REPORT

FIRST SEMI-ANNUAL GROUNDWATER MONITORING REPORT (FORM 1216)

September 2017 Event

Lovington 66
PSTB Facility #1489
503 S. Main Street
Lovington, New Mexico

Submitted To: NMED-PSTB
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

On Behalf of: Jack Walstad Oil Company
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September 28, 2017

Project No. 1782919
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Golder Associates

Form 1216
First Semi-Annual Groundwater Monitoring Report

Site:	Lovington 66
Responsible Party:	Jack Walstad Oil Company Inc., Robert C. Murrell
Responsible Party Mailing Address:	2317 Tuttington Circle Oklahoma City, OK 73170
Facility ID:	1489
Release ID:	1182
Site Address:	424 S. Main St., Lovington, NM
Author/Consulting Company:	Golder Associates Inc.
Date of Report:	September 28, 2017
Date of Confirmation of Release:	December 5, 1991

STATEMENT OF FAMILIARITY

I, the undersigned, am personally familiar with the information submitted in this report and the attached documents and attest that it is complete and true to the best of my knowledge.

Signature:  Date: September 28, 2017

Name: Emily Clark
Affiliation: Golder Associates Inc.
Title: Project Manager

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1.0 INTRODUCTION

On behalf of Jack Walstad Oil Company (Walstad), Golder Associates Inc. (Golder) completed the first semi-annual groundwater monitoring event and first quarter NAPL recovery at the former Lovington 66 site. The monitoring event was completed in accordance with the *Work Plan for Groundwater Monitoring and NAPL Bailing/Disposal, Lovington 66 (LUST ID #1182), Lovington, New Mexico* dated June 27, 2017. This work plan satisfies the requirements stated in the New Mexico Administrative Code, Title 20, Chapter 5, Section 12 and the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) Guidelines for Corrective Action (GCA). The work plan was approved by the NMED PSTB on August 8, 2017 under work plan identification number (WPID #) 17926. This is the first deliverable under WPID #17926, and is identified as deliverable ID 17926-1.

The former Lovington 66 Site is located at 424 South Main Street, Lovington, New Mexico (**Figure 1**). This site is bounded by Highway 83/Avenue D on the south, and Main Street on the east. Avenue C is north of the site; west of the site is commercial property. Southeast of the site is Allsup's #109 convenience store and self-service gasoline station (Allsup's), which is also a PSTB corrective action site. Immediately south of the site, is an Exxon self-service gasoline station. The original Lovington 66 building has been demolished, and a McDonald's restaurant is presently located on the property. The former Lovington 66 was located on the southern portion of the property that now is the parking lot for McDonald's. The Lovington 66 dissolved phase plume has migrated southeast across the intersection of Main and Avenue D and is commingled with the Allsup's site dissolved phase plume.

Significant thickness of nonaqueous phase liquid (NAPL) fuels has been detected at the site in monitoring wells W-1, W-2 and W-3, as well as in Allsup's monitoring well MW-3, located approximately 200 feet downgradient and southeast across the intersection of NM 83 (Avenue D) and Main Street (**Figure 1**). In 2015, Golder further characterized the NAPL accumulation and performed pilot testing. The pilot testing results indicated that multiple remedial strategies could be implemented at the site including: NAPL recovery, water level suppression with enhanced NAPL recovery, multiphase extraction, or secondary enhanced bioremediation using oxygen injection once NAPL has been recovered. To date a remedial strategy has not been selected. At the request of NMED PSTB, Golder has continued NAPL recovery and disposal and groundwater monitoring events at the site to maximize contaminant reduction during the time required to plan, install, and operate capital remediation equipment at the site.

This document (Deliverable 17926-1) includes the 1st quarterly NAPL bailing information and the first semi-annual groundwater monitoring data collected in September 2017.

2.0 ACTIVITIES PERFORMED DURING THIS PERIOD

This section provides a brief description of previous corrective action activities conducted at the site, and monitoring activities performed during this monitoring period.

2.1 Brief Description of Corrective Action Activities

No active remediation activities have been completed at the site and the site is does not have a remedial action system installed. Previous corrective action activities that have occurred at the site include the following:

- July 1991 – AEI Tank, Inc. (AEI) conducted a site assessment that included seven soil borings advanced within the underground storage tank (UST) backfill or UST perimeter, and five borings in or near product pipe trenches. Hydrocarbon contamination was observed.
- November 1991 – AEI removed five USTs that contained diesel, unleaded fuels, and used oil, as well as the associated product piping and fuel dispensers. Hydrocarbon contamination was observed in the location of the dispensers and the location of the diesel tank. It was determined that a release likely occurred from overfilling the USTs and from the dispensers and product lines (a large section of product piping had been replaced).
- November and December 1991 – AEI excavated approximately 600 cubic yards of contaminated soil from product line trenches, dispenser islands and tank excavations.
- December 1991 – AEI attempted to delineate the vertical extent of contamination by installing one soil boring. The location of this soil boring was never documented. During the drilling of the boring auger refusal was encountered at 40 feet below ground surface (bgs).
- February 1992 – AEI installed one groundwater monitoring well. Groundwater sample results indicated that groundwater contamination was present above New Mexico Water Quality Control Commission (NMWQCC) standards.
- March 1992 – AEI installed two additional monitor wells to determine the extent of dissolved phase hydrocarbon contamination. Both wells had dissolved phase hydrocarbon concentrations well above NMWQCC standards.
- June 1992 – Billings & Associates, Inc. (BAI) completed an Interim Hydrogeologic Investigation Report (on-site). During this investigation six soil borings (B-4 through B-9) were advanced at the site to a depth of 40 feet bgs. Heated headspace measurements above action levels were present in all borings except B-8. NAPL was present in the three monitor wells installed by AEI. Three additional monitor wells W-4, W-5, and W-6 were installed. The three new wells exceeded NMWQCC standards.
- September 1993 – BAI completed a 2nd Interim Hydrogeologic Investigation Report. During this investigation free product recovery efforts commenced using BAI's Product Recovery Filter system. In addition six new monitor wells (W-7 through W-12) and vertical extent well V-1, were installed.
- June 1993 – BAI submitted the 3rd Interim Hydrogeologic Investigation Report. Five wells (W-13 through W-17) were installed to delineate the dissolved phase plume. NAPL was present in vertical extent well V-1, which Billings attributed to leaking well casing.
- August 2006 – Golder sampled the Lovington 66 wells as part of an investigation conducted at the Allsup's site located downgradient from the Lovington 66 site.

- November 2007 – Golder completed a Continued Secondary Investigation in which three downgradient wells (W-19, W-20, and W-21) were installed and a NAPL bail down test was completed on wells W-2 and W-3. The downgradient extent of contamination was delineated.
- August 2008 – Golder completed four quarters of groundwater monitoring at the Lovington 66 site.
- February 2009 – Golder completed the first biannual monitoring event and associated quarterly product recovery from wells W-1, W-2, W-3, and V-1. The site data for the First Biannual Groundwater Monitoring Report was completed in January, 2009.
- August 2009 – Golder completed the second biannual monitoring event and associated quarterly product recovery from wells W-1, W-2 and W-3. The site data for the second Biannual Groundwater Monitoring Report was completed in July, 2009.
- February 2014 – Golder completed the first biannual monitoring event and associated quarterly product recovery from wells W-1, W-2, W-3, and V-1. The site data for the First Biannual Groundwater Monitoring Report was completed in January 2014.
- October 2014 – Golder completed the second biannual monitoring event and associated quarterly product recovery from wells W-1, W-2 and W-3. The site data for the second Biannual Groundwater Monitoring Report was completed in October 2014.
- June 2015 – Golder completed installation of a multiphase extraction pilot test well (MPE-1) at the property on June 14, 2015.
- July 2015 – Golder completed multiphase vacuum extraction pilot testing on Walstad wells MPE-1, W-1, W-2 and W-3 on July 12 and 13, 2015.
- June 2015 – Golder completed NAPL bail-down and recovery testing on wells W-1, W-2 and W-3 in June 2015.
- Golder conducted on-going semi-annual groundwater monitoring and quarterly NAPL removal/disposal from June 2017 to present.

2.2 Monitoring Activities Performed

Monitoring activities performed this period under WPID # 17926 included monitoring well W-7rehabilitation, the first semi-annual groundwater monitoring event, and the first quarterly NAPL recovery. Golder subcontracted CMB Environmental & Geological Services, Inc. (CMB) to perform all field monitoring activities at the site. Field activities were performed on September 11 and 12, 2017.

2.2.1 W-7 Rehabilitation

Since June 2015, root mass in W-7 at about 57 feet below the casing elevation has obstructed water level measurements. Before rehabilitating the well, CMB video surveyed the well to confirm the blockage and to determine if the casing was compromised. CMB rehabbed W-7 on September 11, 2017 by swabbing, surging and bailing the well to clean out the root material and silt build up. CMB repeated swabbing, surging, and bailing until tagging hard bottom. The total depth pre-rehab was measured at 57 feet below casing elevation and post-rehab the total depth was measured at 65.21 feet below casing elevation. Once the rehab was complete, CMB video surveyed the well again to ensure all the root material was removed and to inspect the casing and screen slots. A snap shot from the pre-rehab video and post-rehab videos are shown in Photos 1 and 2 below. The video surveys confirmed the casing for the well is intact.

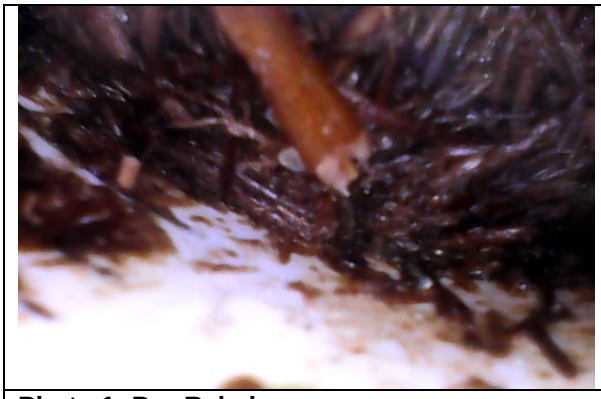	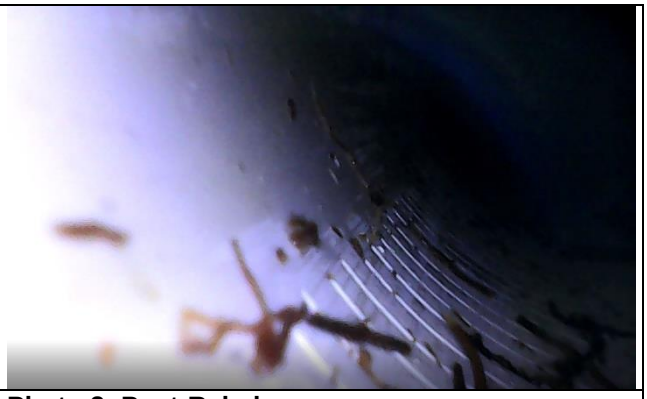
Photo 1: Pre-Rehab	**Photo 2: Post-Rehab**

Roots from a nearby elm tree appear to be growing through the slotted screen. The elm tree was cut sometime in the past; however, CMB observed new growth at the time of the rehab. CMB sprayed the tree with herbicide to inhibit future growth.

2.2.2 NAPL Gauging, Recovery and Disposal

CMB measured fluid levels in wells MPE-1, W-1, W-2 and W-3 on September 11, 2017 pursuant to the first quarterly NAPL bailing event. The four wells were gauged, bailed and then re-gauged. NAPL was present in all four of the Lovington 66 monitor wells (MPE-1, W-1, W-2, and W-3) and is also present in Allsup's well MW-3, located approximately 200 feet downgradient to the southeast. For the first time in the monitoring period of record, 0.74 feet of NAPL was observed in W-14 which is approximately 49 feet northwest of Allsup's well MW-3 (**Figure 1**).

Table 1 contains a cumulative summary of the NAPL thicknesses and recovered quantities from the Lovington 66 monitor wells since 2008. **Table 1** also contains NAPL gauging and recovery data collected during the Multiphase Extraction (MPE) pilot testing that was performed in July, 2015. Approximately 418 gallons of NAPL have been recovered since 2008.

A total of 17.03 gallons of NAPL were recovered from the wells during the September 11, 2017 bailing event. The NAPL and highly contaminated groundwater that were recovered during NAPL bailing at the site on September 11, 2017 were transported to the Gandy Marley disposal facility in Roswell; a copy of the documentation of disposal is included in **Appendix A.**

2.2.3 Groundwater Gauging and Sampling Activities

Groundwater gauging and sampling was conducted on September 11 and 12, 2017. Prior to collecting groundwater samples, CMB measured fluid levels with an electronic water level meter or interface probe. Lovington 66 wells W-4, W-6, W-10, and W-17 were inaccessible. Wells W-4, W-6 and W-17 have been destroyed since 2006. Well W-10 has a broken well vault and is located in the middle of Main Street. Thus, it is generally unsafe to measure fluid levels at this well without a formal traffic control plan. Allsup's site

wells MW-1 and MW-2 were also inaccessible. Allsup's well MW-2 was covered in 2014 when the parking lot was repaved. Allsup's well MW-1 well vault is cemented shut.

Table 2 provides a summary of the groundwater level and NAPL measurements collected from the accessible monitoring wells. A potentiometric surface map was prepared using the collected data and is included in **Figure 2**. Hydrographs showing water levels and NAPL thickness trends in selected wells are included in **Appendix B**.

Eight Lovington 66 monitoring wells (W-5, W-8, W-9, W-11, W-16, W-19, W-20, and W-21) were purged and sampled with disposable polyethylene bailers following the measurement of fluid levels in the wells. MW-14 was scheduled to be sampled, but was not sampled because there was 0.74 feet of NAPL observed in the well. The wells were sampled from least to most contaminated where possible to minimize cross-contamination. All equipment was decontaminated between wells with an Alconox™ solution to prevent cross-contamination. Purge water was ground discharged in accordance with Section 1.7.2 of the GCA. Sampling was accomplished by carefully pouring groundwater from new disposable bailers into the sample containers.

CMB measured field parameters of produced water during purging and prior to sampling. The multi-parameter meter was calibrated and/or checked against standards in accordance with manufacturer's specifications prior to use. Specific conductance, dissolved oxygen (DO), pH, Oxidation-Reduction Potential (ORP) and temperature were recorded on monitoring well sampling field forms. Monitoring well sampling field forms are provided in **Appendix C**. A summary of field parameter data from well purging activities is presented in **Table 3**.

Samples for VOC analysis were collected such that no headspace air existed in the sample vial. All samples were preserved in accordance with analytical method EPA 8260B requirements, then immediately cooled to 4°C with ice and delivered under chain-of-custody to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico within the applicable hold time of 14 days. The analytical laboratory report is provided in **Appendix D**.

2.2.4 Groundwater Sampling Results

The laboratory analytical results for the first semi-annual monitoring event are summarized in **Table 4**. Notable findings from this event are summarized as follows:

- Dissolved phase hydrocarbon concentrations were at or above NMWQCC standards in five of the eight monitor wells sampled.
- Well W-14 was not sampled due to the presence of NAPL. Well W-14 is presumed to exceed regulated limits for gasoline derived groundwater contaminants.

- Benzene concentrations exceeding the New Mexico Water Quality Control Commission (NMWQCC) standard of 10 micrograms per liter (µg/L) in samples collected from W-5 (42 µg/L), W-8 (15,000 µg/L), and W-9 (2,500 µg/L).
- Toluene concentrations exceeding the New Mexico Water Quality Control Commission (NMWQCC) standard of 750 micrograms per liter (µg/L) in the sample collected from W-8 (6,100 µg/L).
- Ethylbenzene concentrations exceeding the New Mexico Water Quality Control Commission (NMWQCC) standard of 750 micrograms per liter (µg/L) in the sample collected from W-8 (2,100 µg/L).
- Xylenes concentration exceeding the New Mexico Water Quality Control Commission (NMWQCC) standard of 620 micrograms per liter (µg/L) in the sample collected from W-8 (4,900 µg/L).
- Methyl tert-butyl ether (MTBE) concentrations exceeding the New Mexico Water Quality Control Commission (NMWQCC) standard of 100 micrograms per liter (µg/L) in samples collected from W-8 (14,000 µg/L) and W-9 (420 µg/L).
- Ethylene dichloride (EDC) concentrations exceeded the 10 µg/L NMWQCC standard in samples collected from W-8 (260 µg/L), W-9 (510 µg/L), W-11 (52 µg/L), and W-19 (130 µg/L).
- Total naphthalene concentrations (total of reported naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene concentrations) exceeded the NMWQCC standard of 30 µg/L standard in samples collected from W-8 (594 µg/L) and W-9 (43 µg/L).
- The detection limit for ethylene dibromide (EDB) concentrations exceeded NMWQCC standard (0.1 µg/L) for all wells and no sample exceeded the detection limit for any of the wells tested.

2.3 Statement Verifying Containment of Release

The Lovington 66 dissolved phase plume has migrated southeast across the intersection of Avenue D and Main Street to Avenue E southeast of the site. The NAPL plume appears to have migrated beneath the intersection of Avenue D and Main Street with NAPL noted in Allsup's network well MW-3, and as of this monitoring period, well W-14. The downgradient extent of the dissolved phase plume appears to be upgradient of wells W-20 and W-21. Cumulative NAPL data, as well as dissolved VOC data from downgradient wells W-9 and W-19 indicate that the dissolved phase plume is mobile to the southeast.

3.0 SUMMARY AND CONCLUSIONS

This section summarizes the results of the first semi-annual monitoring event and includes a brief discussion of water level and contaminant concentration trends at the Lovington 66 site. Additionally, recommendations for future site activities are provided.

3.1 Discussion of any Trends or Changes Noted in Analytical Results or Site Conditions

The groundwater gauging results from the first semiannual groundwater monitoring event conducted in September 2017 indicate that there is a general southeasterly groundwater flow component at the Lovington 66 site. The groundwater flow directions observed in September 2017 are consistent with the flow directions observed during the previous monitoring event in January 2017. The hydraulic gradient in September 2017 is approximately 0.004 foot per foot (**Figure 2**).

Depth to shallow groundwater at the site is approximately 58 to 65 feet below ground surface. Groundwater and NAPL level measurements made during the September 11 and 12 site visits, as well as cumulative groundwater gauging data for the period of record at the site, are included in **Table 2**. The water levels within the individual monitoring wells generally fell by about 0.50 feet between January 2017 and September 2017. These measurements were used to prepare hydrographs and NAPL thickness histories for selected wells which are included in **Appendix B**.

The distribution of dissolved phase organic contaminants determined from analytical data from samples collected on September 12, 2017 and the estimated distribution of NAPL are shown on the map in **Figure 3**. NAPL was present in Lovington wells W-1, W-2, W-3, MPE-1 and for the first time in the monitoring period of record, well W-14. NAPL was also detected in Allsup's site well MW-3. NAPL has historically been detected in W-1, W-2, and W-3 (**Table 2**), but NAPL observations south of the site were first recorded in mid-2016 (MW-3) indicating more recent migration. NAPL thickness measurements in September 2017 were relatively unchanged from the January 2017 monitoring event, except for Allsup's well MW-3. Allsup's well MW-3 thickness decreased by about 5 feet since the previous event. However, the Allsup's site is monitored by NMED-PSTB as a separate facility and may have had NAPL removal recently. The history of NAPL thicknesses in wells W-1, W-2 and W-3 are shown on the hydrographs in **Appendix B**.

The distribution of benzene in the groundwater observed in September 2017 is shown on **Figure 4**. The dissolved phase benzene concentrations in well W-8 was approximately 4 orders of magnitude greater than the NMWQCC standard of 10 μg/L. The benzene concentration in well W-9 sample was anomalously low (10 μg/L) during the previous monitoring event in January 2017. The benzene concentration in Well W-9 was 2,500 μg/L in September 2017, which is more consistent with historical concentrations (3,800 to 8,000 μg/L since 2005). The shape and magnitude of the dissolved benzene plume is generally unchanged since the previous monitoring event in January 2017.

Distribution of MTBE in the groundwater observed in September 2017 is shown on **Figure 5**. The greatest MTBE concentration is downgradient from the NAPL plume near well W-8. EDC concentrations from the September 12, 2017 monitoring event are shown on **Figure 6**. EDC concentrations are also greatest downgradient from the NAPL plume near well W-8. The dissolved phase EDC plume extends to downgradient well W-19 (130 μg/L). The overall shapes of the mapped groundwater analyte plumes do not show significant regression or further excursion of dissolved fuel contaminants than those mapped during the previous sampling event in January 2017. Like benzene, the concentration of MTBE and EDC at well M-9 were anomalous during the previous monitoring event in January 2017. The results from the current monitoring event are consistent with the period of record measurements (**Table 4**).

