Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
I-40 Exit 39
Jamestown, NM 87347

March 11, 2022

Mr. Kevin Pierard, Chief
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505-6303

RE: Response to Approval with Modifications
Revised Investigation Report, SMW-2 and GWM-1 Areas
Marathon Gallup Refinery
(dba Western Refining Southwest LLC)
EPA ID# NMD000333211
HWB-WRG-21-015

Dear Mr. Pierard:

Attached please find the response to comments contained in the New Mexico Environment Department (NMED) Disapproval letter dated December 27, 2021. A timeline of the Investigation Report, SWM-2 and GWM-1 Areas is provided below.

- Investigation Report, submitted September 30, 2021
- Approval with Modifications, received December 27, 2021

Two hard copies and an electronic version of the revised Report are included. Additionally, a redline-strikeout version in electronic format shows where all revisions to the Report were made.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at 505-879-7643.

Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
I-40 Exit 39
Jamestown, NM 87347

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Western Refining Southwest LLC, DBA Marathon Gallup Refinery

Ruth A Cade

Ruth Cade
Vice-President

Enclosures

cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
L. Barr, NMOCD
K. Luka, Marathon Petroleum Corporation
M. Bracey, Marathon Petroleum Corporation
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

ATTACHMENT A

RESPONSE TO COMMENTS

New Mexico Environment Department (NMED) to Marathon Gallup Refinery (Refinery) Comment Letter "Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas" (December 27, 2021)

NMED Comments	Refinery Responses
Comment 1:	**Response 1:**
In Section 2.1 (SMW-2 Area - Monitoring Wells OW-67 and OW-68), page 8 of 15, paragraph 3, the Permittee states, "[e]levated concentrations of chloride and sulfate at [SMW-2] were previously evaluated with the installation of monitoring wells OW-59 and OW-60 in September 2016 [and m]onitoring wells OW-67 and OW-68 were proposed to be screened in the upper-most saturated interval and at a depth that corresponds to the base of EP-2, estimated to be at a depth of 8 to 13 feet below ground surface (ft-bgs)." Wells SMW-2, OW-59, and OW-60 were installed with screened intervals with depths of 34.31 - 54.31, 20 - 35, and 25 - 45 feet bgs, respectively, which were designed to monitor groundwater quality at the ChinIe/Alluvial Interface. Wells OW-67 and OW-68 were installed with screened intervals with depths of 10 - 25, and 5 - 25 feet bgs, respectively, which were designed to monitor shallow groundwater quality at the upper-most saturated interval. The screened intervals of wells OW-67 and OW-68 are not comparable with well SMW-2; therefore, the conclusions regarding the elevated chloride and sulfate concentrations in the groundwater samples collected from wells OW-67 and OW-68 will not be representative of the samples collected from well SMW-2. If the Permittee would like to continue to use the locations of wells OW-67 and OW-68 to evaluate the chloride and sulfate concentrations in the Chinle/Alluvial interface, propose to install nested wells adjacent to OW-67 and OW-68 that are screened to monitor the groundwater quality at the	OW-67 and OW-68 were installed to indicate potential chloride and sulfate migration into the shallow zone that may be attributable to EP-2. Therefore, OW-67 and OW-68 were not installed to be representative of elevated chloride and sulfate concentrations in SMW-2 in the Chinle/Alluvium Aquifer. The wells were installed in accordance with the approved Work Plan [Section 4.1 (SMW-2 Investigation), page 4-1] that states, "Each well will be screened in the upper-most saturated interval(s) with a maximum screen length of 20 feet. Due to concerns over the construction of SMW-2 using a 20-foot well screen, which possibly allows cross-communication between separate zones (upper sands vs. Chinle/alluvium Interface), care will be taken to avoid screening across intervals that may not otherwise be in hydraulic communication. In addition, wells will be screened across the depths corresponding to the base of pond EP-2 if there is indication of the presence of groundwater at these depths. These depths are estimated to range from 8 feet to 13 feet bgs [below ground surface]." Based on the objectives stated in the Work Plan (depths corresponding to the base of EP-2), the depths of monitoring wells OW-67 and OW-68 are sufficient and nested wells are not necessary. To clarify the text, the Executive Summary, page 5 of 13; Section 1.0 (Introduction and Background), page 7 of 15; and Section 4.0 (Summary and Conclusions), page 13 of 15, have been revised to state, "Monitoring wells OW-67 and OW-68 were proposed to further evaluate chloride and sulfate

New Mexico Environment Department (NMED) to Marathon Gallup Refinery (Refinery) Comment Letter "Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas" (December 27, 2021)

NMED Comments	Refinery Responses
Chinle/Alluvial interface; otherwise, explain why wells OW-67 and OW-68 are sufficient for the evaluation in a response letter.	groundwater exceedances observed at monitoring well SMW-2 that may be attributable to Evaporation Pond No. (No.) 2 (EP-2) by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019)."
Comment 2:	**Response 2:**
In Section 2.2 (GWM-1 Area - Monitoring Well OW-69), page 9 of 15, paragraph 3, the Permittee states, "[i]n boring OW-69, clay and silty clay (CL) were observed from 0 to approximately 10 ft-bgs. Bedrock (mudstone, sandstone, and siltstone) was observed from 10 to 25 ft-bgs, the boring terminus. No indication of water was detected during drilling. Since boring log OW-69 included in Appendix A (Boring Logs) does not provide information regarding the ground surface elevation, NMED is unable to evaluate whether boring OW-69 was advanced to a sufficient depth to intercept the saturated zone. The groundwater elevations at well GWM-1 are recorded as approximately 6,891 feet. Based on Figure 2 (SMW-2 and GWM-1 Area Features), boring OW-69 is depicted approximately 75 feet downgradient of well GWM-1 along a relatively flat hydraulic gradient in the pertinent area. Boring OW-69 should have been advanced to the comparable depth of groundwater detected in well GWM-1 (i.e., 6,891 feet), at a minimum. Provide accurate surface elevation survey data for boring OW-69 to confirm that the depth of boring OW-69 was completed to a depth comparable to groundwater levels detected in well GWM-1 in the response letter.	The surface elevation of OW-69 is 6832.52 feet above mean sea level (ft amsl). This is lower than the total depth drilled in GMW-1 (6886.41 ft amsl). GMW-1 groundwater elevations varied between 6889.63 ft amsl (20.59 ft-bgs) and 6892.24 ft amsl (18.45 ft bgs), from March 2020 through September 2021. These elevations are higher than the ground surface elevation of OW-69. OW-69 was planned to be drilled to the Chinle/Alluvium interface as described in the work plan. The actual boring was drilled 15 ft into bedrock (i.e., the Chinle formation). No indication of water was present during drilling. To clarify the text, the Executive Summary, page 5 of 15; Section 1.0 (Introduction and Background), page 7 of 15; and Section 4.0 (Summary and Conclusions), page 13 of 15, were revised to state, "Monitoring well OW-69 was proposed to help delineate potential groundwater impacts and separate-phase hydrocarbon (SPH) occurrences observed at monitoring well GWM-1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019)."

New Mexico Environment Department (NMED) to Marathon Gallup Refinery (Refinery) Comment Letter "Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas" (December 27, 2021)

NMED Comments	Refinery Responses
Comment 3:	**Response 3:**
In Section 3.0 (Soil Sample Results), page 10 of 15, paragraph 2, the Permittee states, "[a] summary of the soil sampling results is presented in Tables 1 through 3. Detected concentrations were compared to the NMED residential and industrial soil screening levels (SSL) (NMED 2019)." Tables 1 through 3 were not evaluated with all of the appropriate SSLs. Address the following comments: a. Tables 1 through 3 only present the industrial SSLs and do not include the residential SSLs. If the Permittee wishes to petition for a corrective action complete (CAC) without controls status at the site in the future, it is appropriate to select residential soil screening levels as criteria to determine whether further remediation and/or investigation is necessary. Revise the tables accordingly and provide replacement tables. b. The commercial/industrial SSLs are only applicable to soils at depths between 0 to 1 foot below ground surface (bgs). Since all soil samples presented in Tables 1 through 3 were collected from depths deeper than 1-foot bgs, the commercial/industrial SSLs are not applicable for the soil samples based on the collection depths. Construction worker SSLs are applicable to soils at depths between 0 to 10 feet bgs and must be used as non-residential SSLs; therefore, replace the industrial SSLs with the construction worker SSLs. Revise the tables accordingly and provide replacement tables. c. Based on the historic data collected from wells SMW-2, OW-59, and OW-60, the groundwater in the vicinity of the OCD Land Farm has been relatively unaffected by volatile organic	Tables 1 through 3 have been revised to include Residential (comment 3.a), Construction (NMED Comment 3.b), and Dilution Attenuation Factor (DAF) (Comment 3.c) soil screening levels (SSLs). Commercial/Industrial SSLs have been removed from Tables 1 through 3. Section 3.0 (Soil Sample Results), page 10 of 15, has been revised to state, "Detected concentrations were compared to the NMED residential, construction, and dilution attenuation factor (DAF) soil screening levels (SSL) (NMED 2019)." Section 3.1 (Volatile Organic Compounds), page 10 of 15, bullets 1, 2, and 3 were revised as follows: • "Acetone…The NMED residential, construction worker, and DAF SSLs for acetone are 66,313 mg/kg [milligram per kilogram], 241,548 mg/kg, and 49.8mg/kg, respectively." • "2-Butanone…The NMED residential, construction worker, and DAF SSLs for 2-butanone are 37,418 mg/kg, 91,657 mg/kg, and 20.1mg/kg, respectively." • "MTBE…The NMED residential, construction worker, and DAF SSLs are 975 mg/kg, 24,231 mg/kg, and 0.55 mg/kg, respectively." Section 3.2 (Semivolatile Organic Compounds), page 11 of 15, bullets 1, 2, and 3 were revised as follows:

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NMED Comments	Refinery Responses
compounds (VOCs) and must be monitored to determine if the constituents of concern (COCs) reach the groundwater underneath the OCD Land Farm. Therefore, the Permittee must compare the soil sample concentrations with Dilution Attenuation Factor (DAF) SSLs to evaluate the OCD Land Farm for potential breakthrough for COCs. Revise Tables 1 through 3 and all sections of the Report, where applicable, to include the appropriate SSLs. Revise the tables accordingly and provide replacement tables.	• "Bis(2-ethylhexyl)phthalate (BEH))…The NMED residential, construction worker, and DAF SSLs for BEHP are 380 mg/kg, 5,381 mg/kg, and 200 mg/kg, respectively." • "Diethyl phthalate…The NMED residential, construction worker, and DAF SSLs for diethyl phthalate are 49,300 mg/kg, 215,250 mg/kg, and 98 mg/kg, respectively." • Di-n-butyl phthalate…The NMED residential, construction worker, and DAF SSLs for di-n-butyl phthalate are 6,160 mg/kg, 29,906 mg/kg, and 33.8 mg/kg, respectively." Section 3.3 (Total Petroleum Hydrocarbons), page 11 of 15, has been revised to state, "The NMED residential and construction worker SSLs for TPH-DRO are 1,000 mg/kg and 3,000 mg/kg, respectively." Section 3.4 (Inorganic Compounds), Pages 11 of 15 and 12 of 15, were revised as follows: • "Barium…The NMED residential, construction worker, and DAF SSLs for barium are 15,558 mg/kg, 4,392 mg/kg, and 2,699 mg/kg, respectively." • "Chromium…The NMED residential, construction worker, and DAF SSLs for chromium are 96 mg/kg, 134 mg/kg, and 205,256 mg/kg, respectively." • "Lead…The NMED residential, construction worker, and DAF SSLs for lead are 400 mg/kg, 800 mg/kg, and 270 mg/kg respectively."

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NMED Comments	Refinery Responses
	• "Mercury…The NMED residential, construction worker, and DAF SSLs for mercury are 23.8 mg/kg, 21 mg/kg, and 2.1 mg/kg, respectively.
Comment 4:	**Response 4:**
In Section 3.1 (Volatile Organic Compounds), page 10 of 15, bullet 3, the Permittee states, "MTBE was compared to the United States Environmental Protection Agency (USEPA) Regional Soil Screening Levels (RSLs) because there are no NMED SSLs for MTBE." The NMED SSLs for MTBE are available in the NMED's November 2021 Risk Assessment Guidance for Site Investigations and Remediation (NMED Guidance). The residential, construction worker, and DAF SSLs for MTBE are listed as 9.75E+02, 2.42E+04, and 5.53E-01 mg/kg, respectively, in the NMED Guidance. Revise Table 1 and any applicable sections of the Report to incorporate the applicable SSLs listed in the NMED Guidance.	Section 3.1 (Volatile Organic Compounds), page 10 of 15, bullet 3, was revised to state, "The NMED residential, construction worker, and DAF SSLs are 975 mg/kg, 24,231 mg/kg, and 0.55 mg/kg, respectively." Table 1 and other applicable sections of the revised Report incorporate the appropriate SSLs listed in the November 2021 NMED guidance. Reference to the United States Environmental Protection Agency (USEPA) Regional Soil Screening Levels (RSLs) was removed from the Executive Summary, page 5 of 15, bullet 2; Section 4.0 (Summary and Conclusions), page 13 of 15, bullet 2; and Section 5.0 (References), page 15 of 15.

New Mexico Environment Department (NMED) to Marathon Gallup Refinery (Refinery) Comment Letter "Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas" (December 27, 2021)

NMED Comments	Refinery Responses
Comment 5:	**Response 5:**
In Section 3.1 (Volatile Organic Compounds), page 10 of 15, bullets 2 and 3, and Section 3.2 (Semivolatile Organic Compounds), page 11 of 15, bullet 2, the Permittee states, "MTBE was detected in OW-68 due to blank contamination [and d]iethyl phthalate [and 2-Butanone were] detected in all six samples due to blank contamination." It is not clear whether the constituents were detected in a trip, equipment, and/or instrument blank samples. Provide details regarding the detections of the constituents in blank samples.	The contamination was present in the methanol trip blank. The Executive Summary, page 5 of 13, bullets 1 and 2, and Section 4.0 (Summary and Conclusions), page 13 of 15, were revised to state, "In addition, 2-butanone and MTBE were detected due to a trip blank contamination. Therefore, VOCs in these locations are not considered to be constituents of concern in soil" and "In addition, diethyl phthalate was detected in all six samples due to method blank contamination," respectively. Section 3.1 (Volatile Organic Compounds), page 10 of 15, bullets 2 and 3, have been revised to state, "2-Butanone was detected in all six samples due to trip blank contamination" and "MTBE was detected in OW-68 due to trip blank contamination," respectively. Section 3.2 (Semivolatile Organic Compounds), Page 11 of 15, bullet 2, has been revised to state, "Diethyl phthalate was detected in all six samples due to method blank contamination."
Comment 6:	**Response 6:**
In Section 3.5 (Deviations from Work Plan), page 12 of 15, paragraph 2, the Permittee states, "[t]he Work Plan (DiSorbo 2019) stated that soil samples would be analyzed for iron and manganese. These compounds were inadvertently left off of the analyte list. The laboratory was contacted, and the soil samples are being analyzed. Note, samples are within holding times. These soil data will be included in the groundwater report, which will be submitted 60 days after data are received from the	The revised laboratory report is included in Attachment B. The statement in the Executive Summary, page 6 of 13, and Section 4.0 (Summary and Conclusions), page 14 of 15, "Iron and manganese soil data will also be included in the groundwater report" was removed. The statement in Section 3.5 (Deviations from Work Plan), page 12 of 15, was revised to state, "The laboratory was

New Mexico Environment Department (NMED) to Marathon Gallup Refinery (Refinery) Comment Letter "Approval with Modifications Investigation Report, SMW-2 and GWM-1 Areas" (December 27, 2021)

NMED Comments	Refinery Responses
laboratory." Include the missing information in the revised Report rather than submit the data separately.	contacted, and the soil samples were analyzed. Note, samples are within holding times. These soil data are included in Table 3 and the revised laboratory report included in Appendix B." Section 3.4 (Inorganic Compounds), pages 11 of 15 and 12 of 15, new bullets were added as bullet 3 and bullet 5, to state, "Iron was detected in all six samples ranging from 8,400 E mg/kg in OW-67 (17 ft) to 19,000 E mg/kg in OW-69 (26 ft). The NMED residential, construction worker, and DAF SSLs for iron are 54,800 mg/kg, 908,000 mg/kg, and 6,960 mg/kg, respectively. An "E" qualifier indicates that the concentration was above the laboratory quantification limit" and "Manganese was detected in all six samples ranging from 220 mg/kg in OW-69 (6 ft) to 710 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF SSLs for manganese are 10,500 mg/kg, 160,000 mg/kg, and 2,630 mg/kg, respectively."

ATTACHMENT B

REDLINE/STRIKEOUT PAGES FOR

INVESTIGATION REPORT SMW-2 AND GWM-1 AREAS

(ELECTRONIC COPY)

Investigation Report
SMW-2 and GWM-1 Areas

Western Refining Southwest LLC
(D/B/A Marathon Gallup Refinery)
Gallup, New Mexico

EPA ID# NMD000333211

SEPTEMBER 2021

Revised MARCH 11, 2022

Executive Summary

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) installed twothree monitoring wells and one soil boring to evaluate potential refinery impacts in the vicinity of wells GWM-1 and SMW-2 (Figure 2). Two monitoring wells (OW-67 and OW-68) were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to Evaporation Pond No. (No.) 2 (EP-2) by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Wells OW-67 and OW-68 were installed July 20, 2021. The investigation indicates that the source of sulfate and chloride is not EP-2.

The third monitoring well (OW-69) was proposed to determine the vertical extent groundwater and separate phase hydrocarbon (SPH) down gradient of monitoring well GWM-1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019). Boring OW-69 could not be completed as a well because the boring was dry. No olfactory or visual evidence of SPH was observed, indicating that SPH has not migrated the 75 feet (ft) from GWM-1 towards boring OW-69.

Soil samples were collected from the three borings at the zone with the highest measured total organic vapor and at the bottom of the boring. The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), diesel range organics (DRO), gasoline range organics (GRO), motor oil range organics (MRO), and total metals. Below is a summary of the key findings from the borings that were installed.

- VOCs. Acetone (OW-68, 22 ft and 26 ft), 2-butanone (all samples), and methyl-tert-butyl-ether (MTBE) (boring OW-68, 22 ft and 26 ft) were detected at estimated concentrations (i.e., "J" values). Estimated concentrations of acetone and 2-butanone were detected at six to seven orders of magnitude below the New Mexico Environment Department (NMED) soil screening levels (SSLs) (NMED 2021). Acetone and 2-butanone are common laboratory contaminants. In addition, 2-butanone and MTBE were detected due to a trip blank contamination. Therefore, VOCs in these locations are not considered to be constituents of concern in soil.
- SVOCs. Bis(2-ethylhexyl)phthalate, diethyl phthalate, and di-n-butyl phthalate were detected. One sample was detected, di-n-butyl phthalate at 0.39 milligrams per kilogram (mg/kg) in OW-68 (26 ft-below ground surface [bgs]); the NMED SSL for di-n-butyl phthalate is 91,630 mg/kg. The remaining detections for bis(2-ethylhexyl)phthalate and diethyl phthalate were estimated (i.e., "J" values) and all were several orders of magnitude below their respective ~~industrial/residential~~ NMED SSLs ~~or United States Environmental Protection Agency (USEPA) residential screening levels (USEPA 2021)~~. In addition, diethyl phthalate was detected in all six samples due to method blank contamination. Therefore, SVOCs in these locations are not considered to be constituents of concern in soil.

- TPH. TPH-DRO was detected in one sample, OW-69 (6 ft) at 8.4 J mg/kg, well below the NMED SSL. The remaining samples were below detection limits. Therefore, TPH in these locations is not considered to be a constituent of concern in soil.
- Total Metals. Barium, ~~and~~ chromium, iron, and manganese were detected in all samples; ~~,~~ lead was detected in four of six samples; ~~,~~ and mercury was detected in one sample at an estimated concentration (i.e., "J" value). These metals were well below the NMED SSLs. Therefore, metals in these locations are not considered to be constituents of concern in soil.

Groundwater samples are scheduled to be collected in late September 2021. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results. ~~Iron and manganese soil data will also be included in the groundwater report.~~

1.0 Introduction and Background

The Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Marathon Gallup Refinery is located on 810 acres. Figure 1 presents the refinery location as well as regional features.

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. Various process units were operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, sulfur recovery, merox treater, and hydrotreating. Refinery operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

As detailed in the New Mexico Environment Department (NMED) approved *Work Plan SMW-2 and GWM-1 Areas* (Work Plan) document dated August 2018 and revised August 2019, the Refinery proposed the installation of three additional monitoring wells (DiSorbo 2019). Monitoring wells OW-67 and OW-68 were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to Evaporation Pond Number (No.) 2 (EP-2) by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Monitoring well OW-69 was proposed to help delineate potential groundwater impacts and separate-phase hydrocarbon (SPH) occurrences observed at monitoring well GWM-1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019).

The three proposed monitoring well~~s~~ locations were drilled in July 2021. Wells were installed at two locations (OW-67 and OW-68). One location was completed as a boring (OW-69) due to lack of groundwater. Groundwater samples are scheduled to be collected in late September 2021. This report provides the monitoring well installation details and the associated soil sample results. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results.

2.0 Well Installation Activities

This section provides information pertaining to the drilling activities, including field screening results and targeted well installation depths. A hollow stem auger with split spoon sampling was used for drilling and sampling. Borings were logged by a geologist using the Unified Soil Classification System (USCS).

Installation of monitoring wells OW-67 and OW-68 occurred on July 20, 2021. The boring for ~~monitoring well~~ OW-69 was drilled on July 21, 2021; however, groundwater was not encountered. A brief description of the lithology is provided in the following sections. Well logs are provided in Appendix A.

2.1 SMW-2 Area – Monitoring Wells OW-67 and OW-68

Elevated concentrations of chloride and sulfate at SWM-2 were previously evaluated with the installation of monitoring wells OW-59 and OW-60 in September 2016. However, monitoring wells OW-59 and OW-60 were installed hydraulically upgradient and downgradient, respectively, of the New Mexico Oil Conservation Division (NMOCD) authorized Refinery landfarm (OCD Central Landfarm). To evaluate the potential effect of ~~Evaporation Pond Number (No.) 2 (~~EP-2~~)~~ on chloride and sulfate concentrations in SMW-2, monitoring wells OW-67 and OW-68 were proposed north (down gradient) of EP-2, hydraulically upgradient of SWM-2, and cross gradient of the OCD Central Landfarm (Figure 2). Monitoring wells OW-67 and OW-68 were proposed to be screened in the upper-most saturated interval and at a depth that corresponds to the base of EP-2, estimated to be at a depth of 8 to 13 feet below ground surface (ft-bgs).

2.1.1 Monitoring Well OW-67

Soil observed in the boring varied between clayey silts (USCS ML) and silty clay, sandy clay, and clay (USCS CL) up to approximately 22 ft-bgs, where a stiff clay (USCS CL) was observed. A poorly graded sand (USCS SP) with a thickness of approximately 6- to 12-inches was observed around 17 to 18 ft-bgs. Groundwater was encountered at approximately 12 ft-bgs. Monitoring well OW-67 was screened from 10 ft-bgs to 25 ft-bgs.

During drilling, field screening for total organic volatiles (TOV) was conducted on approximate 2-ft intervals with a photoionization detector (PID). The TOV values were 0 parts per million (ppm) throughout most of the boring with a maximum detection of 1.9 ppm at 17.5 ft-bgs. No notable odor or visual impacts were recorded during drilling.

2.1.2 Monitoring Well OW-68

Silty clay and clay (USCS CL) were observed from 0 to approximately 21 ft-bgs. The clay changed from a soft clay to a stiff clay as the boring was advanced. Silt (USCS ML) was observed from 21 to 25.5 ft-bgs, changing to clayey, poorly graded gravel (USCS GC) at approximately 25.5 ft-bgs. During drilling, moisture was observed at approximately 5 ft-bgs, however, groundwater was not encountered until

3.0 Soil Sample Results

Soil samples were collected at the zone with the highest measured TOV and at the bottom of the boring. Six samples were collected as follows: OW-67 at 17 ft-bgs (TOV) and 26 ft-bgs, OW-68 at 22 ft-bgs (TOV) and 26 ft-bgs, and OW-69 at 6 ft-bgs (TOV) and 26 ft-bgs. The samples were analyzed for:

- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO), Diesel Range Organic (DRO), and motor oil range organics (MRO)
- Inorganic compounds (Skinner list total metals, iron, and manganese)

A summary of the soil sampling results is presented in Tables 1 through 3. Detected concentrations were compared to the NMED residential, construction, and dilution attenuation factor (DAF) ~~and industrial~~ soil screening levels (SSL) (NMED 2021~~2019~~). The complete laboratory report is provided as Appendix B.

