFB-10619 | 4857 & 4838 | Shallow |
| KAFB-106020 | KAFB-10620 | 4857 | Shallow |
| KAFB-106021 | KAFB-10621 | 4857 & 4838 | Shallow |
| KAFB-106022 | KAFB-10622 | 4857 & 4838 | Shallow |
| KAFB-106023 | KAFB-10623 | 4857 | Shallow |
| KAFB-106024 | KAFB-10624 | 4857 | Shallow |
| KAFB-106025 | KAFB-10625 | 4857 & 4838 | Shallow |
| KAFB-106026 | KAFB-10626 | 4857 | Shallow |
| KAFB-106027 | KAFB-10627 | 4857 | Shallow |
| KAFB-106028 | KAFB-10628-510 | 4857 | Shallow |
| KAFB-106029 | — | 4857 | Shallow |
| KAFB-106030 | — | 4838 | Intermediate |
| KAFB-106031 | — | 4814 | Deep |
| KAFB-106032 | — | 4857 | Shallow |
| KAFB-106033 | — | 4838 | Intermediate |
| KAFB-106034 | — | 4814 | Deep |
| KAFB-106035 | — | 4857 | Shallow |
| KAFB-106036 | — | 4838 | Intermediate |
| KAFB-106037 | — | 4814 | Deep |
| KAFB-106038 | — | 4857 | Shallow |
| KAFB-106039 | — | 4838 | Intermediate |
| KAFB-106040 | — | 4814 | Deep |
| KAFB-106041 | — | 4857 | — |
| KAFB-106042 | — | 4857 | Shallow |
| KAFB-106043 | — | 4814 | Deep |
| KAFB-106044 | — | 4838 | Intermediate |
| KAFB-106045 | — | 4814 | Deep |
| KAFB-106046 | — | 4857 | Shallow |
| KAFB-106047 | — | 4838 | Intermediate |
| KAFB-106048 | — | 4814 | Deep |
| KAFB-106049 | — | 4857 | Shallow |
| KAFB-106050 | — | 4838 | Intermediate |
| KAFB-106051 | — | 4814 | Deep |

## Table B-2
## Current and Former Well Identification

| Current Well ID | Previous Well ID | REI Assignment | Previous Aquifer Assignment |
|---|---|---|---|
| KAFB-106052 | — | 4857 | Shallow |
| KAFB-106053 | — | 4838 | Intermediate |
| KAFB-106054 | — | 4814 | Deep |
| KAFB-106055 | — | 4857 | Shallow |
| KAFB-106057 | — | 4838 | Intermediate |
| KAFB-106058 | — | 4814 | Deep |
| KAFB-106059 | — | 4857 | Shallow |
| KAFB-106060 | — | 4838 | Intermediate |
| KAFB-106061 | — | 4814 | Deep |
| KAFB-106062 | — | 4814 | Deep |
| KAFB-106063 | — | 4838 | Intermediate |
| KAFB-106064 | — | 4857 | Shallow |
| KAFB-106065 | — | 4838 | Intermediate |
| KAFB-106066 | — | 4814 | Deep |
| KAFB-106067 | — | 4857 | Shallow |
| KAFB-106068 | — | 4814 | Deep |
| KAFB-106069 | — | 4838 | Intermediate |
| KAFB-106070 | — | 4857 | Shallow |
| KAFB-106071 | — | 4814 | Deep |
| KAFB-106072 | — | 4838 | Intermediate |
| KAFB-106073 | — | 4838 | Intermediate |
| KAFB-106074 | — | 4814 | Deep |
| KAFB-106075 | — | 4857 | Shallow |
| KAFB-106076 | — | 4857 | Shallow |
| KAFB-106077 | — | 4838 | Intermediate |
| KAFB-106078 | — | 4814 | Deep |
| KAFB-106079 | — | 4857 | Shallow |
| KAFB-106080 | — | 4838 | Intermediate |
| KAFB-106081 | — | 4814 | Deep |
| KAFB-106082 | — | 4857 | Shallow |
| KAFB-106083 | — | 4838 | Intermediate |
| KAFB-106084 | — | 4814 | Deep |
| KAFB-106085 | — | 4857 | Shallow |
| KAFB-106086 | — | 4838 | Intermediate |
| KAFB-106087 | — | 4814 | Deep |
| KAFB-106088 | — | 4857 | Shallow |
| KAFB-106089 | — | 4838 | Intermediate |
| KAFB-106090 | — | 4814 | Deep |
| KAFB-106091 | — | 4857 | Shallow |
| KAFB-106092 | — | 4838 | Intermediate |
| KAFB-106093 | — | 4814 | Deep |
| KAFB-106094 | — | 4857 | Shallow |
| KAFB-106095 | — | 4838 | Intermediate |
| KAFB-106096 | — | 4814 | Deep |
| KAFB-106097 | — | 4838 | Intermediate |
| KAFB-106098 | — | 4814 | Deep |
| KAFB-106099 | — | 4838 | Intermediate |
| KAFB-106100 | — | 4814 | Deep |
| KAFB-106101 | — | 4838 | Intermediate |
| KAFB-106102 | — | 4814 | Deep |
| KAFB-106103 | — | 4838 | Intermediate |
| KAFB-106104 | — | 4814 | Deep |
| KAFB-106105 | — | 4838 | Intermediate |
| KAFB-106106 | — | 4857 | Shallow |