Dissolved concentration historical trends are shown in the plots included in **Appendix E**. A significant spike in the concentration of benzene was detected in samples collected from side-gradient well W-16 between August 2006 and January 2009. A similarly-timed spike in MTBE concentration was noted in samples collected from side-gradient well W-11. These spikes may be associated with mobilization of adsorbed contaminants occurring during the period when groundwater levels rose and peaked during approximately the same time frame. MTBE concentrations declined in MW-8 and rose significantly in MW-9 since the January 2014 monitoring.

Field measurements of the ORP of groundwater samples from each of the nine sampled wells were used to prepare the projection of groundwater ORP shown on the map in **Figure 7**. This map indicates that reducing groundwater conditions, indicating continuing organic loading into groundwater, are distributed more than 800 feet downgradient and 800 feet laterally to gradient direction, across an area of approximately 13.5 acres to the southeast of fuel contaminants at the Walstad site.

3.2 Recommendations

Based on the results of the first semi-annual groundwater monitoring event, we conclude that the geometry of the dissolved phase fuel contaminant plume at the site has not changed significantly since the site was placed into regulatory enforcement in 1991. Separate phase fuel, however, appears to be mobile downgradient and to the southeast. NAPL was observed in monitoring well W-14 for the first time in the period of record. The estimated NAPL plume is now projected slightly larger to the south to include W-14.

The results of MPE pilot testing performed at the site in 2015 indicate that hydraulic conductance of sediments in the adsorbed fuel plume is limited. Vapor flow rates were found to be modest; however, NAPL recovery rates were noted to be significant. During the combined 16.6 hours of MPE operations performed during pilot testing, a total of 141 gallons of NAPL were recovered from the three tested wells, and the equivalent of an additional 89 gallons of fuel was recovered as vapor. Therefore, we recommend that NAPL recovery and/or MPE be implemented at the site.

Until active remediation is implemented, we recommend that semi-annual groundwater monitoring continue and that more frequent and aggressive NAPL recovery be performed using total fluids recovery from existing site wells and produced fluid be disposed at a permitted facility.

TABLES

Table 1: Summary of NAPL Gauging and Recovery
Lovington 66, Lovington, New Mexico

Monitor Well	Date Recovered	Prior to Bailing			Post Bailing			Total NAPL Recovered (gallons)	Sources of Data, Comments
		Depth To NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)	Depth to NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)		
W-1	3-Sep-08	54.69	58.52	3.83	-	57.22	0.00	6.00	1, NAPL Bailing Event
	27-Jan-09	54.69	58.22	3.53	-	56.25	0.00	6.00	1, NAPL Bailing Event
	12-May-09	54.85	57.78	2.93	-	56.62	0.00	1.90	1, NAPL Bailing Event
	10-Jul-09	55.33	56.99	1.66	-	56.69	0.00	1.08	1, NAPL Bailing Event
	12-Feb-14	57.30	60.08	2.78	-	57.88	0.00	8.50	1, NAPL Bailing Event
	9-Jun-14	57.72	64.31	6.59	-	59.85	0.00	4.18	1, NAPL Bailing Event
	15-Oct-14	57.91	64.55	6.64	-	60.20	0.00	20.05	1, NAPL Bailing Event
	2-Jun-15	58.11	64.89	6.78	60.41	60.51	0.10	5.75	1, NAPL Bail-Down Recovery Test
	13-Jul-15	57.12	63.96	6.84	NM	NM	NM	47.61	2, MPE Pilot Test
	15-Jun-16	58.18	64.18	6.00	61.30	61.31	0.01	4.24	1, NAPL Bailing Event
	8-Nov-16	58.38	64.68	6.30	60.70	60.75	0.05	12.80	1, NAPL Bailing Event
	21-Dec-16	58.26	64.42	6.16	61.27	61.28	0.01	6.88	1, NAPL Bailing Event
	18-Apr-17	58.17	64.02	5.85	-	59.91	0.00	7.08	1, NAPL Bailing Event
	11-Sep-17	58.65	65.02	6.37	-	61.63	0.00	4.14	1, NAPL Bailing Event
W-2	3-Sep-08	54.50	54.94	0.44	-	55.52	0.00	0.25	1, NAPL Bailing Event
	27-Jan-09	54.48	54.81	0.33	-	55.55	0.00	0.25	1, NAPL Bailing Event
	12-May-09	54.50	54.83	0.33	-	55.64	0.00	0.21	1, NAPL Bailing Event
	10-Jul-09	54.68	54.96	0.28	-	55.50	0.00	0.18	1, NAPL Bailing Event
	12-Feb-14	56.25	63.26	7.01	-	58.60	0.00	9.75	1, NAPL Bailing Event
	9-Jun-14	56.67	63.64	6.97	-	58.87	0.00	9.15	1, NAPL Bailing Event
	15-Oct-14	56.87	63.85	6.98	-	59.42	0.00	15.85	1, NAPL Bailing Event
	2-Jun-15	57.07	64.26	7.19	59.30	59.32	0.02	6.20	1, NAPL Bail-Down Recovery Test
	13-Jul-15	58.13	64.67	6.54	NM	NM	NM	25.92	2, MPE Pilot Test
	15-Jun-16	57.11	63.60	6.49	59.81	59.82	0.01	5.88	1, NAPL Bailing Event
	8-Nov-16	57.32	64.01	6.69	59.93	59.95	0.02	8.27	1, NAPL Bailing Event
	21-Dec-16	57.22	63.75	6.53	60.17	60.18	0.01	6.48	1, NAPL Bailing Event
	18-Apr-17	57.13	63.28	6.15	-	59.63	0.00	5.08	1, NAPL Bailing Event
	11-Sep-17	57.61	64.33	6.72	-	60.65	0.00	4.36	1, NAPL Bailing Event

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Table 1: Summary of NAPL Gauging and Recovery
Lovington 66, Lovington, New Mexico

Monitor Well	Date Recovered	Prior to Bailing			Post Bailing			Total NAPL Recovered (gallons)	Sources of Data, Comments
		Depth To NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)	Depth to NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)		
W-3	3-Sep-08	54.60	54.81	0.21	-	55.57	0.00	0.25	1, NAPL Bailing Event
	27-Jan-09	54.56	54.69	0.13	-	55.52	0.00	0.25	1, NAPL Bailing Event
	12-May-09	54.58	54.68	0.10	-	55.54	0.00	0.07	1, NAPL Bailing Event
	10-Jul-09	54.78	54.85	0.07	-	55.64	0.00	0.05	1, NAPL Bailing Event
	12-Feb-14	56.36	63.03	6.67	-	58.05	0.00	9.75	1, NAPL Bailing Event
	9-Jun-14	56.78	63.43	6.65	-	59.07	0.00	9.30	1, NAPL Bailing Event
	15-Oct-14	56.96	63.70	6.74	-	60.02	0.00	21.10	1, NAPL Bailing Event
	2-Jun-15	57.17	64.10	6.93	59.80	59.95	0.15	7.00	1, NAPL Bail-Down Recovery Test
	15-Jun-16	57.21	63.53	6.32	NM	NM	NM	8.88	1, NAPL Bailing Event
	8-Nov-16	57.42	63.90	6.48	60.12	60.17	0.05	12.00	1, NAPL Bailing Event
	21-Dec-16	57.32	63.68	6.36	-	60.58	0.00	7.60	1, NAPL Bailing Event
	18-Apr-17	57.22	63.28	6.06	-	60.06	0.00	6.88	1, NAPL Bailing Event
	11-Sep-17	57.75	64.16	6.41	-	60.91	0.00	4.16	1, NAPL Bailing Event
MPE-1	12-Jul-15	57.40	64.08	6.68	61.61	61.65	0.04	67.10	2, MPE Pilot Test
	15-Jun-16	57.43	63.75	6.32	NAPL not bailed				1, NAPL Bailing Event
	8-Nov-16	57.62	64.19	6.57	60.03	60.07	0.04	8.28	1, NAPL Bailing Event
	21-Dec-16	57.51	63.95	6.44	60.22	60.23	0.01	6.88	1, NAPL Bailing Event
	18-Apr-17	57.44	63.58	6.14	-	59.85	0.00	9.28	1, NAPL Bailing Event
	11-Sep-17	57.90	64.55	6.65	-	67.30	0.00	4.37	1, NAPL Bailing Event
V-1	3-Sep-08	53.92	58.45	4.53	-	55.20	0.00	1.00	1
		Well Plugged & Abandoned							

Cumulative Total NAPL Recovered at the Site (gallons) ***418.23***

Notes:

NAPL - Non Aqueous Phase Liquid

NAPL and water disposed of at Gandy-Marley

NM - not measured

Sources of Data

1: Clayton M Barnhill, Roswell NM

2: AcuVac Remediation, Inc. Houston, TX

Golder Associates

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
Allsup's # 109								
MW-1	6-Aug-2005	708392.73	843467.49	3909.74	-	-	55.07	3854.67
	8-Aug-2006				-	-	54.36	3855.38
	7-Nov-2007				-	-	53.93	3855.81
	12-May-2008				-	-	54.36	3855.38
	7-Aug-2008				-	-	54.86	3854.88
	28-Jan-2009				-	-	54.91	3854.83
	10-Jul-2009				-	-	55.12	3854.62
	12-Feb-2014				-	-	58.47	3851.27
	7-Oct-2014				-	-	58.86	3850.88
	23-Jun-2016				-	-	59.19	3850.55
	2-Jan-2017				No access - vault bolts ground off and filled with epoxy			
	12-Sep-2017				No access - well vault cemented shut			
MW-2	6-Aug-2005	708398.53	843584.18	3910.05	-	-	55.74	3854.31
	8-Aug-2006				-	-	55.04	3855.01
	7-Nov-2007				-	-	54.58	3855.47
	12-May-2008				-	-	55.05	3855.00
	7-Aug-2008				-	-	55.54	3854.51
	28-Jan-2009				-	-	55.56	3854.49
	10-Jul-2009				-	-	55.79	3854.26
	12-Feb-2014	Well Destroyed -- covered by new cement (parking lot)						
MW-3	6-Aug-2005	708484.61	843518.13	3910.14	-	-	55.33	3854.81
	8-Aug-2006				-	-	54.65	3855.49
	7-Nov-2007				-	-	54.22	3855.92
	13-May-2008				-	-	54.76	3855.38
	7-Aug-2008				-	-	55.15	3854.99
	28-Jan-2009				-	-	55.16	3854.98
	10-Jul-2009				-	-	55.42	3854.72
	12-Feb-2014				Bolts on vault are cemented in place			
	23-Jun-2016				58.28	5.14	63.42	3850.58
	2-Jan-2017				58.36	5.11	63.47	3850.50
	12-Sep-2017				60.16	0.51	60.67	3849.85

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
Walstad 66								
V-1	29-Aug-1992	708614.74	843348.54	99.37	-	-	56.68	42.69
	25-May-1993				-	-	56.74	42.63
	8-Aug-2006			3910.67	53.32	4.59	57.91	3852.76
	7-Nov-2007				53.01	4.58	57.59	3853.08
	13-Feb-2008				53.01	4.57	57.58	3853.09
	13-May-2008				53.41	4.57	57.98	3852.69
	7-Aug-2008				53.75	4.55	58.30	3852.37
		Well Plugged & Abandoned						
MPE-1	15-Jun-2016	Not Surveyed			57.43	6.32	63.75	Not Surveyed
	8-Nov-2016				57.62	6.57	64.19	Not Surveyed
	2-Jan-2017				57.51	6.44	63.95	Not Surveyed
	11-Sep-2017				57.9	6.65	64.55	Not Surveyed
W-1	12-Feb-1992	708649.18	843347.81	3911.33	0.125" of NAPL Present			
	8-Jun-1992				>30" of NAPL Present			
	24-Jun-1992				>30" of NAPL Present			
	24-May-1993				NAPL Present			
	28-Aug-1993				NAPL Present			
	8-Aug-2006				54.23	3.15	57.38	3856.31
	7-Nov-2007				53.91	3.11	57.02	3856.64
	13-Feb-2008				53.89	3.16	57.05	3856.65
	13-May-2008				54.25	3.37	57.62	3856.24
	7-Aug-2008				54.96	3.31	58.27	3855.54
	28-Jan-2009				55.39	0.31	55.70	3855.86
	10-Jul-2009				55.69	0.09	55.78	3855.62
	21-Jan-2014				57.30	2.78	60.08	3853.34
	7-Oct-2014				57.91	6.64	64.55	3851.76
	15-Jun-2016				58.18	6.00	64.18	3851.65
	2-Jan-2017				58.26	6.16	64.42	3851.53
	11-Sep-2017				58.65	6.37	65.02	3851.09
W-2	13-Mar-1992	708625.02	843381.13	3910.19	0.125" of NAPL Present			
	8-Jun-1992				>30" of NAPL Present			
	24-Jun-1992				>30" of NAPL Present			
	28-Aug-1992				NAPL Present			
	24-May-1993				NAPL Present			
	8-Aug-2006				53.21	5.34	58.55	3855.65
	7-Nov-2007				52.88	3.32	56.20	3856.48
	13-Feb-2008				53.57	0.31	53.88	3856.54
	13-May-2008				53.98	0.38	54.36	3856.12
	7-Aug-2008				54.34	0.44	54.78	3855.74
	28-Jan-2009				54.44	0.03	54.47	3855.74
	10-Jul-2009				54.69	0.11	54.8	3855.47
	21-Jan-2014				56.23	7.00	63.23	3852.21
	7-Oct-2014				56.87	6.98	63.85	3851.58
	15-Jun-2016				57.11	6.49	63.60	3851.46
	2-Jan-2017				57.22	6.53	63.75	3851.34
	11-Sep-2017				57.61	6.72	64.33	3850.90

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-3	13-Mar-1992	708597.90	843348.60	3910.29	0.125" of NAPL Present			
	8-Jun-1992				>30" of NAPL Present			
	24-Jun-1992				>30" of NAPL Present			
	28-Aug-1992				NAPL Present			
	24-May-1993				NAPL Present			
	8-Aug-2006				53.30	3.20	56.50	3856.19
	7-Nov-2007				53.01	3.03	56.04	3856.52
	13-Feb-2008				53.65	0.13	53.78	3856.61
	13-May-2008				54.44	0.21	54.65	3855.80
	7-Aug-2008				54.08	0.18	54.26	3856.17
	28-Jan-2009				54.50	0.06	54.56	3855.78
	10-Jul-2009				54.75	0.02	54.77	3855.54
	21-Jan-2014				56.36	6.66	63.02	3852.27
	7-Oct-2014				56.96	6.74	63.70	3851.65
	15-Jun-2016				57.21	6.32	63.53	3851.50
	2-Jan-2017				57.32	6.36	63.68	3851.38
	11-Sep-2017				57.75	6.41	64.16	3850.94
W-4	24-Jun-1992	-	-	99.62	-	-	57.04	42.58
	28-Aug-1992				-	-	56.69	42.93
	25-May-1993				-	-	56.48	43.14
	8-Aug-2006	Well Destroyed						
W-5	24-Jun-1992	708759.72	843252.39	100.41	-	-	57.59	3854.12
	28-Aug-1992				-	-	57.24	3854.47
	26-May-1993				-	-	57.02	3854.69
	8-Aug-2006			3911.71	-	-	54.88	3856.83
	7-Nov-2007				-	-	54.61	3857.10
	13-Feb-2008				-	-	54.63	3857.08
	12-May-2008				-	-	54.87	3856.84
	7-Aug-2008				-	-	55.36	3856.35
	28-Jan-2009				-	-	55.36	3856.35
	9-Jul-2009				-	-	55.54	3856.17
	21-Jan-2014				-	-	58.51	3853.20
	7-Oct-2014				-	-	59.24	3852.47
	23-Jun-2016				-	-	59.39	3852.32
	2-Jan-2017				-	-	59.38	3852.33
	12-Sep-2017				-	-	59.88	3851.83
W-6	24-Jun-1992	-	-	99.48	-	-	56.97	42.51
	28-Aug-1992				-	-	56.64	42.84
	26-May-1993				-	-	56.49	42.99
	8-Aug-2006	Well Destroyed						

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-7	28-Aug-1992	708911.67	843120.56	100.07	-	-	56.29	3854.59
	25-May-1993				-	-	55.96	3854.92
	8-Aug-2006			3911.35	-	-	53.74	3857.14
	7-Nov-2007				-	-	53.48	3857.40
	12-Feb-2008	708910.73	843120.52	3910.88	-	-	53.33	3857.55
	12-May-2008				-	-	53.55	3857.33
	6-Aug-2008				-	-	53.97	3856.91
	28-Jan-2009				-	-	54.11	3856.77
	9-Jul-2009				-	-	54.23	3856.65
	21-Jan-2014				-	-	57.05	3853.83
	7-Oct-2014				-	-	57.92	3852.96
	23-Jun-2016				Well occluded by roots above the water level (57.73 ft)			
	2-Jan-2017				Well occluded by roots above the water level (57.72 ft)			
	12-Sep-2017				-	-	58.48	3852.40
W-8	28-Aug-1992	708389.76	843640.62	98.69	-	-	57.24	3852.68
	25-May-1993				-	-	57.20	3852.72
	8-Aug-2006			3909.92	-	-	55.11	3854.81
	7-Nov-2007				-	-	54.65	3855.27
	13-Feb-2008				-	-	54.79	3855.13
	12-May-2008				-	-	55.14	3854.78
	7-Aug-2008				-	-	55.64	3854.28
	28-Jan-2009				-	-	55.67	3854.25
	9-Jul-2009				-	-	55.82	3854.10
	21-Jan-2014				-	-	59.33	3850.59
	7-Oct-2014				-	-	59.84	3850.08
	23-Jun-2016				-	-	60.05	3849.87
	2-Jan-2017				-	-	60.07	3849.85
	12-Sep-2017				-	-	60.57	3849.35
W-9	28-Aug-1992	708267.18	843790.26	97.47	-	-	56.76	3851.96
	25-May-1993				-	-	56.74	3851.98
	8-Aug-2006			3908.72	-	-	54.66	3854.06
	7-Nov-2007				-	-	54.12	3854.60
	13-Feb-2008				-	-	54.31	3854.41
	12-May-2008				-	-	54.68	3854.04
	7-Aug-2008				-	-	55.18	3853.54
	28-Jan-2009				-	-	55.19	3853.53
	9-Jul-2009				-	-	55.35	3853.37
	21-Jan-2014				-	-	59.01	3849.71
	7-Oct-2014				-	-	59.50	3849.22
	23-Jun-2016				-	-	59.64	3849.08
	2-Jan-2017				-	-	59.67	3849.05
	12-Sep-2017				-	-	60.21	3848.51

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-10	28-Aug-1992	708254.54	843452.92	97.85	-	-	56.18	41.67
	26-May-1993				-	-	55.80	42.05
	8-Aug-2006			3908.89	-	-	53.79	3855.10
	13-Feb-2008	Unable to gauge well due to traffic constraints						
	12-May-2008	Unable to gauge well due to traffic constraints						
	7-Aug-2008	Unable to gauge well due to traffic constraints						
	28-Jan-2009	Unable to gauge well due to traffic constraints						
	9-Jul-2009	Unable to gauge well due to traffic constraints						
	21-Jan-2014	No access to well, well vault broken						
	7-Oct-2014	No access to well, well vault broken						
W-11	28-Aug-1992	708600.95	843650.96	98.66	-	-	56.82	3853.14
	26-May-1993				-	-	56.85	3853.11
	8-Aug-2006			3909.96	-	-	54.70	3855.26
	7-Nov-2007				-	-	54.26	3855.70
	13-Feb-2008				-	-	54.41	3855.55
	12-May-2008				-	-	54.71	3855.25
	6-Aug-2008				-	-	55.14	3854.82
	28-Jan-2009				-	-	55.26	3854.70
	9-Jul-2009				-	-	55.46	3854.50
	21-Jan-2014				-	-	58.80	3851.16
	7-Oct-2014				-	-	59.41	3850.55
	23-Jun-2016				-	-	59.53	3850.43
	2-Jan-2017				-	-	59.54	3850.42
	12-Sep-2017				-	-	60.05	3849.91
W-12	29-Aug-1992	708435.38	843045.85	99.34	-	-	56.28	3854.31
	26-May-1993				-	-	55.96	3854.63
	8-Aug-2006			3910.59	-	-	53.55	3857.04
	7-Nov-2007				-	-	53.72	3856.87
	12-Feb-2008				-	-	53.29	3857.30
	12-May-2008				-	-	54.05	3856.54
	6-Aug-2008				-	-	54.50	3856.09
	28-Jan-2009				-	-	54.09	3856.50
	9-Jul-2009				-	-	54.23	3856.36
	21-Jan-2014				-	-	57.81	3852.78
	7-Oct-2014				-	-	58.07	3852.52
	23-Jun-2016				-	-	58.69	3851.90
	2-Jan-2017				-	-	58.75	3851.84
	12-Sep-2017				-	-	59.13	3851.46