3.1 Volatile Organic Compounds

Table 1 presents the VOC data. The samples were below detection limits with the following exceptions:

- Acetone was detected in OW-68 (22 ft and 26 ft) at 0.074 J milligrams per kilogram (mg/kg) and 0.075 J mg/kg, respectively. The NMED residential, construction worker, and ~~industrial~~ DAF SSLs for acetone are 66,31~~300~~ mg/kg, 241,548 mg/kg, and 49.8~~960,100~~ mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- 2-Butanone was detected in all six samples due to trip blank contamination. The concentrations ranged from 0.057 J mg/kg in OW-67 (26 ft) to 0.16 J mg/kg in OW-69 (26 ft). The NMED residential, construction worker, and ~~industrial~~ DAF SSLs for 2-butanone are 37,418~~00~~ mg/kg, 91,657 mg/kg, and 20.1~~411,000~~ mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- MTBE was detected in OW-68 due to trip blank contamination. The concentrations were 0.0055 J mg/kg and 0.0055 J mg/kg at 22 ft and 26 ft, respectively. The NMED residential, construction worker, and DAF SSLs are 975 mg/kg, 24,231 mg/kg, and 0.55 mg/kg, respectively.~~MTBE was compared to the United States Environmental Protection Agency (USEPA) Regional Soil Screening Levels (RSLs) because there are no NMED SSLs for MTBE. The USEPA RSL residential and industrial SSLs for MTBE are 47 mg/kg and 210 mg/kg, respectively.~~ A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.2 Semivolatile Organic Compounds

Table 2 presents the SVOC data. The samples were below detection limits with the following exceptions:

- Bis(2-ethylhexyl)phthalate (BEHP) was detected in OW-67 (26 ft), OW-68 (22 ft and 26 ft), and OW-69 (26 ft). The concentrations ranged from 0.22 J mg/kg to 0.31 J mg/kg. The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for BEHP are 380 mg/kg, 5,381 mg/kg, and 200~~1,832~~ mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- Diethyl phthalate was detected in all six samples due to method blank contamination. The concentrations ranged from 0.69 B mg/kg in OW-69 (26 ft) to 1.1 JB mg/kg in OW-68 (22 ft). The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for diethyl phthalate are 49,300 mg/kg, 215,250 mg/kg, and 98~~733,000~~ mg/kg, respectively. A "B" qualifier indicates that the constituent was detected in the blank. A "JB" qualifier indicates that the concentration is estimated and was detected in the blank.
- Di-n-butyl phthalate was detected in OW-67 (26 ft), OW-68 (22 ft and 26 ft), and OW-69 (26 ft). The concentrations ranged from 0.3 J mg/kg to 0.39 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for di-n-butyl phthalate are 6,160 mg/kg, 29,906 mg/kg, and 33.8~~91,630~~ mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.3 Total Petroleum Hydrocarbons

Table 3 presents the TPH-DRO, TPH-GRO, and TPH-MRO data. TPH-DRO was detected in OW-69 (6 ft) at 8.4 J mg/kg. The NMED residential and construction worker ~~and industrial~~ SSLs for TPH-DRO are 1,000 mg/kg and 3,000 mg/kg, respectively. The remaining samples were below detection limits. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.4 Inorganic Compounds

Table 3 presents the total metals data. The samples were below detection limits with the following exceptions:

- Barium was detected in all six samples ranging from 160 mg/kg in OW-69 (26 ft) to 800 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for barium are 15,558~~600~~ mg/kg, 4,392 mg/kg, and ~~254,700~~2,699 mg/kg, respectively.

- Chromium was detected in all six samples ranging from 5.4 mg/kg in OW-67 (17 ft) to 18 mg/kg in OW-69 (26 ft). The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for chromium are 96 mg/kg, 134 mg/kg, and 205,256~~505~~ mg/kg, respectively.
- Iron was detected in all six samples ranging from 8,400 E mg/kg in OW-67 (17 ft) to 19,000 E mg/kg in OW-69 (26 ft). The NMED residential, construction worker, and DAF SSLs for iron are 54,800 mg/kg, 908,000 mg/kg, and 6,960 mg/kg, respectively. An "E" qualifier indicates that the concentration was above the laboratory quantification limit.
- Lead was detected in ~~all~~ four of six samples with concentrations ranging from 1.2 mg/kg in OW-68 (22 ft) to 4.5 mg/kg in OW-69 (6 ft). The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for lead are 400 mg/kg, ~~and~~ 800 mg/kg, and 270 mg/kg respectively.
- Manganese was detected in all six samples ranging from 220 mg/kg in OW-69 (6 ft) to 710 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF SSLs for manganese are 10,500 mg/kg, 160,000 mg/kg, and 2,630 mg/kg, respectively.
- Mercury was detected in OW-69 (6 ft) at an estimated concentration of 0.0051 J mg/kg. The NMED residential, construction worker, and DAF ~~and industrial~~ SSLs for mercury are 23.8 mg/kg, 21 mg/kg, ~~and~~ 2.1 ~~112~~ mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.5 Deviations from Work Plan

The Work Plan (DiSorbo 2019) stated that soil samples would be analyzed for iron and manganese. These compounds were inadvertently left off of the analyte list. The laboratory was contacted, and the soil samples ~~are being~~were analyzed. Note, samples are within holding times. These soil data are included in Table 3 and the revised laboratory report included in Appendix B. ~~will be included in the groundwater report, which will be submitted 60 days after data are received from the laboratory.~~

4.0 Summary and Conclusions

The Refinery proposed the installation of three monitoring wells (DiSorbo 2019). Monitoring wells OW-67 and OW-68 were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to EP-2 by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Monitoring well OW-69 was proposed to help delineate the groundwater impacts and SPH occurrence observed at monitoring well GWM-1 1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019). Wells OW-67 and OW-68 were installed as described in the Work Plan (DiSorbo 2019). The investigation indicates that the source of sulfate and chloride is not EP-2.

Boring OW-69 was not completed as a well because the boring was dry. The objectives of well installation at this location was to determine the extent of SPH downgradient of GWM-1 and enable SPH monitoring in the shallow aquifer. Based on the boring log (Appendix A), no olfactory or visual evidence of SPH was observed, indicating that SPH has not migrated the 75 ft from GWM-1 towards the proposed location.

Soil samples were collected from the three borings at the zone with the highest measured TOV and at the bottom of the boring. The samples were analyzed for VOCs, SVOCs, TPH-DRO, TPH-GRO, TPH-MRO, and total metals. Below is a summary of the key findings from the borings that were installed.

- VOCs. Acetone (OW-68, 22 ft and 26 ft), 2-butanone (all samples), and methyl-tert-butyl-ether (MTBE) (boring OW-68, 22 ft and 26 ft) were detected at estimated concentrations (i.e., "J" values). Estimated concentrations of acetone and 2-butanone were detected at six to seven orders of magnitude below the NMED SSLs. Acetone and 2-butanone are common laboratory contaminants. In addition, 2-butanone and MTBE were detected due to trip blank contamination. Therefore, VOCs in these locations are not considered to be constituents of concern in soil.
- SVOCs. Bis(2-ethylhexyl)phthalate, diethyl phthalate, and di-n-butyl phthalate were detected. One sample was detected, di-n-butyl phthalate at 0.39 milligrams per kilogram (mg/kg) in OW-68 (26 ft-below ground surface [bgs]); the NMED SSL for di-n-butyl phthalate is 91,630 mg/kg. The remaining detections for bis(2-ethylhexyl)phthalate and diethyl phthalate were estimated (i.e., "J" values) and all were several orders of magnitude below their respective ~~industrial/residential~~ NMED SSLs. ~~or United States Environmental Protection Agency (USEPA) residential screening levels (USEPA 2021).~~ In addition, diethyl phthalate was detected in all six samples due to method blank contamination. Therefore, SVOCs in these locations are not considered to be constituents of concern in soil.
- TPH. TPH-DRO was detected in one sample, OW-69 (6 ft) at 8.4 J mg/kg, well below the NMED SSL. The remaining samples were below detection limits. Therefore, TPH in these locations is not considered to be a constituent of concern in soil.

- Total Metals. Barium and chromium were detected in all samples, lead was detected in four of six samples, and mercury was detected in one sample at an estimated concentration (i.e., "J" value). These metals were well below the NMED SSLs. Therefore, metals in these locations are not considered to be constituents of concern in soil.

As stated in Section 1.0, groundwater samples are scheduled to be collected in late September 2021. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results. ~~The iron and manganese soil data will be included in the groundwater report (see Section 3.0).~~

5.0 References

DiSorbo. 2019. Work Plan SMW-2 and GWM-1 Areas, Gallup Refinery, Marathon Petroleum Company, Gallup, New Mexico, EPA ID# NMD000333211, Revised. August.

New Mexico Environment Department (NMED). 20212119. Risk Assessment Guidance for Investigations and Remediation, Volume I, Soil Screening Guidance for Human Health Risk Assessments, Revision 2. June 19November.

United States Environmental Protection Agency (USEPA). 2021. Regional Soil Screening Levels. September. Available from: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

ATTACHMENT C

INVESTIGATION REPORT SMW-2 AND GWM-1 AREAS

(TWO HARD COPIES AND ONE ELECTRONIC COPY)

Investigation Report
SMW-2 and GWM-1 Areas

Western Refining Southwest LLC
(D/B/A Marathon Gallup Refinery)
Gallup, New Mexico

EPA ID# NMD000333211

SEPTEMBER 2021

Revised MARCH 11, 2022

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List of Acronyms

BEHP	bis(2-ethylhexyl)phthalate
DRO	diesel range organic
EP-2	Evaporation Pond No. 2
ft-bgs	feet below ground surface
GRO	gasoline range organic
mg/kg	milligrams per kilogram
MRO	motor oil range organic
MTBE	methyl-tert-butyl-ether
NMED	New Mexico Environment Department
NMOCD	New Mexico Oil Conservation Division
No.	Number
PID	photoionization detector
ppm	parts per million
RSL	Regional Soil Screening Level
SPH	separate-phase hydrocarbon
SSL	soil screening level
SVOC	semivolatile organic compound
TOV	total organic volatiles
TPH	total petroleum hydrocarbon
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

Executive Summary

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) installed two monitoring wells and one soil boring to evaluate potential refinery impacts in the vicinity of wells GWM-1 and SMW-2 (Figure 2). Two monitoring wells (OW-67 and OW-68) were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to Evaporation Pond No. (No.) 2 (EP-2) by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Wells OW-67 and OW-68 were installed July 20, 2021. The investigation indicates that the source of sulfate and chloride is not EP-2.

The third monitoring well (OW-69) was proposed to determine the vertical extent groundwater and separate phase hydrocarbon (SPH) down gradient of monitoring well GWM-1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019). Boring OW-69 could not be completed as a well because the boring was dry. No olfactory or visual evidence of SPH was observed, indicating that SPH has not migrated the 75 feet (ft) from GWM-1 towards boring OW-69.

Soil samples were collected from the three borings at the zone with the highest measured total organic vapor and at the bottom of the boring. The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), diesel range organics (DRO), gasoline range organics (GRO), motor oil range organics (MRO), and total metals. Below is a summary of the key findings from the borings that were installed.

- VOCs. Acetone (OW-68, 22 ft and 26 ft), 2-butanone (all samples), and methyl-tert-butyl-ether (MTBE) (boring OW-68, 22 ft and 26 ft) were detected at estimated concentrations (i.e., “J” values). Estimated concentrations of acetone and 2-butanone were detected at six to seven orders of magnitude below the New Mexico Environment Department (NMED) soil screening levels (SSLs) (NMED 2021). Acetone and 2-butanone are common laboratory contaminants. In addition, 2-butanone and MTBE were detected due to a trip blank contamination. Therefore, VOCs in these locations are not considered to be constituents of concern in soil.
- SVOCs. Bis(2-ethylhexyl)phthalate, diethyl phthalate, and di-n-butyl phthalate were detected. One sample was detected, di-n-butyl phthalate at 0.39 milligrams per kilogram (mg/kg) in OW-68 (26 ft-below ground surface [bgs]); the NMED SSL for di-n-butyl phthalate is 91,630 mg/kg. The remaining detections for bis(2-ethylhexyl)phthalate and diethyl phthalate were estimated (i.e., “J” values) and all were several orders of magnitude below their respective NMED SSLs. In addition, diethyl phthalate was detected in all six samples due to method blank contamination. Therefore, SVOCs in these locations are not considered to be constituents of concern in soil.
- TPH. TPH-DRO was detected in one sample, OW-69 (6 ft) at 8.4 J mg/kg, well below the NMED SSL. The remaining samples were below detection limits. Therefore, TPH in these locations is not considered to be a constituent of concern in soil.

- Total Metals. Barium, chromium, iron, and manganese were detected in all samples; lead was detected in four of six samples; and mercury was detected in one sample at an estimated concentration (i.e., "J" value). These metals were well below the NMED SSLs. Therefore, metals in these locations are not considered to be constituents of concern in soil.

Groundwater samples are scheduled to be collected in late September 2021. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results.

1.0 Introduction and Background

The Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Marathon Gallup Refinery is located on 810 acres. Figure 1 presents the refinery location as well as regional features.

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. Various process units were operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, sulfur recovery, merox treater, and hydrotreating. Refinery operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

As detailed in the New Mexico Environment Department (NMED) approved *Work Plan SMW-2 and GWM-1 Areas* (Work Plan) document dated August 2018 and revised August 2019, the Refinery proposed the installation of three additional monitoring wells (DiSorbo 2019). Monitoring wells OW-67 and OW-68 were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to Evaporation Pond Number (No.) 2 (EP-2) by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Monitoring well OW-69 was proposed to help delineate potential groundwater impacts and separate-phase hydrocarbon (SPH) occurrences observed at monitoring well GWM-1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019).

The three proposed monitoring well locations were drilled in July 2021. Wells were installed at two locations (OW-67 and OW-68). One location was completed as a boring (OW-69) due to lack of groundwater. Groundwater samples are scheduled to be collected in late September 2021. This report provides the monitoring well installation details and the associated soil sample results. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results.

2.0 Well Installation Activities

This section provides information pertaining to the drilling activities, including field screening results and targeted well installation depths. A hollow stem auger with split spoon sampling was used for drilling and sampling. Borings were logged by a geologist using the Unified Soil Classification System (USCS).

Installation of monitoring wells OW-67 and OW-68 occurred on July 20, 2021. The boring for OW-69 was drilled on July 21, 2021; however, groundwater was not encountered. A brief description of the lithology is provided in the following sections. Well logs are provided in Appendix A.

2.1 SMW-2 Area – Monitoring Wells OW-67 and OW-68

Elevated concentrations of chloride and sulfate at SWM-2 were previously evaluated with the installation of monitoring wells OW-59 and OW-60 in September 2016. However, monitoring wells OW-59 and OW-60 were installed hydraulically upgradient and downgradient, respectively, of the New Mexico Oil Conservation Division (NMOCD) authorized Refinery landfarm (OCD Central Landfarm). To evaluate the potential effect of EP-2 on chloride and sulfate concentrations in SMW-2, monitoring wells OW-67 and OW-68 were proposed north (down gradient) of EP-2, hydraulically upgradient of SWM-2, and cross gradient of the OCD Central Landfarm (Figure 2). Monitoring wells OW-67 and OW-68 were proposed to be screened in the upper-most saturated interval and at a depth that corresponds to the base of EP-2, estimated to be at a depth of 8 to 13 feet below ground surface (ft-bgs).

2.1.1 Monitoring Well OW-67

Soil observed in the boring varied between clayey silts (USCS ML) and silty clay, sandy clay, and clay (USCS CL) up to approximately 22 ft-bgs, where a stiff clay (USCS CL) was observed. A poorly graded sand (USCS SP) with a thickness of approximately 6- to 12-inches was observed around 17 to 18 ft-bgs. Groundwater was encountered at approximately 12 ft-bgs. Monitoring well OW-67 was screened from 10 ft-bgs to 25 ft-bgs.

During drilling, field screening for total organic volatiles (TOV) was conducted on approximate 2-ft intervals with a photoionization detector (PID). The TOV values were 0 parts per million (ppm) throughout most of the boring with a maximum detection of 1.9 ppm at 17.5 ft-bgs. No notable odor or visual impacts were recorded during drilling.

2.1.2 Monitoring Well OW-68

Silty clay and clay (USCS CL) were observed from 0 to approximately 21 ft-bgs. The clay changed from a soft clay to a stiff clay as the boring was advanced. Silt (USCS ML) was observed from 21 to 25.5 ft-bgs, changing to clayey, poorly graded gravel (USCS GC) at approximately 25.5 ft-bgs. During drilling, moisture was observed at approximately 5 ft-bgs, however, groundwater was not encountered until approximately 21 ft-bgs. Monitoring well OW-68 was screened from 5 ft-bgs to 25 ft-bgs to capture the occurrence of groundwater as well as the depth corresponding to the base of EP-2.

Field screening for TOV was conducted on approximately 2-foot intervals with a PID. The TOV values ranged from 0.8 parts per million (ppm) to 6.1 ppm. A hydrocarbon-like odor was observed at approximately 21 ft-bgs, corresponding to the depth of the 6.1 ppm TOV value and the depth to groundwater.

2.2 GWM-1 Area – Monitoring Well OW-69

Monitoring well GWM-1 is located on the top of a dike that forms the western boundary of the former aeration basin (Solid Waste Management Unit No. 1). The monitoring well, installed in 2004, routinely had detections of benzene, toluene, ethylbenzene, and xylene and methyl tert butyl ether (MTBE). Historically benzene has exceeded the applicable screening level. In September of 2015, SPH was discovered in monitoring well GWM-1 for the first time. Based on the presence of SPH, monitoring well OW-69 was proposed to be installed west (hydraulically downgradient) of GWM-1, approximately halfway between the former aeration basin and EP-2 to evaluate the extent of SPH in the shallow aquifer. The location of the aeration basin, EP-2, monitoring well GWM-1, and proposed monitoring well OW-69 are provided on Figure 2.

In boring OW-69, clay and silty clay (CL) were observed from 0 to approximately 10 ft-bgs. Bedrock (mudstone, sandstone, and siltstone) was observed from 10 to 25 ft-bgs, the boring terminus. No indication of water was detected during drilling. The soil and bedrock were dry to the bottom of the boring. Because groundwater was not observed, no monitoring well was installed at this location.

Field screening for TOV was conducted on approximately 2-foot intervals with a PID. The TOV values ranged from 0 ppm to 2.4 ppm. No notable odor or visual impacts were recorded during drilling.

3.0 Soil Sample Results

Soil samples were collected at the zone with the highest measured TOV and at the bottom of the boring. Six samples were collected as follows: OW-67 at 17 ft-bgs (TOV) and 26 ft-bgs, OW-68 at 22 ft-bgs (TOV) and 26 ft-bgs, and OW-69 at 6 ft-bgs (TOV) and 26 ft-bgs. The samples were analyzed for:

- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO), Diesel Range Organic (DRO), and motor oil range organics (MRO)
- Inorganic compounds (Skinner list total metals, iron, and manganese)

A summary of the soil sampling results is presented in Tables 1 through 3. Detected concentrations were compared to the NMED residential, construction, and dilution attenuation factor (DAF) soil screening levels (SSL) (NMED 2021). The complete laboratory report is provided as Appendix B.

3.1 Volatile Organic Compounds

Table 1 presents the VOC data. The samples were below detection limits with the following exceptions:

- Acetone was detected in OW-68 (22 ft and 26 ft) at 0.074 J milligrams per kilogram (mg/kg) and 0.075 J mg/kg, respectively. The NMED residential, construction worker, and DAF SSLs for acetone are 66,313 mg/kg, 241,548 mg/kg, and 49.8mg/kg, respectively. A “J” qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- 2-Butanone was detected in all six samples due to trip blank contamination. The concentrations ranged from 0.057 J mg/kg in OW-67 (26 ft) to 0.16 J mg/kg in OW-69 (26 ft). The NMED residential, construction worker, and DAF SSLs for 2-butanone are 37,418 mg/kg, 91,657 mg/kg, and 20.1mg/kg, respectively. A “J” qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- MTBE was detected in OW-68 due to trip blank contamination. The concentrations were 0.0055 J mg/kg and 0.0055 J mg/kg at 22 ft and 26 ft, respectively. The NMED residential, construction worker, and DAF SSLs are 975 mg/kg, 24,231 mg/kg, and 0.55 mg/kg, respectively. A “J” qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.2 Semivolatile Organic Compounds

Table 2 presents the SVOC data. The samples were below detection limits with the following exceptions:

- Bis(2-ethylhexyl)phthalate (BEHP) was detected in OW-67 (26 ft), OW-68 (22 ft and 26 ft), and OW-69 (26 ft). The concentrations ranged from 0.22 J mg/kg to 0.31 J mg/kg. The NMED residential, construction worker, and DAF SSLs for BEHP are 380 mg/kg, 5,381 mg/kg, and 200 mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.
- Diethyl phthalate was detected in all six samples due to method blank contamination. The concentrations ranged from 0.69 B mg/kg in OW-69 (26 ft) to 1.1 JB mg/kg in OW-68 (22 ft). The NMED residential, construction worker, and DAF SSLs for diethyl phthalate are 49,300 mg/kg, 215,250 mg/kg, and 98 mg/kg, respectively. A "B" qualifier indicates that the constituent was detected in the blank. A "JB" qualifier indicates that the concentration is estimated and was detected in the blank.
- Di-n-butyl phthalate was detected in OW-67 (26 ft), OW-68 (22 ft and 26 ft), and OW-69 (26 ft). The concentrations ranged from 0.3 J mg/kg to 0.39 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF SSLs for di-n-butyl phthalate are 6,160 mg/kg, 29,906 mg/kg, and 33.8 mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.3 Total Petroleum Hydrocarbons

Table 3 presents the TPH-DRO, TPH-GRO, and TPH-MRO data. TPH-DRO was detected in OW-69 (6 ft) at 8.4 J mg/kg. The NMED residential and construction worker SSLs for TPH-DRO are 1,000 mg/kg and 3,000 mg/kg, respectively. The remaining samples were below detection limits. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.4 Inorganic Compounds

Table 3 presents the total metals data. The samples were below detection limits with the following exceptions:

- Barium was detected in all six samples ranging from 160 mg/kg in OW-69 (26 ft) to 800 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF SSLs for barium are 15,558 mg/kg, 4,392 mg/kg, and 2,699 mg/kg, respectively.
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- Lead was detected in four of six samples with concentrations ranging from 1.2 mg/kg in OW-68 (22 ft) to 4.5 mg/kg in OW-69 (6 ft). The NMED residential, construction worker, and DAF SSLs for lead are 400 mg/kg, 800 mg/kg, and 270 mg/kg respectively.
- Manganese was detected in all six samples ranging from 220 mg/kg in OW-69 (6 ft) to 710 mg/kg in OW-68 (26 ft). The NMED residential, construction worker, and DAF SSLs for manganese are 10,500 mg/kg, 160,000 mg/kg, and 2,630 mg/kg, respectively.
- Mercury was detected in OW-69 (6 ft) at an estimated concentration of 0.0051 J mg/kg. The NMED residential, construction worker, and DAF SSLs for mercury are 23.8 mg/kg, 21 mg/kg, and 2.1 mg/kg, respectively. A "J" qualifier indicates that the concentration was detected below the detection limit and is, therefore, an estimated concentration.

3.5 Deviations from Work Plan

The Work Plan (DiSorbo 2019) stated that soil samples would be analyzed for iron and manganese. These compounds were inadvertently left off of the analyte list. The laboratory was contacted, and the soil samples were analyzed. Note, samples are within holding times. These soil data are included in Table 3 and the revised laboratory report included in Appendix B.

4.0 Summary and Conclusions

The Refinery proposed the installation of three monitoring wells (DiSorbo 2019). Monitoring wells OW-67 and OW-68 were proposed to further evaluate chloride and sulfate groundwater exceedances observed at monitoring well SMW-2 that may be attributable to EP-2 by installing the wells at depths corresponding to the base of EP-2 (DiSorbo 2019). Monitoring well OW-69 was proposed to help delineate the groundwater impacts and SPH occurrence observed at monitoring well GWM-1 1 by drilling to the Chinle/Alluvium aquifer interface (DiSorbo 2019). Wells OW-67 and OW-68 were installed as described in the Work Plan (DiSorbo 2019). The investigation indicates that the source of sulfate and chloride is not EP-2.

Boring OW-69 was not completed as a well because the boring was dry. The objectives of well installation at this location was to determine the extent of SPH downgradient of GWM-1 and enable SPH monitoring in the shallow aquifer. Based on the boring log (Appendix A), no olfactory or visual evidence of SPH was observed, indicating that SPH has not migrated the 75 ft from GWM-1 towards the proposed location.

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- VOCs. Acetone (OW-68, 22 ft and 26 ft), 2-butanone (all samples), and methyl-tert-butyl-ether (MTBE) (boring OW-68, 22 ft and 26 ft) were detected at estimated concentrations (i.e., "J" values). Estimated concentrations of acetone and 2-butanone were detected at six to seven orders of magnitude below the NMED SSLs. Acetone and 2-butanone are common laboratory contaminants. In addition, 2-butanone and MTBE were detected due to trip blank contamination. Therefore, VOCs in these locations are not considered to be constituents of concern in soil.
- SVOCs. Bis(2-ethylhexyl)phthalate, diethyl phthalate, and di-n-butyl phthalate were detected. One sample was detected, di-n-butyl phthalate at 0.39 milligrams per kilogram (mg/kg) in OW-68 (26 ft-below ground surface [bgs]); the NMED SSL for di-n-butyl phthalate is 91,630 mg/kg. The remaining detections for bis(2-ethylhexyl)phthalate and diethyl phthalate were estimated (i.e., "J" values) and all were several orders of magnitude below their respective NMED SSLs. In addition, diethyl phthalate was detected in all six samples due to method blank contamination. Therefore, SVOCs in these locations are not considered to be constituents of concern in soil.
- TPH. TPH-DRO was detected in one sample, OW-69 (6 ft) at 8.4 J mg/kg, well below the NMED SSL. The remaining samples were below detection limits. Therefore, TPH in these locations is not considered to be a constituent of concern in soil.

- Total Metals. Barium and chromium were detected in all samples, lead was detected in four of six samples, and mercury was detected in one sample at an estimated concentration (i.e., "J" value). These metals were well below the NMED SSLs. Therefore, metals in these locations are not considered to be constituents of concern in soil.