## Table B-2
## Current and Former Well Identification

| Current Well ID | Previous Well ID | REI Assignment | Previous Aquifer Assignment |
|---|---|---|---|
| KAFB-106107 | — | 4814 | Deep |
| KAFB-106148-484 | — | 4857 | — |
| KAFB-106149-484 | — | 4857 | — |
| KAFB-106150-484 | — | 4857 | — |
| KAFB-106151-484 | — | 4857 | — |
| KAFB-106152-484 | — | 4857 | — |
| KAFB-106153-484 | — | 4857 | — |
| KAFB-106154-484 | — | 4857 | — |
| KAFB-106155-484 | — | 4857 | — |
| KAFB-106156-484 | — | 4857 | — |
| KAFB-106201 | — | 4857 | Shallow |
| KAFB-106202 | — | 4838 | Intermediate |
| KAFB-106203 | — | 4814 | Deep |
| KAFB-106204 | — | 4857 | Shallow |
| KAFB-106205 | — | 4838 | Intermediate |
| KAFB-106206 | — | 4814 | Deep |
| KAFB-106207 | — | 4857 | Shallow |
| KAFB-106208 | — | 4838 | Intermediate |
| KAFB-106209 | — | 4814 | Deep |
| KAFB-106212 | — | 4814 | Deep |
| KAFB-106213 | — | 4857 | Shallow |
| KAFB-106214 | — | 4838 | Intermediate |
| KAFB-106215 | — | 4814 | Deep |
| KAFB-106216 | — | 4857 | Shallow |
| KAFB-106217 | — | 4838 | Intermediate |
| KAFB-106218 | — | 4814 | Deep |
| KAFB-106219 | — | 4857 | Shallow |
| KAFB-106220 | — | 4838 | Intermediate |
| KAFB-106221 | — | 4814 | Deep |
| KAFB-106222 | — | 4857 | Shallow |
| KAFB-106223 | — | 4838 | Intermediate |
| KAFB-106224 | — | 4814 | Deep |
| KAFB-106225 | — | 4857 | Shallow |
| KAFB-106226 | — | 4838 | Intermediate |
| KAFB-106227 | — | 4814 | Deep |
| KAFB-106228 | — | — | — |
| KAFB-106229 | — | 4857 | Shallow, Intermediate, and Deep |
| KAFB-106230 | — | 4838 | Intermediate |
| KAFB-106231 | — | 4857 | Shallow |
| KAFB-106232 | — | 4838 | Intermediate |
| KAFB-106233 | — | — | — |
| KAFB-106234 | — | — | — |
| KAFB-106235-438 | KAFB-106235-463 | 4857 | — |
| KAFB-106235-472 | KAFB-106235-492 | 4838 | — |
| KAFB-106235-501 | KAFB-106235-521 | 4814 | — |
| KAFB-106236-436 | KAFB-106236-461 | 4857 | — |
| KAFB-106236-470 | KAFB-106236-490 | 4838 | — |
| KAFB-106236-499 | KAFB-106236-519 | 4814 | — |
| KAFB-106240-449 | — | 4857 | — |
| KAFB-106241-428 | — | 4857 | — |
| KAFB-106242-418 | — | 4857 | — |
| KAFB-106243-425 | — | 4857 | — |
| KAFB-106244-445 | — | 4857 | — |
| KAFB-106245-460 | — | 4857 | — |

## Table B-2
## Current and Former Well Identification

| Current Well ID | Previous Well ID | REI Assignment | Previous Aquifer Assignment |
|---|---|---|---|
| KAFB-106247-490 | — | 4857 | — |
| KAFB-106S1-447 | — | 4857 | — |
| KAFB-106S2-451 | — | 4857 | — |
| KAFB-106S3-449 | — | 4857 | — |
| KAFB-106S4-446 | — | 4857 | — |
| KAFB-106S5-446 | — | 4857 | — |
| KAFB-106S7-491 | — | 4857 | — |
| KAFB-106S8-491 | — | 4857 | — |
| KAFB-106S9-447 | — | 4857 | — |
| KAFB-106248-452 | — | 4857 | — |
| KAFB-106249-450 | — | 4857 | — |
| KAFB-106250-447 | — | 4857 | — |
| KAFB-106251-425 | — | 4857 | — |
| KAFB-106252-443 | — | 4857 | — |
| KAFB-106252-515 | — | 4838 | — |
| KAFB-106S10-443 | -- | 4857 | — |
| KAFB-3411 | KAFB3411 | 4857 | Shallow |
| ST106-VA2 | VA HOSPITAL WELL | — | Regional Deep |

— = not applicable
ID = identification
REI = reference elevation interval
VA = Veterans Affairs