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-13	29-Aug-1992	708915.13	843525.37	99.07	-	-	56.36	3854.00
	26-May-1993				-	-	56.25	3854.11
	8-Aug-2006			3910.36	-	-	54.01	3856.35
	7-Nov-2007				-	-	53.70	3856.66
	12-Feb-2008				-	-	53.80	3856.56
	12-May-2008				-	-	54.08	3856.28
	6-Aug-2008				-	-	54.50	3855.86
	28-Jan-2009				-	-	54.66	3855.70
	9-Jul-2009				-	-	54.74	3855.62
	21-Jan-2014				-	-	57.87	3852.49
	7-Oct-2014				-	-	58.67	3851.69
	23-Jun-2016				-	-	58.69	3851.67
	2-Jan-2017				-	-	58.76	3851.60
	12-Sep-2017				-	-	59.24	3851.12
W-14	26-May-1993	708504.99	843463.76	98.54	-	-	56.26	3853.47
	8-Aug-2006			3909.73	-	-	54.15	3855.58
	7-Nov-2007				-	-	53.72	3856.01
	13-Feb-2008				-	-	53.80	3855.93
	13-May-2008				-	-	54.24	3855.49
	7-Aug-2008				-	-	54.65	3855.08
	28-Jan-2009				-	-	54.67	3855.06
	10-Jul-2009				-	-	54.90	3854.83
	21-Jan-2014				-	-	58.15	3851.58
	7-Oct-2014				-	-	58.65	3851.08
	23-Jun-2016				-	-	58.93	3850.80
	2-Jan-2017				-	-	58.98	3850.75
	12-Sep-2017				59.27	0.74	60.01	3850.28
W-15	26-May-1993	708195.85	843053.51	98.49	-	-	55.40	3854.00
	8-Aug-2006				-	-	53.41	3855.99
	7-Nov-2007			3909.71	-	-	53.11	3856.29
	12-Feb-2008	708221.99	843030.65	3909.40	-	-	53.02	3856.38
	12-May-2008				-	-	53.27	3856.13
	6-Aug-2008				-	-	53.71	3855.69
	28-Jan-2009				-	-	53.82	3855.58
	9-Jul-2009				-	-	53.91	3855.49
	21-Jan-2014				-	-	57.09	3852.31
	7-Oct-2014				-	-	56.53	3852.87
	23-Jun-2016				-	-	57.98	3851.42
	2-Jan-2017				-	-	58.02	3851.38
	12-Sep-2017				-	-	58.39	3851.01

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-16	26-May-1993	708153.28	843364.45	97.44	-	-	55.52	3853.15
	8-Aug-2006			3908.67	-	-	53.49	3855.18
	7-Nov-2007				-	-	53.06	3855.61
	13-Feb-2008				-	-	53.20	3855.47
	12-May-2008				-	-	53.52	3855.15
	7-Aug-2008				-	-	54.03	3854.64
	28-Jan-2009				-	-	53.52	3855.15
	9-Jul-2009				-	-	54.23	3854.44
	21-Jan-2014				-	-	57.61	3851.06
	7-Oct-2014				-	-	57.84	3850.83
	23-Jun-2016				-	-	58.40	3850.27
	2-Jan-2017				-	-	58.42	3850.25
	12-Sep-2017				-	-	58.86	3849.81
W-17	26-May-1993	-	-	96.94	-	-	56.86	40.08
	8-Aug-2006	Well Destroyed						
W-18	26-May-1993	708698.11	843818.96	98.26	-	-	56.79	3852.59
	8-Aug-2006				-	-	54.60	3854.78
	7-Nov-2007			3909.50	-	-	54.19	3855.19
	12-Feb-2008	708697.21	843818.98	3909.38	-	-	54.13	3855.25
	12-May-2008				-	-	54.65	3854.73
	6-Aug-2008				-	-	54.90	3854.48
	28-Jan-2009				-	-	55.04	3854.34
	9-Jul-2009				-	-	55.14	3854.24
	21-Jan-2014				-	-	58.60	3850.78
	7-Oct-2014				-	-	59.26	3850.12
	23-Jun-2016				-	-	59.33	3850.05
	2-Jan-2017				-	-	59.36	3850.02
	12-Sep-2017				-	-	59.88	3849.50
W-19	7-Nov-2007	708148.94	843934.18	3908.36	-	-	54.23	3854.13
	13-Feb-2008				-	-	54.51	3853.85
	12-May-2008				-	-	54.88	3853.48
	6-Aug-2008				-	-	55.31	3853.05
	28-Jan-2009				-	-	55.36	3853.00
	9-Jul-2009				-	-	55.48	3852.88
	21-Jan-2014				-	-	59.27	3849.09
	7-Oct-2014				-	-	59.78	3848.58
	23-Jun-2016				-	-	59.94	3848.42
	2-Jan-2017				-	-	59.89	3848.47
	12-Sep-2017				-	-	60.45	3847.91

Table 2: Summary of Fluid Gauging Data
Lovington 66, Lovington, New Mexico

Monitor Well	Date Measured	Northing[1]	Easting[1]	Casing Elevation[2]	Depth to Product[3]	Product Thickness[4]	Depth to Water[3]	Groundwater Elevation[2]
W-20	7-Nov-2007	707780.85	844187.25	3907.45	-	-	54.29	3853.16
	13-Feb-2008				-	-	54.69	3852.76
	12-May-2008				-	-	55.09	3852.36
	6-Aug-2008				-	-	55.53	3851.92
	28-Jan-2009				-	-	55.54	3851.91
	9-Jul-2009				-	-	55.60	3851.85
	21-Jan-2014				-	-	59.80	3847.65
	7-Oct-2014				-	-	60.32	3847.13
	23-Jun-2016				-	-	60.68	3846.77
	2-Jan-2017				-	-	60.37	3847.08
	12-Sep-2017				-	-	61.05	3846.40
W-21	7-Nov-2007	707988.79	843841.61	3908.49	-	-	54.19	3854.30
	13-Feb-2008				-	-	54.45	3854.04
	12-May-2008				-	-	54.81	3853.68
	6-Aug-2008				-	-	55.23	3853.26
	28-Jan-2009				-	-	55.32	3853.17
	9-Jul-2009				-	-	55.39	3853.10
	21-Jan-2014				-	-	59.22	3849.27
	7-Oct-2014				-	-	59.74	3848.75
	23-Jun-2016				-	-	59.88	3848.61
	2-Jan-2017				-	-	59.92	3848.57
	12-Sep-2017				-	-	60.45	3848.04

Notes:
[1] Horizontal control to NM State Plane Coordinates Central NAD83 Grid Coordinates (in feet)
[2] Vertical Control to NAVD88 Datum in feet above mean sea level
[3] Measured in feet below the top of casing at survey point on north side of well
[4] Measured in feet

Table 3: Summary of Groundwater Purging Field Parameter Data Lovington 66, Lovington, New Mexico

Monitor Well	Date Sampled	Temp. (°C)	Conductance (µs/cm)	pH	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (millivolts)	Total Purge Volume (gallons)	Comments
W-5	9/12/2017	20.91	1,431	6.41	2.03	90.0	2.50	Turbid, fine silt, strong hydrocarbon odor
W-8	9/12/2017	20.31	1,275	6.48	0.63	-190.0	2.25	Gray-black turbid, strong hydrocarbon odor
W-9	9/12/2017	20.68	1,369	6.48	2.50	-169.0	2.50	Clear to grey-black, strong hydrocarbon odor
W-11	9/12/2017	22.18	1,357	6.44	1.01	-111.3	2.50	Clear, strong hydrocarbon odor
W-14	9/12/2017	20.31	1,518	6.74	1.26	-173.0	2.75	Black-grey turbid, strong hydrocarbon odor
W-16	9/12/2017	21.18	1,598	6.44	1.13	-13.1	3.00	Turbid, fine silt
W-19	9/12/2017	21.76	1,130	6.45	2.51	-102.2	2.50	Clear to slightly turbid, strong odor
W-20	9/12/2017	20.35	1,034	6.33	5.42	14.0	2.50	Turbid, fine silt
W-21	9/12/2017	21.98	1,066	6.62	5.04	2.8	2.50	Turbid, fine silt

Notes:

Purge parameters as finals (end of purging)

Table 4: Summary of Groundwater Sample Results
Volatile Organic Compounds
Lovington 66, Lovington, New Mexico

Monitoring Well	Date Sampled	Concentrations in Groundwater (µg/L)							
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	EDB	EDC	Total Naphthalenes
NMWQCC Standards		**10**	**750**	**750**	**620**	**100**	**0.10**	**10**	**30**
W-2	13-Mar-92	29,878	28,953	3,874	13,109	5,921	NA	NA	NA
W-3	13-Mar-92	10,493	8,961	1,253	5,320	5,150	NA	NA	NA
W-4	24-Jun-92	200	53	21	40	<5.0	NA	NA	NA
	28-Aug-92	1,400	430	95	300	<2.5	NA	NA	NA
	25-May-93	2,500	980	310	470	<63	NA	NA	NA
W-5	24-Jun-92	470	250	41	290	<10	NA	NA	NA
	28-Aug-92	850	400	58	450	3.3	NA	NA	NA
	9-Aug-06	2.0	<1.0	3.7	<3.0	22	<1.0	<1.0	<2.0
	7-Nov-07	45	8.5	29	15	170	<1.0	<1.0	4.9
	13-Feb-08	26	1.1	24	<1.5	140	<1.0	<1.0	4.5
	12-May-08	16	<1.0	7.6	<1.5	65	<1.0	<1.0	<2.0
	7-Aug-08	5.2	<1.0	3.7	<1.5	39	<1.0	<1.0	<2.0
	28-Jan-09	<1.0	<1.0	<1.0	<1.5	18	<1.0	<1.0	<2.0
	9-Jul-09	<1.0	<1.0	<1.0	<1.5	21	<1.0	<1.0	<2.0
	21-Jan-14	8.5	1.0	2.7	2.5	3.8	<1.0	<1.0	<2.0
	7-Oct-14	8.5	<2.0	<2.0	<3.0	2.5	<2.0	<2.0	<4.0
	23-Jun-16	17.0	<1.0	7.5	7.0	2.1	<1.0	<1.0	<2.0
	2-Jan-17	**37.0**	1.9	9.6	12.0	12.0	<1.0	<1.0	<2.0
	12-Sep-17	**42.0**	<2.0	5.6	10.0	3.2	<1.0	<1.0	<8.0
W-6	24-Jun-92	1,400	1,200	48	500	<25	NA	NA	NA
	28-Aug-92	3,000	2,700	93	860	<2.5	NA	NA	NA
W-7	28-Aug-92	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA	NA
	25-May-93	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA	NA
	8-Aug-06	<1.0	<1.0	<1.0	<3.0	<1.5	<1.0	<1.0	<2.0
	7-Nov-07	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
W-8	28-Aug-92	8,000	9,500	690	5,200	<2.5	NA	NA	NA
	25-May-93	12,000	8,300	1,500	8,800	<250	NA	NA	NA
	4-Aug-05	27,000	35,000	3,800	18,000	3,700	1,100	4,300	622
	9-Aug-06	21,000	29,000	2,600	13,000	6,300	<500	3,700	1,100
	7-Nov-07	20,000	27,000	3,200	15,000	5,900	440	4,100	770
	13-Feb-08	27,000	39,000	4,800	16,000	8,600	670	4,000	1,350
	12-May-08	19,000	22,000	1,800	8,000	4,900	250	2,100	400
	7-Aug-08	20,000	24,000	2,400	11,000	8,600	270	2,900	670
	28-Jan-09	19,000	26,000	2,500	11,000	9,800	290	3,000	570
	9-Jul-09	18,000	26,000	2,400	11,000	13,000	230	2,300	500
	21-Jan-14	14,000	8,800	2,300	7,900	25,000	<100	610	610
	7-Oct-14	14,000	7,000	2,400	7,600	28,000	<100	440	590
	23-Jun-16	16,000	7,300	2,100	6,000	16,000	<200	320	540
	2-Jan-17	**15,000**	**7,200**	**2,100**	**5,700**	**16,000**	<200	**350**	**430**
	12-Sep-17	**15,000**	**6,100**	**2,100**	**4,900**	**14,000**	<200	**260**	**594**

Table 4: Summary of Groundwater Sample Results
Volatile Organic Compounds
Lovington 66, Lovington, New Mexico

Monitoring Well	Date Sampled	Concentrations in Groundwater (µg/L)							
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	EDB	EDC	Total Naphthalenes
NMWQCC Standards		**10**	**750**	**750**	**620**	**100**	**0.10**	**10**	**30**
W-9	28-Aug-92	130	8.2	16	140	<2.5	NA	NA	NA
	25-May-93	100	6.3	2.5	170	<5.0	NA	NA	NA
	4-Aug-05	4,300	180	850	830	<1.0	<0.01	320	28.5
	9-Aug-06	6,700	560	1,200	1,400	<150	<100	650	250
	7-Nov-07	6,500	120	620	450	<10	<10	360	51
	13-Feb-08	7,500	130	910	590	<10	<10	450	129
	12-May-08	3,000	63	800	360	<10	<10	480	228
	7-Aug-08	5,100	<100	830	300	<100	<100	520	<200
	28-Jan-09	4,800	<10	370	380	<10	<10	580	120
	9-Jul-09	6,400	<5	1,100	460	<5	<5	570	139
	21-Jan-14	7,500	<10	1,200	250	100	<10	910	180
	7-Oct-14	8,000	<50	1,200	210	150	<50	960	180
	23-Jun-16	3,800	<50	290	<75	300	<50	410	<100
	2-Jan-17	**10**	<1	1.5	<1.5	51	<1	**60**	<2
	12-Sep-17	**2,500**	<1	110	61	**420**	<1	**510**	**43**
W-10*	28-Aug-92	1,100	11.0	120	440	<2.5	NA	NA	NA
	4-Aug-05	940	2.6	930	140	2,400	0.11	48	27.1
	9-Aug-06	420	<1.0	31	<3.0	22	<1.0	12	121
W-11	28-Aug-92	770	13	13	280	<2.5	NA	NA	NA
	9-Aug-06	5.0	<1.0	62	44	88	<1.0	33	<2.0
	7-Nov-07	18	<1.0	38	13	540	<1.0	35	<2.0
	13-Feb-08	3.2	<1.0	41	5.1	540	<1.0	37	<2.0
	12-May-08	3.0	<1.0	31	3.7	740	<1.0	36	<2.0
	6-Aug-08	3.2	<1.0	28	2.5	610	<1.0	38	<2.0
	28-Jan-09	<1.0	<1.0	40	5.7	160	<1.0	44	<2.0
	9-Jul-09	<1.0	<1.0	34	7.2	160	<1.0	44	<2.0
	21-Jan-14	5.4	<1.0	25	1.8	44	<1.0	51	<2.0
	7-Oct-14	90	<5.0	150	<7.5	11	<5.0	57	<10
	23-Jun-16	1.7	<1.0	47	<1.5	34	<1.0	63	<2.0
	2-Jan-17	2.2	<1.0	27	4.2	46	<1.0	**58**	2.2
	12-Sep-17	5.1	<1.0	24	<1.5	35	<1.0	**52**	3.9
W-12	29-Aug-92	87	6.1	2.6	180	<2.5	NA	NA	NA
	8-Aug-06	<1.0	<1.0	<1.0	<3.0	<1.5	<1.0	<1.0	<2.0
W-13	29-Aug-92	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA	NA
	8-Aug-06	<1.0	<1.0	<1.0	<3.0	<1.5	<1.0	<1.0	<2.0
W-14	26-May-93	6,600	4,300	1,200	4,000	<125	NA	NA	NA
	5-Aug-05	27,000	26,000	4,900	9,500	7,600	3.3	120	413
	9-Aug-06	25,000	23,000	4,000	9,500	4,700	<500	<500	1,200
	13-Feb-08	30,000	23,000	4,900	13,000	4,400	<50	210	1,270
	13-May-08	14,000	6,500	2,800	6,300	2,400	<10	170	1,001
	7-Aug-08	26,000	20,000	4,400	11,000	3,700	<100	160	840
	28-Jan-09	24,000	19,000	2,200	8,700	3,200	<100	150	640
	10-Jul-09	26,000	24,000	4,000	11,000	2,600	<50	160	590
	21-Jan-14	28,000	27,000	4,000	12,000	1,700	<100	120	730
	7-Oct-14	31,000	31,000	4,200	11,000	1,600	<200	<200	700
	23-Jun-16	32,000	35,000	4,000	13,000	1,400	<200	<200	760
	2-Jan-17	**28,000**	**31,000**	**3,800**	**12,000**	**1,900**	<200	<200	**620**
	12-Sep-17	NA	NA	NA	NA	NA	NA	NA	NA

Table 4: Summary of Groundwater Sample Results
Volatile Organic Compounds
Lovington 66, Lovington, New Mexico

Monitoring Well	Date Sampled	Concentrations in Groundwater (µg/L)							
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	EDB	EDC	Total Naphthalenes
NMWQCC Standards		**10**	**750**	**750**	**620**	**100**	**0.10**	**10**	**30**
W-15	26-May-93	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA	NA
	8-Aug-06	<1.0	<1.0	<1.0	<3.0	<1.5	<1.0	<1.0	<2.0
W-16	26-May-93	52	<0.5	7.9	15	<2.5	NA	NA	NA
	8-Aug-06	1.3	14	2.9	<3	<1.5	<1.0	<1.0	<2.0
	7-Nov-07	640	<1.0	22	12	55	<1.0	23	363
	13-Feb-08	630	<1.0	12	8.6	47	<1.0	17	342
	12-May-08	690	<1.0	12	3.6	60	<1.0	21	327
	7-Aug-08	790	<1.0	5.4	<1.5	59	<1.0	17	352
	28-Jan-09	170	<1.0	<1.0	<1.5	39	<1.0	13	120
	9-Jul-09	35	<1.0	1.3	<1.5	11	<1.0	3.8	14.5
	21-Jan-14	<1.0	<1.0	<1.0	<1.5	4.3	<1.0	<1.0	<2.0
	7-Oct-14	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	23-Jun-16	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	2-Jan-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-Sep-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<4.0
W-17	26-May-93	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NA	NA
W-18	26-May-93	1.6	1.8	<0.5	2.0	<2.5	NA	NA	NA
	8-Aug-06	<1.0	<1.0	<1.0	<3.0	<1.5	<1.0	<1.0	<2.0
W-19	8-Nov-07	4.3	<1.0	<1.0	<1.5	<1.5	<1.0	23	<2.0
	13-Feb-08	2.4	<1.0	<1.0	<1.5	<1.5	<1.0	10	<2.0
	12-May-08	1.6	<1.0	<1.0	<1.5	<1.0	<1.0	9.2	<2.0
	6-Aug-08	2.4	<1.0	<1.0	<1.5	<1.0	<1.0	19	<2.0
	28-Jan-09	3.8	<1.0	<1.0	<1.5	<1.0	<1.0	37	<2.0
	9-Jul-09	3.4	<1.0	<1.0	<1.5	<1.0	<1.0	37	<2.0
	21-Jan-14	4.9	<1.0	<1.0	<1.5	<1.0	<1.0	59	<2.0
	7-Oct-14	6.9	<2.0	<2.0	<3.0	<2.0	<2.0	100	<4.0
	23-Jun-16	4.5	<1.0	<1.0	<1.5	<1.0	<1.0	79	<2.0
	2-Jan-17	4.2	<1.0	<1.0	<1.5	<1.0	<1.0	**97**	<2.0
	12-Sep-17	3.1	1.3	<1.0	<1.5	<1.0	<1.0	**130**	<4.0
W-20	8-Nov-07	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	13-Feb-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-May-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	6-Aug-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	28-Jan-09	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	9-Jul-09	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	21-Jan-14	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	7-Oct-14	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	<4.0
	23-Jun-16	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	2-Jan-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-Sep-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<4.0

Table 4: Summary of Groundwater Sample Results
Volatile Organic Compounds
Lovington 66, Lovington, New Mexico

Monitoring Well	Date Sampled	Concentrations in Groundwater (µg/L)							
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	EDB	EDC	Total Naphthalenes
NMWQCC Standards		**10**	**750**	**750**	**620**	**100**	**0.10**	**10**	**30**
W-21	8-Nov-07	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-Feb-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-May-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	6-Aug-08	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	28-Jan-09	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	9-Jul-09	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	21-Jan-14	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	7-Oct-14	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	<4.0
	23-Jun-16	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	2-Jan-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<2.0
	12-Sep-17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<4.0
V-1	29-Aug-92	250	680	240	810	<2.5	NA	NA	NA
	25-May-93	5,000	14,000	3,000	10,000	600	NA	NA	NA