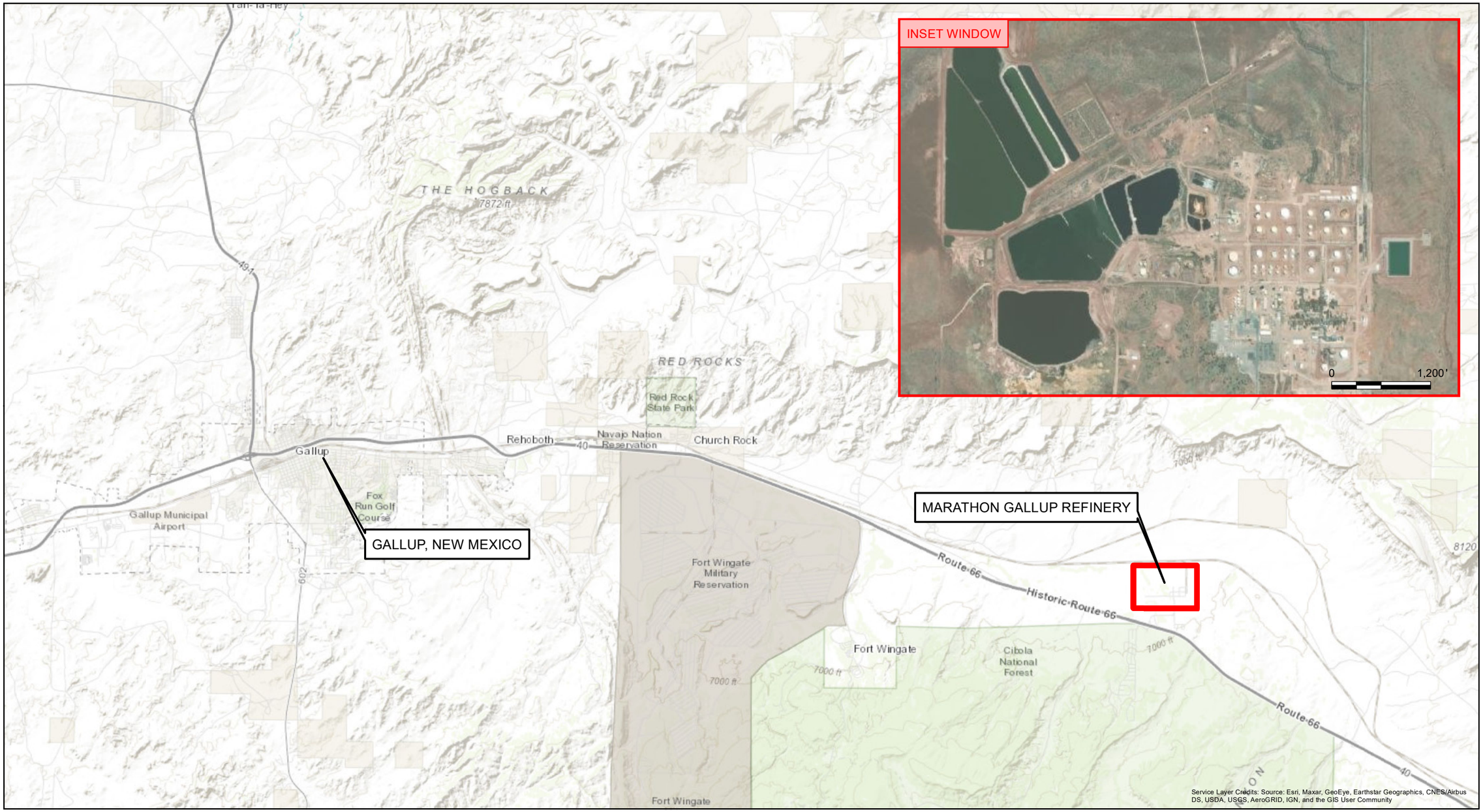
As stated in Section 1.0, groundwater samples are scheduled to be collected in late September 2021. Groundwater results will be included in a separate report that will be submitted within 60 days after receipt of groundwater results.

5.0 References

DiSorbo. 2019. Work Plan SMW-2 and GWM-1 Areas, Gallup Refinery, Marathon Petroleum Company, Gallup, New Mexico, EPA ID# NMD000333211, Revised. August.

New Mexico Environment Department (NMED). 2021. Risk Assessment Guidance for Investigations and Remediation, Volume I, Soil Screening Guidance for Human Health Risk Assessments, Revision 2. November.

Figures



NOTE:

SITE LEGAL DESCRIPTION: TOWNSHIP 15 NORTH, RANGE 15 WEST, SECTION 33

N

0 2 Miles

Trihydro CORPORATION

1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1

SITE LOCATION MAP

WESTERN REFINING SOUTHWEST LLC.
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Drawn By: JDH	Checked By: LA	Scale: 1 " = 2 miles	Date: 9/20/21	File: FIG1_SiteLocation.mxd

M:\TON\MARATHON\GIS\PROJECTS\GALLUPREFINERY\SWMU2_GWM1\FIG1_SITELOCATION.MXD

EXPLANATION

- EXISTING MONITORING WELL
- NEW MONITORING WELL
- BORING LOCATION
- GROUNDWATER CONTOUR & FLOW DIRECTION
- OIL CONSERVATION DIVISION (OCD) CENTRAL LANDFARM BOUNDARY

N

0 200'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
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FIGURE 2

SMW-2 AND GWM-1 AREA FEATURES

WESTERN REFINING SOUTHWEST LLC.
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Drawn By: JDH	Checked By: LA	Scale: 1 " = 200 '	Date: 9/20/21	File: FIG2_SMW-2_GWM-1.mxd

M:\TOM\MARATHON\GIS\PROJECTS\GALLUP\REFINERY\SVM\2_GWM1\FIG2_SMW-2_GWM-1.MXD

Tables

TABLE 1. SOIL ANALYTICAL RESULTS, VOCs
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	Acetone (mg/kg)	Benzene (mg/kg)	Bromobenzene (mg/kg)	Bromodichloro-methane (mg/kg)	Bromoform (mg/kg)	Bromomethane (mg/kg)	2-Butanone (mg/kg)	n-Butylbenzene (mg/kg)	sec-Butylbenzene (mg/kg)	tert-Butylbenzene (mg/kg)	Carbon Disulfide (mg/kg)	Carbon tetrachloride (mg/kg)	Chlorobenzene (mg/kg)	Chloroethane (mg/kg)	Chloroform (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.43)	ND(0.014)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.086)	0.08J/ND(0.29)U*	ND(0.086)	ND(0.029)	ND(0.029)	ND(0.29)	ND(0.029)	ND(0.029)	ND(0.057)	ND(0.029)
OW-67 (26 ft)	07/20/21	ND(0.35)	ND(0.012)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.069)	0.057J/ND(0.23)U*	ND(0.069)	ND(0.023)	ND(0.023)	ND(0.23)	ND(0.023)	ND(0.023)	ND(0.046)	ND(0.023)
OW-68 (22 ft)	07/20/21	0.074 J	ND(0.013)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.077)	0.095J/ND(0.26)U*	ND(0.077)	ND(0.026)	ND(0.026)	ND(0.26)	ND(0.026)	ND(0.026)	ND(0.051)	ND(0.026)
OW-68 (26 ft)	07/20/21	0.075 J	ND(0.014)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.084)	0.098J/ND(0.28)U*	ND(0.084)	ND(0.028)	ND(0.028)	ND(0.28)	ND(0.028)	ND(0.028)	ND(0.056)	ND(0.028)
OW-69 (6 ft)	07/21/21	ND(0.51)	ND(0.017)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.1)	0.094J/ND(0.34)U*	ND(0.1)	ND(0.034)	ND(0.034)	ND(0.34)	ND(0.034)	ND(0.034)	ND(0.068)	ND(0.034)
OW-69 (26 ft)	07/21/21	ND(0.53)	ND(0.018)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.11)	0.16J/ND(0.35)U*	ND(0.11)	ND(0.035)	ND(0.035)	ND(0.35)	ND(0.035)	ND(0.035)	ND(0.071)	ND(0.035)
NMED Construction Soil Screening Level (mg/kg) [1]:		**241,548**	**141.9**	**NA**	**142.6**	**5,381**	**17.9**	**91,657**	**NA**	**NA**	**NA**	**1,621**	**201.5**	**412**	**16,644**	**133.9**
NMED Residential Soil Screening Level (mg/kg) [1]:		**66,313**	**17.8**	**NA**	**6.19**	**674**	**17.7**	**37,418**	**NA**	**NA**	**NA**	**1,554**	**10.7**	**378**	**18,996**	**5.90**
NMED DAF Soil Screening Level (mg/kg) [1]:		**49.8**	**0.042**	**NA**	**0.0062**	**0.15**	**0.034**	**20.1**	**NA**	**NA**	**NA**	**4.42**	**0.037**	**1.08**	**107**	**0.011**

Location ID	Date Sampled	Chloromethane (mg/kg)	2-Chlorotoluene (mg/kg)	4-Chlorotoluene (mg/kg)	1,2-Dibromo-3-chloro-propane (mg/kg)	Dibromochloro-methane (mg/kg)	1,2-Dibromo-ethane (mg/kg)	Dibromomethane (mg/kg)	1,2-Dichloro-benzene (mg/kg)	1,3-Dichlorobenzene (mg/kg)	1,4-Dichlorobenzene (mg/kg)	Dichlorodifluoro-methane (mg/kg)	1,1-Dichloroethane (mg/kg)	1,2-Dichloro-ethane (mg/kg)	1,1-Dichloro-ethene (mg/kg)	cis-1,2-Dichloro-ethene (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.086)	ND(0.029)	ND(0.029)	ND(0.057)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)
OW-67 (26 ft)	07/20/21	ND(0.069)	ND(0.023)	ND(0.023)	ND(0.046)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)
OW-68 (22 ft)	07/20/21	ND(0.077)	ND(0.026)	ND(0.026)	ND(0.051)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)
OW-68 (26 ft)	07/20/21	ND(0.084)	ND(0.028)	ND(0.028)	ND(0.056)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)
OW-69 (6 ft)	07/21/21	ND(0.1)	ND(0.034)	ND(0.034)	ND(0.068)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)
OW-69 (26 ft)	07/21/21	ND(0.11)	ND(0.035)	ND(0.035)	ND(0.071)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)
NMED Construction Soil Screening Level (mg/kg) [1]:		**235**	**7,079**	**NA**	**5.53**	**340.5**	**16.32**	**53.9**	**2,496**	**NA**	**24,776**	**161**	**1,817**	**53.8**	**424**	**708**
NMED Residential Soil Screening Level (mg/kg) [1]:		**41.1**	**1,564**	**NA**	**0.086**	**13.9**	**0.672**	**57.9**	**2,150**	**NA**	**1,287**	**182**	**78.6**	**8.32**	**440**	**156**
NMED DAF Soil Screening Level (mg/kg) [1]:		**0.095**	**3.6**	**NA**	**0.0014**	**0.0075**	**0.00035**	**0.034**	**9.08**	**NA**	**1.12**	**7.23**	**0.136**	**0.024**	**1.95**	**0.35**

Location ID	Date Sampled	trans-1,2-Dichloroethene (mg/kg)	1,2-Dichloropropane (mg/kg)	1,3-Dichloro-propane (mg/kg)	2,2-Dichloropropane (mg/kg)	1,1-Dichloro-propene (mg/kg)	Cis-1,3-dichloro-propene (mg/kg)	trans-1,3-Dichloro-propene (mg/kg)	Ethylbenzene (mg/kg)	Hexachloro-butadiene (mg/kg)	2-Hexanone (mg/kg)	Isopropyl-benzene (mg/kg)	p-Isopropyl toluene (mg/kg)	4-Methyl-2-Pentanone (mg/kg)	Methylene Chloride (mg/kg)	1-Methyl-naphthalene (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.057)	ND(0.057)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.057)	ND(0.29)	ND(0.029)	ND(0.029)	ND(0.29)	ND(0.086)	ND(0.11)
OW-67 (26 ft)	07/20/21	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.046)	ND(0.046)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.046)	ND(0.23)	ND(0.023)	ND(0.023)	ND(0.23)	ND(0.069)	ND(0.092)
OW-68 (22 ft)	07/20/21	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.051)	ND(0.051)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.051)	ND(0.26)	ND(0.026)	ND(0.026)	ND(0.26)	ND(0.077)	ND(0.1)
OW-68 (26 ft)	07/20/21	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.056)	ND(0.056)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.056)	ND(0.28)	ND(0.028)	ND(0.028)	ND(0.28)	ND(0.084)	ND(0.11)
OW-69 (6 ft)	07/21/21	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.068)	ND(0.068)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.068)	ND(0.34)	ND(0.034)	ND(0.034)	ND(0.34)	ND(0.1)	ND(0.14)
OW-69 (26 ft)	07/21/21	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.071)	ND(0.071)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.071)	ND(0.35)	ND(0.035)	ND(0.035)	ND(0.35)	ND(0.11)	ND(0.14)
NMED Construction Soil Screening Level (mg/kg) [1]:		**206**	**25.4**	**NA**	**NA**	**NA**	**NA**	**NA**	**1,772**	**269.1**	**NA**	**2,738**	**NA**	**20,234**	**1,207**	**6,059**
NMED Residential Soil Screening Level (mg/kg) [1]:		**210**	**17.8**	**NA**	**NA**	**NA**	**NA**	**NA**	**75.1**	**61.6**	**NA**	**2,364**	**NA**	**5,810**	**409**	**172**
NMED DAF Soil Screening Level (mg/kg) [1]:		**0.50**	**0.028**	**NA**	**NA**	**NA**	**NA**	**NA**	**12.3**	**0.041**	**NA**	**11**	**NA**	**4.80**	**0.47**	**0.89**

Location ID	Date Sampled	2-Methyl-naphthalene (mg/kg)	MTBE (mg/kg)	Naphthalene (mg/kg)	n-Propylbenzene (mg/kg)	Styrene (mg/kg)	1,1,1,2-Tetrachloro-ethane (mg/kg)	1,1,2,2-Tetrachloro-ethane (mg/kg)	Tetrachloro-ethene (mg/kg)	Toluene (mg/kg)	1,2,3-Trichloro-benzene (mg/kg)	1,2,4-Trichloro-benzene (mg/kg)	1,1,1-Trichloroethane (mg/kg)	1,1,2-Trichloro-ethane (mg/kg)	Trichloro-ethene (mg/kg)	Trichloro-fluoromethane (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.11)	ND(0.029)	ND(0.057)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.057)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.029)
OW-67 (26 ft)	07/20/21	ND(0.092)	ND(0.023)	ND(0.046)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.046)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.023)
OW-68 (22 ft)	07/20/21	ND(0.1)	0.0055J/ND(0.026)U*	ND(0.051)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.051)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.026)
OW-68 (26 ft)	07/20/21	ND(0.11)	0.0057J/ND(0.028)U*	ND(0.056)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.056)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)
OW-69 (6 ft)	07/21/21	ND(0.14)	ND(0.034)	ND(0.068)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.068)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.034)
OW-69 (26 ft)	07/21/21	ND(0.14)	ND(0.035)	ND(0.071)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.071)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.035)
NMED Construction Soil Screening Level (mg/kg) [1]:		**1,004**	**24,231**	**159**	**NA**	**10,166**	**659**	**196.5**	**120**	**14,041**	**NA**	**79.1**	**13,602**	**2.3**	**6.90**	**1,127**
NMED Residential Soil Screening Level (mg/kg) [1]:		**232**	**975**	**22.6**	**NA**	**7,264**	**28.1**	**7.98**	**111**	**5,228**	**NA**	**82.9**	**14,375**	**2.61**	**6.77**	**1,230**
NMED DAF Soil Screening Level (mg/kg) [1]:		**2.76**	**0.55**	**0.06**	**NA**	**20.6**	**0.036**	**0.0048**	**0.32**	**12.1**	**NA**	**3.10**	**51.1**	**0.027**	**0.031**	**15.7**

Location ID	Date Sampled	1,2,3-Trichloro-propane (mg/kg)	1,2,4-Trimethyl-benzene (mg/kg)	1,3,5-Trimethyl-benzene (mg/kg)	Vinyl Chloride (mg/kg)	Xylenes, Total (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.057)	ND(0.029)	ND(0.029)	ND(0.029)	ND(0.057)
OW-67 (26 ft)	07/20/21	ND(0.046)	ND(0.023)	ND(0.023)	ND(0.023)	ND(0.046)
OW-68 (22 ft)	07/20/21	ND(0.051)	ND(0.026)	ND(0.026)	ND(0.026)	ND(0.051)
OW-68 (26 ft)	07/20/21	ND(0.056)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.056)
OW-69 (6 ft)	07/21/21	ND(0.068)	ND(0.034)	ND(0.034)	ND(0.034)	ND(0.068)
OW-69 (26 ft)	07/21/21	ND(0.071)	ND(0.035)	ND(0.035)	ND(0.035)	ND(0.071)
NMED Construction Soil Screening Level (mg/kg) [1]:		**6.31**	**NA**	**NA**	**161**	**798**
NMED Residential Soil Screening Level (mg/kg) [1]:		**0.051**	**NA**	**NA**	**0.742**	**871**
NMED DAF Soil Screening Level (mg/kg) [1]:		**0.000058**	**NA**	**NA**	**0.013**	**154**

Notes:
DAF - Dilution Attenuation Factor
ft - feet
mg/kg - milligrams per kilogram
NA - No applicable
ND - Constituent not detected - method detection limit in mg/kg provided in parentheses
NMED - New Mexico Environment Department
VOCs - volatile organic compounds
J - estimated concentration
U* - laboratory detection due to blank contamination

[1] Risk Assessment Guidance for Investigations and Remediation Volume I, Soil Screening Guidance for Human Health Risk Assessments, November 2021, [Construction Soil Cancer/Noncancer; Residential Soil Cancer/Noncancer; Dilution Attenuation Factor]

TABLE 2. SOIL ANALYTICAL RESULTS, SVOCs
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	1,2,4-Trichloro-benzene (mg/kg)	1,2-Dichloro-benzene (mg/kg)	1,3-Dichloro-benzene (mg/kg)	1,4-Dichloro-benzene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2,4,5-Trichloro-phenol (mg/kg)	2,4,6-Trichloro-phenol (mg/kg)	2,4-Dichloro-phenol (mg/kg)	2,4-Dimethyl-phenol (mg/kg)	2,4-Dinitro-phenol (mg/kg)	2,4-Dinitro Toluene (mg/kg)	2,6-Dinitro Toluene (mg/kg)	2-Chloronaphthalene (mg/kg)	2-Chlorophenol (mg/kg)	2-Methyl-naphthalene (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.29)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.24)	ND(0.2)	ND(0.2)
OW-67 (26 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.29)	ND(0.49)	ND(0.49)	ND(0.49)	ND(0.25)	ND(0.2)	ND(0.2)
OW-68 (22 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.4)	ND(0.3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.25)	ND(0.2)	ND(0.2)
OW-68 (26 ft)	07/20/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.28)	ND(0.47)	ND(0.47)	ND(0.47)	ND(0.24)	ND(0.19)	ND(0.19)
OW-69 (6 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.29)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.24)	ND(0.19)	ND(0.19)
OW-69 (26 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.29)	ND(0.48)	ND(0.48)	ND(0.48)	ND(0.24)	ND(0.19)	ND(0.19)
NMED Construction Soil Screening Level (mg/kg) [1]:		**79**	**2,496**	**NA**	**24,776**	**6,059**	**26,906**	**269**	**807**	**5,381**	**538**	**535.6**	**80.9**	**28,315**	**1,770**	**1,004**
NMED Residential Soil Screening Level (mg/kg) [1]:		**82.9**	**2,150**	**NA**	**1,287**	**172**	**6,160**	**61.6**	**185**	**1,230**	**123**	**17.1**	**3.56**	**6,260**	**391**	**232**
NMED DAF Soil Screening Level (mg/kg) [1]:		**3.1**	**9.08**	**NA**	**1.12**	**0.89**	**66.2**	**0.67**	**0.83**	**6.4**	**0.67**	**0.049**	**0.0102**	**57.0**	**1.15**	**2.76**

Location ID	Date Sampled	2-Methyl phenol (mg/kg)	2-Nitroaniline (mg/kg)	2-Nitrophenol (mg/kg)	3,3'-Dichloro-benzidine (mg/kg)	3,4-Methyl phenol (mg/kg)	3-Nitroaniline (mg/kg)	2-Methyl-4,6-dinitro phenol (mg/kg)	4-Bromophenyl-phenylether (mg/kg)	4-Chloro-3-Methyl phenol (mg/kg)	4-Chloro-aniline (mg/kg)	4-Chlorophenyl-phenylether (mg/kg)	4-Nitroaniline (mg/kg)	4-Nitrophenol (mg/kg)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.24)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.49)	ND(0.49)	ND(0.2)	ND(0.39)	ND(0.24)	ND(0.2)	ND(0.2)
OW-67 (26 ft)	07/20/21	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.25)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.49)	ND(0.49)	ND(0.2)	ND(0.39)	ND(0.25)	ND(0.2)	ND(0.2)
OW-68 (22 ft)	07/20/21	ND(0.4)	ND(0.2)	ND(0.2)	ND(0.25)	ND(0.2)	ND(0.2)	ND(0.4)	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.4)	ND(0.25)	ND(0.2)	ND(0.2)
OW-68 (26 ft)	07/20/21	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.24)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.47)	ND(0.47)	ND(0.19)	ND(0.38)	ND(0.24)	ND(0.19)	ND(0.19)
OW-69 (6 ft)	07/21/21	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.24)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.48)	ND(0.48)	ND(0.19)	ND(0.38)	ND(0.24)	ND(0.19)	ND(0.19)
OW-69 (26 ft)	07/21/21	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.24)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.48)	ND(0.48)	ND(0.19)	ND(0.38)	ND(0.24)	ND(0.19)	ND(0.19)
NMED Construction Soil Screening Level (mg/kg) [1]:		**NA**	**NA**	**NA**	**409.6**	**NA**	**NA**	**21.5**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**15,060**	**NA**
NMED Residential Soil Screening Level (mg/kg) [1]:		**NA**	**NA**	**NA**	**11.8**	**NA**	**NA**	**4.93**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**3,480**	**NA**
NMED DAF Soil Screening Level (mg/kg) [1]:		**NA**	**NA**	**NA**	**0.12**	**NA**	**NA**	**0.0398**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**82.5**	**NA**

Location ID	Date Sampled	Aniline (mg/kg)	Anthracene (mg/kg)	Azobenzene (mg/kg)	Benzo(a)-anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluor-anthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluor-anthene (mg/kg)	Benzoic Acid (mg/kg)	Benzyl Alcohol (mg/kg)	Bis(2chloro ethoxy)-methane (mg/kg)	Bis(2-chloro ethyl)ether (mg/kg)	Bis(2chloro isopropyl)-ether (mg/kg)	Bis(2-ethyl hexyl)-phthalate (mg/kg)	Benzyl Butyl Phthalate (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.49)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.49)	ND(0.2)
OW-67 (26 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.49)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.22 J	ND(0.2)
OW-68 (22 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.5)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.22 J	ND(0.2)
OW-68 (26 ft)	07/20/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.47)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	0.22 J	ND(0.19)
OW-69 (6 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.48)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.48)	ND(0.19)
OW-69 (26 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.48)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	0.31 J	ND(0.19)
NMED Construction Soil Screening Level (mg/kg) [1]:		**NA**	**75,301**	**NA**	**239.7**	**14.998**	**239.7**	**NA**	**2,313**	**NA**	**NA**	**NA**	**1.9**	**3,539**	**5,381**	**NA**
NMED Residential Soil Screening Level (mg/kg) [1]:		**NA**	**17,400**	**NA**	**1.53**	**1.12**	**1.53**	**NA**	**15.3**	**NA**	**NA**	**NA**	**3.11**	**99**	**380**	**NA**
NMED DAF Soil Screening Level (mg/kg) [1]:		**NA**	**851**	**NA**	**0.64**	**4.42**	**6.17**	**NA**	**60.5**	**NA**	**NA**	**NA**	**0.00061**	**0.048**	**200**	**NA**

Location ID	Date Sampled	Carbazole (mg/kg)	Chrysene (mg/kg)	Dibenz(a,h) anthracene (mg/kg)	Dibenzofuran (mg/kg)	Diethyl Phthalate (mg/kg)	Dimethyl Phthalate (mg/kg)	Di-n-butyl Phthalate (mg/kg)	Di-n-octyl Phthalate (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Hexachloro Benzene (mg/kg)	Hexachloro-butadiene (mg/kg)	Hexachloro-cyclopentadiene (mg/kg)	Hexachloro-ethane (mg/kg)	Indeno(1,2,3-cd) pyrene (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.8 JB	ND(0.2)	ND(0.39)	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
OW-67 (26 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.92 JB	ND(0.2)	0.3 J	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
OW-68 (22 ft)	07/20/21	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	1.1 JB	ND(0.2)	0.36 J	ND(0.4)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)
OW-68 (26 ft)	07/20/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	1 JB	ND(0.19)	0.39	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
OW-69 (6 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	0.69B/ND(0.69)U*	ND(0.19)	ND(0.38)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
OW-69 (26 ft)	07/21/21	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	0.88 JB	ND(0.19)	0.35 J	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
NMED Construction Soil Screening Level (mg/kg) [1]:		**NA**	**23,126**	**23.96**	**NA**	**215,250**	**269,062**	**26,906**	**NA**	**10,040**	**10,040**	**116.7**	**269.1**	**867**	**188**	**239.7**
NMED Residential Soil Screening Level (mg/kg) [1]:		**NA**	**153**	**0.153**	**NA**	**49,300**	**61,635**	**6,160**	**NA**	**2,320**	**2,320**	**3.33**	**61.6**	**2.30**	**43.1**	**1.53**
NMED DAF Soil Screening Level (mg/kg) [1]:		**NA**	**186**	**1.97**	**NA**	**98**	**3.57**	**33.8**	**NA**	**1,337**	**80**	**0.19**	**0.041**	**2.40**	**0.032**	**20.1**

Location ID	Date Sampled	Isophorone (mg/kg)	Naphthalene (mg/kg)	Nitrobenzene (mg/kg)	N-Nitrosodimethyl-amine (mg/kg)	N-Nitrosodi-n-propyl-amine (mg/kg)	N-Nitrosodiphenyl-amine (mg/kg)	Pentachlorophenol (mg/kg)	Phenanthrene (mg/kg)	Phenol (mg/kg)	Pyrene (mg/kg)	Pyridine (mg/kg)
OW-67 (17 ft)	07/20/21	ND(0.39)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)
OW-67 (26 ft)	07/20/21	ND(0.39)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.39)
OW-68 (22 ft)	07/20/21	ND(0.4)	ND(0.2)	ND(0.4)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.4)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.4)
OW-68 (26 ft)	07/20/21	ND(0.38)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)
OW-69 (6 ft)	07/21/21	ND(0.38)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)
OW-69 (26 ft)	07/21/21	ND(0.38)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.38)
NMED Construction Soil Screening Level (mg/kg) [1]:		**53,658**	**159**	**353**	**2.14**	**NA**	**37,855**	**346.2**	**7,530**	**77,384**	**7,530**	**NA**
NMED Residential Soil Screening Level (mg/kg) [1]:		**5,610**	**22.6**	**60.4**	**0.023**	**NA**	**1,090**	**9.85**	**1,740**	**18,490**	**1,740**	**NA**
NMED DAF Soil Screening Level (mg/kg) [1]:		**4.23**	**0.058**	**0.014**	**0.0000204**	**NA**	**10.05**	**0.15**	**85.92**	**52.3**	**192**	**NA**

Notes:
DAF - Dilution Attenuation Factor
ft - feet
mg/kg - milligrams per kilogram
NA - No applicable
ND - Constituent not detected - method detection limit in mg/kg provided in parentheses
NMED - New Mexico Environment Department
SVOCs - semivolatile organic compounds
J - estimated concentration
JB - estimated concentration due to blank contamination
U* - laboratory detection due to blank contamination
[1] Risk Assessment Guidance for Investigations and Remediation Volume I, Soil Screening Guidance for Human Health Risk Assessments, November 2021, [Construction Soil Cancer/Noncancer; Residential Soil Cancer/Noncancer; Dilution Attenuation Factor]

TABLE 3. SOIL ANALYTICAL RESULTS, INORGANICS AND TPH
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	Arsenic, Total (mg/kg)	Barium, Total (mg/kg)	Cadmium, Total (mg/kg)	Chromium, Total (mg/kg)	Iron, Total (mg/kg)	Lead, Total (mg/kg)	Manganese, Total (mg/kg)	Mercury, Total (mg/kg)	Selenium, Total (mg/kg)	Silver, Total (mg/kg)
OW-67 (17 ft)	07/20/21	ND(4.8)	650	ND(0.19)	5.4	8,400 E	1.7	420	ND(0.16)	ND(4.8)	ND(0.48)
OW-67 (26 ft)	07/20/21	ND(4.8)	340	ND(0.19)	7.1	10,000 E	1.3	450	ND(0.033)	ND(4.8)	ND(0.48)
OW-68 (22 ft)	07/20/21	ND(5.2)	400	ND(0.21)	9.1	11,000 E	1.2	420	ND(0.035)	ND(5.2)	ND(0.52)
OW-68 (26 ft)	07/20/21	ND(5)	800	ND(0.2)	10	14,000 E	ND(0.61)	710	ND(0.035)	ND(5)	ND(0.5)
OW-69 (6 ft)	07/21/21	ND(4.9)	290	ND(0.2)	5.5	9,800 E	4.5	220	0.0051 J	ND(4.9)	ND(0.49)
OW-69 (26 ft)	07/21/21	ND(5.1)	160	ND(0.2)	18	19,000 E	ND(0.61)	250	ND(0.032)	ND(5.1)	ND(0.51)
NMED Construction Soil Screening Level (mg/kg) [1]:		**41.2**	**4,392**	**72**	**134**	**908,000**	**800**	**160,000**	**21**	**1,753**	**1,770**
NMED Residential Soil Screening Level (mg/kg) [1]:		**7.07**	**15,558**	**70.53**	**96.6**	**54,800**	**400**	**10,500**	**23.8**	**391**	**391**
NMED DAF Soil Screening Level (mg/kg) [1]:		**5.83**	**2,699**	**9.39**	**205,256**	**6,960**	**270**	**2,630**	**2.1**	**10**	**14**

Location ID	Date Sampled	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Oil Range Organics (mg/kg)
OW-67 (17 ft)	07/20/21	ND(9.7)	ND(2.9)	ND(49)
OW-67 (26 ft)	07/20/21	ND(9.7)	ND(2.3)	ND(48)
OW-68 (22 ft)	07/20/21	ND(9)	ND(2.6)	ND(45)
OW-68 (26 ft)	07/20/21	ND(8.7)	ND(2.8)	ND(43)
OW-69 (6 ft)	07/21/21	8.4 J	ND(3.4)	ND(47)
OW-69 (26 ft)	07/21/21	ND(9.3)	ND(3.5)	ND(46)
NMED Construction Soil Screening Level (mg/kg) [1]:		**3,000**	**500**	**3,800**
NMED Residential Soil Screening Level (mg/kg) [1]:		**1,000**	**100**	**1,000**
NMED DAF Soil Screening Level (mg/kg) [1]:		**NA**	**NA**	**NA**

Notes:
DAF - Dilution Attenuation Factor
ft - feet
mg/kg - milligrams per kilogram
NA - No applicable
ND - Constituent not detected - method detection limit in mg/kg provided in parentheses
NMED - New Mexico Environment Department
TPH - Total Petroleum Hydrocarbons
E - Value above quantitation range
J - estimated concentration
[1] Risk Assessment Guidance for Investigations and Remediation Volume I, Soil Screening Guidance for Human Health Risk Assessments, November 2021, [Construction Soil Cancer/Noncancer; Residential Soil Cancer/Noncancer; Dilution Attenuation Factor]

Appendix A – Boring Logs

WELL COMPLETION LOG

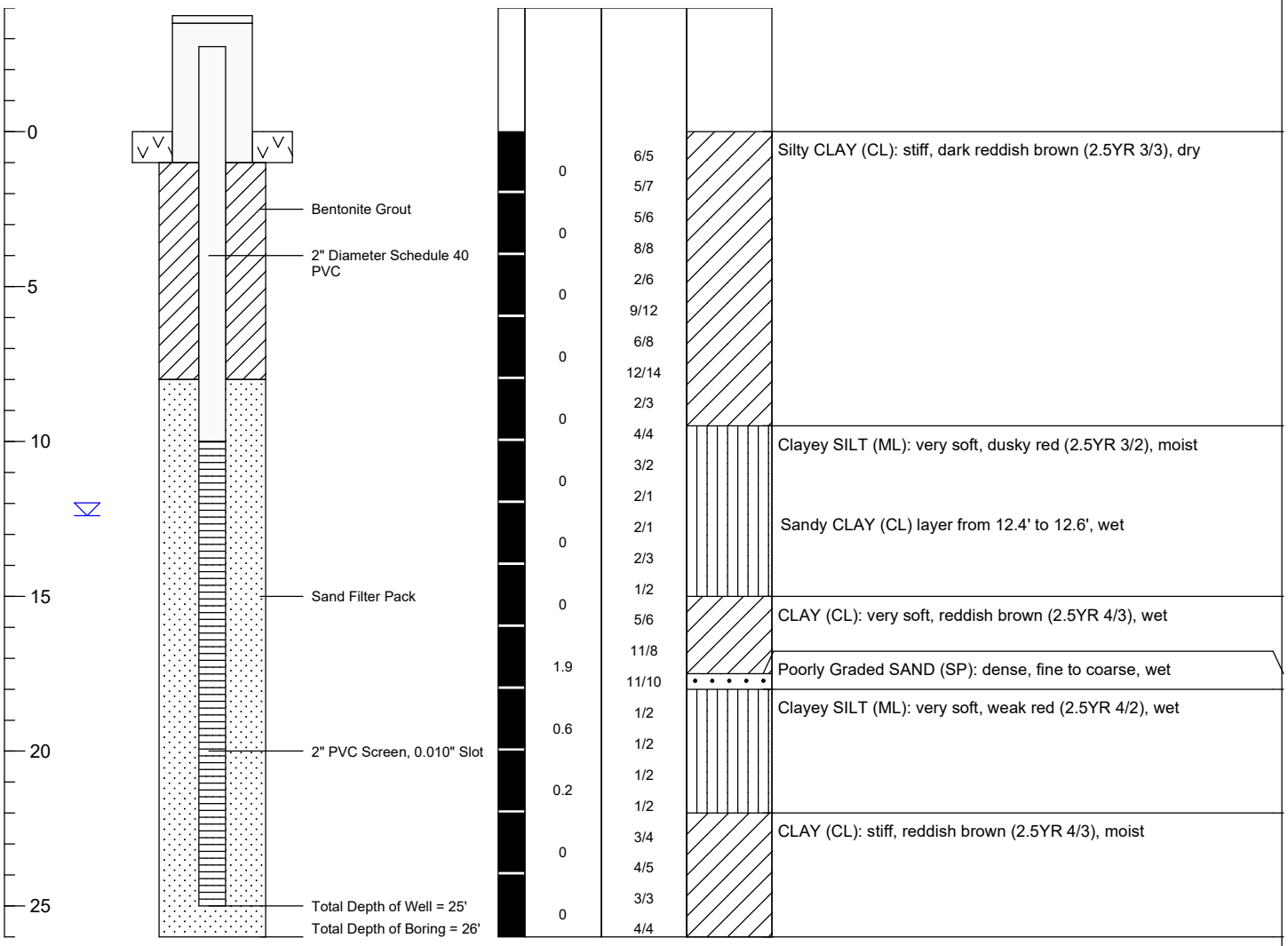
WELL ID: OW-67

Client: Marathon
Project Name: Additional Well Installation
Field Geologist: Mackensie Swift, Will Glenn
Well Location: Gallup Refinery, Gallup, NM
Ground Surface Elevation:
Top of Casing Elevation:

Contractor: Terracon
Driller: JC, EJ
Drilling Method: Hollow Stem Auger
Borehole Diameter: 8"
Total Depth Drilled: 26'
Depth of Set Well: 25'

Date Started: July 20, 2021
Date Completed: July 20, 2021
Checked By: MS, WG
Easting:
Northing:
Sample Type: Split Spoon

Depth of First Encountered Water: 12.4'
Water Level in Completed Well:



NOTES: OVA calibrated with 100 ppm isobutylene

Trihydro Corporation
2501 Cherry Ave. Suite 200, Signal Hill, CA
Phone (562) 453-3536
Fax (562) 453-3555

DO NOT USE WELL LOG SEPARATE FROM THE ASSOCIATED REPORT

WELL COMPLETION LOG

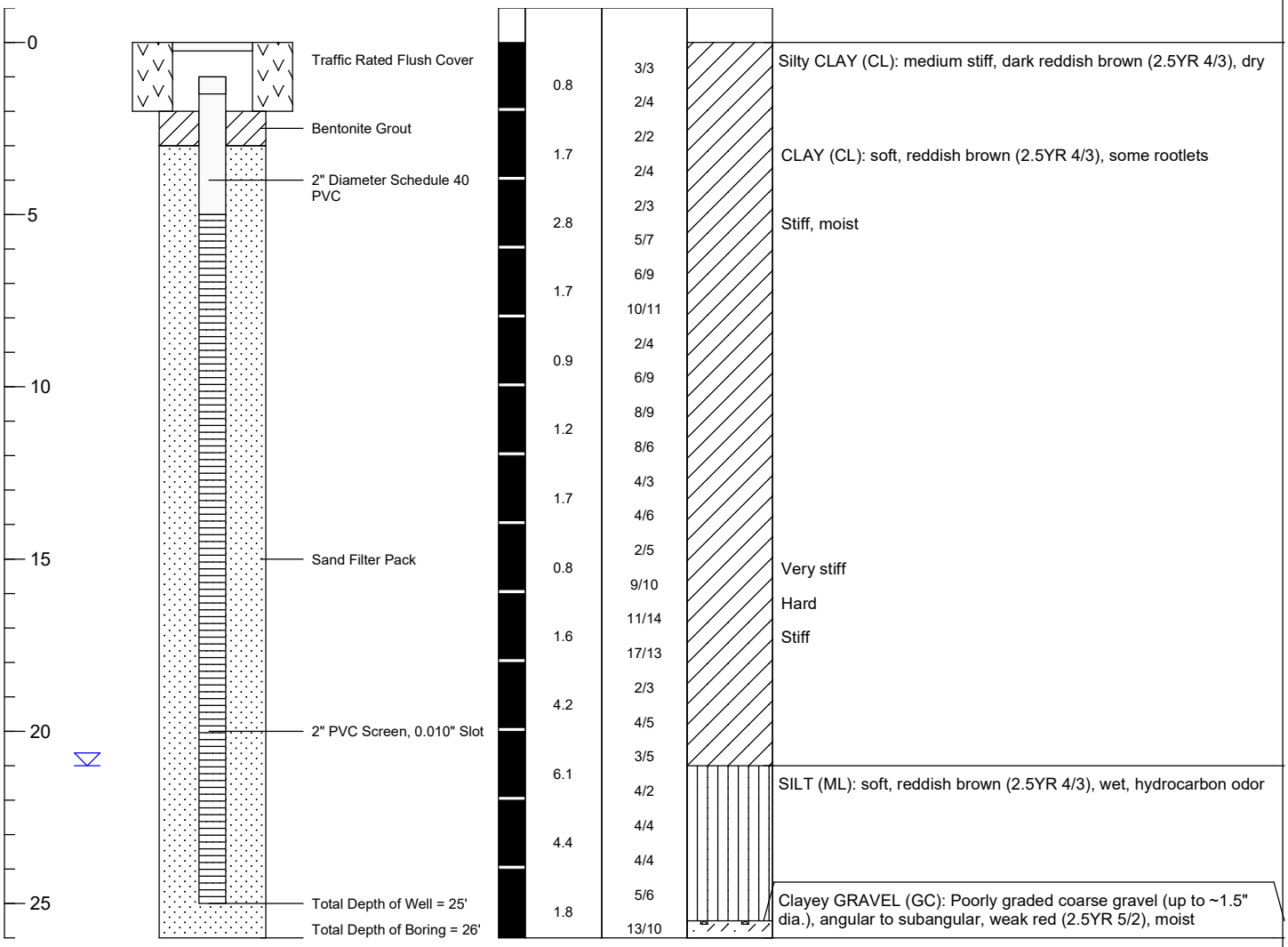
WELL ID: OW-68

Client: Marathon
Project Name: Additional Well Installation
Field Geologist: Mackensie Swift, Will Glenn
Well Location: Gallup Refinery, Gallup, NM
Ground Surface Elevation:
Top of Casing Elevation:

Contractor: Terracon
Driller: JC, EJ
Drilling Method: Hollow Stem Auger
Borehole Diameter: 8"
Total Depth Drilled: 26'
Depth of Set Well: 25'

Date Started: July 20, 2021
Date Completed: July 21, 2021
Checked By: MS, WG
Easting:
Northing:
Sample Type: Split Spoon

Depth of First Encountered Water: 21'
Water Level in Completed Well:



NOTES: OVA calibrated with 100 ppm isobutylene

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DO NOT USE WELL LOG SEPARATE FROM THE ASSOCIATED REPORT

WELL COMPLETION LOG

WELL ID: OW-69

Client: Marathon
Contractor: Terracon
Date Started: July 21, 2021

Project Name: Additional Well Installation
Driller: JC, EJ
Date Completed: July 21, 2021

Field Geologist: Will Glenn
Drilling Method: Hollow Stem Auger
Checked By: MS, WG

Well Location: Gallup Refinery, Gallup, NM
Borehole Diameter: 8"
Easting:

Ground Surface Elevation:
Total Depth Drilled: 26'
Northing:

Top of Casing Elevation:
Depth of Set Well: NA
Sample Type: Split Spoon

Depth of First Encountered Water:

Water Level in Completed Well:

DEPTH (ft-bgs)	WELL CONSTRUCTION	Sample Interval	TOV Value (ppm)	Blow Counts	Lithologic Symbol	LITHOLOGIC DESCRIPTION
0			0.5	6/8		CLAY (CL): stiff, reddish brown (5YR 4/3), dry, some rootlets
				8/11		
				9/8		
			1.2	10/11		4'-5': sand, dense, reddish brown (2.5YR 4/3), dry
5				9/9		
			2.4	10/12		Silty CLAY (CL): very stiff, reddish brown (2.5YR 4/3), dry, some rootlets
				12/15		
			0.5	15/16		
				9/17		
			0.9	25/24		MUDSTONE: hard, reddish brown (2.5YR 4/3), dry
				24/28		
			0.6	29/28		
				15/23		
			0.3	30/28		Turns to dark reddish gray (10R 4/1)
10				35/24		
			0.2	28/27		Calcium carbonate veins
				24/24		
			1.0	38/42		
				21/38		
			0.8	42/44		Green mineral veins (worm burrows)
				10/15		
15			0.5	20/29		
				18/27		SANDSTONE: hard, light gray (5Y 3/1), dry
			0.4	50-6"		CLAY (CL): hard, weak red (2.5YR 5/2), dry
				80-5"		Sandy SILTSTONE: hard, weak red (2.5YR 4/2), dry
20			0	80-5"		
25						

NOTES: OVA calibrated with 100 ppm isobutylene

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DO NOT USE WELL LOG SEPARATE FROM THE ASSOCIATED REPORT

Appendix B – Laboratory Report

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 22, 2021

Lesli Alexander

Marathon
92 Giant Crossing Rd
Gallup, NM 87301
TEL: (505) 722-3833
FAX

RE: Well Installations 2021 OrderNo.: 2107A83

Dear Lesli Alexander:

Hall Environmental Analysis Laboratory received 11 sample(s) on 7/21/2021 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued August 04, 2021.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-18
Project: Well Installations 2021 **Collection Date:** 7/19/2021 12:00:00 PM
Lab ID: 2107A83-001 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	96	4.2	8.5		mg/Kg	1	7/23/2021 6:46:49 PM	61498
Motor Oil Range Organics (MRO)	ND	43	43		mg/Kg	1	7/23/2021 6:46:49 PM	61498
Surr: DNOP	111	0	70-130		%Rec	1	7/23/2021 6:46:49 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0026	0.032		mg/Kg	1	7/23/2021 10:04:32 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	2.9	2.7	4.8	J	mg/Kg	2	7/23/2021 4:17:11 PM	61509
Barium	340	0.29	0.48		mg/Kg	5	7/29/2021 2:08:00 PM	61509
Cadmium	ND	0.096	0.19		mg/Kg	2	7/23/2021 4:17:11 PM	61509
Chromium	4.3	0.29	0.57		mg/Kg	2	7/23/2021 4:17:11 PM	61509
Iron	7100	24	24	E	mg/Kg	10	7/29/2021 2:16:23 PM	61509
Lead	1.2	0.51	0.57		mg/Kg	2	7/23/2021 4:17:11 PM	61509
Manganese	480	0.32	0.38		mg/Kg	2	7/29/2021 2:01:18 PM	61509
Selenium	ND	4.2	4.8		mg/Kg	2	7/29/2021 2:01:18 PM	61509
Silver	ND	0.28	0.48		mg/Kg	2	7/23/2021 4:17:11 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.087	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Acenaphthylene	ND	0.088	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Anthracene	ND	0.088	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzo(k)fluoranthene	ND	0.073	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.099	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Butyl benzyl phthalate	ND	0.059	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Chloro-3-methylphenol	ND	0.082	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2-Chloronaphthalene	ND	0.093	0.24		mg/Kg	1	7/28/2021 12:12:39 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-18
Project: Well Installations 2021 **Collection Date:** 7/19/2021 12:00:00 PM
Lab ID: 2107A83-001 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Chrysene	ND	0.086	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Di-n-butyl phthalate	0.33	0.27	0.39	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.24		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Diethyl phthalate	1.0	0.32	0.49	B	mg/Kg	1	7/28/2021 12:12:39 PM	61566
Dimethyl phthalate	ND	0.090	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4-Dichlorophenol	ND	0.079	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4-Dimethylphenol	ND	0.069	0.29		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,6-Dinitrotoluene	ND	0.099	0.49		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Fluoranthene	0.080	0.079	0.20	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
Fluorene	ND	0.087	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Hexachloroethane	ND	0.086	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
1-Methylnaphthalene	0.59	0.090	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2-Methylnaphthalene	1.1	0.081	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2-Methylphenol	0.097	0.082	0.39	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
3+4-Methylphenol	0.12	0.081	0.20	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
N-Nitrosodi-n-propylamine	ND	0.090	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Naphthalene	1.4	0.092	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Nitrobenzene	ND	0.080	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566

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Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-18
Project: Well Installations 2021 **Collection Date:** 7/19/2021 12:00:00 PM
Lab ID: 2107A83-001 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
4-Nitrophenol	ND	0.080	0.24		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Pentachlorophenol	ND	0.084	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Phenanthrene	0.12	0.10	0.20	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
Phenol	0.15	0.075	0.20	J	mg/Kg	1	7/28/2021 12:12:39 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 12:12:39 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4,5-Trichlorophenol	ND	0.062	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
2,4,6-Trichlorophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 12:12:39 PM	61566
Surr: 2-Fluorophenol	0		20.3-74.1	S	%Rec	1	7/28/2021 12:12:39 PM	61566
Surr: Phenol-d5	77.7		23.1-92.7		%Rec	1	7/28/2021 12:12:39 PM	61566
Surr: 2,4,6-Tribromophenol	87.1		17.3-122		%Rec	1	7/28/2021 12:12:39 PM	61566
Surr: Nitrobenzene-d5	54.8		24.7-73.2		%Rec	1	7/28/2021 12:12:39 PM	61566
Surr: 2-Fluorobiphenyl	50.3		21.5-90.1		%Rec	1	7/28/2021 12:12:39 PM	61566
Surr: 4-Terphenyl-d14	83.1		15-140		%Rec	1	7/28/2021 12:12:39 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	10	0.021	0.055		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Toluene	52	0.12	1.1		mg/Kg	50	7/23/2021 4:22:41 PM	R80062
Ethylbenzene	8.1	0.027	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Methyl tert-butyl ether (MTBE)	0.054	0.022	0.11	J	mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2,4-Trimethylbenzene	39	0.16	1.1		mg/Kg	50	7/23/2021 4:22:41 PM	R80062
1,3,5-Trimethylbenzene	13	0.25	1.1		mg/Kg	50	7/23/2021 4:22:41 PM	R80062
1,2-Dichloroethane (EDC)	ND	0.025	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.044	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Naphthalene	2.4	0.020	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1-Methylnaphthalene	1.2	0.13	0.44		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
2-Methylnaphthalene	2.3	0.10	0.44		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Acetone	0.37	0.10	1.7	J	mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Bromobenzene	ND	0.0089	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Bromodichloromethane	ND	0.010	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Bromoform	ND	0.027	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Bromomethane	ND	0.097	0.33		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
2-Butanone	ND	0.17	1.1		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Carbon disulfide	ND	0.027	1.1		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Carbon tetrachloride	ND	0.0098	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Chlorobenzene	ND	0.018	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Chloroethane	ND	0.041	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Chloroform	ND	0.015	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-18
Project: Well Installations 2021 **Collection Date:** 7/19/2021 12:00:00 PM
Lab ID: 2107A83-001 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	0.11	0.011	0.33	J	mg/Kg	5	7/22/2021 6:44:15 PM	A80017
2-Chlorotoluene	ND	0.023	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
4-Chlorotoluene	ND	0.070	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
cis-1,2-DCE	ND	0.055	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
cis-1,3-Dichloropropene	ND	0.015	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.048	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Dibromochloromethane	ND	0.015	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Dibromomethane	ND	0.017	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2-Dichlorobenzene	ND	0.023	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,3-Dichlorobenzene	ND	0.021	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,4-Dichlorobenzene	ND	0.030	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Dichlorodifluoromethane	ND	0.034	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1-Dichloroethane	ND	0.019	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1-Dichloroethene	ND	0.016	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2-Dichloropropane	ND	0.019	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,3-Dichloropropane	ND	0.024	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
2,2-Dichloropropane	ND	0.013	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1-Dichloropropene	ND	0.012	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Hexachlorobutadiene	ND	0.029	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
2-Hexanone	ND	0.021	1.1		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Isopropylbenzene	0.49	0.021	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
4-Isopropyltoluene	0.23	0.029	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
4-Methyl-2-pentanone	ND	0.13	1.1		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Methylene chloride	ND	0.080	0.33		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
n-Butylbenzene	1.2	0.030	0.33		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
n-Propylbenzene	2.6	0.018	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
sec-Butylbenzene	0.41	0.091	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Styrene	ND	0.014	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
tert-Butylbenzene	ND	0.026	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0097	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.036	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Tetrachloroethene (PCE)	ND	0.030	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
trans-1,2-DCE	ND	0.019	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
trans-1,3-Dichloropropene	ND	0.026	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0075	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2,4-Trichlorobenzene	ND	0.039	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1,1-Trichloroethane	ND	0.024	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,1,2-Trichloroethane	ND	0.0098	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Trichloroethene (TCE)	ND	0.017	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017