Notes:
All concentrations in micrograms per liter (parts per billion)
Groundwater samples analyzed by EPA Method 8260
Bold font indicates analyte above NMWQCC or NMED standard
NMWQCC = Standard - New Mexico Water Quality Control Commission
µg/L = micrograms per liter
MTBE = Methyl tertiary butyl ether
EDC = Ethylene Dichloride (1,2-Dichloroethane)
EDB = Ethylene Dibromide (1, 2-Dibromoethane)
PAHs = total naphthalene plus 1-methylnaphthalene and 2-methylnaphthalene per NMAC 20.6.2
-- = well was not sampled due to presence of free product
NA = Not Analyzed

FIGURES

LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL IN THE WALSTAD 66 SITE NETWORK
- MW-3 — LOCATION OF GROUNDWATER MONITORING WELL IN THE ALLSUPS SITE NETWORK

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

TITLE
SITE MAP

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in 0

Path: \\ausom\cadd\NMED\Walstad66LUST\99_PROJECTS\1782919_GWMon\0001_BiAnnual_Mon\02_PRODUCTION\DWG\ | File Name: 1782919_0001_FIG_001.dwg | Last Edited By: jediaz Date: 2017-09-29 Time:4:06:19 PM | Printed By: JeDiaz Date: 2017-09-29 Time:4:25:22 PM

LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL IN THE WALSTAD 66 SITE NETWORK
- MW-3 — LOCATION OF GROUNDWATER MONITORING WELL IN THE ALLSUPS SITE NETWORK
- DIRECTION OF GROUNDWATER GRADIENT
- PROJECTED GROUNDWATER ELEVATION CONTOUR FEET ABOVE MEAN SEA LEVEL

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

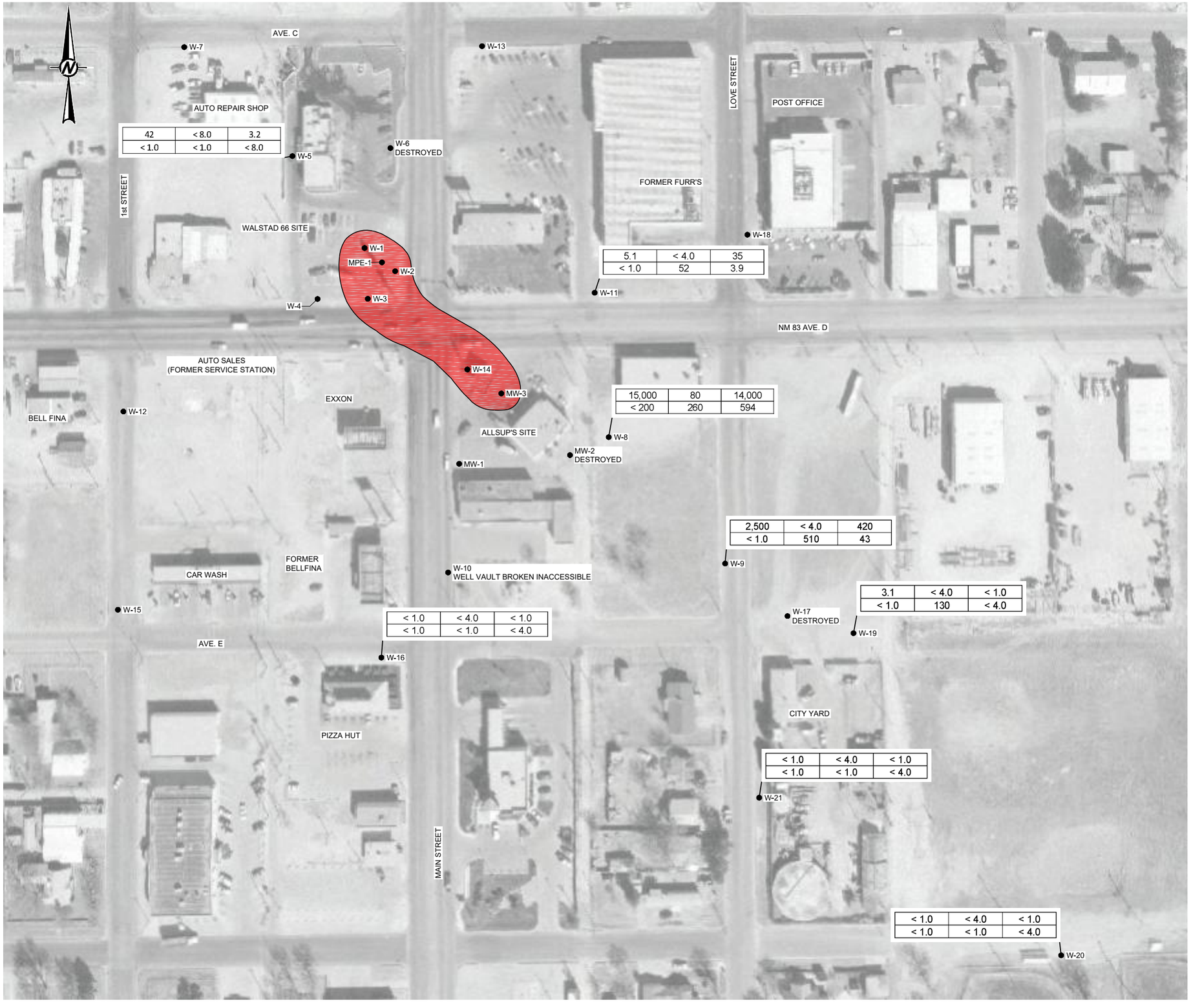
TITLE
POTENTIOMETRIC SURFACE MAP SEPTEMBER 2017

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL IN THE WALSTAD 66 SITE NETWORK
- MW-3 — LOCATION OF GROUNDWATER MONITORING WELL IN THE ALLSUPS SITE NETWORK
- NAPL PLUME

VOC CONCENTRATIONS AT WELL 1/2/2017

Benzene	BTEX	MTBE
EDB	EDC	Total Napthalene

ALL CONCENTRATIONS IN MICROGRAPMS PER LITER (µg/L)
BOLD FONT INDICATED THAT CONCENTRATION EXCEEDS NMWQCC STANDARD

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

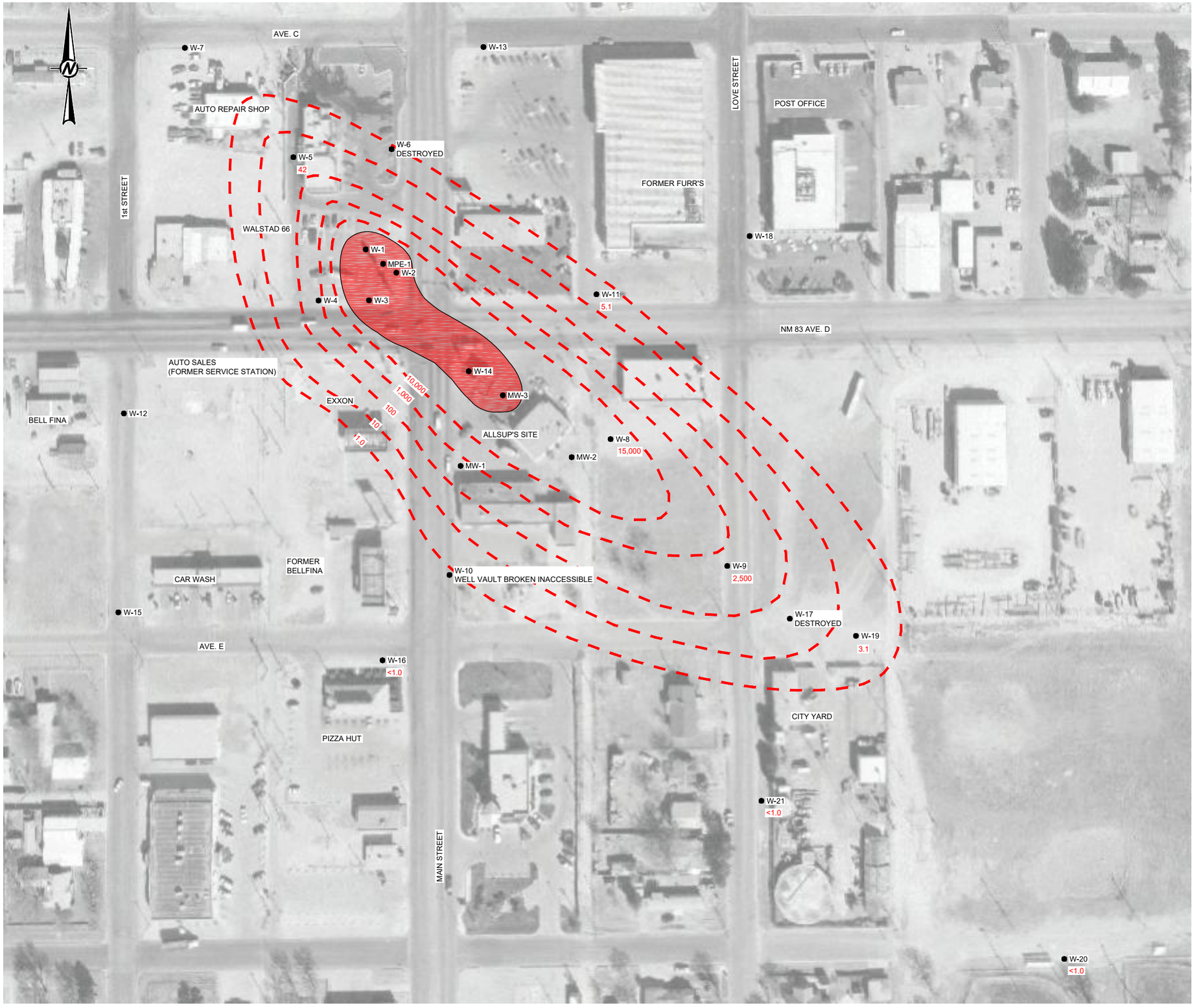
TITLE
DISTRIBUTION OF ORGANIC CONTAMINANTS IN GROUNDWATER SEPTEMBER 2017

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL SHOWING DESIGNATION AND DISSOLVED BENZENE
- 32,000 — CONCENTRATION (µg/L) IN GROUNDWATER SAMPLE COLLECTED 1/2/2017
- 10 — ISOPLETH ON PROJECTED EQUAL DISSOLVED BENZENE CONCENTRATION (µg/L)
- NAPL PLUME

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

TITLE
DISTRIBUTION OF DISSOLVED BENZENE IN GROUNDWATER - SEPTEMBER 2017

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in

0

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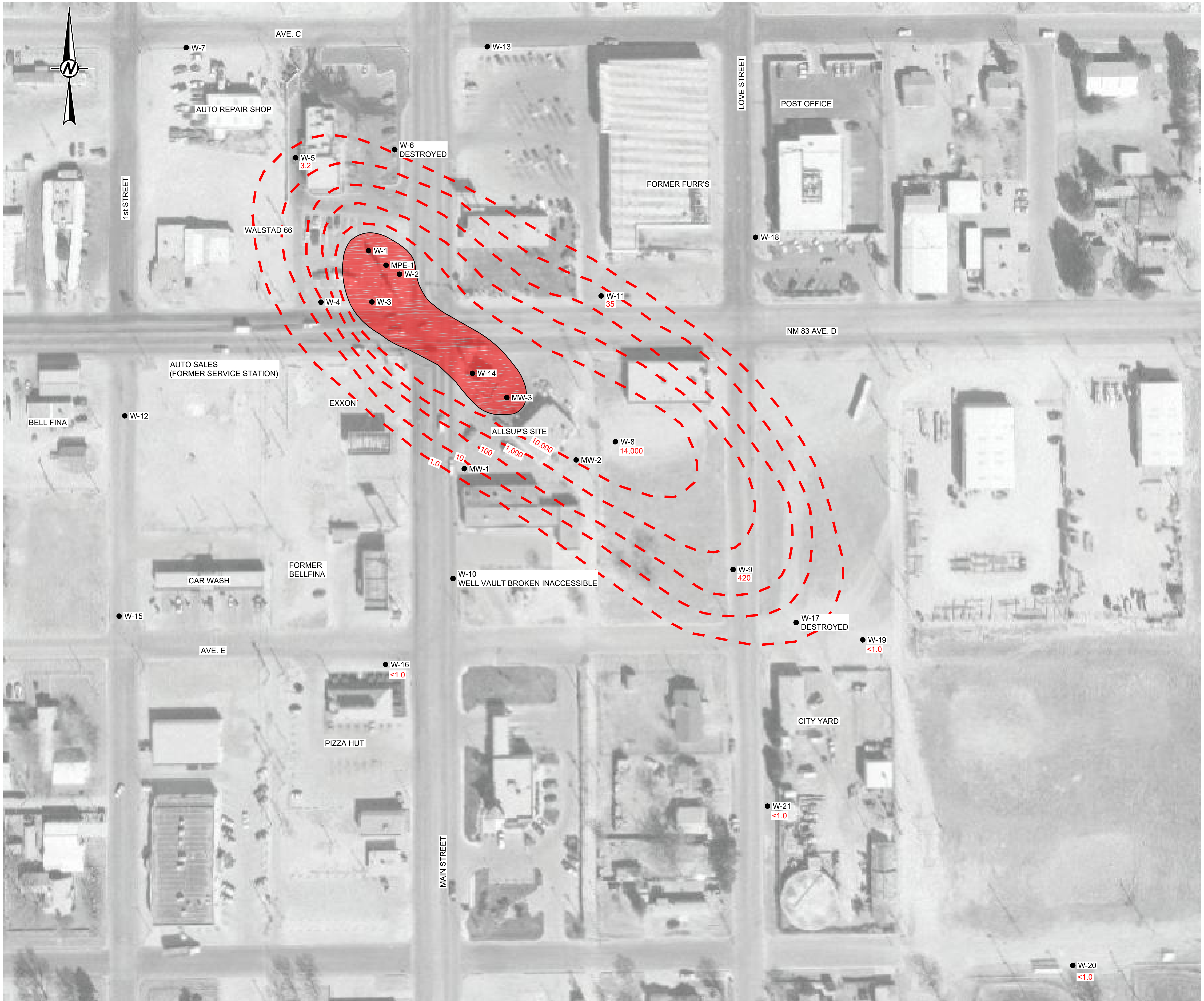

LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL SHOWING DESIGNATION AND DISSOLVED MTBE
- 32,000 — CONCENTRATION (µg/L) IN GROUNDWATER SAMPLE COLLECTED 1/2/2017
- 10 — ISOPLETH ON PROJECTED EQUAL DISSOLVED mtbe CONCENTRATION (µg/L)
- NAPL PLUME

0 60 120

1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

TITLE
DISTRIBUTION OF DISSOLVED MTBE IN GROUNDWATER - SEPTEMBER 2017

CONSULTANT: Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL SHOWING DESIGNATION AND DISSOLVED EDC
- 32,000 — CONCENTRATION (µg/L) IN GROUNDWATER SAMPLE COLLECTED 1/2/2017
- 10 — ISOPLETH ON PROJECTED EQUAL DISSOLVED EDC CONCENTRATION (µg/L)
- NAPL PLUME

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

TITLE
DISTRIBUTION OF DISSOLVED EDC IN GROUNDWATER - SEPTEMBER 2017

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 1in

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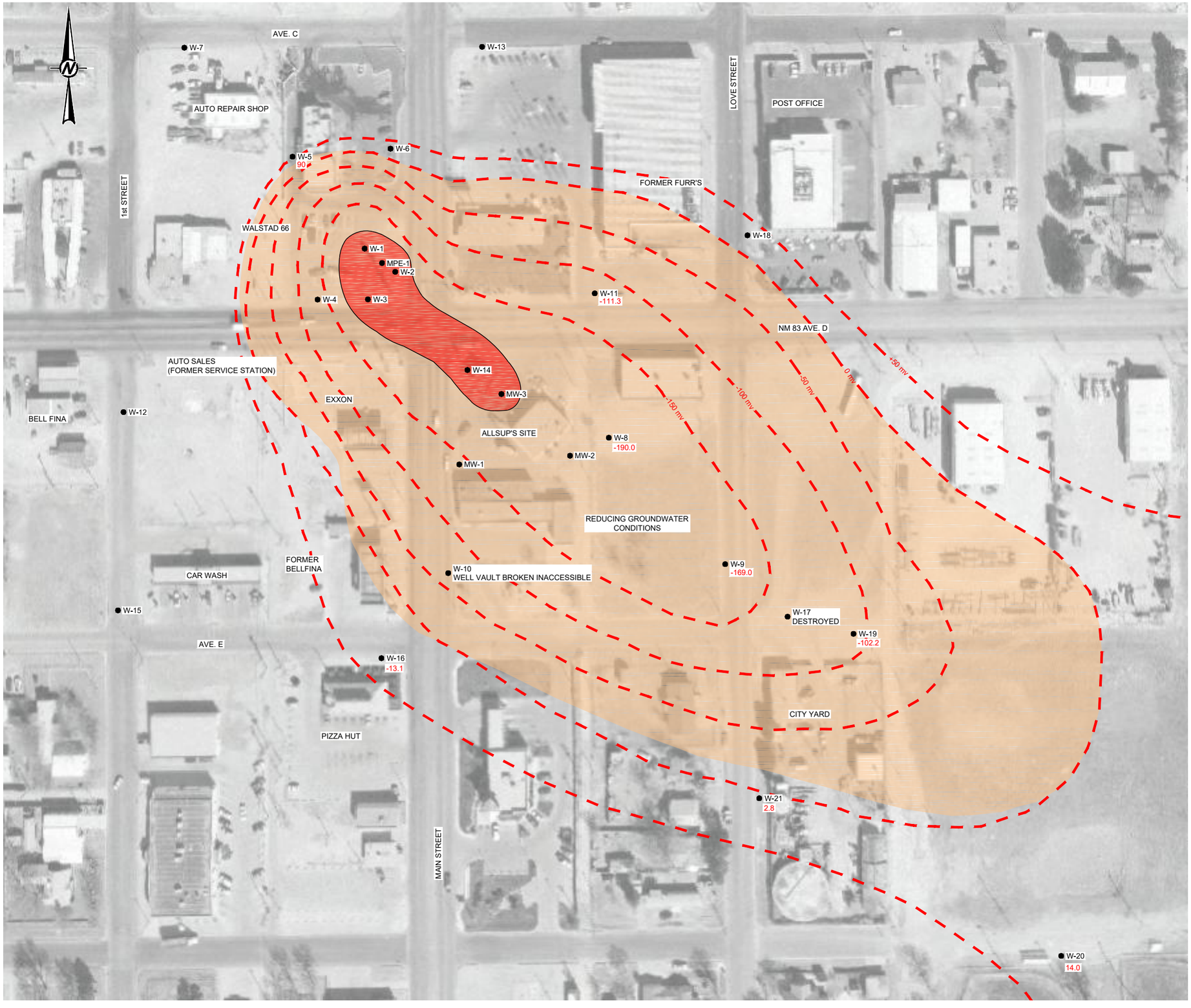

LEGEND

- W-11 — LOCATION OF GROUNDWATER MONITORING WELL SHOWING DESIGNATION AND ORP
- -299 — POTENTIAL (ORP IN MILLIVOLTS) IN GROUNDWATER SAMPLE COLLECTED 1/2/2017
- 0 mv — ISOPLETH ON PROJECTED EQUAL OXIDATION REDUCTION POTENTIAL VALUE (millivolts)
- NAPL PLUME

0 60 120
1" = 120' FEET

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

PROJECT
WALSTAD 66
424 SOUTH MAIN
LOVINGTON, NEW MEXICO

TITLE
DISTRIBUTION OF OXIDATION-REDUCTION POTENTIAL (ORP) IN GROUNDWATER SEPTEMBER 2017

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-27
DESIGNED	KK
PREPARED	JAD
REVIEWED	EMC
APPROVED	TS

PROJECT NO.	PHASE	REV.	FIGURE
1782919	1	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in 0

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APPENDIX A
NAPL DISPOSAL MANIFEST

N.M.E.D. – DP-1041

Gandy Marley, Inc.