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 Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-18
Project: Well Installations 2021 **Collection Date:** 7/19/2021 12:00:00 PM
Lab ID: 2107A83-001 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.025	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
1,2,3-Trichloropropane	ND	0.047	0.22		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Vinyl chloride	ND	0.0093	0.11		mg/Kg	5	7/22/2021 6:44:15 PM	A80017
Xylenes, Total	93	0.58	2.2		mg/Kg	50	7/23/2021 4:22:41 PM	R80062
Surr: Dibromofluoromethane	89.1		70-130		%Rec	5	7/22/2021 6:44:15 PM	A80017
Surr: 1,2-Dichloroethane-d4	93.8		70-130		%Rec	5	7/22/2021 6:44:15 PM	A80017
Surr: Toluene-d8	103		70-130		%Rec	5	7/22/2021 6:44:15 PM	A80017
Surr: 4-Bromofluorobenzene	107		70-130		%Rec	5	7/22/2021 6:44:15 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	1200	31	110		mg/Kg	50	7/23/2021 4:22:41 PM	R80062
Surr: BFB	98.9	0	70-130		%Rec	50	7/23/2021 4:22:41 PM	R80062

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-26
Project: Well Installations 2021 **Collection Date:** 7/19/2021 11:50:00 AM
Lab ID: 2107A83-002 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	7.8	4.8	9.8	J	mg/Kg	1	7/23/2021 6:58:39 PM	61498
Motor Oil Range Organics (MRO)	ND	49	49		mg/Kg	1	7/23/2021 6:58:39 PM	61498
Surr: DNOP	110	0	70-130		%Rec	1	7/23/2021 6:58:39 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	0.0033	0.0025	0.032	J	mg/Kg	1	7/23/2021 10:06:36 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.9	5.2		mg/Kg	2	7/23/2021 4:34:10 PM	61509
Barium	580	1.2	2.1		mg/Kg	20	7/29/2021 2:29:20 PM	61509
Cadmium	ND	0.10	0.21		mg/Kg	2	7/23/2021 4:34:10 PM	61509
Chromium	6.6	0.31	0.62		mg/Kg	2	7/29/2021 2:18:40 PM	61509
Iron	9200	52	52	E	mg/Kg	20	7/29/2021 2:29:20 PM	61509
Lead	0.69	0.55	0.62		mg/Kg	2	7/29/2021 2:18:40 PM	61509
Manganese	180	0.34	0.41		mg/Kg	2	7/23/2021 4:34:10 PM	61509
Selenium	ND	4.5	5.2		mg/Kg	2	7/29/2021 2:18:40 PM	61509
Silver	ND	0.30	0.52		mg/Kg	2	7/23/2021 4:34:10 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.088	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Acenaphthylene	ND	0.089	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Anthracene	ND	0.089	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzo(k)fluoranthene	ND	0.074	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Butyl benzyl phthalate	ND	0.060	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Chloro-3-methylphenol	ND	0.083	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2-Chloronaphthalene	ND	0.093	0.25		mg/Kg	1	7/28/2021 2:18:47 PM	61566

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-26
Project: Well Installations 2021 **Collection Date:** 7/19/2021 11:50:00 AM
Lab ID: 2107A83-002 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Chrysene	ND	0.087	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Di-n-butyl phthalate	0.29	0.27	0.39	J	mg/Kg	1	7/28/2021 2:18:47 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.25		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Diethyl phthalate	1.1	0.32	0.49	B	mg/Kg	1	7/28/2021 2:18:47 PM	61566
Dimethyl phthalate	ND	0.091	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4-Dichlorophenol	ND	0.080	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4-Dimethylphenol	ND	0.070	0.29		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.083	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,6-Dinitrotoluene	ND	0.10	0.49		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Fluoranthene	ND	0.079	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Fluorene	ND	0.087	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Hexachloroethane	ND	0.087	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
1-Methylnaphthalene	ND	0.090	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2-Methylnaphthalene	ND	0.081	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2-Methylphenol	ND	0.083	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
3+4-Methylphenol	ND	0.081	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
N-Nitrosodi-n-propylamine	ND	0.091	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Naphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Nitrobenzene	ND	0.080	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566

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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-26
Project: Well Installations 2021 **Collection Date:** 7/19/2021 11:50:00 AM
Lab ID: 2107A83-002 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.085	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
4-Nitrophenol	ND	0.081	0.25		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Pentachlorophenol	ND	0.085	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Phenol	ND	0.076	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 2:18:47 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4,5-Trichlorophenol	ND	0.062	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
2,4,6-Trichlorophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 2:18:47 PM	61566
Surr: 2-Fluorophenol	59.0		20.3-74.1		%Rec	1	7/28/2021 2:18:47 PM	61566
Surr: Phenol-d5	72.3		23.1-92.7		%Rec	1	7/28/2021 2:18:47 PM	61566
Surr: 2,4,6-Tribromophenol	82.5		17.3-122		%Rec	1	7/28/2021 2:18:47 PM	61566
Surr: Nitrobenzene-d5	51.8		24.7-73.2		%Rec	1	7/28/2021 2:18:47 PM	61566
Surr: 2-Fluorobiphenyl	55.9		21.5-90.1		%Rec	1	7/28/2021 2:18:47 PM	61566
Surr: 4-Terphenyl-d14	66.3		15-140		%Rec	1	7/28/2021 2:18:47 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	0.12	0.0046	0.012		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Toluene	0.33	0.0025	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Ethylbenzene	0.057	0.0058	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Methyl tert-butyl ether (MTBE)	0.035	0.0048	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2,4-Trimethylbenzene	0.18	0.0034	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,3,5-Trimethylbenzene	0.059	0.0054	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0055	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.0094	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Naphthalene	0.013	0.0044	0.048	J	mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1-Methylnaphthalene	ND	0.027	0.096		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
2-Methylnaphthalene	ND	0.022	0.096		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Acetone	ND	0.022	0.36		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Bromobenzene	ND	0.0019	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Bromodichloromethane	ND	0.0022	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Bromoform	ND	0.0058	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Bromomethane	ND	0.021	0.072		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
2-Butanone	0.057	0.037	0.24	J	mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Carbon disulfide	ND	0.0058	0.24		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Carbon tetrachloride	ND	0.0021	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Chlorobenzene	ND	0.0038	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Chloroethane	0.017	0.0089	0.048	J	mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Chloroform	ND	0.0033	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017

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PQL	Practical Quanitative Limit
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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: OW-66-26
Project: Well Installations 2021
Collection Date: 7/19/2021 11:50:00 AM
Lab ID: 2107A83-002
Matrix: MEOH (SOIL)
Received Date: 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0023	0.072		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
2-Chlorotoluene	ND	0.0050	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
4-Chlorotoluene	ND	0.015	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
cis-1,2-DCE	ND	0.012	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
cis-1,3-Dichloropropene	ND	0.0032	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.010	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Dibromochloromethane	ND	0.0031	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Dibromomethane	ND	0.0036	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2-Dichlorobenzene	ND	0.0050	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,3-Dichlorobenzene	ND	0.0045	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,4-Dichlorobenzene	ND	0.0064	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Dichlorodifluoromethane	ND	0.0073	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1-Dichloroethane	ND	0.0040	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1-Dichloroethene	ND	0.0035	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2-Dichloropropane	ND	0.0041	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,3-Dichloropropane	ND	0.0053	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
2,2-Dichloropropane	ND	0.0028	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1-Dichloropropene	ND	0.0025	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Hexachlorobutadiene	ND	0.0062	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
2-Hexanone	ND	0.0046	0.24		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Isopropylbenzene	ND	0.0044	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
4-Isopropyltoluene	ND	0.0062	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
4-Methyl-2-pentanone	ND	0.028	0.24		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Methylene chloride	ND	0.017	0.072		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
n-Butylbenzene	ND	0.0064	0.072		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
n-Propylbenzene	0.022	0.0039	0.024	J	mg/Kg	1	7/22/2021 7:41:47 PM	A80017
sec-Butylbenzene	ND	0.020	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Styrene	ND	0.0030	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
tert-Butylbenzene	ND	0.0055	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0021	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.0077	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Tetrachloroethene (PCE)	ND	0.0066	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
trans-1,2-DCE	ND	0.0041	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
trans-1,3-Dichloropropene	ND	0.0056	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0016	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2,4-Trichlorobenzene	ND	0.0083	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1,1-Trichloroethane	ND	0.0053	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,1,2-Trichloroethane	ND	0.0021	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Trichloroethene (TCE)	ND	0.0037	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-66-26
Project: Well Installations 2021 **Collection Date:** 7/19/2021 11:50:00 AM
Lab ID: 2107A83-002 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0054	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
1,2,3-Trichloropropane	ND	0.010	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Vinyl chloride	ND	0.0020	0.024		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Xylenes, Total	0.38	0.013	0.048		mg/Kg	1	7/22/2021 7:41:47 PM	A80017
Surr: Dibromofluoromethane	100		70-130		%Rec	1	7/22/2021 7:41:47 PM	A80017
Surr: 1,2-Dichloroethane-d4	107		70-130		%Rec	1	7/22/2021 7:41:47 PM	A80017
Surr: Toluene-d8	96.3		70-130		%Rec	1	7/22/2021 7:41:47 PM	A80017
Surr: 4-Bromofluorobenzene	98.0		70-130		%Rec	1	7/22/2021 7:41:47 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	5.7	0.67	2.4		mg/Kg	1	7/22/2021 7:41:47 PM	C80017
Surr: BFB	98.5	0	70-130		%Rec	1	7/22/2021 7:41:47 PM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-14
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:55:00 PM
Lab ID: 2107A83-003 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.6	9.3		mg/Kg	1	7/23/2021 7:10:20 PM	61498
Motor Oil Range Organics (MRO)	ND	47	47		mg/Kg	1	7/23/2021 7:10:20 PM	61498
Surr: DNOP	105	0	70-130		%Rec	1	7/23/2021 7:10:20 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	0.0028	0.0027	0.034	J	mg/Kg	1	7/23/2021 10:08:41 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.7	4.8		mg/Kg	2	7/23/2021 4:36:25 PM	61509
Barium	1000	1.1	1.9		mg/Kg	20	7/29/2021 2:33:43 PM	61509
Cadmium	ND	0.095	0.19		mg/Kg	2	7/23/2021 4:36:25 PM	61509
Chromium	11	0.29	0.57		mg/Kg	2	7/29/2021 2:31:28 PM	61509
Iron	15000	48	48	E	mg/Kg	20	7/29/2021 2:33:43 PM	61509
Lead	ND	0.51	0.57		mg/Kg	2	7/23/2021 4:36:25 PM	61509
Manganese	960	3.2	3.8		mg/Kg	20	7/29/2021 2:33:43 PM	61509
Selenium	ND	4.2	4.8		mg/Kg	2	7/29/2021 2:31:28 PM	61509
Silver	ND	0.28	0.48		mg/Kg	2	7/23/2021 4:36:25 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Acenaphthylene	ND	0.089	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Anthracene	ND	0.089	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzo(k)fluoranthene	ND	0.073	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.099	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Butyl benzyl phthalate	ND	0.059	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Chloro-3-methylphenol	ND	0.082	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2-Chloronaphthalene	ND	0.093	0.24		mg/Kg	1	7/28/2021 3:01:02 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-14
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:55:00 PM
Lab ID: 2107A83-003 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Chrysene	ND	0.086	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Di-n-butyl phthalate	0.28	0.27	0.39	J	mg/Kg	1	7/28/2021 3:01:02 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.24		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Diethyl phthalate	0.95	0.32	0.49	B	mg/Kg	1	7/28/2021 3:01:02 PM	61566
Dimethyl phthalate	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4-Dichlorophenol	ND	0.079	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4-Dimethylphenol	ND	0.070	0.29		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,6-Dinitrotoluene	ND	0.099	0.49		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Fluoranthene	ND	0.079	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Fluorene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Hexachloroethane	ND	0.086	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
1-Methylnaphthalene	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2-Methylnaphthalene	ND	0.081	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2-Methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
3+4-Methylphenol	ND	0.081	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
N-Nitrosodi-n-propylamine	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Naphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Nitrobenzene	ND	0.080	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566

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Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
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RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-14
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:55:00 PM
Lab ID: 2107A83-003 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
4-Nitrophenol	ND	0.080	0.24		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Pentachlorophenol	ND	0.084	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Phenol	ND	0.075	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 3:01:02 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4,5-Trichlorophenol	ND	0.062	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
2,4,6-Trichlorophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 3:01:02 PM	61566
Surr: 2-Fluorophenol	53.5		20.3-74.1		%Rec	1	7/28/2021 3:01:02 PM	61566
Surr: Phenol-d5	64.4		23.1-92.7		%Rec	1	7/28/2021 3:01:02 PM	61566
Surr: 2,4,6-Tribromophenol	78.6		17.3-122		%Rec	1	7/28/2021 3:01:02 PM	61566
Surr: Nitrobenzene-d5	48.3		24.7-73.2		%Rec	1	7/28/2021 3:01:02 PM	61566
Surr: 2-Fluorobiphenyl	52.3		21.5-90.1		%Rec	1	7/28/2021 3:01:02 PM	61566
Surr: 4-Terphenyl-d14	63.3		15-140		%Rec	1	7/28/2021 3:01:02 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0079	0.020		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Toluene	ND	0.0043	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Ethylbenzene	ND	0.010	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0082	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0058	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0092	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0093	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.016	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Naphthalene	ND	0.0075	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1-Methylnaphthalene	ND	0.047	0.16		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
2-Methylnaphthalene	ND	0.038	0.16		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Acetone	0.11	0.037	0.61	J	mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Bromobenzene	ND	0.0033	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Bromodichloromethane	ND	0.0038	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Bromoform	ND	0.0099	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Bromomethane	ND	0.036	0.12		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
2-Butanone	0.12	0.063	0.41	J	mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Carbon disulfide	ND	0.010	0.41		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Carbon tetrachloride	ND	0.0036	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Chlorobenzene	ND	0.0065	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Chloroethane	ND	0.015	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Chloroform	ND	0.0056	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
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P	Sample pH Not In Range
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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-14
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:55:00 PM
Lab ID: 2107A83-003 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0039	0.12		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
2-Chlorotoluene	ND	0.0085	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
4-Chlorotoluene	ND	0.026	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
cis-1,2-DCE	ND	0.020	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
cis-1,3-Dichloropropene	ND	0.0054	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.018	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Dibromochloromethane	ND	0.0054	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Dibromomethane	ND	0.0062	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2-Dichlorobenzene	ND	0.0085	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,3-Dichlorobenzene	ND	0.0077	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,4-Dichlorobenzene	ND	0.011	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Dichlorodifluoromethane	ND	0.013	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1-Dichloroethane	ND	0.0069	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1-Dichloroethene	ND	0.0060	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2-Dichloropropane	ND	0.0070	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,3-Dichloropropane	ND	0.0090	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
2,2-Dichloropropane	ND	0.0048	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1-Dichloropropene	ND	0.0043	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Hexachlorobutadiene	ND	0.011	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
2-Hexanone	ND	0.0078	0.41		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Isopropylbenzene	ND	0.0076	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
4-Isopropyltoluene	ND	0.011	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
4-Methyl-2-pentanone	ND	0.048	0.41		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Methylene chloride	ND	0.030	0.12		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
n-Butylbenzene	ND	0.011	0.12		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
n-Propylbenzene	ND	0.0066	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
sec-Butylbenzene	ND	0.034	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Styrene	ND	0.0052	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
tert-Butylbenzene	ND	0.0095	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0036	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.013	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Tetrachloroethene (PCE)	ND	0.011	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
trans-1,2-DCE	ND	0.0070	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
trans-1,3-Dichloropropene	ND	0.0096	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0028	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2,4-Trichlorobenzene	ND	0.014	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1,1-Trichloroethane	ND	0.0090	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,1,2-Trichloroethane	ND	0.0036	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Trichloroethene (TCE)	ND	0.0063	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017

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 Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-14
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:55:00 PM
Lab ID: 2107A83-003 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0093	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
1,2,3-Trichloropropane	ND	0.017	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Vinyl chloride	ND	0.0034	0.041		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Xylenes, Total	ND	0.022	0.082		mg/Kg	1	7/22/2021 8:10:32 PM	A80017
Surr: Dibromofluoromethane	108		70-130		%Rec	1	7/22/2021 8:10:32 PM	A80017
Surr: 1,2-Dichloroethane-d4	101		70-130		%Rec	1	7/22/2021 8:10:32 PM	A80017
Surr: Toluene-d8	97.2		70-130		%Rec	1	7/22/2021 8:10:32 PM	A80017
Surr: 4-Bromofluorobenzene	98.7		70-130		%Rec	1	7/22/2021 8:10:32 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	1.1	4.1		mg/Kg	1	7/22/2021 8:10:32 PM	C80017
Surr: BFB	97.1	0	70-130		%Rec	1	7/22/2021 8:10:32 PM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-25.5
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:45:00 PM
Lab ID: 2107A83-004 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.6	9.3		mg/Kg	1	7/23/2021 7:22:13 PM	61498
Motor Oil Range Organics (MRO)	ND	47	47		mg/Kg	1	7/23/2021 7:22:13 PM	61498
Surr: DNOP	108	0	70-130		%Rec	1	7/23/2021 7:22:13 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0025	0.031		mg/Kg	1	7/23/2021 10:10:46 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.9	5.1		mg/Kg	2	7/23/2021 4:38:46 PM	61509
Barium	250	0.12	0.20		mg/Kg	2	7/29/2021 2:36:16 PM	61509
Cadmium	ND	0.10	0.20		mg/Kg	2	7/23/2021 4:38:46 PM	61509
Chromium	12	0.31	0.61		mg/Kg	2	7/29/2021 2:36:16 PM	61509
Iron	16000	5.1	5.1	E	mg/Kg	2	7/29/2021 2:36:16 PM	61509
Lead	ND	0.54	0.61		mg/Kg	2	7/23/2021 4:38:46 PM	61509
Manganese	330	0.34	0.41		mg/Kg	2	7/23/2021 4:38:46 PM	61509
Selenium	ND	4.5	5.1		mg/Kg	2	7/29/2021 2:36:16 PM	61509
Silver	ND	0.30	0.51		mg/Kg	2	7/23/2021 4:38:46 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Acenaphthylene	ND	0.089	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Anthracene	ND	0.089	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzo(k)fluoranthene	ND	0.074	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.099	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Butyl benzyl phthalate	ND	0.060	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Chloro-3-methylphenol	ND	0.082	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2-Chloronaphthalene	ND	0.093	0.24		mg/Kg	1	7/28/2021 3:43:05 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-25.5
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:45:00 PM
Lab ID: 2107A83-004 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Chrysene	ND	0.086	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Di-n-butyl phthalate	ND	0.27	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.24		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Diethyl phthalate	0.81	0.32	0.49	B	mg/Kg	1	7/28/2021 3:43:05 PM	61566
Dimethyl phthalate	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4-Dichlorophenol	ND	0.079	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4-Dimethylphenol	ND	0.070	0.29		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,6-Dinitrotoluene	ND	0.099	0.49		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Fluoranthene	ND	0.079	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Fluorene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Hexachloroethane	ND	0.087	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
1-Methylnaphthalene	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2-Methylnaphthalene	ND	0.081	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2-Methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
3+4-Methylphenol	ND	0.081	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
N-Nitrosodi-n-propylamine	ND	0.091	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Naphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Nitrobenzene	ND	0.080	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-25.5
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:45:00 PM
Lab ID: 2107A83-004 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
4-Nitrophenol	ND	0.080	0.24		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Pentachlorophenol	ND	0.084	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Phenol	ND	0.075	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 3:43:05 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4,5-Trichlorophenol	ND	0.062	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
2,4,6-Trichlorophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 3:43:05 PM	61566
Surr: 2-Fluorophenol	46.4		20.3-74.1		%Rec	1	7/28/2021 3:43:05 PM	61566
Surr: Phenol-d5	53.1		23.1-92.7		%Rec	1	7/28/2021 3:43:05 PM	61566
Surr: 2,4,6-Tribromophenol	78.6		17.3-122		%Rec	1	7/28/2021 3:43:05 PM	61566
Surr: Nitrobenzene-d5	44.4		24.7-73.2		%Rec	1	7/28/2021 3:43:05 PM	61566
Surr: 2-Fluorobiphenyl	45.9		21.5-90.1		%Rec	1	7/28/2021 3:43:05 PM	61566
Surr: 4-Terphenyl-d14	61.8		15-140		%Rec	1	7/28/2021 3:43:05 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0073	0.019		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Toluene	ND	0.0040	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Ethylbenzene	ND	0.0092	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0075	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0053	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0085	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0086	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.015	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Naphthalene	ND	0.0069	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1-Methylnaphthalene	ND	0.043	0.15		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
2-Methylnaphthalene	ND	0.035	0.15		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Acetone	ND	0.034	0.57		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Bromobenzene	ND	0.0030	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Bromodichloromethane	ND	0.0035	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Bromoform	ND	0.0091	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Bromomethane	ND	0.033	0.11		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
2-Butanone	0.16	0.058	0.38	J	mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Carbon disulfide	ND	0.0092	0.38		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Carbon tetrachloride	ND	0.0034	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Chlorobenzene	ND	0.0060	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Chloroethane	ND	0.014	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Chloroform	ND	0.0052	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-25.5
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:45:00 PM
Lab ID: 2107A83-004 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0036	0.11		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
2-Chlorotoluene	ND	0.0078	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
4-Chlorotoluene	ND	0.024	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
cis-1,2-DCE	ND	0.019	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
cis-1,3-Dichloropropene	ND	0.0050	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.016	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Dibromochloromethane	ND	0.0050	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Dibromomethane	ND	0.0058	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2-Dichlorobenzene	ND	0.0079	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,3-Dichlorobenzene	ND	0.0072	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,4-Dichlorobenzene	ND	0.010	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Dichlorodifluoromethane	ND	0.012	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1-Dichloroethane	ND	0.0063	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1-Dichloroethene	ND	0.0055	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2-Dichloropropane	ND	0.0065	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,3-Dichloropropane	ND	0.0083	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
2,2-Dichloropropane	ND	0.0044	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1-Dichloropropene	ND	0.0040	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Hexachlorobutadiene	ND	0.0099	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
2-Hexanone	ND	0.0072	0.38		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Isopropylbenzene	ND	0.0070	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
4-Isopropyltoluene	ND	0.0097	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
4-Methyl-2-pentanone	ND	0.044	0.38		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Methylene chloride	ND	0.027	0.11		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
n-Butylbenzene	ND	0.010	0.11		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
n-Propylbenzene	ND	0.0061	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
sec-Butylbenzene	ND	0.031	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Styrene	ND	0.0048	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
tert-Butylbenzene	ND	0.0088	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0033	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.012	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Tetrachloroethene (PCE)	ND	0.010	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
trans-1,2-DCE	ND	0.0065	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
trans-1,3-Dichloropropene	ND	0.0089	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0026	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2,4-Trichlorobenzene	ND	0.013	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1,1-Trichloroethane	ND	0.0084	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,1,2-Trichloroethane	ND	0.0034	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Trichloroethene (TCE)	ND	0.0058	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-13A-25.5
Project: Well Installations 2021 **Collection Date:** 7/19/2021 3:45:00 PM
Lab ID: 2107A83-004 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0086	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
1,2,3-Trichloropropane	ND	0.016	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Vinyl chloride	ND	0.0032	0.038		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Xylenes, Total	ND	0.020	0.076		mg/Kg	1	7/22/2021 8:39:14 PM	A80017
Surr: Dibromofluoromethane	104		70-130		%Rec	1	7/22/2021 8:39:14 PM	A80017
Surr: 1,2-Dichloroethane-d4	100		70-130		%Rec	1	7/22/2021 8:39:14 PM	A80017
Surr: Toluene-d8	93.6		70-130		%Rec	1	7/22/2021 8:39:14 PM	A80017
Surr: 4-Bromofluorobenzene	102		70-130		%Rec	1	7/22/2021 8:39:14 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	1.1	3.8		mg/Kg	1	7/22/2021 8:39:14 PM	C80017
Surr: BFB	99.3	0	70-130		%Rec	1	7/22/2021 8:39:14 PM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-22
Project: Well Installations 2021 **Collection Date:** 7/20/2021 5:15:00 PM
Lab ID: 2107A83-005 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.4	9.0		mg/Kg	1	7/23/2021 7:33:59 PM	61498
Motor Oil Range Organics (MRO)	ND	45	45		mg/Kg	1	7/23/2021 7:33:59 PM	61498
Surr: DNOP	107	0	70-130		%Rec	1	7/23/2021 7:33:59 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0028	0.035		mg/Kg	1	7/23/2021 10:12:53 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.9	5.2		mg/Kg	2	7/23/2021 4:40:58 PM	61509
Barium	400	0.13	0.21		mg/Kg	2	7/29/2021 2:38:24 PM	61509
Cadmium	ND	0.10	0.21		mg/Kg	2	7/23/2021 4:40:58 PM	61509
Chromium	9.1	0.31	0.62		mg/Kg	2	7/29/2021 2:38:24 PM	61509
Iron	11000	5.2	5.2	E	mg/Kg	2	7/29/2021 2:38:24 PM	61509
Lead	1.2	0.56	0.62		mg/Kg	2	7/29/2021 2:38:24 PM	61509
Manganese	420	0.34	0.42		mg/Kg	2	7/23/2021 4:40:58 PM	61509
Selenium	ND	4.6	5.2		mg/Kg	2	7/29/2021 2:38:24 PM	61509
Silver	ND	0.30	0.52		mg/Kg	2	7/23/2021 4:40:58 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.089	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Acenaphthylene	ND	0.090	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Aniline	ND	0.069	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Anthracene	ND	0.090	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Azobenzene	ND	0.099	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benz(a)anthracene	ND	0.064	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzo(a)pyrene	ND	0.094	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzo(b)fluoranthene	ND	0.11	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzo(k)fluoranthene	ND	0.075	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzoic acid	ND	0.12	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Benzyl alcohol	ND	0.082	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Bis(2-chloroethoxy)methane	ND	0.076	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Bis(2-ethylhexyl)phthalate	0.22	0.21	0.50	J	mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Butyl benzyl phthalate	ND	0.061	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Carbazole	ND	0.088	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Chloro-3-methylphenol	ND	0.084	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Chloroaniline	ND	0.097	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2-Chloronaphthalene	ND	0.094	0.25		mg/Kg	1	7/28/2021 4:25:22 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-22
Project: Well Installations 2021 **Collection Date:** 7/20/2021 5:15:00 PM
Lab ID: 2107A83-005 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.11	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Chlorophenyl phenyl ether	ND	0.084	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Chrysene	ND	0.088	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Di-n-butyl phthalate	0.36	0.28	0.40	J	mg/Kg	1	7/28/2021 4:25:22 PM	61566
Di-n-octyl phthalate	ND	0.13	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
1,2-Dichlorobenzene	ND	0.081	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
1,3-Dichlorobenzene	ND	0.071	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
1,4-Dichlorobenzene	ND	0.084	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.25		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Diethyl phthalate	1.1	0.32	0.50	B	mg/Kg	1	7/28/2021 4:25:22 PM	61566
Dimethyl phthalate	ND	0.092	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4-Dichlorophenol	ND	0.081	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4-Dimethylphenol	ND	0.071	0.30		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.084	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4-Dinitrophenol	ND	0.050	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,6-Dinitrotoluene	ND	0.10	0.50		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Fluoranthene	ND	0.080	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Fluorene	ND	0.089	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Hexachlorobenzene	ND	0.089	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Hexachlorobutadiene	ND	0.093	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Hexachloroethane	ND	0.088	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Isophorone	ND	0.081	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
1-Methylnaphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2-Methylnaphthalene	ND	0.082	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2-Methylphenol	ND	0.084	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
3+4-Methylphenol	ND	0.082	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
N-Nitrosodi-n-propylamine	ND	0.092	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Naphthalene	ND	0.094	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
3-Nitroaniline	ND	0.12	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Nitroaniline	ND	0.13	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Nitrobenzene	ND	0.082	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-22
Project: Well Installations 2021 **Collection Date:** 7/20/2021 5:15:00 PM
Lab ID: 2107A83-005 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.086	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
4-Nitrophenol	ND	0.082	0.25		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Pentachlorophenol	ND	0.086	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Phenol	ND	0.077	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Pyrene	ND	0.075	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Pyridine	ND	0.16	0.40		mg/Kg	1	7/28/2021 4:25:22 PM	61566
1,2,4-Trichlorobenzene	ND	0.091	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4,5-Trichlorophenol	ND	0.063	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
2,4,6-Trichlorophenol	ND	0.086	0.20		mg/Kg	1	7/28/2021 4:25:22 PM	61566
Surr: 2-Fluorophenol	55.1		20.3-74.1		%Rec	1	7/28/2021 4:25:22 PM	61566
Surr: Phenol-d5	69.6		23.1-92.7		%Rec	1	7/28/2021 4:25:22 PM	61566
Surr: 2,4,6-Tribromophenol	83.6		17.3-122		%Rec	1	7/28/2021 4:25:22 PM	61566
Surr: Nitrobenzene-d5	50.9		24.7-73.2		%Rec	1	7/28/2021 4:25:22 PM	61566
Surr: 2-Fluorobiphenyl	51.2		21.5-90.1		%Rec	1	7/28/2021 4:25:22 PM	61566
Surr: 4-Terphenyl-d14	65.2		15-140		%Rec	1	7/28/2021 4:25:22 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0049	0.013		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Toluene	ND	0.0027	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Ethylbenzene	ND	0.0063	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Methyl tert-butyl ether (MTBE)	0.0055	0.0051	0.026	J	mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0036	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0058	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0059	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.010	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Naphthalene	ND	0.0047	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1-Methylnaphthalene	ND	0.029	0.10		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
2-Methylnaphthalene	ND	0.024	0.10		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Acetone	0.074	0.023	0.38	J	mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Bromobenzene	ND	0.0021	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Bromodichloromethane	ND	0.0024	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Bromoform	ND	0.0062	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Bromomethane	ND	0.022	0.077		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
2-Butanone	0.095	0.040	0.26	J	mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Carbon disulfide	ND	0.0062	0.26		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Carbon tetrachloride	ND	0.0023	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Chlorobenzene	ND	0.0041	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Chloroethane	ND	0.0096	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Chloroform	ND	0.0035	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-22
Project: Well Installations 2021 **Collection Date:** 7/20/2021 5:15:00 PM
Lab ID: 2107A83-005 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0025	0.077		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
2-Chlorotoluene	ND	0.0053	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
4-Chlorotoluene	ND	0.016	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
cis-1,2-DCE	ND	0.013	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
cis-1,3-Dichloropropene	ND	0.0034	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.011	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Dibromochloromethane	ND	0.0034	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Dibromomethane	ND	0.0039	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2-Dichlorobenzene	ND	0.0053	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,3-Dichlorobenzene	ND	0.0048	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,4-Dichlorobenzene	ND	0.0069	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Dichlorodifluoromethane	ND	0.0079	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1-Dichloroethane	ND	0.0043	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1-Dichloroethene	ND	0.0038	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2-Dichloropropane	ND	0.0044	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,3-Dichloropropane	ND	0.0056	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
2,2-Dichloropropane	ND	0.0030	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1-Dichloropropene	ND	0.0027	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Hexachlorobutadiene	ND	0.0067	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
2-Hexanone	ND	0.0049	0.26		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Isopropylbenzene	ND	0.0048	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
4-Isopropyltoluene	ND	0.0066	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
4-Methyl-2-pentanone	ND	0.030	0.26		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Methylene chloride	ND	0.019	0.077		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
n-Butylbenzene	ND	0.0069	0.077		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
n-Propylbenzene	ND	0.0041	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
sec-Butylbenzene	ND	0.021	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Styrene	ND	0.0032	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
tert-Butylbenzene	ND	0.0059	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0022	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.0083	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Tetrachloroethene (PCE)	ND	0.0070	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
trans-1,2-DCE	ND	0.0044	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
trans-1,3-Dichloropropene	ND	0.0060	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0017	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2,4-Trichlorobenzene	ND	0.0089	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1,1-Trichloroethane	ND	0.0057	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,1,2-Trichloroethane	ND	0.0023	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Trichloroethene (TCE)	ND	0.0039	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-22
Project: Well Installations 2021 **Collection Date:** 7/20/2021 5:15:00 PM
Lab ID: 2107A83-005 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0058	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
1,2,3-Trichloropropane	ND	0.011	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Vinyl chloride	ND	0.0021	0.026		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Xylenes, Total	ND	0.013	0.051		mg/Kg	1	7/22/2021 9:07:57 PM	A80017
Surr: Dibromofluoromethane	101		70-130		%Rec	1	7/22/2021 9:07:57 PM	A80017
Surr: 1,2-Dichloroethane-d4	99.2		70-130		%Rec	1	7/22/2021 9:07:57 PM	A80017
Surr: Toluene-d8	96.9		70-130		%Rec	1	7/22/2021 9:07:57 PM	A80017
Surr: 4-Bromofluorobenzene	96.6		70-130		%Rec	1	7/22/2021 9:07:57 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.71	2.6		mg/Kg	1	7/22/2021 9:07:57 PM	C80017
Surr: BFB	93.6	0	70-130		%Rec	1	7/22/2021 9:07:57 PM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 3:20:00 PM
Lab ID: 2107A83-006 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.3	8.7		mg/Kg	1	7/23/2021 7:45:38 PM	61498
Motor Oil Range Organics (MRO)	ND	43	43		mg/Kg	1	7/23/2021 7:45:38 PM	61498
Surr: DNOP	107	0	70-130		%Rec	1	7/23/2021 7:45:38 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0027	0.035		mg/Kg	1	7/23/2021 10:15:00 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.9	5.0		mg/Kg	2	7/23/2021 4:43:14 PM	61509
Barium	800	1.2	2.0		mg/Kg	20	7/29/2021 2:42:54 PM	61509
Cadmium	ND	0.10	0.20		mg/Kg	2	7/23/2021 4:43:14 PM	61509
Chromium	10	0.30	0.61		mg/Kg	2	7/29/2021 2:40:37 PM	61509
Iron	14000	50	50	E	mg/Kg	20	7/29/2021 2:42:54 PM	61509
Lead	ND	0.54	0.61		mg/Kg	2	7/23/2021 4:43:14 PM	61509
Manganese	710	3.3	4.0		mg/Kg	20	7/29/2021 2:42:54 PM	61509
Selenium	ND	4.4	5.0		mg/Kg	2	7/29/2021 2:40:37 PM	61509
Silver	ND	0.29	0.50		mg/Kg	2	7/23/2021 4:43:14 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.085	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Acenaphthylene	ND	0.086	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Aniline	ND	0.066	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Anthracene	ND	0.086	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Azobenzene	ND	0.095	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benz(a)anthracene	ND	0.061	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzo(a)pyrene	ND	0.089	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzo(g,h,i)perylene	ND	0.097	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzo(k)fluoranthene	ND	0.071	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzoic acid	ND	0.12	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Benzyl alcohol	ND	0.078	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Bis(2-chloroethoxy)methane	ND	0.073	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Bis(2-chloroethyl)ether	ND	0.099	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.096	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Bis(2-ethylhexyl)phthalate	0.22	0.20	0.47	J	mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Bromophenyl phenyl ether	ND	0.099	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Butyl benzyl phthalate	ND	0.058	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Carbazole	ND	0.083	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Chloro-3-methylphenol	ND	0.080	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Chloroaniline	ND	0.092	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2-Chloronaphthalene	ND	0.090	0.24		mg/Kg	1	7/28/2021 5:07:46 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 3:20:00 PM
Lab ID: 2107A83-006 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Chlorophenyl phenyl ether	ND	0.080	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Chrysene	ND	0.084	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Di-n-butyl phthalate	0.39	0.26	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Di-n-octyl phthalate	ND	0.12	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Dibenzofuran	ND	0.099	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
1,2-Dichlorobenzene	ND	0.077	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
1,3-Dichlorobenzene	ND	0.068	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
1,4-Dichlorobenzene	ND	0.080	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
3,3´-Dichlorobenzidine	ND	0.14	0.24		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Diethyl phthalate	1.0	0.31	0.47	B	mg/Kg	1	7/28/2021 5:07:46 PM	61566
Dimethyl phthalate	ND	0.088	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4-Dichlorophenol	ND	0.077	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4-Dimethylphenol	ND	0.067	0.28		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.080	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4-Dinitrophenol	ND	0.048	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,6-Dinitrotoluene	ND	0.096	0.47		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Fluoranthene	ND	0.077	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Fluorene	ND	0.085	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Hexachlorobenzene	ND	0.084	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Hexachlorobutadiene	ND	0.089	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Hexachloroethane	ND	0.084	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Isophorone	ND	0.077	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
1-Methylnaphthalene	ND	0.087	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2-Methylnaphthalene	ND	0.078	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2-Methylphenol	ND	0.080	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
3+4-Methylphenol	ND	0.078	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
N-Nitrosodi-n-propylamine	ND	0.088	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
N-Nitrosodimethylamine	ND	0.14	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
N-Nitrosodiphenylamine	ND	0.099	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Naphthalene	ND	0.089	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2-Nitroaniline	ND	0.097	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
3-Nitroaniline	ND	0.11	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Nitroaniline	ND	0.12	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Nitrobenzene	ND	0.078	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 3:20:00 PM
Lab ID: 2107A83-006 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.082	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
4-Nitrophenol	ND	0.078	0.24		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Pentachlorophenol	ND	0.082	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Phenanthrene	ND	0.097	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Phenol	ND	0.073	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Pyrene	ND	0.072	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Pyridine	ND	0.15	0.38		mg/Kg	1	7/28/2021 5:07:46 PM	61566
1,2,4-Trichlorobenzene	ND	0.087	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4,5-Trichlorophenol	ND	0.060	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
2,4,6-Trichlorophenol	ND	0.082	0.19		mg/Kg	1	7/28/2021 5:07:46 PM	61566
Surr: 2-Fluorophenol	40.4		20.3-74.1		%Rec	1	7/28/2021 5:07:46 PM	61566
Surr: Phenol-d5	53.7		23.1-92.7		%Rec	1	7/28/2021 5:07:46 PM	61566
Surr: 2,4,6-Tribromophenol	77.9		17.3-122		%Rec	1	7/28/2021 5:07:46 PM	61566
Surr: Nitrobenzene-d5	40.3		24.7-73.2		%Rec	1	7/28/2021 5:07:46 PM	61566
Surr: 2-Fluorobiphenyl	40.6		21.5-90.1		%Rec	1	7/28/2021 5:07:46 PM	61566
Surr: 4-Terphenyl-d14	63.2		15-140		%Rec	1	7/28/2021 5:07:46 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0054	0.014		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Toluene	ND	0.0029	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Ethylbenzene	ND	0.0068	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Methyl tert-butyl ether (MTBE)	0.0057	0.0055	0.028	J	mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0039	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0063	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0063	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.011	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Naphthalene	ND	0.0051	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1-Methylnaphthalene	ND	0.032	0.11		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
2-Methylnaphthalene	ND	0.026	0.11		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Acetone	0.075	0.025	0.42	J	mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Bromobenzene	ND	0.0022	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Bromodichloromethane	ND	0.0026	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Bromoform	ND	0.0067	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Bromomethane	ND	0.024	0.084		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
2-Butanone	0.098	0.043	0.28	J	mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Carbon disulfide	ND	0.0068	0.28		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Carbon tetrachloride	ND	0.0025	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Chlorobenzene	ND	0.0044	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Chloroethane	ND	0.010	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Chloroform	ND	0.0038	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 3:20:00 PM
Lab ID: 2107A83-006 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0027	0.084		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
2-Chlorotoluene	ND	0.0058	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
4-Chlorotoluene	ND	0.018	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
cis-1,2-DCE	ND	0.014	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
cis-1,3-Dichloropropene	ND	0.0037	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.012	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Dibromochloromethane	ND	0.0037	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Dibromomethane	ND	0.0042	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2-Dichlorobenzene	ND	0.0058	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,3-Dichlorobenzene	ND	0.0053	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,4-Dichlorobenzene	ND	0.0074	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Dichlorodifluoromethane	ND	0.0085	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1-Dichloroethane	ND	0.0047	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1-Dichloroethene	ND	0.0041	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2-Dichloropropane	ND	0.0048	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,3-Dichloropropane	ND	0.0061	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
2,2-Dichloropropane	ND	0.0033	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1-Dichloropropene	ND	0.0029	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Hexachlorobutadiene	ND	0.0073	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
2-Hexanone	ND	0.0053	0.28		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Isopropylbenzene	ND	0.0052	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
4-Isopropyltoluene	ND	0.0072	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
4-Methyl-2-pentanone	ND	0.032	0.28		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Methylene chloride	ND	0.020	0.084		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
n-Butylbenzene	ND	0.0074	0.084		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
n-Propylbenzene	ND	0.0045	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
sec-Butylbenzene	ND	0.023	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Styrene	ND	0.0035	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
tert-Butylbenzene	ND	0.0064	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0024	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.0090	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Tetrachloroethene (PCE)	ND	0.0076	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
trans-1,2-DCE	ND	0.0048	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
trans-1,3-Dichloropropene	ND	0.0065	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0019	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2,4-Trichlorobenzene	ND	0.0097	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1,1-Trichloroethane	ND	0.0061	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,1,2-Trichloroethane	ND	0.0025	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Trichloroethene (TCE)	ND	0.0043	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-68-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 3:20:00 PM
Lab ID: 2107A83-006 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0063	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
1,2,3-Trichloropropane	ND	0.012	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Vinyl chloride	ND	0.0023	0.028		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Xylenes, Total	ND	0.015	0.056		mg/Kg	1	7/22/2021 9:36:37 PM	A80017
Surr: Dibromofluoromethane	100		70-130		%Rec	1	7/22/2021 9:36:37 PM	A80017
Surr: 1,2-Dichloroethane-d4	99.8		70-130		%Rec	1	7/22/2021 9:36:37 PM	A80017
Surr: Toluene-d8	95.2		70-130		%Rec	1	7/22/2021 9:36:37 PM	A80017
Surr: 4-Bromofluorobenzene	103		70-130		%Rec	1	7/22/2021 9:36:37 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.77	2.8		mg/Kg	1	7/22/2021 9:36:37 PM	C80017
Surr: BFB	100	0	70-130		%Rec	1	7/22/2021 9:36:37 PM	C80017

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 Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-17
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:10:00 PM
Lab ID: 2107A83-007 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.8	9.7		mg/Kg	1	7/23/2021 7:57:27 PM	61498
Motor Oil Range Organics (MRO)	ND	49	49		mg/Kg	1	7/23/2021 7:57:27 PM	61498
Surr: DNOP	107	0	70-130		%Rec	1	7/23/2021 7:57:27 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.012	0.16		mg/Kg	5	7/23/2021 10:38:09 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.7	4.8		mg/Kg	2	7/23/2021 4:45:30 PM	61509
Barium	650	1.1	1.9		mg/Kg	20	7/29/2021 2:47:17 PM	61509
Cadmium	ND	0.095	0.19		mg/Kg	2	7/23/2021 4:45:30 PM	61509
Chromium	5.4	0.29	0.57		mg/Kg	2	7/29/2021 2:45:11 PM	61509
Iron	8400	48	48	E	mg/Kg	20	7/29/2021 2:47:17 PM	61509
Lead	1.7	0.51	0.57		mg/Kg	2	7/29/2021 2:45:11 PM	61509
Manganese	420	0.32	0.38		mg/Kg	2	7/23/2021 4:45:30 PM	61509
Selenium	ND	4.2	4.8		mg/Kg	2	7/29/2021 2:45:11 PM	61509
Silver	ND	0.28	0.48		mg/Kg	2	7/23/2021 4:45:30 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.087	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Acenaphthylene	ND	0.088	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Anthracene	ND	0.088	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzo(k)fluoranthene	ND	0.073	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.099	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Butyl benzyl phthalate	ND	0.059	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Chloro-3-methylphenol	ND	0.082	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2-Chloronaphthalene	ND	0.093	0.24		mg/Kg	1	7/28/2021 5:50:05 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-17
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:10:00 PM
Lab ID: 2107A83-007 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Chrysene	ND	0.086	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Di-n-butyl phthalate	ND	0.27	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.24		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Diethyl phthalate	0.80	0.32	0.49	B	mg/Kg	1	7/28/2021 5:50:05 PM	61566
Dimethyl phthalate	ND	0.090	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4-Dichlorophenol	ND	0.079	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4-Dimethylphenol	ND	0.069	0.29		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,6-Dinitrotoluene	ND	0.099	0.49		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Fluoranthene	ND	0.079	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Fluorene	ND	0.087	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Hexachloroethane	ND	0.086	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
1-Methylnaphthalene	ND	0.090	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2-Methylnaphthalene	ND	0.081	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2-Methylphenol	ND	0.082	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
3+4-Methylphenol	ND	0.081	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
N-Nitrosodi-n-propylamine	ND	0.090	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Naphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Nitrobenzene	ND	0.080	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-17
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:10:00 PM
Lab ID: 2107A83-007 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
4-Nitrophenol	ND	0.080	0.24		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Pentachlorophenol	ND	0.084	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Phenol	ND	0.075	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 5:50:05 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4,5-Trichlorophenol	ND	0.062	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
2,4,6-Trichlorophenol	ND	0.084	0.20		mg/Kg	1	7/28/2021 5:50:05 PM	61566
Surr: 2-Fluorophenol	51.6		20.3-74.1		%Rec	1	7/28/2021 5:50:05 PM	61566
Surr: Phenol-d5	63.7		23.1-92.7		%Rec	1	7/28/2021 5:50:05 PM	61566
Surr: 2,4,6-Tribromophenol	79.1		17.3-122		%Rec	1	7/28/2021 5:50:05 PM	61566
Surr: Nitrobenzene-d5	53.0		24.7-73.2		%Rec	1	7/28/2021 5:50:05 PM	61566
Surr: 2-Fluorobiphenyl	53.4		21.5-90.1		%Rec	1	7/28/2021 5:50:05 PM	61566
Surr: 4-Terphenyl-d14	58.2		15-140		%Rec	1	7/28/2021 5:50:05 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0055	0.014		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Toluene	ND	0.0030	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Ethylbenzene	ND	0.0070	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0057	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0040	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0064	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0065	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.011	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Naphthalene	ND	0.0052	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1-Methylnaphthalene	ND	0.033	0.11		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
2-Methylnaphthalene	ND	0.026	0.11		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Acetone	ND	0.026	0.43		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Bromobenzene	ND	0.0023	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Bromodichloromethane	ND	0.0027	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Bromoform	ND	0.0069	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Bromomethane	ND	0.025	0.086		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
2-Butanone	0.080	0.044	0.29	J	mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Carbon disulfide	ND	0.0070	0.29		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Carbon tetrachloride	ND	0.0025	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Chlorobenzene	ND	0.0045	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Chloroethane	ND	0.011	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Chloroform	ND	0.0039	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-17
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:10:00 PM
Lab ID: 2107A83-007 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0028	0.086		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
2-Chlorotoluene	ND	0.0059	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
4-Chlorotoluene	ND	0.018	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
cis-1,2-DCE	ND	0.014	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
cis-1,3-Dichloropropene	ND	0.0038	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.012	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Dibromochloromethane	ND	0.0038	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Dibromomethane	ND	0.0044	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2-Dichlorobenzene	ND	0.0060	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,3-Dichlorobenzene	ND	0.0054	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,4-Dichlorobenzene	ND	0.0077	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Dichlorodifluoromethane	ND	0.0088	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1-Dichloroethane	ND	0.0048	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1-Dichloroethene	ND	0.0042	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2-Dichloropropane	ND	0.0049	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,3-Dichloropropane	ND	0.0063	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
2,2-Dichloropropane	ND	0.0034	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1-Dichloropropene	ND	0.0030	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Hexachlorobutadiene	ND	0.0075	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
2-Hexanone	ND	0.0055	0.29		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Isopropylbenzene	ND	0.0053	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
4-Isopropyltoluene	ND	0.0074	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
4-Methyl-2-pentanone	ND	0.033	0.29		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Methylene chloride	ND	0.021	0.086		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
n-Butylbenzene	ND	0.0077	0.086		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
n-Propylbenzene	ND	0.0046	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
sec-Butylbenzene	ND	0.024	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Styrene	ND	0.0036	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
tert-Butylbenzene	ND	0.0066	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0025	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.0093	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Tetrachloroethene (PCE)	ND	0.0078	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
trans-1,2-DCE	ND	0.0049	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
trans-1,3-Dichloropropene	ND	0.0067	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0019	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2,4-Trichlorobenzene	ND	0.010	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1,1-Trichloroethane	ND	0.0063	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,1,2-Trichloroethane	ND	0.0025	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Trichloroethene (TCE)	ND	0.0044	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017

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 Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-17
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:10:00 PM
Lab ID: 2107A83-007 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0065	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
1,2,3-Trichloropropane	ND	0.012	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Vinyl chloride	ND	0.0024	0.029		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Xylenes, Total	ND	0.015	0.057		mg/Kg	1	7/22/2021 10:05:14 PM	A80017
Surr: Dibromofluoromethane	99.8		70-130		%Rec	1	7/22/2021 10:05:14 PM	A80017
Surr: 1,2-Dichloroethane-d4	105		70-130		%Rec	1	7/22/2021 10:05:14 PM	A80017
Surr: Toluene-d8	94.8		70-130		%Rec	1	7/22/2021 10:05:14 PM	A80017
Surr: 4-Bromofluorobenzene	102		70-130		%Rec	1	7/22/2021 10:05:14 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.80	2.9		mg/Kg	1	7/22/2021 10:05:14 PM	C80017
Surr: BFB	97.5	0	70-130		%Rec	1	7/22/2021 10:05:14 PM	C80017