P.O. BOX 1658 • ROSWELL, NM 88202

LOAD INSPECTION FORM 18028

Date of Receipt: 09/29/17 Time of Receipt 10:15 AM/PM Cell Placement: UST-8

Quantity 72 bbls T/CY: ______ Description: MW Purge H2O Golder Holsted Oil Co. Lovington, NM Proj# 1651353

Name/Address of Generator: Golder Associates Inc. 5200 Pasadena Ave. N.E. Suite C Albuquerque, NM 87113 505.821.3043

Origin of Materials (if different) ______

Transporter Name: CMB Environmental SCC ID No. ______

Name of Laboratory Performing Sample Analysis HEAL (ON-FILE)

TCLP (EPA Method 1311) ______ BTEX ______ MTBE ______ TPH ______ Non-Hazardous ______ Exempt ______

Verification of No Free Liquids ______ Paint Filter Liquids Test Performed ______

Verification of Property Completed Manifest ______ Generator Manifest Number ______

As a condition to Gandy Marley, Inc.'s acceptance of the materials shipped as represented on this Load Inspection Form, Generator represents and warrants that the waste material shipped herewith is exempt from the Resource Conservation and Recovery Act of 1976, as amended from time to time, 40 U.S.C. Section 6901, et seq., The New Mexico Health and Safety Code, section 361.001, et seq., and regulations related thereto, OR has been characterized as non-hazardous material by virtue of appropriate laboratory analysis done in accordance with EPA-approved testing methods.

Further, as a condition to Gandy Marley, Inc.'s acceptance of the materials shipped as represented on this Load Inspection Form, Transporter represents and warrants that only the material delivered by Generator to Transporter is now delivered by Transporter to Gandy Marley, Inc.'s facility for disposal.

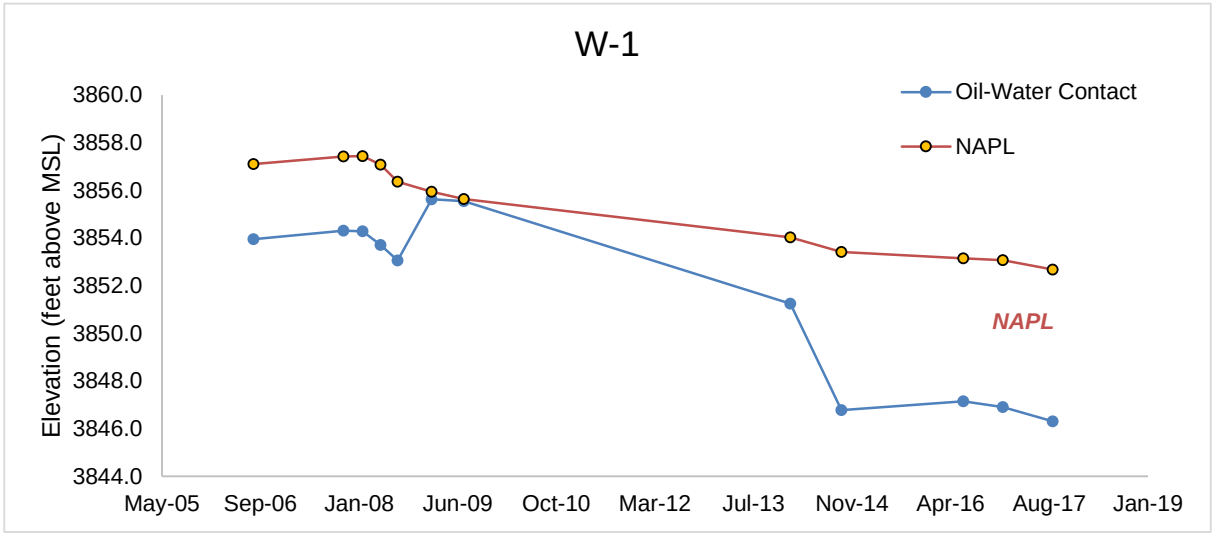
THIS WILL CERTIFY that the above Transporter loaded the material as represented on this Load Inspection Form at the above described location, and that it was tendered by the above described Generator. THIS WILL CERTIFY that no additional materials were added to this load, and that the material was delivered without incident.

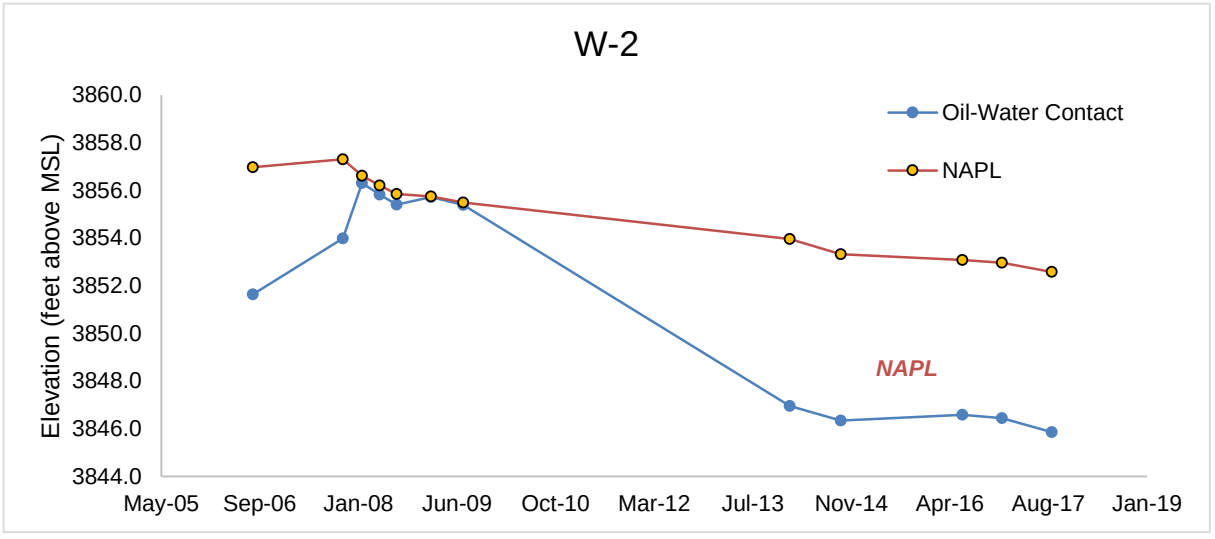
Transporter: [illegible] Print Name [illegible] Signature

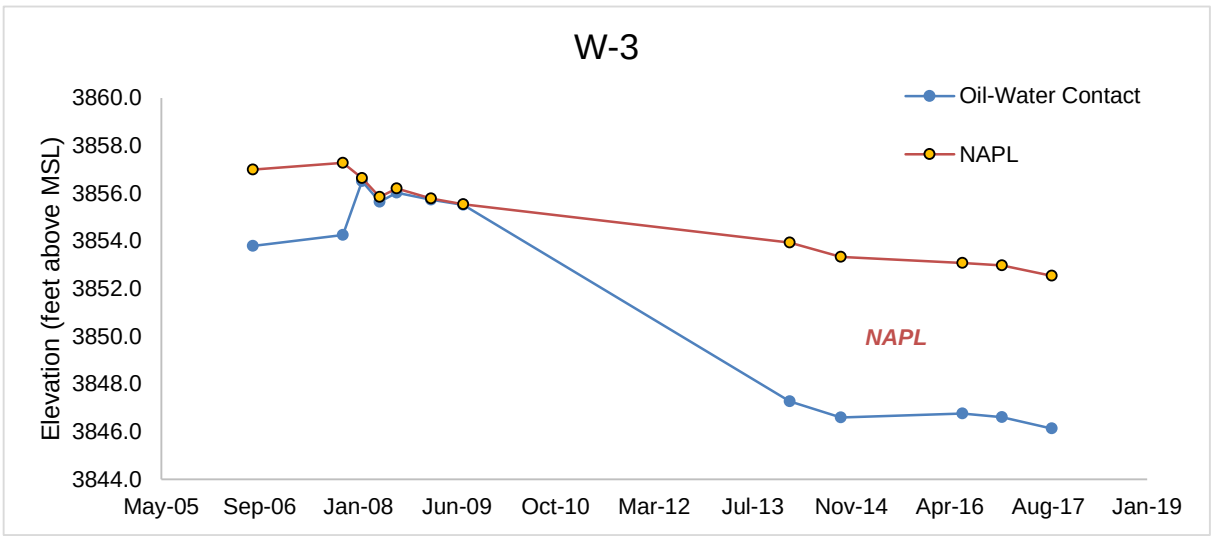
GMI Employee: Rick Johnson Print Name [illegible] Signature

APPENDIX B
HYDROGRAPHS

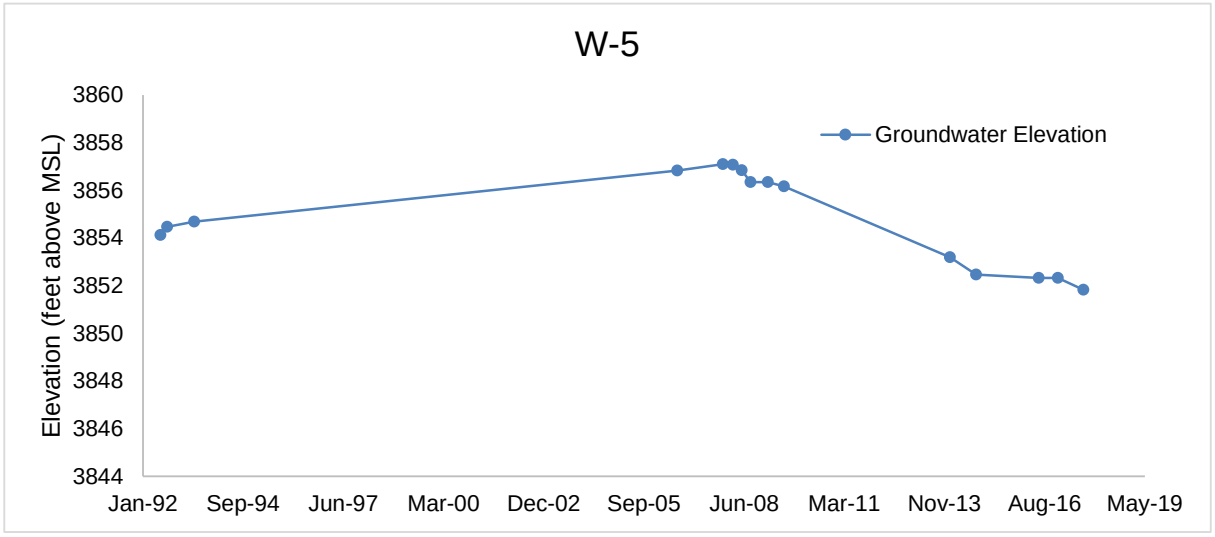
Appendix B: Monitoring Well Hydrographs
Lovington 66, Lovington, New Mexico

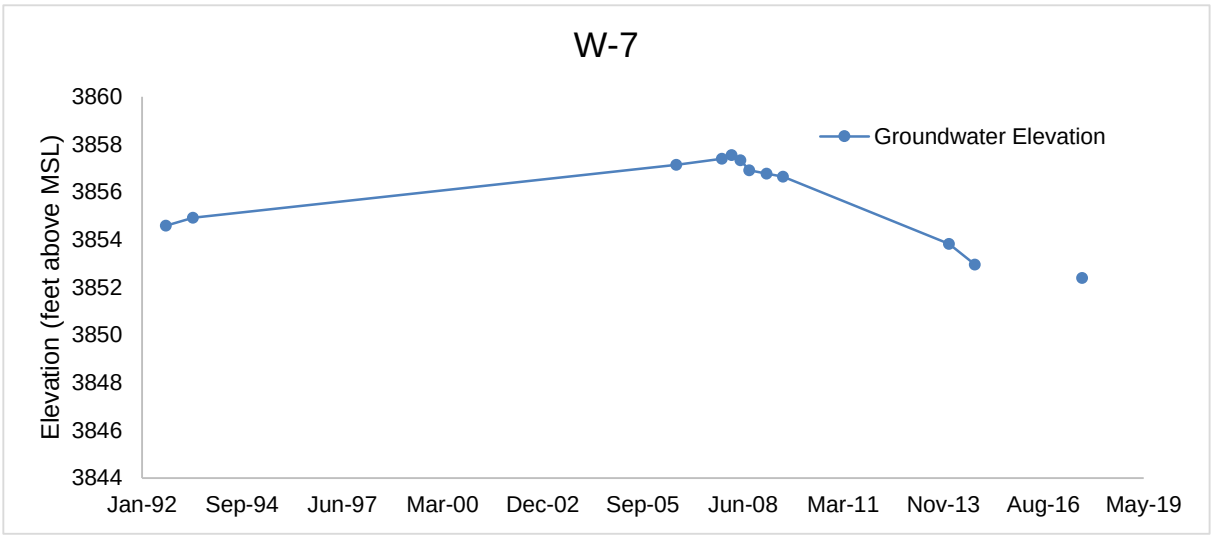


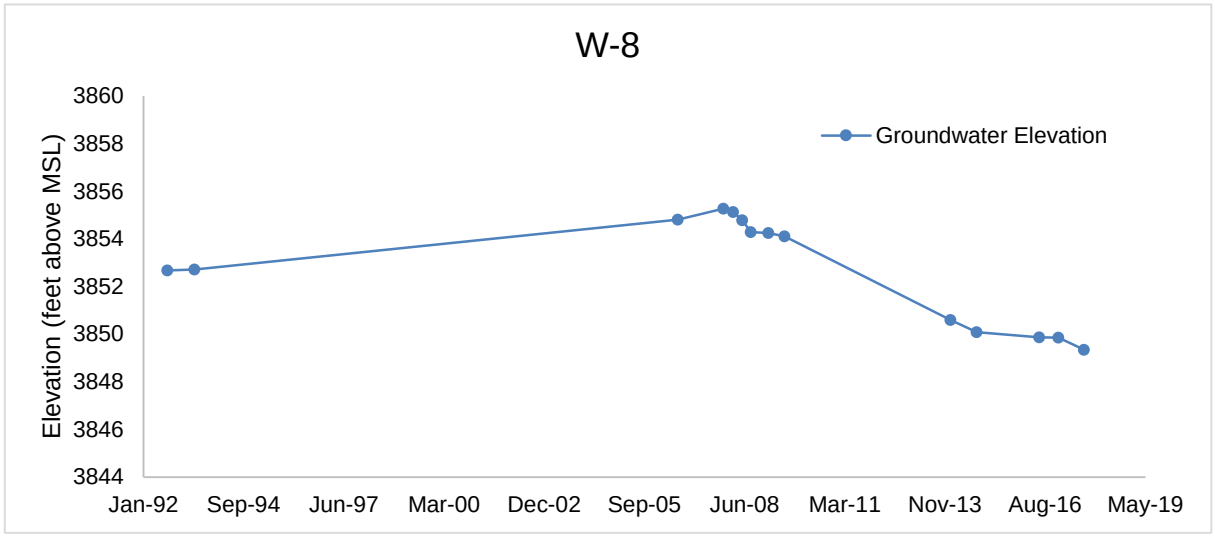




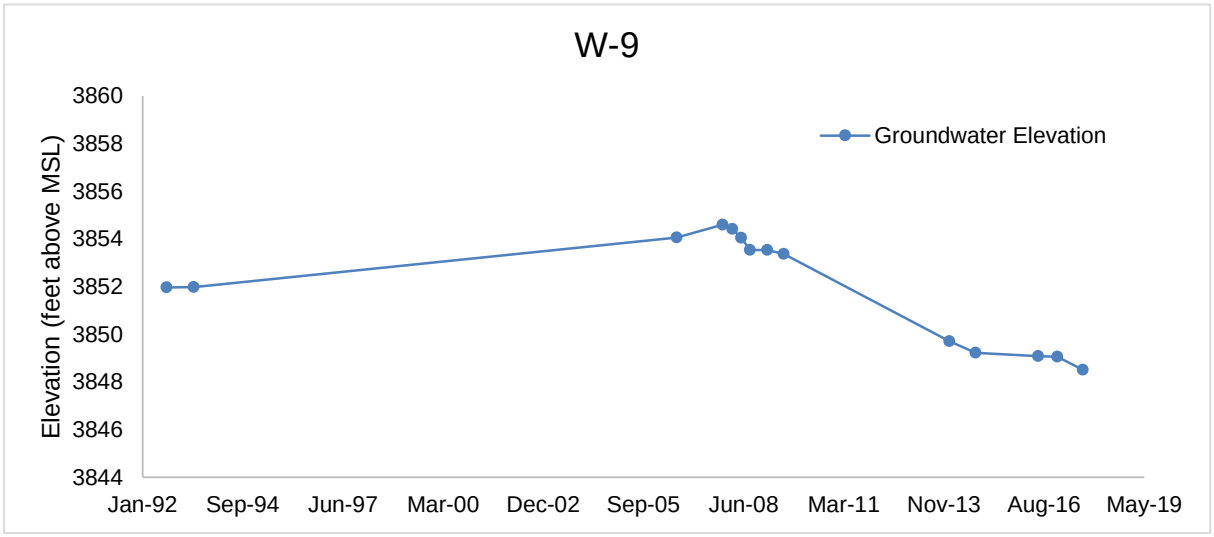
Appendix B: Monitoring Well Hydrographs
Lovington 66, Lovington, New Mexico

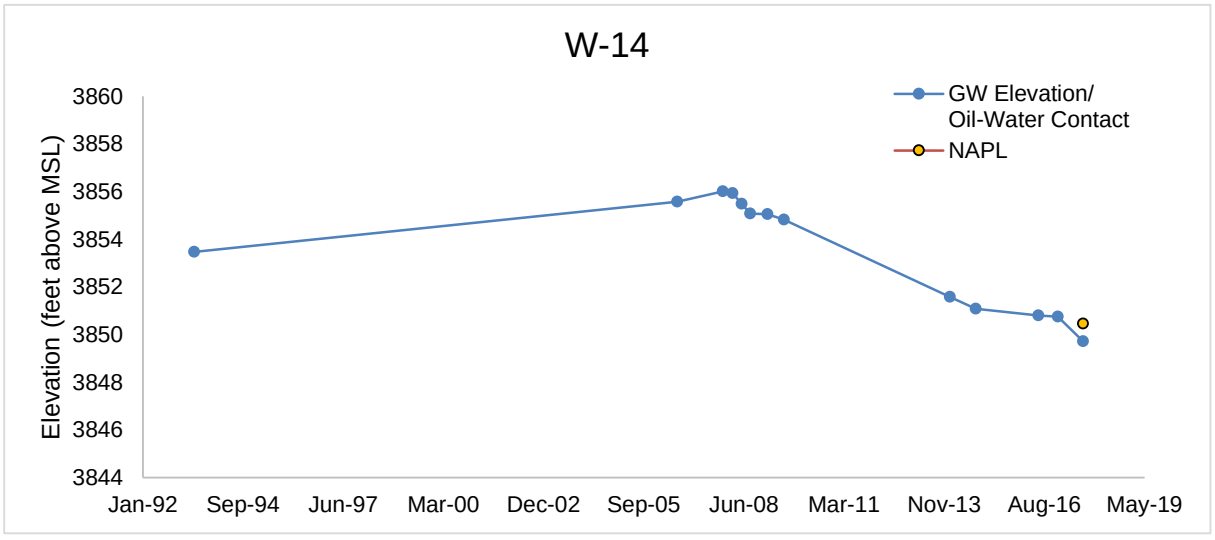






Appendix B: Monitoring Well Hydrographs
Lovington 66, Lovington, New Mexico





APPENDIX C
FIELD FORMS

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well ☒ MW ☐ Production ☐ Other _____	Type of Data ☐ Development ☒ Sampling ☐ Pump Test ☐ Other Wolfstad	Well No. W-5 Sheet 1 of 1 Sheets
1. Project #161353 Golder Wolfstad O.U.G.	2. Project Location Lovington 66 Site 410 S. Main Street	3. Date 09/12/17
4. Technician CM Bernhill, PG	Lovington, NM 88260	
7. Method Pumping Surging Air Lift Bailing Other	8. Manufacturer's Designation of Rig DSR-2115	9. Location of Well (Site, Description) Monitor Well W-5

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 10:10	Date: 09/12/17 Time: 10:25	Date: Time:
10. Total Depth of Well (from TOC) 64.75'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 59.88'	16. Water Level (from TOC) 60.01	21. Water Level (from TOC)

12. Water Column Height 4.87'	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes 2.337 Gallons
13. Well Diameter 2" SCH40 PVC MW	2"	0.16	0.1534	18. 5 Well Volumes 3.89 Gallons
14. Well Volume (gal) (s) w.e. height) 0.779	4"	0.65	0.5972	19. Purge Volume 2.50 Gallons
	6"	1.47	1.3540	
	8"	2.61	2.3720	

22. Size and Type of Pump or Bailer: 1.5" x 3.0 Poly Disposable Bailer, T.P. Twine

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled?
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	(Yes) No If yes, what was the sample number & Date: Sampling Personnel? W-5, 09/12/17 CMB @ 10:22 3x VOAs / HCl / 8260