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 Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:25:00 PM
Lab ID: 2107A83-008 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **SB**	
Diesel Range Organics (DRO)	ND	4.8	9.7		mg/Kg	1	7/23/2021 8:09:30 PM	61498
Motor Oil Range Organics (MRO)	ND	48	48		mg/Kg	1	7/23/2021 8:09:30 PM	61498
Surr: DNOP	111	0	70-130		%Rec	1	7/23/2021 8:09:30 PM	61498
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0026	0.033		mg/Kg	1	7/23/2021 10:27:39 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.7	4.8		mg/Kg	2	7/23/2021 4:47:41 PM	61509
Barium	340	0.12	0.19		mg/Kg	2	7/29/2021 2:49:28 PM	61509
Cadmium	ND	0.096	0.19		mg/Kg	2	7/23/2021 4:47:41 PM	61509
Chromium	7.1	0.29	0.58		mg/Kg	2	7/29/2021 2:49:28 PM	61509
Iron	10000	48	48	E	mg/Kg	20	7/29/2021 3:00:19 PM	61509
Lead	1.3	0.51	0.58		mg/Kg	2	7/29/2021 2:49:28 PM	61509
Manganese	450	0.32	0.38		mg/Kg	2	7/23/2021 4:47:41 PM	61509
Selenium	ND	4.2	4.8		mg/Kg	2	7/29/2021 2:49:28 PM	61509
Silver	ND	0.28	0.48		mg/Kg	2	7/23/2021 4:47:41 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.088	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Acenaphthylene	ND	0.089	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Aniline	ND	0.068	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Anthracene	ND	0.089	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Azobenzene	ND	0.098	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benz(a)anthracene	ND	0.063	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzo(a)pyrene	ND	0.092	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzo(g,h,i)perylene	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzo(k)fluoranthene	ND	0.074	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzoic acid	ND	0.12	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Benzyl alcohol	ND	0.080	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Bis(2-chloroethoxy)methane	ND	0.075	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Bis(2-ethylhexyl)phthalate	0.22	0.21	0.49	J	mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Butyl benzyl phthalate	ND	0.060	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Carbazole	ND	0.086	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Chloro-3-methylphenol	ND	0.083	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Chloroaniline	ND	0.095	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2-Chloronaphthalene	ND	0.093	0.25		mg/Kg	1	7/28/2021 6:32:14 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:25:00 PM
Lab ID: 2107A83-008 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.11	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Chlorophenyl phenyl ether	ND	0.083	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Chrysene	ND	0.087	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Di-n-butyl phthalate	0.30	0.27	0.39	J	mg/Kg	1	7/28/2021 6:32:14 PM	61566
Di-n-octyl phthalate	ND	0.13	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Dibenzofuran	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
1,2-Dichlorobenzene	ND	0.079	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
1,3-Dichlorobenzene	ND	0.070	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
1,4-Dichlorobenzene	ND	0.083	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
3,3´-Dichlorobenzidine	ND	0.15	0.25		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Diethyl phthalate	0.92	0.32	0.49	B	mg/Kg	1	7/28/2021 6:32:14 PM	61566
Dimethyl phthalate	ND	0.091	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4-Dichlorophenol	ND	0.080	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4-Dimethylphenol	ND	0.070	0.29		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.083	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4-Dinitrophenol	ND	0.049	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,6-Dinitrotoluene	ND	0.10	0.49		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Fluoranthene	ND	0.079	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Fluorene	ND	0.088	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Hexachlorobenzene	ND	0.087	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Hexachlorobutadiene	ND	0.092	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Hexachloroethane	ND	0.087	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Isophorone	ND	0.080	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
1-Methylnaphthalene	ND	0.090	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2-Methylnaphthalene	ND	0.081	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2-Methylphenol	ND	0.083	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
3+4-Methylphenol	ND	0.081	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
N-Nitrosodi-n-propylamine	ND	0.091	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
N-Nitrosodimethylamine	ND	0.15	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Naphthalene	ND	0.092	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2-Nitroaniline	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
3-Nitroaniline	ND	0.11	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Nitroaniline	ND	0.13	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Nitrobenzene	ND	0.081	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:25:00 PM
Lab ID: 2107A83-008 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.085	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
4-Nitrophenol	ND	0.081	0.25		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Pentachlorophenol	ND	0.085	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Phenanthrene	ND	0.10	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Phenol	ND	0.076	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Pyrene	ND	0.074	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Pyridine	ND	0.16	0.39		mg/Kg	1	7/28/2021 6:32:14 PM	61566
1,2,4-Trichlorobenzene	ND	0.090	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4,5-Trichlorophenol	ND	0.063	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
2,4,6-Trichlorophenol	ND	0.085	0.20		mg/Kg	1	7/28/2021 6:32:14 PM	61566
Surr: 2-Fluorophenol	55.1		20.3-74.1		%Rec	1	7/28/2021 6:32:14 PM	61566
Surr: Phenol-d5	69.8		23.1-92.7		%Rec	1	7/28/2021 6:32:14 PM	61566
Surr: 2,4,6-Tribromophenol	75.9		17.3-122		%Rec	1	7/28/2021 6:32:14 PM	61566
Surr: Nitrobenzene-d5	52.2		24.7-73.2		%Rec	1	7/28/2021 6:32:14 PM	61566
Surr: 2-Fluorobiphenyl	47.7		21.5-90.1		%Rec	1	7/28/2021 6:32:14 PM	61566
Surr: 4-Terphenyl-d14	61.0		15-140		%Rec	1	7/28/2021 6:32:14 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0044	0.012		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Toluene	ND	0.0024	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Ethylbenzene	ND	0.0056	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0046	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2,4-Trimethylbenzene	ND	0.0033	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,3,5-Trimethylbenzene	ND	0.0052	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2-Dichloroethane (EDC)	ND	0.0053	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2-Dibromoethane (EDB)	ND	0.0091	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Naphthalene	ND	0.0042	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1-Methylnaphthalene	ND	0.027	0.092		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
2-Methylnaphthalene	ND	0.021	0.092		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Acetone	ND	0.021	0.35		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Bromobenzene	ND	0.0018	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Bromodichloromethane	ND	0.0021	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Bromoform	ND	0.0056	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Bromomethane	ND	0.020	0.069		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
2-Butanone	0.057	0.036	0.23	J	mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Carbon disulfide	ND	0.0056	0.23		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Carbon tetrachloride	ND	0.0020	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Chlorobenzene	ND	0.0037	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Chloroethane	ND	0.0086	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Chloroform	ND	0.0032	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:25:00 PM
Lab ID: 2107A83-008 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0022	0.069		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
2-Chlorotoluene	ND	0.0048	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
4-Chlorotoluene	ND	0.015	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
cis-1,2-DCE	ND	0.011	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
cis-1,3-Dichloropropene	ND	0.0030	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2-Dibromo-3-chloropropane	ND	0.010	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Dibromochloromethane	ND	0.0030	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Dibromomethane	ND	0.0035	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2-Dichlorobenzene	ND	0.0048	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,3-Dichlorobenzene	ND	0.0044	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,4-Dichlorobenzene	ND	0.0062	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Dichlorodifluoromethane	ND	0.0071	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1-Dichloroethane	ND	0.0039	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1-Dichloroethene	ND	0.0034	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2-Dichloropropane	ND	0.0040	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,3-Dichloropropane	ND	0.0051	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
2,2-Dichloropropane	ND	0.0027	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1-Dichloropropene	ND	0.0024	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Hexachlorobutadiene	ND	0.0060	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
2-Hexanone	ND	0.0044	0.23		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Isopropylbenzene	ND	0.0043	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
4-Isopropyltoluene	ND	0.0060	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
4-Methyl-2-pentanone	ND	0.027	0.23		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Methylene chloride	ND	0.017	0.069		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
n-Butylbenzene	ND	0.0062	0.069		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
n-Propylbenzene	ND	0.0037	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
sec-Butylbenzene	ND	0.019	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Styrene	ND	0.0029	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
tert-Butylbenzene	ND	0.0054	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0020	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1,2,2-Tetrachloroethane	ND	0.0075	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Tetrachloroethene (PCE)	ND	0.0063	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
trans-1,2-DCE	ND	0.0040	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
trans-1,3-Dichloropropene	ND	0.0054	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2,3-Trichlorobenzene	ND	0.0016	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2,4-Trichlorobenzene	ND	0.0080	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1,1-Trichloroethane	ND	0.0051	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,1,2-Trichloroethane	ND	0.0020	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Trichloroethene (TCE)	ND	0.0036	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-67-26
Project: Well Installations 2021 **Collection Date:** 7/20/2021 12:25:00 PM
Lab ID: 2107A83-008 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0052	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
1,2,3-Trichloropropane	ND	0.0097	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Vinyl chloride	ND	0.0019	0.023		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Xylenes, Total	ND	0.012	0.046		mg/Kg	1	7/22/2021 10:33:50 PM	A80017
Surr: Dibromofluoromethane	103		70-130		%Rec	1	7/22/2021 10:33:50 PM	A80017
Surr: 1,2-Dichloroethane-d4	106		70-130		%Rec	1	7/22/2021 10:33:50 PM	A80017
Surr: Toluene-d8	95.7		70-130		%Rec	1	7/22/2021 10:33:50 PM	A80017
Surr: 4-Bromofluorobenzene	103		70-130		%Rec	1	7/22/2021 10:33:50 PM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.64	2.3		mg/Kg	1	7/22/2021 10:33:50 PM	C80017
Surr: BFB	100	0	70-130		%Rec	1	7/22/2021 10:33:50 PM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** MeOH Blank
Project: Well Installations 2021 **Collection Date:**
Lab ID: 2107A83-009 **Matrix:** MEOH BLAN **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0096	0.025		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Toluene	ND	0.0052	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Ethylbenzene	ND	0.012	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Methyl tert-butyl ether (MTBE)	0.017	0.010	0.050	J	mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2,4-Trimethylbenzene	ND	0.0071	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,3,5-Trimethylbenzene	ND	0.011	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2-Dichloroethane (EDC)	ND	0.011	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2-Dibromoethane (EDB)	ND	0.020	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Naphthalene	ND	0.0092	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1-Methylnaphthalene	ND	0.057	0.20		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
2-Methylnaphthalene	ND	0.046	0.20		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Acetone	ND	0.045	0.75		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Bromobenzene	ND	0.0040	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Bromodichloromethane	ND	0.0046	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Bromoform	ND	0.012	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Bromomethane	ND	0.044	0.15		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
2-Butanone	0.15	0.077	0.50	J	mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Carbon disulfide	ND	0.012	0.50		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Carbon tetrachloride	ND	0.0044	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Chlorobenzene	ND	0.0079	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Chloroethane	ND	0.019	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Chloroform	ND	0.0069	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Chloromethane	ND	0.0048	0.15		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
2-Chlorotoluene	ND	0.010	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
4-Chlorotoluene	ND	0.032	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
cis-1,2-DCE	ND	0.025	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
cis-1,3-Dichloropropene	ND	0.0066	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2-Dibromo-3-chloropropane	ND	0.022	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Dibromochloromethane	ND	0.0066	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Dibromomethane	ND	0.0076	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2-Dichlorobenzene	ND	0.010	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,3-Dichlorobenzene	ND	0.0094	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,4-Dichlorobenzene	ND	0.013	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Dichlorodifluoromethane	ND	0.015	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1-Dichloroethane	ND	0.0084	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1-Dichloroethene	ND	0.0073	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2-Dichloropropane	ND	0.0086	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,3-Dichloropropane	ND	0.011	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
2,2-Dichloropropane	ND	0.0059	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** MeOH Blank
Project: Well Installations 2021 **Collection Date:**
Lab ID: 2107A83-009 **Matrix:** MEOH BLAN **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
1,1-Dichloropropene	ND	0.0053	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Hexachlorobutadiene	ND	0.013	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
2-Hexanone	ND	0.0095	0.50		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Isopropylbenzene	ND	0.0093	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
4-Isopropyltoluene	ND	0.013	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
4-Methyl-2-pentanone	ND	0.058	0.50		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Methylene chloride	ND	0.036	0.15		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
n-Butylbenzene	ND	0.013	0.15		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
n-Propylbenzene	ND	0.0081	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
sec-Butylbenzene	ND	0.041	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Styrene	ND	0.0063	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
tert-Butylbenzene	ND	0.012	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0044	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1,2,2-Tetrachloroethane	ND	0.016	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Tetrachloroethene (PCE)	ND	0.014	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
trans-1,2-DCE	ND	0.0085	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
trans-1,3-Dichloropropene	ND	0.012	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2,3-Trichlorobenzene	ND	0.0034	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2,4-Trichlorobenzene	ND	0.017	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1,1-Trichloroethane	ND	0.011	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,1,2-Trichloroethane	ND	0.0044	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Trichloroethene (TCE)	ND	0.0077	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Trichlorofluoromethane	ND	0.011	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
1,2,3-Trichloropropane	ND	0.021	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Vinyl chloride	ND	0.0042	0.050		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Xylenes, Total	ND	0.026	0.10		mg/Kg	1	7/23/2021 1:25:20 AM	A80017
Surr: Dibromofluoromethane	102		70-130		%Rec	1	7/23/2021 1:25:20 AM	A80017
Surr: 1,2-Dichloroethane-d4	104		70-130		%Rec	1	7/23/2021 1:25:20 AM	A80017
Surr: Toluene-d8	97.4		70-130		%Rec	1	7/23/2021 1:25:20 AM	A80017
Surr: 4-Bromofluorobenzene	102		70-130		%Rec	1	7/23/2021 1:25:20 AM	A80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-26
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:10:00 PM
Lab ID: 2107A83-010 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **CLP**	
Diesel Range Organics (DRO)	ND	4.6	9.3		mg/Kg	1	7/23/2021 10:52:22 AM	61499
Motor Oil Range Organics (MRO)	ND	46	46		mg/Kg	1	7/23/2021 10:52:22 AM	61499
Surr: DNOP	173	0	70-130	S	%Rec	1	7/23/2021 10:52:22 AM	61499
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	ND	0.0025	0.032		mg/Kg	1	7/23/2021 10:29:45 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.9	5.1		mg/Kg	2	7/23/2021 4:49:49 PM	61509
Barium	160	0.12	0.20		mg/Kg	2	7/29/2021 3:02:32 PM	61509
Cadmium	ND	0.10	0.20		mg/Kg	2	7/23/2021 4:49:49 PM	61509
Chromium	18	0.31	0.61		mg/Kg	2	7/29/2021 3:02:32 PM	61509
Iron	19000	51	51	E	mg/Kg	20	7/29/2021 3:04:47 PM	61509
Lead	ND	0.54	0.61		mg/Kg	2	7/23/2021 4:49:49 PM	61509
Manganese	250	0.34	0.41		mg/Kg	2	7/23/2021 4:49:49 PM	61509
Selenium	ND	4.5	5.1		mg/Kg	2	7/29/2021 3:02:32 PM	61509
Silver	ND	0.30	0.51		mg/Kg	2	7/23/2021 4:49:49 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Acenaphthylene	ND	0.087	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Aniline	ND	0.066	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Anthracene	ND	0.087	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Azobenzene	ND	0.095	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benz(a)anthracene	ND	0.062	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzo(a)pyrene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzo(g,h,i)perylene	ND	0.097	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzo(k)fluoranthene	ND	0.072	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzoic acid	ND	0.12	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Benzyl alcohol	ND	0.078	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Bis(2-chloroethoxy)methane	ND	0.073	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.097	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Bis(2-ethylhexyl)phthalate	0.31	0.21	0.48	J	mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Butyl benzyl phthalate	ND	0.058	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Carbazole	ND	0.084	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Chloro-3-methylphenol	ND	0.081	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Chloroaniline	ND	0.093	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2-Chloronaphthalene	ND	0.091	0.24		mg/Kg	1	7/28/2021 7:14:20 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-26
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:10:00 PM
Lab ID: 2107A83-010 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Chlorophenyl phenyl ether	ND	0.081	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Chrysene	ND	0.084	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Di-n-butyl phthalate	0.35	0.27	0.38	J	mg/Kg	1	7/28/2021 7:14:20 PM	61566
Di-n-octyl phthalate	ND	0.12	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Dibenzofuran	ND	0.099	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
1,2-Dichlorobenzene	ND	0.077	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
1,3-Dichlorobenzene	ND	0.068	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
1,4-Dichlorobenzene	ND	0.081	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
3,3´-Dichlorobenzidine	ND	0.14	0.24		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Diethyl phthalate	0.88	0.31	0.48	B	mg/Kg	1	7/28/2021 7:14:20 PM	61566
Dimethyl phthalate	ND	0.088	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4-Dichlorophenol	ND	0.078	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4-Dimethylphenol	ND	0.068	0.29		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.081	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4-Dinitrophenol	ND	0.048	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,6-Dinitrotoluene	ND	0.097	0.48		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Fluoranthene	ND	0.077	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Fluorene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Hexachlorobenzene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Hexachlorobutadiene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Hexachloroethane	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Isophorone	ND	0.078	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
1-Methylnaphthalene	ND	0.088	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2-Methylnaphthalene	ND	0.079	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2-Methylphenol	ND	0.080	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
3+4-Methylphenol	ND	0.079	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
N-Nitrosodi-n-propylamine	ND	0.089	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
N-Nitrosodimethylamine	ND	0.14	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Naphthalene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2-Nitroaniline	ND	0.098	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
3-Nitroaniline	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Nitroaniline	ND	0.12	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Nitrobenzene	ND	0.078	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566

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Qualifiers:

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ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-26
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:10:00 PM
Lab ID: 2107A83-010 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.082	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
4-Nitrophenol	ND	0.079	0.24		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Pentachlorophenol	ND	0.083	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Phenanthrene	ND	0.098	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Phenol	ND	0.074	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Pyrene	ND	0.072	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Pyridine	ND	0.15	0.38		mg/Kg	1	7/28/2021 7:14:20 PM	61566
1,2,4-Trichlorobenzene	ND	0.088	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4,5-Trichlorophenol	ND	0.061	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
2,4,6-Trichlorophenol	ND	0.082	0.19		mg/Kg	1	7/28/2021 7:14:20 PM	61566
Surr: 2-Fluorophenol	61.5		20.3-74.1		%Rec	1	7/28/2021 7:14:20 PM	61566
Surr: Phenol-d5	70.7		23.1-92.7		%Rec	1	7/28/2021 7:14:20 PM	61566
Surr: 2,4,6-Tribromophenol	84.7		17.3-122		%Rec	1	7/28/2021 7:14:20 PM	61566
Surr: Nitrobenzene-d5	57.8		24.7-73.2		%Rec	1	7/28/2021 7:14:20 PM	61566
Surr: 2-Fluorobiphenyl	59.0		21.5-90.1		%Rec	1	7/28/2021 7:14:20 PM	61566
Surr: 4-Terphenyl-d14	69.5		15-140		%Rec	1	7/28/2021 7:14:20 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0068	0.018		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Toluene	ND	0.0037	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Ethylbenzene	ND	0.0086	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0070	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2,4-Trimethylbenzene	ND	0.0050	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,3,5-Trimethylbenzene	ND	0.0079	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2-Dichloroethane (EDC)	ND	0.0081	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2-Dibromoethane (EDB)	ND	0.014	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Naphthalene	ND	0.0065	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1-Methylnaphthalene	ND	0.041	0.14		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
2-Methylnaphthalene	ND	0.033	0.14		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Acetone	ND	0.032	0.53		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Bromobenzene	ND	0.0028	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Bromodichloromethane	ND	0.0033	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Bromoform	ND	0.0085	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Bromomethane	ND	0.031	0.11		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
2-Butanone	0.16	0.055	0.35	J	mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Carbon disulfide	ND	0.0086	0.35		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Carbon tetrachloride	ND	0.0031	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Chlorobenzene	ND	0.0056	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Chloroethane	ND	0.013	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Chloroform	ND	0.0049	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017

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PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: OW-69-26
Project: Well Installations 2021
Collection Date: 7/21/2021 12:10:00 PM
Lab ID: 2107A83-010
Matrix: MEOH (SOIL)
Received Date: 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0034	0.11		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
2-Chlorotoluene	ND	0.0073	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
4-Chlorotoluene	ND	0.022	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
cis-1,2-DCE	ND	0.018	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
cis-1,3-Dichloropropene	ND	0.0047	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2-Dibromo-3-chloropropane	ND	0.015	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Dibromochloromethane	ND	0.0046	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Dibromomethane	ND	0.0054	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2-Dichlorobenzene	ND	0.0074	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,3-Dichlorobenzene	ND	0.0067	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,4-Dichlorobenzene	ND	0.0095	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Dichlorodifluoromethane	ND	0.011	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1-Dichloroethane	ND	0.0059	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1-Dichloroethene	ND	0.0052	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2-Dichloropropane	ND	0.0061	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,3-Dichloropropane	ND	0.0078	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
2,2-Dichloropropane	ND	0.0041	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1-Dichloropropene	ND	0.0037	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Hexachlorobutadiene	ND	0.0092	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
2-Hexanone	ND	0.0067	0.35		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Isopropylbenzene	ND	0.0066	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
4-Isopropyltoluene	ND	0.0091	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
4-Methyl-2-pentanone	ND	0.041	0.35		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Methylene chloride	ND	0.026	0.11		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
n-Butylbenzene	ND	0.0094	0.11		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
n-Propylbenzene	ND	0.0057	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
sec-Butylbenzene	ND	0.029	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Styrene	ND	0.0044	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
tert-Butylbenzene	ND	0.0082	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0031	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1,2,2-Tetrachloroethane	ND	0.011	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Tetrachloroethene (PCE)	ND	0.0097	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
trans-1,2-DCE	ND	0.0060	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
trans-1,3-Dichloropropene	ND	0.0083	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2,3-Trichlorobenzene	ND	0.0024	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2,4-Trichlorobenzene	ND	0.012	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1,1-Trichloroethane	ND	0.0078	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,1,2-Trichloroethane	ND	0.0031	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Trichloroethene (TCE)	ND	0.0054	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017

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Qualifiers:

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B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
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Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-26
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:10:00 PM
Lab ID: 2107A83-010 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0080	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
1,2,3-Trichloropropane	ND	0.015	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Vinyl chloride	ND	0.0030	0.035		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Xylenes, Total	ND	0.019	0.071		mg/Kg	1	7/23/2021 1:53:54 AM	A80017
Surr: Dibromofluoromethane	104		70-130		%Rec	1	7/23/2021 1:53:54 AM	A80017
Surr: 1,2-Dichloroethane-d4	104		70-130		%Rec	1	7/23/2021 1:53:54 AM	A80017
Surr: Toluene-d8	96.2		70-130		%Rec	1	7/23/2021 1:53:54 AM	A80017
Surr: 4-Bromofluorobenzene	98.9		70-130		%Rec	1	7/23/2021 1:53:54 AM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.98	3.5		mg/Kg	1	7/23/2021 1:53:54 AM	C80017
Surr: BFB	95.8	0	70-130		%Rec	1	7/23/2021 1:53:54 AM	C80017

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-6
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:15:00 PM
Lab ID: 2107A83-011 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **CLP**	
Diesel Range Organics (DRO)	8.4	4.7	9.5	J	mg/Kg	1	7/23/2021 11:21:20 AM	61499
Motor Oil Range Organics (MRO)	ND	47	47		mg/Kg	1	7/23/2021 11:21:20 AM	61499
Surr: DNOP	117	0	70-130		%Rec	1	7/23/2021 11:21:20 AM	61499
EPA METHOD 7471B: MERCURY							Analyst: **ags**	
Mercury	0.0051	0.0028	0.035	J	mg/Kg	1	7/23/2021 10:31:50 AM	61495
EPA METHOD 6010B: SOIL METALS							Analyst: **ags**	
Arsenic	ND	2.8	4.9		mg/Kg	2	7/23/2021 4:52:01 PM	61509
Barium	290	0.12	0.20		mg/Kg	2	7/29/2021 3:06:50 PM	61509
Cadmium	ND	0.099	0.20		mg/Kg	2	7/23/2021 4:52:01 PM	61509
Chromium	5.5	0.30	0.59		mg/Kg	2	7/29/2021 3:06:50 PM	61509
Iron	9800	49	49	E	mg/Kg	20	7/29/2021 3:08:55 PM	61509
Lead	4.5	0.53	0.59		mg/Kg	2	7/29/2021 3:06:50 PM	61509
Manganese	220	0.33	0.40		mg/Kg	2	7/23/2021 4:52:01 PM	61509
Selenium	ND	4.3	4.9		mg/Kg	2	7/29/2021 3:06:50 PM	61509
Silver	ND	0.29	0.49		mg/Kg	2	7/23/2021 4:52:01 PM	61509
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Acenaphthene	ND	0.086	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Acenaphthylene	ND	0.087	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Aniline	ND	0.066	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Anthracene	ND	0.087	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Azobenzene	ND	0.096	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benz(a)anthracene	ND	0.062	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzo(a)pyrene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzo(b)fluoranthene	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzo(g,h,i)perylene	ND	0.098	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzo(k)fluoranthene	ND	0.072	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzoic acid	ND	0.12	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Benzyl alcohol	ND	0.079	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Bis(2-chloroethoxy)methane	ND	0.073	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Bis(2-chloroethyl)ether	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Bis(2-chloroisopropyl)ether	ND	0.097	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Bis(2-ethylhexyl)phthalate	ND	0.21	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Bromophenyl phenyl ether	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Butyl benzyl phthalate	ND	0.058	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Carbazole	ND	0.084	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Chloro-3-methylphenol	ND	0.081	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Chloroaniline	ND	0.093	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2-Chloronaphthalene	ND	0.091	0.24		mg/Kg	1	7/28/2021 7:56:12 PM	61566

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

Qualifiers:

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

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-6
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:15:00 PM
Lab ID: 2107A83-011 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Chlorophenol	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Chlorophenyl phenyl ether	ND	0.081	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Chrysene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Di-n-butyl phthalate	ND	0.27	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Di-n-octyl phthalate	ND	0.12	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Dibenz(a,h)anthracene	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Dibenzofuran	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
1,2-Dichlorobenzene	ND	0.077	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
1,3-Dichlorobenzene	ND	0.068	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
1,4-Dichlorobenzene	ND	0.081	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
3,3´-Dichlorobenzidine	ND	0.14	0.24		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Diethyl phthalate	0.69	0.31	0.48	B	mg/Kg	1	7/28/2021 7:56:12 PM	61566
Dimethyl phthalate	ND	0.089	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4-Dichlorophenol	ND	0.078	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4-Dimethylphenol	ND	0.068	0.29		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4,6-Dinitro-2-methylphenol	ND	0.081	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4-Dinitrophenol	ND	0.048	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4-Dinitrotoluene	ND	0.12	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,6-Dinitrotoluene	ND	0.097	0.48		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Fluoranthene	ND	0.077	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Fluorene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Hexachlorobenzene	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Hexachlorobutadiene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Hexachlorocyclopentadiene	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Hexachloroethane	ND	0.085	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Indeno(1,2,3-cd)pyrene	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Isophorone	ND	0.078	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
1-Methylnaphthalene	ND	0.088	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2-Methylnaphthalene	ND	0.079	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2-Methylphenol	ND	0.081	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
3+4-Methylphenol	ND	0.079	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
N-Nitrosodi-n-propylamine	ND	0.089	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
N-Nitrosodimethylamine	ND	0.14	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
N-Nitrosodiphenylamine	ND	0.10	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Naphthalene	ND	0.090	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2-Nitroaniline	ND	0.098	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
3-Nitroaniline	ND	0.11	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Nitroaniline	ND	0.12	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Nitrobenzene	ND	0.079	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566