27. Final Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
10:21	20.91	1.431	6.41	Turbid	60.01	2.5 Gallons		Turbid w/ odor

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Turbid Fine Silt - Strong HC odor

29. Purgewater disposal method: On Ground Surface

Sampling / Development Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
10:15	22.05	1.467	6.87	Clear Strong HC odor	59.88'	Initial parameters	4.58	0.50	-3.9/132.5
10:17	21.04	1.458	6.53	Turbid Fine Silt	/	1	2.56	0.50	7.2/117.4
10:19	20.60	1.447	6.47	Turbid	/	2	2.09	0.50	9.6/98.5
10:21	20.91	1.431	6.41	Turbid Fine Silt Strong odor	60.01	2.5	2.03	0.50	11.4/90.0

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: [signature] PG — Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well	Type of Data	Well No.
☑ MW ☐ Production ☐ Other _____	☐ Development ☑ Sampling ☐ Pump Test ☐ Other _____	Sheet 1 of 1 Sheets W-8

1. Project	2. Project Location	3. Date
#165353 Golder Walstad Oil Co.	Lovington 66 Site 410 S. Main Street Lovington, NM 88260	09/12/17
4. Technician		
CMBarnhill, PE		
7. Method	**8. Manufacturer's Designation of Rig**	**9. Location of Well (Site, Description)**
Pumping Surging Air Lift (Bailing) Other	PSR-2025	Monitor Well W-8

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 12:05	Date: 09/12/17 Time: 12:20	Date: Time:
10. Total Depth of Well (from TOC) 65.25'	15. Total Depth of Well (from TOC)	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 60.57'	16. Water Level (from TOC) 61.05'	21. Water Level (from TOC)

12. Water Column Height	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes	22. Size and Type of Pump or (Bailer)
4.68'				2.24 Gallons	
13. Well Diameter 2" SCH40 PVC MW	(2")	0.16	0.1534	18. 5 Well Volumes 3.74 Gallons	1.5" x 3.0' poly Disposable Bailer Tie. Twine
14. Well Volume (gal) (s) w.e. height) 0.75	4"	0.65	0.5972	19. Purge Volume 2.25 Gallons	
	6"	1.47	1.3540		
	8"	2.61	2.3720		

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
2.25 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? W-8, 09/12/17 CMB @ 12:17 3x40mL VOA's/HCl/8260

27. Final Parameters

Time	Temp C	Conductivity (mS/cm)	pH	NTUs	WL	Removed	Flow Rate	Observations (Photo Roll #,)
12:16	20.31	1.275	6.48	TURBID	61.05	2.25 Gal	0.50 GPM	Gray Black Strong HC Odor

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: GRAY Black TURBID H2O - Strong HC Odor

29. Purgewater disposal method: ON Ground Surface

Sampling / Development Parameters

Time	Temp C	Conductivity (mS/cm)	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
12:10	22.60	1.294	6.53	Clear Strong HC Odor	60.57'	Initial parameters	0.58	0.50	7.3/-134.8
12:12	20.85	1.281	6.49	Black Turbid Strong HC Odor	—	1.0	1.13	0.50	8.4/-139.3
12:14	20.83	1.275	6.46	〃 〃 〃	—	1.5	0.71	0.50	9.6/-159.2
12:15	20.81	1.273	6.46	〃 〃 〃	—	2.0	1.35	0.50	9.2/-166.5
12:16	20.31	1.275	6.48	〃 〃 〃	61.05	2.25	0.63	0.50	8.7/-190.0

(1) Note volume and physical character of sediments removed
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: [signature] BB — Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well ☒ MW ☐ Production ☐ Other _____	Type of Data ☐ Development ☒ Sampling ☐ Pump Test ☐ Other _____	Well No. W-9 Sheet 1 of 1 Sheets
1. Project #165 1353 Golder Walstad Oil Co.	2. Project Location Walstad Oil Co. Lovington, 66 Site 410 S Main Street Lovington, NM 88260	3. Date 09/12/17
4. Technician CM Barnhill, PE		
7. Method Pumping Surging Air Lift (Bailing) Other	8. Manufacturer's Designation of Rig DSR-2015	9. Location of Well (Site, Description) Monitor Well W-9

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 12:35	Date: 09/12/17 Time: 12:48	Date: Time:
10. Total Depth of Well (from TOC) 64.85'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 60.21'	16. Water Level (from TOC) 60.46'	21. Water Level (from TOC)

12. Water Column Height 4.64'	Nom Dia / x = gal/ft Sch 40 / Sch 80: (2") 0.16 0.1534 4" 0.65 0.5972 6" 1.47 1.3540 8" 2.61 2.3720	17. 3 Well Volumes 2.22 Gallons	22. Size and Type of Pump or (Bailer)
13. Well Diameter		18. 5 Well Volumes 3.71 Gallons	1.5" x 3.0' Poly Disposable Bailer T.P. Twine
14. Well Volume (gal) (s) w.e. height) 0.74		19. Purge Volume 2.50	

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	(Yes) No If yes, what was the sample number & Date: Sampling Personnel? W-9, 09/12/17 CMB @ 12:45 3x40mL VOA's/HCl/ice

27. Final Parameters

Time	Temp C	Conductivity mS/cm	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
12:44	20.68	1.369	6.48	Clear	60.48	2.50 Gal	0.50 GPM	Strong odor

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Clear to grey Black Strong HC odor

29. Purgewater disposal method: ON GROUND Surface

Sampling / Development Parameters

Time	Temp C	Conductivity mS/cm	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
12:36	20.67	1.318	6.56	Clear Strong odor	60.21'	~~Initial~~ parameters	0.86	0.50	5.8/-192.7
12:40	20.36	1.320	6.51	" " "	—	1	1.97	0.50	7.4/-186.2
12:42	20.35	1.342	6.50	Clear Strong odor	—	2	1.96	0.50	7.9/-182.2
12:44	20.68	1.369	6.48	" " "	60.48	2.50	2.50	0.50	9.0/-169.0

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By [signature] Date 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well	Type of Data	Well No.
☒ MW ☐ Production ☐ Other _____	☐ Development ☒ Sampling ☐ Pump Test ☐ Other _____	W-11 Sheet 1 of 1 Sheets

1. Project	2. Project Location	3. Date
#165353 Golder Walsted Oil Co.	Walsted 66 Lovington site 410 S. Main Street	09/12/2017
4. Technician		
CM Barnhill, PG	Lovington, NM 88260	
7. Method Pumping Surging Air Lift (Bailing) Other	8. Manufacturer's Designation of Rig DSR-2015	9. Location of Well (Site, Description) Monitor well W-11

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 10:53	Date: 09/12/17 Time: 11:05	Date: Time:
10. Total Depth of Well (from TOC) 65.17'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 60.05'	16. Water Level (from TOC) 60.92'	21. Water Level (from TOC)

12. Water Column Height	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes	22. Size and Type of Pump or Bailer
5.12'				2.457 Gallons	
13. Well Diameter	2"	0.16	0.1534	18. 5 Well Volumes	1.5" x 3.0' Poly Disposable Bailer, Tie, Twine
2" SCH 40	4"	0.65	0.5972	4.09 Gallons	
14. Well Volume (gal) (s) w.e. height) 0.819	6"	1.47	1.3540	19. Purge Volume 2.50 Gallons	
	8"	2.61	2.3720		

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? W-11, 09/12/17 CMB @ 11:03 3x VOAs/HCl/8260

27. Final Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
11:03	22.18	1.357	6.44	Clear	60.92'	2.50 Gallons	0.50	Clear w/ odor

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Clear H2O with Strong HC odor

29. Purgewater disposal method: ON Ground Surface

Sampling / Development Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
10:56	21.63	1.387	6.37	Clear strong odor	60.05	Initial parameters	0.78	0.50	12.8/-62.4
11:00	21.49	1.395	6.41	Clear w/ odor	—	1	1.18	0.50	11.3/-91.3
11:02	21.37	1.368	6.42	Clear	—	2	0.73	0.50	11.2/-102.9
11:03	22.18	1.357	6.44	Clear w/ odor	60.92'	2.5	1.01	0.50	10.4/-111.3

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: Christopher M. Ball PG — Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well: ☒ MW ☐ Production ☐ Other _____	Type of Data: ☐ Development ☒ Sampling ☐ Pump Test ☐ Other _____	Well No. W-16, Sheet 1 of 1 Sheets
1. Project # 1651353 Golder Walstad Oil Company	2. Project Location Walstad 66 Lovington site 410 S. Main Street Lovington, NM 88260	3. Date 09/12/17
4. Technician CM Barnhill, PG		
7. Method: Pumping Surging Air Lift (Bailing) Other	8. Manufacturer's Designation of Rig DSR-2015	9. Location of Well (Site, Description) Monitor well W-16

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: ~~14:40~~ 14:40	Date: 09/12/17 Time: ~~13~~ 14:55	Date: Time:
10. Total Depth of Well (from TOC) 64.90'	15. Total Depth of Well (from TOC)	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 58.86'	16. Water Level (from TOC) 59.12	21. Water Level (from TOC)

12. Water Column Height 6.04'	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes 2.89 Gallons
13. Well Diameter 2" SCH 40 PVC MW	(2")	(0.16)	0.1534	18. 5 Well Volumes 4.83 Gallons
14. Well Volume (gal) (s) w.e. height) 0.966	4"	0.65	0.5972	19. Purge Volume 3.0 Gallons
	6"	1.47	1.3540	
	8"	2.61	2.3720	

22. Size and Type of Pump or (Bailer): 1.5" x 3.0' Poly Disposible Bailer Tipi Twine

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry? Yes (No)	25. Was water added to well? (No) Yes If yes, source:	26. Was the Groundwater Sampled (Yes) No If yes, what was the sample number & Date: Sampling Personnel? W-16, 09/12/17 CMB @ 14:54 3x40mL VOA's/HCl/8260
3.0 Gallons			

27. Final Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL	~~Removed~~ 3.0 Gallons	Flow Rate	Photo Roll #, Observations
14:53	21.18	1.598	6.44	Turbid	59.12'	~~2.50 Gallons~~	0.50	Turbid Fine Silt

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Turbid Fine Silt

29. Purgewater disposal method: On Ground Surface

Sampling / Development Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
14:45	22.06	1.643	6.68	Clear H2O	58.86'	Initial parameters	3.79	0.50	2.5/2.4
14:47	21.25	1.678	6.47	Turbid Fine Silt	—	1	1.25	0.50	10.5/-4.8
14:49	20.87	1.610	6.43		—	2	1.76	0.50	9.9/-7.6
14:53	21.18	1.598	6.44	Turbid Fine Silt	59.12'	3	1.13	0.50	10.5/-13.1

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: CM Barnhill PG Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well	Type of Data	Well No.
☒ MW ☐ Production ☐ Other _____	☐ Development ☒ Sampling ☐ Pump Test ☐ Other _____	Sheet 1 of 1 Sheets MW-19

1. Project	2. Project Location	3. Date
#165133 Goldeneye Walstad Oil. Co.	Walstad 66 Lovington Site 410 S. Main St.	09/12/17
4. Technician		
CM Barnhill, PG	Lovington, NM 88260	
7. Method	**8. Manufacturer's Designation of Rig**	**9. Location of Well (Site, Description)**
Pumping Surging Air Lift (Bailing) Other	DSR-2015	Monitor Well MW-19

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 13:25	Date: 09/12/17 Time: 13:39	Date: Time:
10. Total Depth of Well (from TOC) 65.45'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 60.45'	16. Water Level (from TOC) 60.60'	21. Water Level (from TOC)

12. Water Column Height	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes	22. Size and Type of Pump or Bailer
5.0'				2.40 Gallons	
13. Well Diameter	(2")	(0.16)	0.1534	18. 5 Well Volumes	1.5" x 3.0' Poly Disposable Bailer Tie, Twine
2" SCH 40 PVC	4"	0.65	0.5972	4 Gallons	
14. Well Volume (gal) (s) w.e. height) 0.80	6"	1.47	1.3540	19. Purge Volume 2.50	
	8"	2.61	2.3720		

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? MW-19, 09/12/17 CMB @ 13:36 3x40mL VIA's / HCl / 820

27. Final Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
13:35	21.76	1.130	6.45	Slight Turbid	60.60	2.50 Gal.	0.50 GPM	Slight Turbid

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Clear to Slightly Turbid - Strong Odor

29. Purgewater disposal method: ON Ground Surface

Sampling / Development Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons) (1)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
13:30	21.14	1.086	6.74	Clear Strong odor	60.45	Initial parameters	3.51	0.50	1.7/-127.4
13:32	21.03	1.084	6.52	" " "	—	1	2.68	0.50	7.2/-113.9
13:34	20.48	1.126	6.47	" " "	—	2	2.70	0.50	9.5/-110.2
13:35	21.76	1.130	6.45	Clear to slight Turbid Strong odor	60.60	2.50	2.51	0.50	10.3/-102.2

(1) Note volume and physical character of sediments removed
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: [signature] PG — Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well	Type of Data	Well No.
☒ MW ☐ Production ☐ Other _____	☐ Development ☑ Sampling ☐ Pump Test ☐ Other _____	Sheet 1 of 1 Sheets W-20

1. Project	2. Project Location	3. Date
#165353 Golden Walstad Oil Co.	Walstad 66 Lovington site 410 S. Main Street Lovington, NM 88260	09/12/17
4. Technician CM Barnhill, PG		
7. Method Pumping Surging Air Lift (Bailing) Other	8. Manufacturer's Designation of Rig DSR-2015	9. Location of Well (Site, Description) Monitor well W-20

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 13:52	Date: 09/12/17 Time: 14:05	Date: Time:
10. Total Depth of Well (from TOC) 65.20'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 61.05	16. Water Level (from TOC) 61.10	21. Water Level (from TOC)

12. Water Column Height	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes	22. Size and Type of Pump or Bailer
4.15'				1.99 Gallons	
13. Well Diameter 2" SCH 40 PVC MW	(2")	(0.16)	0.1534	18. 5 Well Volumes ~~5.0~~ 3.32 Gal.	~~1.5~~ 1" x 3.0' Poly Disposable Bailer Tie, Twine
14. Well Volume (gal) (s) w.e. height) 0.664	4"	0.65	0.5972	19. Purge Volume 2.50 Gallons	
	6"	1.47	1.3540		
	8"	2.61	2.3720		

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? W-20, 09/12/17 CMB @ 14:03 3x40mL VOAs/HCl/8260

27. Final Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
14:02	20.35	1.034	6.33	Turbid	61.10'	2.50 Gl	0.50 GPM	Turbid

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Turbid Fine Silt

29. Purgewater disposal method: On Ground Surface

Sampling / Development Parameters

Time	Temp C	mS/cm Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
13:55	20.85	0.929	6.76	Clear H2O	61.05'	Initial parameters	6.47	0.50	-3.2/-50.7
13:57	19.92	1.015	6.76	Turbid Fine Silt	—	1	6.70	0.50	-3.2/-25.9
14:00	19.22	1.030	6.77	" " "	—	2	5.82	0.50	-3.0/-13.4
14:02	20.35	1.034	6.33	Turbid Fine Silt	61.10'	2.50	5.42	0.50	14.3/14.0

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: Christopher Bolle PG — Date: 09/12/17

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well	Type of Data	Well No. W-21
☒ MW ☐ Production ☐ Other	☐ Development ☒ Sampling ☐ Pump Test ☐ Other	Sheet 1 of 1 Sheets

1. Project #1651353 Golder Walstad Oil Company	2. Project Location Walstad 66 Lovington Site 410 S. Main Street Lovington, NM 88260	3. Date 09/12/17
4. Technician CMBarnhill, PG		
7. Method Pumping Surging Air Lift (Bailing) Other	8. Manufacturer's Designation of Rig DSR-2015	9. Location of Well (Site, Description) Monitor Well W-21

Water Levels

Initial	Final	Final + 24 Hours
Date: 09/12/17 Time: 14:15	Date: 09/12/17 Time: 14:28	Date: / Time:
10. Total Depth of Well (from TOC) 65.40'	15. Total Depth of Well (from TOC) /	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 60.45'	16. Water Level (from TOC) 60.85'	21. Water Level (from TOC)

	Nom Dia	x = gal/ft Sch 40	Sch 80		
12. Water Column Height 4.95'	2"	0.16	0.1534	17. 3 Well Volumes 2.376 Gallons	22. Size and Type of Pump or Bailer 1.5"×3.0' Poly Disposable Bailer Tip, Twine
13. Well Diameter 2" SCH 40 PVC MW	4"	0.65	0.5972	18. 5 Well Volumes 3.96 Gallons	
14. Well Volume (gal) (s) w.e. height) 0.792	6"	1.47	1.3540	19. Purge Volume 2.50 Gallons	
	8"	2.61	2.3720		

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
2.50 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? W-21, 09/12/17 CMB @ 14:26 3×40 mL VOAs/Hg/L 18260

27. Final Parameters

Time	Temp C	Conductivity mS/cm	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
14:25	21.98	1.066	6.62	Turbid	60.85	2.50 Gal.	0.5 GPM	TURBID

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: TURBID Fine Silt -

29. Purgewater disposal method: ON GROUND Surface

Sampling / Development Parameters

Time	Temp C	Conductivity mS/cm	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	pHmv/ORP
14:20	20.59	1.054	6.74	clear H2O	60.45'	Initial parameters	4.96	0.50	-1.6/-10.5
14:22	19.95	1.058	6.65	TURBID Fine Silt	—	1	4.93	0.50	1.9/-6.8
14:24	20.16	1.060	6.60	" " "	—	2	4.75	0.50	3.2/-5.0
14:25	21.98	1.066	6.62	" " "	60.85'	2.50	5.04	0.50	2.8/2.8

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By [signature] PG Date 09/12/17

APPENDIX D
ANALYTICAL LABORATORY REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

September 21, 2017

Emily Clark

Golder Associates
5200 Pasadena, NE Suite C
Albuquerque, NM 87113
TEL: (505) 821-3043
FAX (505) 821-5273

RE: Walstad Oil Co Lovington 66 Site OrderNo.: 1709834

Dear Emily Clark:

Hall Environmental Analysis Laboratory received 9 sample(s) on 9/14/2017 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-5
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 10:22:00 AM
Lab ID: 1709834-001
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	42	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Toluene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Ethylbenzene	5.6	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Methyl tert-butyl ether (MTBE)	3.2	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2,4-Trimethylbenzene	4.4	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,3,5-Trimethylbenzene	2.4	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2-Dichloroethane (EDC)	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Naphthalene	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1-Methylnaphthalene	ND	8.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
2-Methylnaphthalene	ND	8.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Acetone	ND	20		µg/L	2	9/20/2017 3:18:00 AM	A45748
Bromobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Bromodichloromethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Bromoform	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Bromomethane	ND	6.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
2-Butanone	ND	20		µg/L	2	9/20/2017 3:18:00 AM	A45748
Carbon disulfide	ND	20		µg/L	2	9/20/2017 3:18:00 AM	A45748
Carbon Tetrachloride	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Chlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Chloroethane	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Chloroform	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Chloromethane	ND	6.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
2-Chlorotoluene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
4-Chlorotoluene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
cis-1,2-DCE	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
cis-1,3-Dichloropropene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Dibromochloromethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Dibromomethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2-Dichlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,3-Dichlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,4-Dichlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Dichlorodifluoromethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1-Dichloroethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1-Dichloroethene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2-Dichloropropane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,3-Dichloropropane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
2,2-Dichloropropane	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-5
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 10:22:00 AM
Lab ID: 1709834-001
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Hexachlorobutadiene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
2-Hexanone	ND	20		µg/L	2	9/20/2017 3:18:00 AM	A45748
Isopropylbenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
4-Isopropyltoluene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
4-Methyl-2-pentanone	ND	20		µg/L	2	9/20/2017 3:18:00 AM	A45748
Methylene Chloride	ND	6.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
n-Butylbenzene	ND	6.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
n-Propylbenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
sec-Butylbenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Styrene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
tert-Butylbenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Tetrachloroethene (PCE)	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
trans-1,2-DCE	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
trans-1,3-Dichloropropene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2,3-Trichlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2,4-Trichlorobenzene	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1,1-Trichloroethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,1,2-Trichloroethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Trichloroethene (TCE)	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Trichlorofluoromethane	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
1,2,3-Trichloropropane	ND	4.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Vinyl chloride	ND	2.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Xylenes, Total	10	3.0		µg/L	2	9/20/2017 3:18:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	92.8	70-130		%Rec	2	9/20/2017 3:18:00 AM	A45748
Surr: 4-Bromofluorobenzene	96.1	70-130		%Rec	2	9/20/2017 3:18:00 AM	A45748
Surr: Dibromofluoromethane	97.9	70-130		%Rec	2	9/20/2017 3:18:00 AM	A45748
Surr: Toluene-d8	87.9	70-130		%Rec	2	9/20/2017 3:18:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-8
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 12:17:00 PM
Lab ID: 1709834-002 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	15000	500		µg/L	500	9/20/2017 4:48:00 PM	R45765
Toluene	6100	500		µg/L	500	9/20/2017 4:48:00 PM	R45765
Ethylbenzene	2100	500		µg/L	500	9/20/2017 4:48:00 PM	R45765
Methyl tert-butyl ether (MTBE)	14000	500		µg/L	500	9/20/2017 4:48:00 PM	R45765
1,2,4-Trimethylbenzene	1600	500		µg/L	500	9/20/2017 4:48:00 PM	R45765
1,3,5-Trimethylbenzene	430	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2-Dichloroethane (EDC)	260	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Naphthalene	470	10		µg/L	5	9/20/2017 3:42:00 AM	A45748
1-Methylnaphthalene	44	20		µg/L	5	9/20/2017 3:42:00 AM	A45748
2-Methylnaphthalene	80	20		µg/L	5	9/20/2017 3:42:00 AM	A45748
Acetone	ND	50		µg/L	5	9/20/2017 3:42:00 AM	A45748
Bromobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Bromodichloromethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Bromoform	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Bromomethane	ND	15		µg/L	5	9/20/2017 3:42:00 AM	A45748
2-Butanone	ND	50		µg/L	5	9/20/2017 3:42:00 AM	A45748
Carbon disulfide	ND	50		µg/L	5	9/20/2017 3:42:00 AM	A45748
Carbon Tetrachloride	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Chlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Chloroethane	ND	10		µg/L	5	9/20/2017 3:42:00 AM	A45748
Chloroform	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Chloromethane	ND	15		µg/L	5	9/20/2017 3:42:00 AM	A45748
2-Chlorotoluene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
4-Chlorotoluene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
cis-1,2-DCE	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	9/20/2017 3:42:00 AM	A45748
Dibromochloromethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Dibromomethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,3-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,4-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Dichlorodifluoromethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1-Dichloroethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1-Dichloroethene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2-Dichloropropane	39	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,3-Dichloropropane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
2,2-Dichloropropane	ND	10		µg/L	5	9/20/2017 3:42:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-8
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 12:17:00 PM
Lab ID: 1709834-002
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Hexachlorobutadiene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
2-Hexanone	ND	50		µg/L	5	9/20/2017 3:42:00 AM	A45748
Isopropylbenzene	68	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
4-Isopropyltoluene	5.3	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
4-Methyl-2-pentanone	ND	50		µg/L	5	9/20/2017 3:42:00 AM	A45748
Methylene Chloride	ND	15		µg/L	5	9/20/2017 3:42:00 AM	A45748
n-Butylbenzene	19	15		µg/L	5	9/20/2017 3:42:00 AM	A45748
n-Propylbenzene	200	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
sec-Butylbenzene	7.6	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Styrene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
tert-Butylbenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	9/20/2017 3:42:00 AM	A45748
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
trans-1,2-DCE	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1,1-Trichloroethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,1,2-Trichloroethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Trichloroethene (TCE)	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Trichlorofluoromethane	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
1,2,3-Trichloropropane	ND	10		µg/L	5	9/20/2017 3:42:00 AM	A45748
Vinyl chloride	ND	5.0		µg/L	5	9/20/2017 3:42:00 AM	A45748
Xylenes, Total	4900	750		µg/L	500	9/20/2017 4:48:00 PM	R45765
Surr: 1,2-Dichloroethane-d4	94.3	70-130		%Rec	5	9/20/2017 3:42:00 AM	A45748
Surr: 4-Bromofluorobenzene	95.2	70-130		%Rec	5	9/20/2017 3:42:00 AM	A45748
Surr: Dibromofluoromethane	95.5	70-130		%Rec	5	9/20/2017 3:42:00 AM	A45748
Surr: Toluene-d8	88.0	70-130		%Rec	5	9/20/2017 3:42:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-9
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 12:45:00 PM
Lab ID: 1709834-003
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	2500	50		µg/L	50	9/20/2017 5:12:00 PM	R45765
Toluene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Ethylbenzene	110	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Methyl tert-butyl ether (MTBE)	420	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2,4-Trimethylbenzene	190	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,3,5-Trimethylbenzene	35	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2-Dichloroethane (EDC)	510	50		µg/L	50	9/20/2017 5:12:00 PM	R45765
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Naphthalene	43	10		µg/L	5	9/20/2017 5:36:00 PM	R45765
1-Methylnaphthalene	ND	20		µg/L	5	9/20/2017 5:36:00 PM	R45765
2-Methylnaphthalene	ND	20		µg/L	5	9/20/2017 5:36:00 PM	R45765
Acetone	ND	50		µg/L	5	9/20/2017 5:36:00 PM	R45765
Bromobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Bromodichloromethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Bromoform	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Bromomethane	ND	15		µg/L	5	9/20/2017 5:36:00 PM	R45765
2-Butanone	ND	50		µg/L	5	9/20/2017 5:36:00 PM	R45765
Carbon disulfide	ND	50		µg/L	5	9/20/2017 5:36:00 PM	R45765
Carbon Tetrachloride	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Chlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Chloroethane	ND	10		µg/L	5	9/20/2017 5:36:00 PM	R45765
Chloroform	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Chloromethane	ND	15		µg/L	5	9/20/2017 5:36:00 PM	R45765
2-Chlorotoluene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
4-Chlorotoluene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
cis-1,2-DCE	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	9/20/2017 5:36:00 PM	R45765
Dibromochloromethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Dibromomethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,3-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,4-Dichlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Dichlorodifluoromethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1-Dichloroethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1-Dichloroethene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2-Dichloropropane	18	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,3-Dichloropropane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
2,2-Dichloropropane	ND	10		µg/L	5	9/20/2017 5:36:00 PM	R45765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-9
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 12:45:00 PM
Lab ID: 1709834-003
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Hexachlorobutadiene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
2-Hexanone	ND	50		µg/L	5	9/20/2017 5:36:00 PM	R45765
Isopropylbenzene	6.2	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
4-Isopropyltoluene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
4-Methyl-2-pentanone	ND	50		µg/L	5	9/20/2017 5:36:00 PM	R45765
Methylene Chloride	ND	15		µg/L	5	9/20/2017 5:36:00 PM	R45765
n-Butylbenzene	ND	15		µg/L	5	9/20/2017 5:36:00 PM	R45765
n-Propylbenzene	6.6	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
sec-Butylbenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Styrene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
tert-Butylbenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	9/20/2017 5:36:00 PM	R45765
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
trans-1,2-DCE	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1,1-Trichloroethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,1,2-Trichloroethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Trichloroethene (TCE)	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Trichlorofluoromethane	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
1,2,3-Trichloropropane	ND	10		µg/L	5	9/20/2017 5:36:00 PM	R45765
Vinyl chloride	ND	5.0		µg/L	5	9/20/2017 5:36:00 PM	R45765
Xylenes, Total	61	7.5		µg/L	5	9/20/2017 5:36:00 PM	R45765
Surr: 1,2-Dichloroethane-d4	92.7	70-130		%Rec	5	9/20/2017 5:36:00 PM	R45765
Surr: 4-Bromofluorobenzene	96.2	70-130		%Rec	5	9/20/2017 5:36:00 PM	R45765
Surr: Dibromofluoromethane	96.4	70-130		%Rec	5	9/20/2017 5:36:00 PM	R45765
Surr: Toluene-d8	86.8	70-130		%Rec	5	9/20/2017 5:36:00 PM	R45765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-11
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 11:03:00 AM
Lab ID: 1709834-004
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	5.1	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Toluene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Ethylbenzene	24	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Methyl tert-butyl ether (MTBE)	35	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2,4-Trimethylbenzene	1.7	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,3,5-Trimethylbenzene	1.2	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2-Dichloroethane (EDC)	52	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Naphthalene	3.9	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Acetone	ND	10		µg/L	1	9/20/2017 7:12:00 PM	R45765
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Bromoform	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Bromomethane	ND	3.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
2-Butanone	ND	10		µg/L	1	9/20/2017 7:12:00 PM	R45765
Carbon disulfide	ND	10		µg/L	1	9/20/2017 7:12:00 PM	R45765
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Chloroethane	ND	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Chloroform	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Chloromethane	ND	3.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-11
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 11:03:00 AM
Lab ID: 1709834-004
Matrix: AQUEOUS
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
2-Hexanone	ND	10		µg/L	1	9/20/2017 7:12:00 PM	R45765
Isopropylbenzene	14	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 7:12:00 PM	R45765
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
n-Propylbenzene	4.2	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
sec-Butylbenzene	7.4	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Styrene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 7:12:00 PM	R45765
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 7:12:00 PM	R45765
Surr: 1,2-Dichloroethane-d4	91.4	70-130		%Rec	1	9/20/2017 7:12:00 PM	R45765
Surr: 4-Bromofluorobenzene	97.0	70-130		%Rec	1	9/20/2017 7:12:00 PM	R45765
Surr: Dibromofluoromethane	95.4	70-130		%Rec	1	9/20/2017 7:12:00 PM	R45765
Surr: Toluene-d8	87.6	70-130		%Rec	1	9/20/2017 7:12:00 PM	R45765

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-16
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:54:00 PM
Lab ID: 1709834-005 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Toluene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Ethylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Naphthalene	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Acetone	ND	10		µg/L	1	9/20/2017 5:41:00 AM	A45748
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Bromoform	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Bromomethane	ND	3.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
2-Butanone	ND	10		µg/L	1	9/20/2017 5:41:00 AM	A45748
Carbon disulfide	ND	10		µg/L	1	9/20/2017 5:41:00 AM	A45748
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Chloroethane	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Chloroform	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Chloromethane	ND	3.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-16
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:54:00 PM
Lab ID: 1709834-005 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
2-Hexanone	ND	10		µg/L	1	9/20/2017 5:41:00 AM	A45748
Isopropylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 5:41:00 AM	A45748
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
n-Propylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
sec-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Styrene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 5:41:00 AM	A45748
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 5:41:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	91.2	70-130		%Rec	1	9/20/2017 5:41:00 AM	A45748
Surr: 4-Bromofluorobenzene	94.8	70-130		%Rec	1	9/20/2017 5:41:00 AM	A45748
Surr: Dibromofluoromethane	96.6	70-130		%Rec	1	9/20/2017 5:41:00 AM	A45748
Surr: Toluene-d8	87.2	70-130		%Rec	1	9/20/2017 5:41:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-19
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 1:36:00 PM
Lab ID: 1709834-006 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	3.1	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Toluene	1.3	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Ethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2-Dichloroethane (EDC)	130	10		µg/L	10	9/20/2017 7:36:00 PM	R45765
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Naphthalene	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Acetone	ND	10		µg/L	1	9/20/2017 6:05:00 AM	A45748
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Bromoform	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Bromomethane	ND	3.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
2-Butanone	ND	10		µg/L	1	9/20/2017 6:05:00 AM	A45748
Carbon disulfide	ND	10		µg/L	1	9/20/2017 6:05:00 AM	A45748
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Chloroethane	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Chloroform	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Chloromethane	ND	3.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2-Dichloropropane	8.6	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-19
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 1:36:00 PM
Lab ID: 1709834-006 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
2-Hexanone	ND	10		µg/L	1	9/20/2017 6:05:00 AM	A45748
Isopropylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 6:05:00 AM	A45748
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
n-Propylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
sec-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Styrene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 6:05:00 AM	A45748
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 6:05:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	91.1	70-130		%Rec	1	9/20/2017 6:05:00 AM	A45748
Surr: 4-Bromofluorobenzene	96.7	70-130		%Rec	1	9/20/2017 6:05:00 AM	A45748
Surr: Dibromofluoromethane	95.5	70-130		%Rec	1	9/20/2017 6:05:00 AM	A45748
Surr: Toluene-d8	88.0	70-130		%Rec	1	9/20/2017 6:05:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-20
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:03:00 PM
Lab ID: 1709834-007 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Toluene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Ethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Naphthalene	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Acetone	ND	10		µg/L	1	9/20/2017 6:28:00 AM	A45748
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Bromoform	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Bromomethane	ND	3.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
2-Butanone	ND	10		µg/L	1	9/20/2017 6:28:00 AM	A45748
Carbon disulfide	ND	10		µg/L	1	9/20/2017 6:28:00 AM	A45748
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Chloroethane	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Chloroform	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Chloromethane	ND	3.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-20
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:03:00 PM
Lab ID: 1709834-007 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
2-Hexanone	ND	10		µg/L	1	9/20/2017 6:28:00 AM	A45748
Isopropylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 6:28:00 AM	A45748
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
n-Propylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
sec-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Styrene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 6:28:00 AM	A45748
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 6:28:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	90.6	70-130		%Rec	1	9/20/2017 6:28:00 AM	A45748
Surr: 4-Bromofluorobenzene	95.6	70-130		%Rec	1	9/20/2017 6:28:00 AM	A45748
Surr: Dibromofluoromethane	97.8	70-130		%Rec	1	9/20/2017 6:28:00 AM	A45748
Surr: Toluene-d8	88.1	70-130		%Rec	1	9/20/2017 6:28:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-21
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:26:00 PM
Lab ID: 1709834-008 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Toluene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Ethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Naphthalene	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Acetone	ND	10		µg/L	1	9/20/2017 6:52:00 AM	A45748
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Bromoform	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Bromomethane	ND	3.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
2-Butanone	ND	10		µg/L	1	9/20/2017 6:52:00 AM	A45748
Carbon disulfide	ND	10		µg/L	1	9/20/2017 6:52:00 AM	A45748
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Chloroethane	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Chloroform	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Chloromethane	ND	3.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: W-21
Project: Walstad Oil Co Lovington 66 Site
Collection Date: 9/12/2017 2:26:00 PM
Lab ID: 1709834-008 **Matrix:** AQUEOUS **Received Date:** 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
2-Hexanone	ND	10		µg/L	1	9/20/2017 6:52:00 AM	A45748
Isopropylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 6:52:00 AM	A45748
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
n-Propylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
sec-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Styrene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 6:52:00 AM	A45748
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 6:52:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	93.3	70-130		%Rec	1	9/20/2017 6:52:00 AM	A45748
Surr: 4-Bromofluorobenzene	95.9	70-130		%Rec	1	9/20/2017 6:52:00 AM	A45748
Surr: Dibromofluoromethane	98.0	70-130		%Rec	1	9/20/2017 6:52:00 AM	A45748
Surr: Toluene-d8	88.7	70-130		%Rec	1	9/20/2017 6:52:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: TRIP BLANK
Project: Walstad Oil Co Lovington 66 Site
Collection Date:
Lab ID: 1709834-009
Matrix: TRIP BLANK
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Toluene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Ethylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Naphthalene	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
2-Methylnaphthalene	ND	4.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Acetone	ND	10		µg/L	1	9/20/2017 7:16:00 AM	A45748
Bromobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Bromodichloromethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Bromoform	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Bromomethane	ND	3.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
2-Butanone	ND	10		µg/L	1	9/20/2017 7:16:00 AM	A45748
Carbon disulfide	ND	10		µg/L	1	9/20/2017 7:16:00 AM	A45748
Carbon Tetrachloride	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Chlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Chloroethane	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Chloroform	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Chloromethane	ND	3.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
2-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
4-Chlorotoluene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
cis-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Dibromochloromethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Dibromomethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1-Dichloroethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1-Dichloroethene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,3-Dichloropropane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
2,2-Dichloropropane	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Golder Associates
Client Sample ID: TRIP BLANK
Project: Walstad Oil Co Lovington 66 Site
Collection Date:
Lab ID: 1709834-009
Matrix: TRIP BLANK
Received Date: 9/14/2017 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Hexachlorobutadiene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
2-Hexanone	ND	10		µg/L	1	9/20/2017 7:16:00 AM	A45748
Isopropylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
4-Isopropyltoluene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
4-Methyl-2-pentanone	ND	10		µg/L	1	9/20/2017 7:16:00 AM	A45748
Methylene Chloride	ND	3.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
n-Butylbenzene	ND	3.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
n-Propylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
sec-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Styrene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
tert-Butylbenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
trans-1,2-DCE	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Trichlorofluoromethane	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Vinyl chloride	ND	1.0		µg/L	1	9/20/2017 7:16:00 AM	A45748
Xylenes, Total	ND	1.5		µg/L	1	9/20/2017 7:16:00 AM	A45748
Surr: 1,2-Dichloroethane-d4	92.5	70-130		%Rec	1	9/20/2017 7:16:00 AM	A45748
Surr: 4-Bromofluorobenzene	95.2	70-130		%Rec	1	9/20/2017 7:16:00 AM	A45748
Surr: Dibromofluoromethane	95.7	70-130		%Rec	1	9/20/2017 7:16:00 AM	A45748
Surr: Toluene-d8	89.2	70-130		%Rec	1	9/20/2017 7:16:00 AM	A45748

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **A45748**	RunNo: **45748**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1452828** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	110	70	130			
Toluene	20	1.0	20.00	0	98.6	70	130			
Chlorobenzene	20	1.0	20.00	0	99.3	70	130			
1,1-Dichloroethene	23	1.0	20.00	0	115	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.6	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		95.5	70	130			
Surr: Dibromofluoromethane	9.7		10.00		97.5	70	130			
Surr: Toluene-d8	8.9		10.00		89.0	70	130			

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **A45748**	RunNo: **45748**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1452829** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **A45748**	RunNo: **45748**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1452829** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **A45748**	RunNo: **45748**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1452829** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.7	70	130			
Surr: 4-Bromofluorobenzene	9.5		10.00		94.8	70	130			
Surr: Dibromofluoromethane	9.6		10.00		96.4	70	130			
Surr: Toluene-d8	8.9		10.00		88.6	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R45765**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1453589** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	107	70	130			
Toluene	19	1.0	20.00	0	96.6	70	130			
Chlorobenzene	19	1.0	20.00	0	96.2	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	111	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	104	70	130			
Surr: 1,2-Dichloroethane-d4	9.2		10.00		91.6	70	130			
Surr: 4-Bromofluorobenzene	9.5		10.00		95.4	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.5	70	130			
Surr: Toluene-d8	8.9		10.00		89.0	70	130			

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R45765**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1453590** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R45765**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1453590** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R45765**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1453590** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.9	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		95.6	70	130			
Surr: Dibromofluoromethane	9.6		10.00		96.4	70	130			
Surr: Toluene-d8	8.9		10.00		89.3	70	130			

Sample ID **1709834-003ams**	SampType: **MS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **W-9**	Batch ID: **A45748**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1454006** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2500	5.0	100.0	2423	67.5	70	130			ES
Toluene	99	5.0	100.0	1.700	97.3	70	130			
Chlorobenzene	98	5.0	100.0	0	98.0	70	130			
1,1-Dichloroethene	110	5.0	100.0	0	114	70	130			
Trichloroethene (TCE)	110	5.0	100.0	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	45		50.00		90.6	70	130			
Surr: 4-Bromofluorobenzene	48		50.00		96.9	70	130			
Surr: Dibromofluoromethane	48		50.00		96.9	70	130			
Surr: Toluene-d8	44		50.00		88.1	70	130			

Sample ID **1709834-003amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **W-9**	Batch ID: **A45748**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1454007** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2400	5.0	100.0	2423	-20.6	70	130	3.60	20	ES
Toluene	95	5.0	100.0	1.700	93.0	70	130	4.41	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1709834**

21-Sep-17

Client: Golder Associates

Project: Walstad Oil Co Lovington 66 Site

Sample ID **1709834-003amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **W-9**	Batch ID: **A45748**	RunNo: **45765**
Prep Date:	Analysis Date: **9/20/2017**	SeqNo: **1454007** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chlorobenzene	94	5.0	100.0	0	93.7	70	130	4.49	20	
1,1-Dichloroethene	110	5.0	100.0	0	109	70	130	3.80	20	
Trichloroethene (TCE)	100	5.0	100.0	0	103	70	130	3.26	20	
Surr: 1,2-Dichloroethane-d4	46		50.00		91.8	70	130	0	0	
Surr: 4-Bromofluorobenzene	48		50.00		95.1	70	130	0	0	
Surr: Dibromofluoromethane	47		50.00		94.4	70	130	0	0	
Surr: Toluene-d8	44		50.00		88.4	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **Golder Assoc** Work Order Number: **1709834** RcptNo: **1**

Received By: **Isaiah Ortiz** **9/14/2017 9:40:00 AM** IO

Completed By: **Ashley Gallegos** **9/15/2017 9:35:22 AM** AG

Reviewed By: ENM 9/18/17

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	UPS		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.5	Good	Yes			

Chain-of-Custody Record

Client: Golder & Associates, Inc.
ATTN: Emily Clark
Mailing Address: 5200 Pasadena Ave NE, Suite C
Albuquerque, NM 87113
Phone #: 505.821.3043
email or Fax#: 505.821.5273
QA/QC Package: Emily_Clark@golder.com
~~X~~ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush
Project Name: Walstad Oil Co. Lovington 66 Site
Project #: 1651353 Golder & Assoc. GW Monitoring 2017
Project Manager: Emily Clark
Sampler: CM Barnhill, PE
On Ice: ~~X~~ Yes ☐ No
Sample Temperature: 4.5

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1709834	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Air Bubbles (Y or N)
09/12/17	10:22	H_2O	W-5	3x40mL VOA's	$HgCl_2$	-001										X		N
09/12/17	12:17	H_2O	W-8			-002												N
09/12/17	12:45	H_2O	W-9			-003												N
09/12/17	11:03	H_2O	W-11			-004												N
09/12/17	14:54	H_2O	W-16			-005												N
09/12/17	13:36	H_2O	W-19			-006												N
09/12/17	14:03	H_2O	W-20			-007												N
09/12/17	14:26	H_2O	W-21			-008												N
			TRIP Blank	2x40mL VOA's	$HgCl_2$	-009												

Date:	Time:	Relinquished by:	Received by:	Date	Time
09/13/17	0930			9/14/17	0940
Date:	Time:	Relinquished by:	Received by:	Date	Time

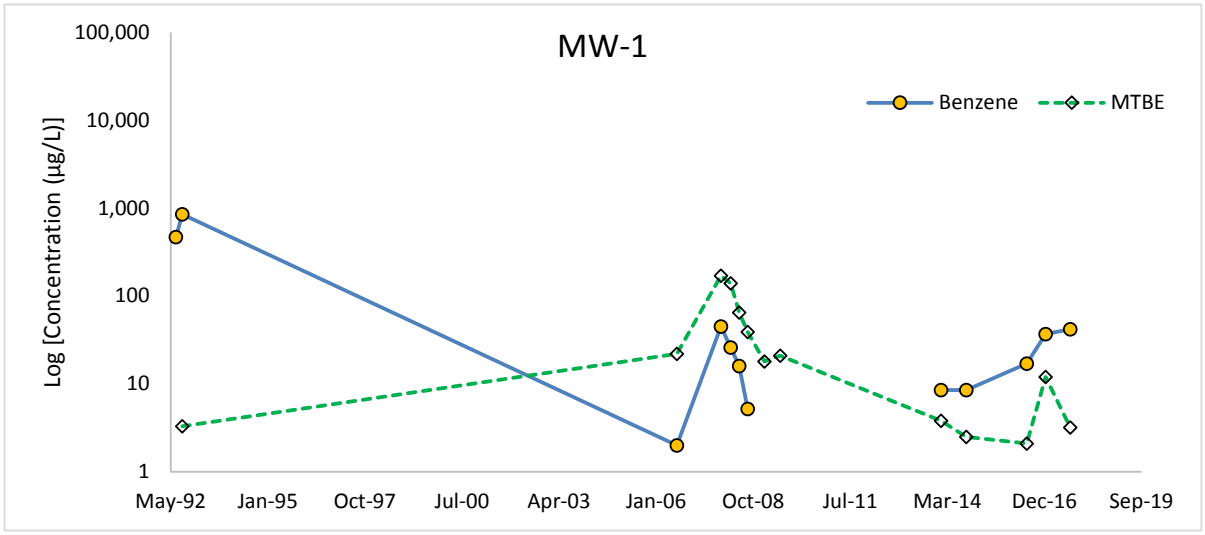
Remarks: Any Questions? Please Call Emily Clark @ 505.392.2922

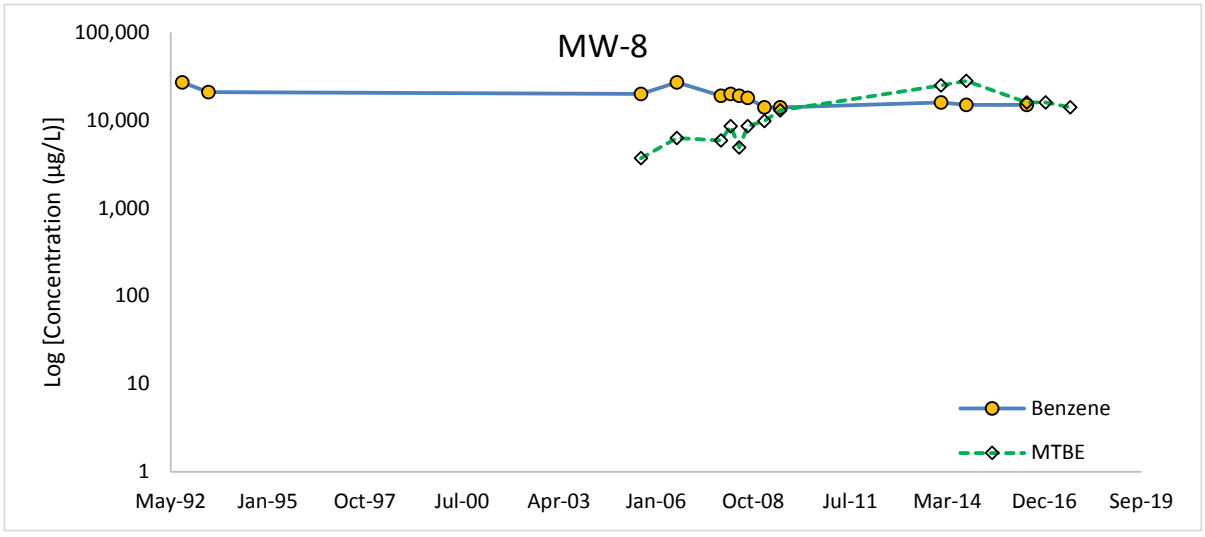
If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

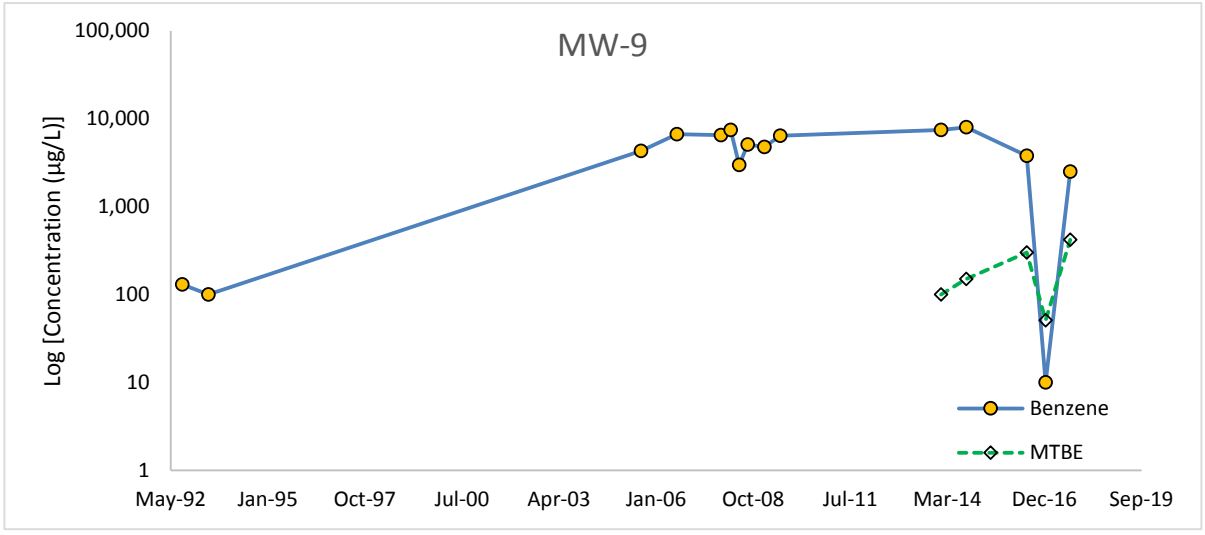
JPS

APPENDIX E
CONCENTRATION TREND PLOTS

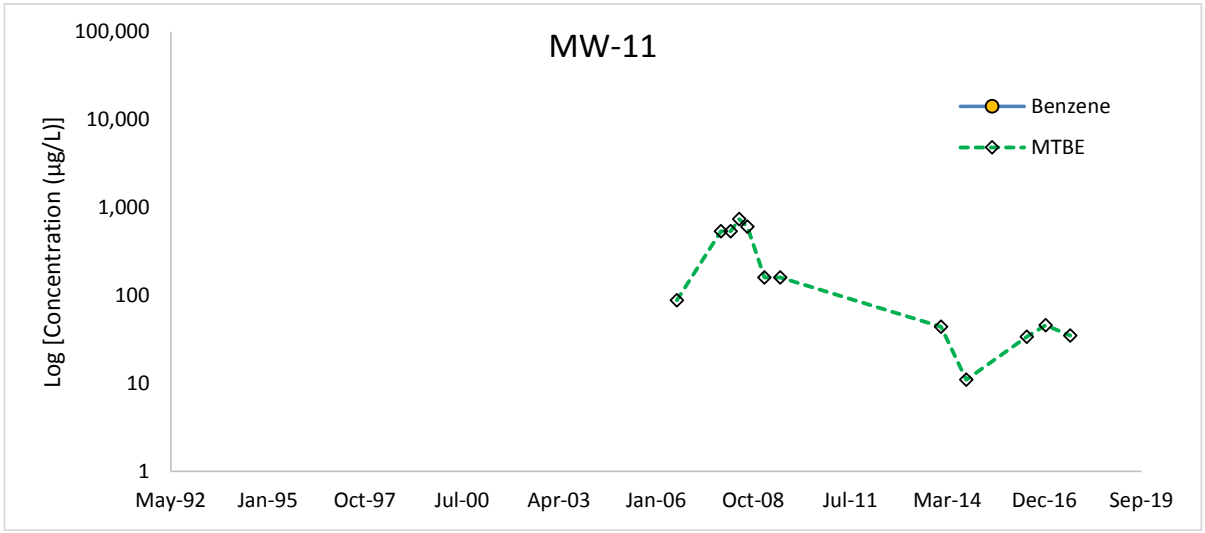
Appendix E: Benzene and MTBE Concentration Trends
Lovington 66, Lovington, New Mexico

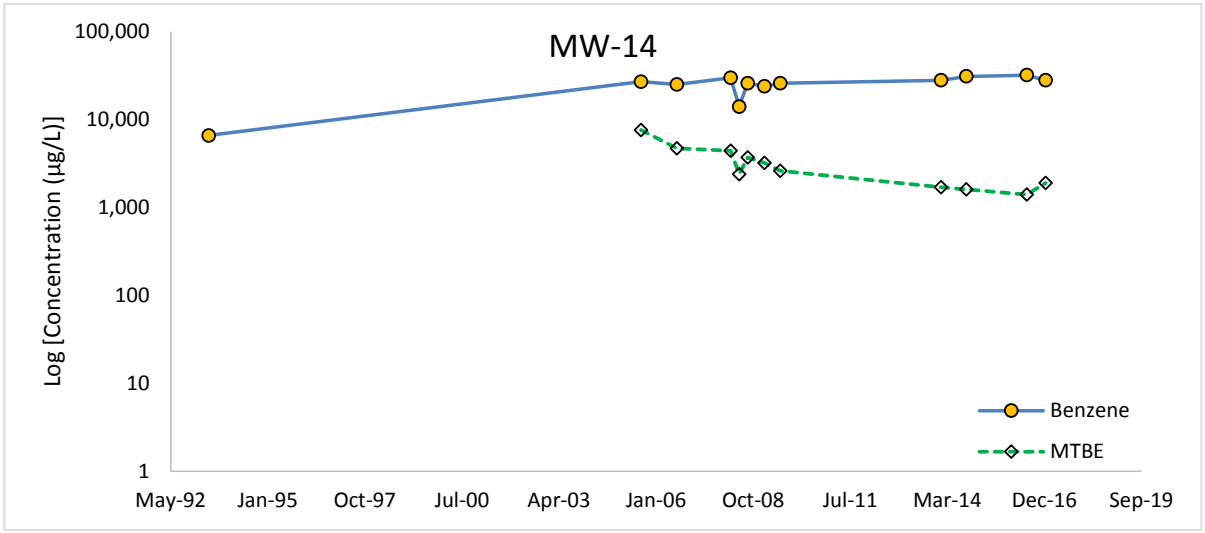


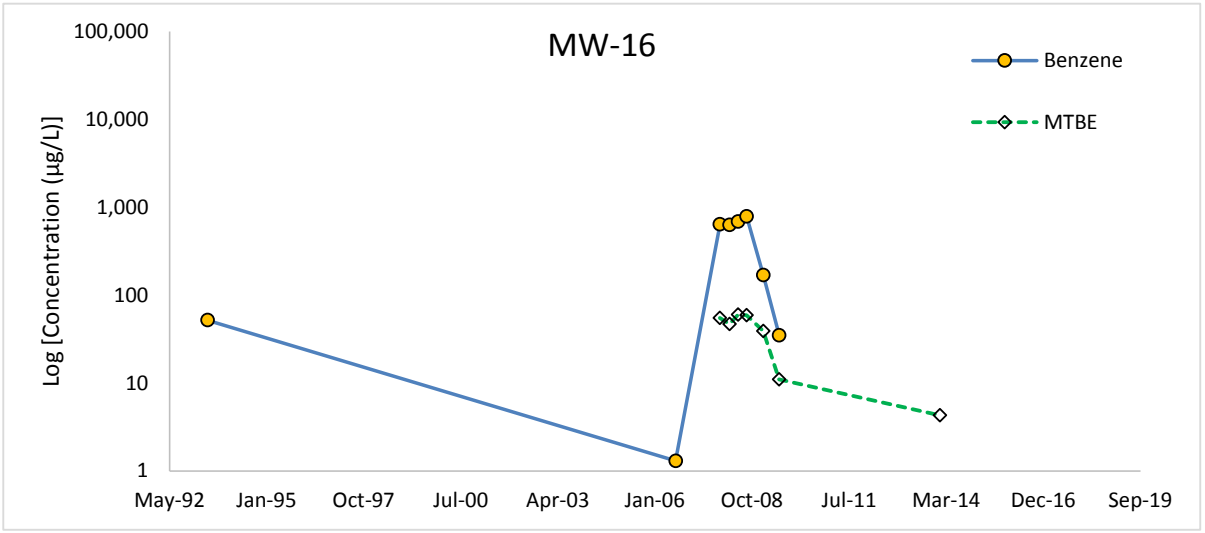




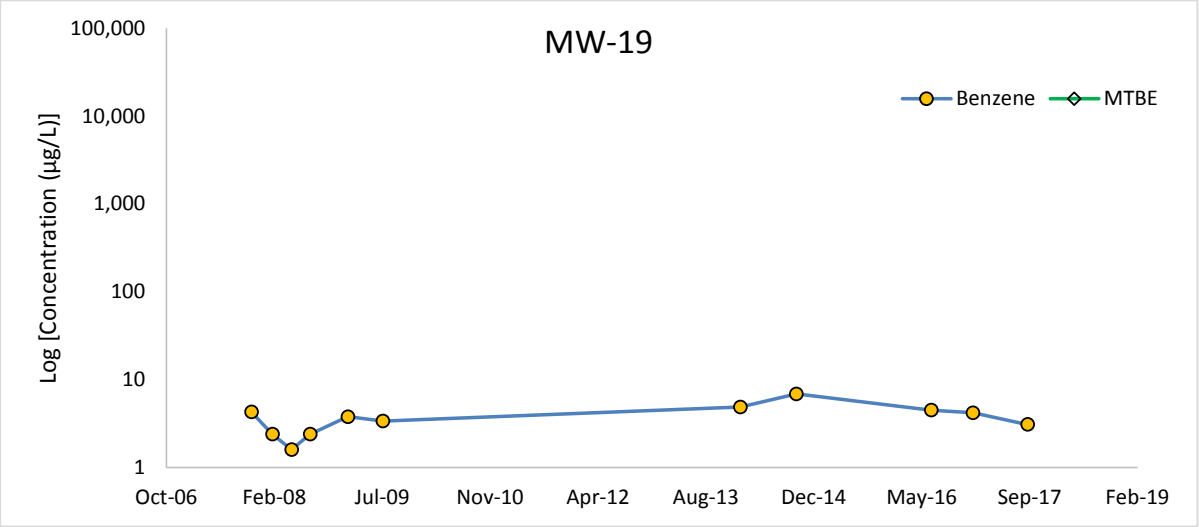
Appendix E: Benzene and MTBE Concentration Trends
Lovington 66, Lovington, New Mexico

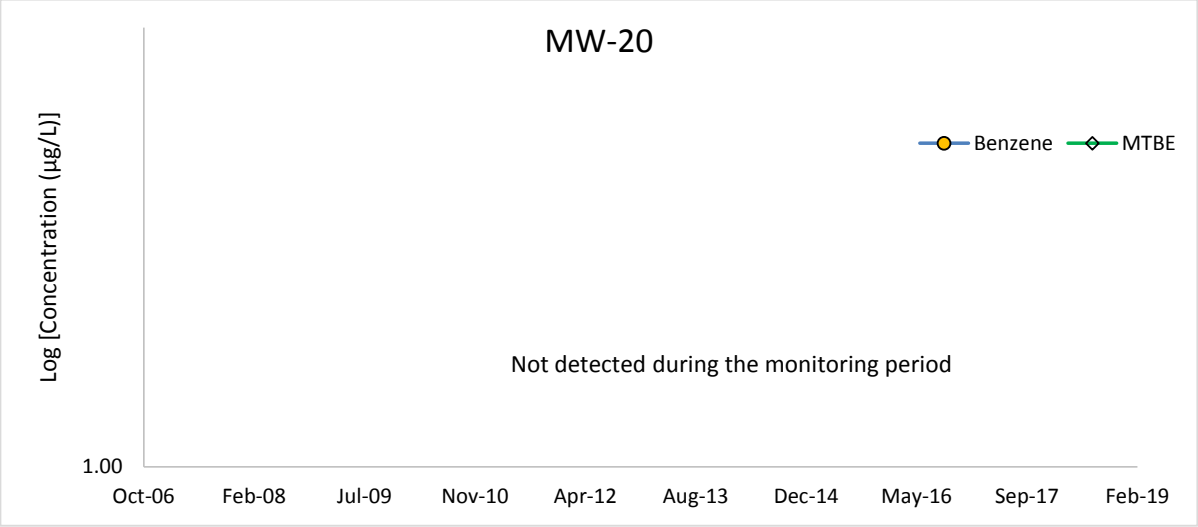


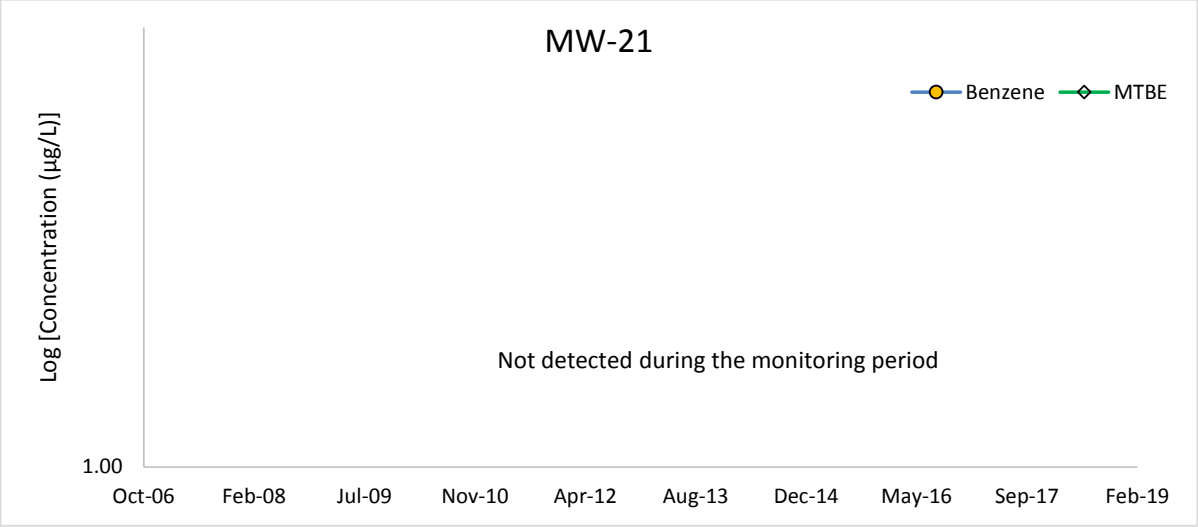




Appendix E: Benzene and MTBE Concentration Trends
Lovington 66, Lovington, New Mexico







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