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Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-6
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:15:00 PM
Lab ID: 2107A83-011 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
2-Nitrophenol	ND	0.083	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
4-Nitrophenol	ND	0.079	0.24		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Pentachlorophenol	ND	0.083	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Phenanthrene	ND	0.098	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Phenol	ND	0.074	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Pyrene	ND	0.073	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Pyridine	ND	0.15	0.38		mg/Kg	1	7/28/2021 7:56:12 PM	61566
1,2,4-Trichlorobenzene	ND	0.088	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4,5-Trichlorophenol	ND	0.061	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
2,4,6-Trichlorophenol	ND	0.082	0.19		mg/Kg	1	7/28/2021 7:56:12 PM	61566
Surr: 2-Fluorophenol	49.7		20.3-74.1		%Rec	1	7/28/2021 7:56:12 PM	61566
Surr: Phenol-d5	56.2		23.1-92.7		%Rec	1	7/28/2021 7:56:12 PM	61566
Surr: 2,4,6-Tribromophenol	91.4		17.3-122		%Rec	1	7/28/2021 7:56:12 PM	61566
Surr: Nitrobenzene-d5	48.0		24.7-73.2		%Rec	1	7/28/2021 7:56:12 PM	61566
Surr: 2-Fluorobiphenyl	51.0		21.5-90.1		%Rec	1	7/28/2021 7:56:12 PM	61566
Surr: 4-Terphenyl-d14	65.2		15-140		%Rec	1	7/28/2021 7:56:12 PM	61566
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Benzene	ND	0.0065	0.017		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Toluene	ND	0.0035	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Ethylbenzene	ND	0.0082	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Methyl tert-butyl ether (MTBE)	ND	0.0067	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2,4-Trimethylbenzene	ND	0.0048	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,3,5-Trimethylbenzene	ND	0.0076	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2-Dichloroethane (EDC)	ND	0.0077	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2-Dibromoethane (EDB)	ND	0.013	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Naphthalene	ND	0.0062	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1-Methylnaphthalene	ND	0.039	0.14		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
2-Methylnaphthalene	ND	0.031	0.14		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Acetone	ND	0.030	0.51		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Bromobenzene	ND	0.0027	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Bromodichloromethane	ND	0.0031	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Bromoform	ND	0.0082	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Bromomethane	ND	0.030	0.10		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
2-Butanone	0.094	0.052	0.34	J	mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Carbon disulfide	ND	0.0082	0.34		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Carbon tetrachloride	ND	0.0030	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Chlorobenzene	ND	0.0054	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Chloroethane	ND	0.013	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Chloroform	ND	0.0047	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-6
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:15:00 PM
Lab ID: 2107A83-011 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Chloromethane	ND	0.0033	0.10		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
2-Chlorotoluene	ND	0.0070	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
4-Chlorotoluene	ND	0.021	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
cis-1,2-DCE	ND	0.017	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
cis-1,3-Dichloropropene	ND	0.0045	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2-Dibromo-3-chloropropane	ND	0.015	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Dibromochloromethane	ND	0.0044	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Dibromomethane	ND	0.0052	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2-Dichlorobenzene	ND	0.0070	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,3-Dichlorobenzene	ND	0.0064	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,4-Dichlorobenzene	ND	0.0091	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Dichlorodifluoromethane	ND	0.010	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1-Dichloroethane	ND	0.0057	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1-Dichloroethene	ND	0.0049	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2-Dichloropropane	ND	0.0058	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,3-Dichloropropane	ND	0.0074	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
2,2-Dichloropropane	ND	0.0040	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1-Dichloropropene	ND	0.0036	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Hexachlorobutadiene	ND	0.0088	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
2-Hexanone	ND	0.0065	0.34		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Isopropylbenzene	ND	0.0063	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
4-Isopropyltoluene	ND	0.0087	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
4-Methyl-2-pentanone	ND	0.039	0.34		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Methylene chloride	ND	0.025	0.10		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
n-Butylbenzene	ND	0.0090	0.10		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
n-Propylbenzene	ND	0.0055	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
sec-Butylbenzene	ND	0.028	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Styrene	ND	0.0043	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
tert-Butylbenzene	ND	0.0078	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1,1,2-Tetrachloroethane	ND	0.0030	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1,2,2-Tetrachloroethane	ND	0.011	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Tetrachloroethene (PCE)	ND	0.0093	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
trans-1,2-DCE	ND	0.0058	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
trans-1,3-Dichloropropene	ND	0.0079	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2,3-Trichlorobenzene	ND	0.0023	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2,4-Trichlorobenzene	ND	0.012	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1,1-Trichloroethane	ND	0.0075	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,1,2-Trichloroethane	ND	0.0030	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Trichloroethene (TCE)	ND	0.0052	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2107A83**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon **Client Sample ID:** OW-69-6
Project: Well Installations 2021 **Collection Date:** 7/21/2021 12:15:00 PM
Lab ID: 2107A83-011 **Matrix:** MEOH (SOIL) **Received Date:** 7/21/2021 4:10:00 PM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260B: VOLATILES							Analyst: **JMR**	
Trichlorofluoromethane	ND	0.0077	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
1,2,3-Trichloropropane	ND	0.014	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Vinyl chloride	ND	0.0028	0.034		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Xylenes, Total	ND	0.018	0.068		mg/Kg	1	7/23/2021 2:22:27 AM	A80017
Surr: Dibromofluoromethane	100		70-130		%Rec	1	7/23/2021 2:22:27 AM	A80017
Surr: 1,2-Dichloroethane-d4	103		70-130		%Rec	1	7/23/2021 2:22:27 AM	A80017
Surr: Toluene-d8	97.4		70-130		%Rec	1	7/23/2021 2:22:27 AM	A80017
Surr: 4-Bromofluorobenzene	101		70-130		%Rec	1	7/23/2021 2:22:27 AM	A80017
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	0.94	3.4		mg/Kg	1	7/23/2021 2:22:27 AM	C80017
Surr: BFB	102	0	70-130		%Rec	1	7/23/2021 2:22:27 AM	C80017

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

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **MB-61499**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **61499**	RunNo: **80042**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2816402**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		129	70	130			

Sample ID: **LCS-61499**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **61499**	RunNo: **80042**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2816403**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	103	68.9	141			
Surr: DNOP	4.4		5.000		87.3	70	130			

Sample ID: **2107A83-010AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **OW-69-26**	Batch ID: **61499**	RunNo: **80042**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2816405**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	9.1	45.45	0	109	15	184			
Surr: DNOP	4.9		4.545		108	70	130			

Sample ID: **MB-61498**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **61498**	RunNo: **80027**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2817071**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		132	70	130			S

Sample ID: **LCS-61498**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **61498**	RunNo: **80027**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2817072**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	64	10	50.00	0	128	68.9	141			
Surr: DNOP	6.6		5.000		131	70	130			S

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **2107A83-010AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **OW-69-26** Batch ID: **61499** RunNo: **80090**
Prep Date: **7/22/2021** Analysis Date: **7/26/2021** SeqNo: **2819394** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	8.6	42.77	0	102	15	184	12.7	23.9	
Surr: DNOP	5.0		4.277		116	70	130	0	0	

Qualifiers:

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H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **LCSS**	Batch ID: **A80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815786** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	110	70	130			
Toluene	1.0	0.050	1.000	0	99.9	70	130			
Chlorobenzene	0.97	0.050	1.000	0	97.2	70	130			
1,1-Dichloroethene	1.0	0.050	1.000	0	105	70	130			
Trichloroethene (TCE)	0.93	0.050	1.000	0	93.4	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		97.6	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.6	70	130			
Surr: Toluene-d8	0.49		0.5000		98.2	70	130			
Surr: 4-Bromofluorobenzene	0.54		0.5000		108	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **A80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815787** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Methyl tert-butyl ether (MTBE)	ND	0.050								
1,2,4-Trimethylbenzene	ND	0.050								
1,3,5-Trimethylbenzene	ND	0.050								
1,2-Dichloroethane (EDC)	ND	0.050								
1,2-Dibromoethane (EDB)	ND	0.050								
Naphthalene	ND	0.10								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
Acetone	ND	0.75								
Bromobenzene	ND	0.050								
Bromodichloromethane	ND	0.050								
Bromoform	ND	0.050								
Bromomethane	ND	0.15								
2-Butanone	ND	0.50								
Carbon disulfide	ND	0.50								
Carbon tetrachloride	ND	0.050								
Chlorobenzene	ND	0.050								
Chloroethane	ND	0.10								
Chloroform	ND	0.050								
Chloromethane	ND	0.15								
2-Chlorotoluene	ND	0.050								

Qualifiers:

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D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **A80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815787** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	0.050								
cis-1,2-DCE	ND	0.050								
cis-1,3-Dichloropropene	ND	0.050								
1,2-Dibromo-3-chloropropane	ND	0.10								
Dibromochloromethane	ND	0.050								
Dibromomethane	ND	0.050								
1,2-Dichlorobenzene	ND	0.050								
1,3-Dichlorobenzene	ND	0.050								
1,4-Dichlorobenzene	ND	0.050								
Dichlorodifluoromethane	ND	0.050								
1,1-Dichloroethane	ND	0.050								
1,1-Dichloroethene	ND	0.050								
1,2-Dichloropropane	ND	0.050								
1,3-Dichloropropane	ND	0.050								
2,2-Dichloropropane	ND	0.10								
1,1-Dichloropropene	ND	0.10								
Hexachlorobutadiene	ND	0.10								
2-Hexanone	ND	0.50								
Isopropylbenzene	ND	0.050								
4-Isopropyltoluene	ND	0.050								
4-Methyl-2-pentanone	ND	0.50								
Methylene chloride	ND	0.15								
n-Butylbenzene	ND	0.15								
n-Propylbenzene	ND	0.050								
sec-Butylbenzene	ND	0.050								
Styrene	ND	0.050								
tert-Butylbenzene	ND	0.050								
1,1,1,2-Tetrachloroethane	ND	0.050								
1,1,2,2-Tetrachloroethane	ND	0.050								
Tetrachloroethene (PCE)	ND	0.050								
trans-1,2-DCE	ND	0.050								
trans-1,3-Dichloropropene	ND	0.050								
1,2,3-Trichlorobenzene	ND	0.10								
1,2,4-Trichlorobenzene	ND	0.050								
1,1,1-Trichloroethane	ND	0.050								
1,1,2-Trichloroethane	ND	0.050								
Trichloroethene (TCE)	ND	0.050								
Trichlorofluoromethane	ND	0.050								
1,2,3-Trichloropropane	ND	0.10								

Qualifiers:

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H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles**
Client ID: **PBS**	Batch ID: **A80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815787** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.49		0.5000		97.2	70	130			
Surr: 4-Bromofluorobenzene	0.52		0.5000		104	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **mb-61566** SampType: **MBLK** TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBS** Batch ID: **61566** RunNo: **80150**
Prep Date: **7/26/2021** Analysis Date: **7/28/2021** SeqNo: **2822045** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	0.20								
Acenaphthylene	ND	0.20								
Aniline	ND	0.20								
Anthracene	ND	0.20								
Azobenzene	ND	0.20								
Benz(a)anthracene	ND	0.20								
Benzo(a)pyrene	ND	0.20								
Benzo(b)fluoranthene	ND	0.20								
Benzo(g,h,i)perylene	ND	0.20								
Benzo(k)fluoranthene	ND	0.20								
Benzoic acid	ND	0.50								
Benzyl alcohol	ND	0.20								
Bis(2-chloroethoxy)methane	ND	0.20								
Bis(2-chloroethyl)ether	ND	0.20								
Bis(2-chloroisopropyl)ether	ND	0.20								
Bis(2-ethylhexyl)phthalate	ND	0.50								
4-Bromophenyl phenyl ether	ND	0.20								
Butyl benzyl phthalate	ND	0.20								
Carbazole	ND	0.20								
4-Chloro-3-methylphenol	ND	0.50								
4-Chloroaniline	ND	0.50								
2-Chloronaphthalene	ND	0.25								
2-Chlorophenol	ND	0.20								
4-Chlorophenyl phenyl ether	ND	0.20								
Chrysene	ND	0.20								
Di-n-butyl phthalate	ND	0.40								
Di-n-octyl phthalate	ND	0.40								
Dibenz(a,h)anthracene	ND	0.20								
Dibenzofuran	ND	0.20								
1,2-Dichlorobenzene	ND	0.20								
1,3-Dichlorobenzene	ND	0.20								
1,4-Dichlorobenzene	ND	0.20								
3,3´-Dichlorobenzidine	ND	0.25								
Diethyl phthalate	0.76	0.50								
Dimethyl phthalate	ND	0.20								
2,4-Dichlorophenol	ND	0.40								
2,4-Dimethylphenol	ND	0.30								
4,6-Dinitro-2-methylphenol	ND	0.40								
2,4-Dinitrophenol	ND	0.50								

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **mb-61566** SampType: **MBLK** TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBS** Batch ID: **61566** RunNo: **80150**
Prep Date: **7/26/2021** Analysis Date: **7/28/2021** SeqNo: **2822045** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	0.50								
2,6-Dinitrotoluene	ND	0.50								
Fluoranthene	ND	0.20								
Fluorene	ND	0.20								
Hexachlorobenzene	ND	0.20								
Hexachlorobutadiene	ND	0.20								
Hexachlorocyclopentadiene	ND	0.20								
Hexachloroethane	ND	0.20								
Indeno(1,2,3-cd)pyrene	ND	0.20								
Isophorone	ND	0.40								
1-Methylnaphthalene	ND	0.20								
2-Methylnaphthalene	ND	0.20								
2-Methylphenol	ND	0.40								
3+4-Methylphenol	ND	0.20								
N-Nitrosodi-n-propylamine	ND	0.20								
N-Nitrosodimethylamine	ND	0.20								
N-Nitrosodiphenylamine	ND	0.20								
Naphthalene	ND	0.20								
2-Nitroaniline	ND	0.20								
3-Nitroaniline	ND	0.20								
4-Nitroaniline	ND	0.40								
Nitrobenzene	ND	0.40								
2-Nitrophenol	ND	0.20								
4-Nitrophenol	ND	0.25								
Pentachlorophenol	ND	0.40								
Phenanthrene	ND	0.20								
Phenol	ND	0.20								
Pyrene	ND	0.20								
Pyridine	ND	0.40								
1,2,4-Trichlorobenzene	ND	0.20								
2,4,5-Trichlorophenol	ND	0.20								
2,4,6-Trichlorophenol	ND	0.20								
Surr: 2-Fluorophenol	1.7		3.330		50.7	20.3	74.1			
Surr: Phenol-d5	2.1		3.330		63.0	23.1	92.7			
Surr: 2,4,6-Tribromophenol	2.4		3.330		73.2	17.3	122			
Surr: Nitrobenzene-d5	0.85		1.670		51.2	24.7	73.2			
Surr: 2-Fluorobiphenyl	0.97		1.670		57.9	21.5	90.1			
Surr: 4-Terphenyl-d14	2.1		1.670		123	15	140			

Qualifiers:

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H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **lcs-61566** SampType: **LCS** TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS** Batch ID: **61566** RunNo: **80150**
Prep Date: **7/26/2021** Analysis Date: **7/28/2021** SeqNo: **2822046** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	1.1	0.20	1.670	0	68.3	22.9	109			
4-Chloro-3-methylphenol	2.3	0.50	3.330	0	68.5	24.2	109			
2-Chlorophenol	1.8	0.20	3.330	0	55.5	18.8	103			
1,4-Dichlorobenzene	0.83	0.20	1.670	0	49.5	18.8	89.5			
2,4-Dinitrotoluene	1.1	0.50	1.670	0	66.1	20.2	94.5			
N-Nitrosodi-n-propylamine	1.1	0.20	1.670	0	64.4	19.2	96.9			
4-Nitrophenol	3.0	0.25	3.330	0	90.9	25	118			
Pentachlorophenol	2.5	0.40	3.330	0	74.1	24.1	107			
Phenol	2.1	0.20	3.330	0	62.8	17.8	112			
Pyrene	1.8	0.20	1.670	0	110	25.9	125			
1,2,4-Trichlorobenzene	0.91	0.20	1.670	0	54.4	18.5	92.8			
Surr: 2-Fluorophenol	1.7		3.330		52.3	20.3	74.1			
Surr: Phenol-d5	2.1		3.330		63.7	23.1	92.7			
Surr: 2,4,6-Tribromophenol	2.5		3.330		75.2	17.3	122			
Surr: Nitrobenzene-d5	0.95		1.670		57.1	24.7	73.2			
Surr: 2-Fluorobiphenyl	1.1		1.670		63.3	21.5	90.1			
Surr: 4-Terphenyl-d14	2.1		1.670		124	15	140			

Sample ID: **2107a83-001ams** SampType: **MS** TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **OW-66-18** Batch ID: **61566** RunNo: **80150**
Prep Date: **7/26/2021** Analysis Date: **7/28/2021** SeqNo: **2822048** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	0.95	0.19	1.625	0	58.5	24.8	111			
4-Chloro-3-methylphenol	2.2	0.49	3.239	0	67.1	40.7	97.8			
2-Chlorophenol	1.9	0.19	3.239	0	57.5	21.2	91.6			
1,4-Dichlorobenzene	0.57	0.19	1.625	0	35.3	17.8	74.2			
2,4-Dinitrotoluene	0.94	0.49	1.625	0	58.0	36.5	81.5			
N-Nitrosodi-n-propylamine	1.1	0.19	1.625	0	66.9	25.5	85.2			
4-Nitrophenol	3.0	0.24	3.239	0	92.5	15	143			
Pentachlorophenol	2.8	0.39	3.239	0	87.9	15	116			
Phenol	2.2	0.19	3.239	0.1480	64.1	24.8	94.5			
Pyrene	1.7	0.19	1.625	0	108	42	112			
1,2,4-Trichlorobenzene	0.80	0.19	1.625	0	49.1	18.5	85.3			
Surr: 2-Fluorophenol	0		3.239		0	20.3	74.1			S
Surr: Phenol-d5	2.2		3.239		67.3	23.1	92.7			
Surr: 2,4,6-Tribromophenol	3.0		3.239		93.1	17.3	122			
Surr: Nitrobenzene-d5	0.86		1.625		53.1	24.7	73.2			
Surr: 2-Fluorobiphenyl	0.83		1.625		51.2	21.5	90.1			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **2107a83-001ams**	SampType: **MS**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **OW-66-18**	Batch ID: **61566**	RunNo: **80150**							
Prep Date: **7/26/2021**	Analysis Date: **7/28/2021**	SeqNo: **2822048**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	0.85		1.625		52.5	15	140			

Sample ID: **2107a83-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **OW-66-18**	Batch ID: **61566**	RunNo: **80150**							
Prep Date: **7/26/2021**	Analysis Date: **7/28/2021**	SeqNo: **2822049**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	1.0	0.20	1.661	0	62.7	24.8	111	9.01	20	
4-Chloro-3-methylphenol	2.2	0.50	3.311	0	66.5	40.7	97.8	1.30	20	
2-Chlorophenol	2.0	0.20	3.311	0	60.2	21.2	91.6	6.66	20	
1,4-Dichlorobenzene	0.69	0.20	1.661	0	41.5	17.8	74.2	18.2	20	
2,4-Dinitrotoluene	0.94	0.50	1.661	0	56.8	36.5	81.5	0.0592	20	
N-Nitrosodi-n-propylamine	1.2	0.20	1.661	0	72.0	25.5	85.2	9.48	20	
4-Nitrophenol	2.9	0.25	3.311	0	89.0	15	143	1.72	20	
Pentachlorophenol	2.9	0.40	3.311	0	88.5	15	116	2.97	20	
Phenol	2.3	0.20	3.311	0.1480	65.4	24.8	94.5	3.95	20	
Pyrene	1.8	0.20	1.661	0	108	42	112	2.16	20	
1,2,4-Trichlorobenzene	0.92	0.20	1.661	0	55.2	18.5	85.3	13.9	20	
Surr: 2-Fluorophenol	0		3.311		0	20.3	74.1	0	0	S
Surr: Phenol-d5	2.2		3.311		67.4	23.1	92.7	0	0	
Surr: 2,4,6-Tribromophenol	3.0		3.311		90.3	17.3	122	0	0	
Surr: Nitrobenzene-d5	0.93		1.661		56.2	24.7	73.2	0	0	
Surr: 2-Fluorobiphenyl	0.97		1.661		58.6	21.5	90.1	0	0	
Surr: 4-Terphenyl-d14	0.96		1.661		57.7	15	140	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 Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**

22-Sep-21

Client: Marathon

Project: Well Installations 2021

Sample ID: **MB-61495**	SampType: **MBLK**	TestCode: **EPA Method 7471B: Mercury**							
Client ID: **PBS**	Batch ID: **61495**	RunNo: **80020**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2815962**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID: **LLLCS-61495**	SampType: **LCSLL**	TestCode: **EPA Method 7471B: Mercury**							
Client ID: **BatchQC**	Batch ID: **61495**	RunNo: **80020**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2815963**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0063	0.033	0.006660	0	94.2	70	130			J

Sample ID: **LCS-61495**	SampType: **LCS**	TestCode: **EPA Method 7471B: Mercury**							
Client ID: **LCSS**	Batch ID: **61495**	RunNo: **80020**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2815964**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1667	0	101	80	120			

Sample ID: **2107A83-007AMS**	SampType: **MS**	TestCode: **EPA Method 7471B: Mercury**							
Client ID: **OW-67-17**	Batch ID: **61495**	RunNo: **80020**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2816001**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.18	0.1802	0	93.5	80	120			J

Sample ID: **2107A83-007AMSD**	SampType: **MSD**	TestCode: **EPA Method 7471B: Mercury**							
Client ID: **OW-67-17**	Batch ID: **61495**	RunNo: **80020**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2816002**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.21	0.17	0.1761	0	117	80	120	19.9	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 Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **MB-61509** SampType: **MBLK** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS** Batch ID: **61509** RunNo: **80056**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817187** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	2.5								
Barium	ND	0.10								
Cadmium	0.059	0.10								J
Chromium	ND	0.30								
Iron	ND	2.5								
Lead	ND	0.30								
Manganese	ND	0.20								
Silver	ND	0.25								

Sample ID: **LCS-61509** SampType: **LCS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS** Batch ID: **61509** RunNo: **80056**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817189** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	24	2.5	25.00	0	95.5	80	120			
Barium	24	0.10	25.00	0	97.0	80	120			
Cadmium	24	0.10	25.00	0	95.8	80	120			
Chromium	24	0.30	25.00	0	97.4	80	120			
Iron	25	2.5	25.00	0	99.8	80	120			
Lead	25	0.30	25.00	0	98.8	80	120			
Manganese	24	0.20	25.00	0	95.3	80	120			
Silver	4.8	0.25	5.000	0	95.6	80	120			

Sample ID: **2107A83-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80056**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817240** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	23	5.2	25.83	2.912	78.4	75	125			
Cadmium	23	0.21	25.83	0	89.5	75	125			
Chromium	28	0.62	25.83	4.279	92.6	75	125			
Lead	26	0.62	25.83	1.205	97.0	75	125			
Silver	5.0	0.52	5.165	0	96.2	75	125			

Sample ID: **2107A83-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80056**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817244** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	27	5.2	25.83	2.912	92.4	75	125	14.4	20	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **2107A83-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80056**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817244** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	24	0.21	25.83	0	92.9	75	125	3.81	20	
Chromium	31	0.62	25.83	4.279	102	75	125	7.88	20	
Lead	26	0.62	25.83	1.205	94.4	75	125	2.57	20	
Silver	4.5	0.52	5.165	0	87.6	75	125	9.40	20	

Sample ID: **MB-61509** SampType: **MBLK** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS** Batch ID: **61509** RunNo: **80177**
Prep Date: **7/22/2021** Analysis Date: **7/29/2021** SeqNo: **2823029** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	2.5								

Sample ID: **LCS-61509** SampType: **LCS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS** Batch ID: **61509** RunNo: **80177**
Prep Date: **7/22/2021** Analysis Date: **7/29/2021** SeqNo: **2823031** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	22	2.5	25.00	0	89.2	80	120			

Sample ID: **2107A83-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80177**
Prep Date: **7/22/2021** Analysis Date: **7/29/2021** SeqNo: **2823077** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	21	5.2	25.83	0	80.2	75	125			

Sample ID: **2107A83-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80177**
Prep Date: **7/22/2021** Analysis Date: **7/29/2021** SeqNo: **2823078** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	23	5.2	25.83	0	87.9	75	125	9.15	20	

Sample ID: **2107A83-001APS** SampType: **PS** TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **OW-66-18** Batch ID: **61509** RunNo: **80177**
Prep Date: Analysis Date: **7/29/2021** SeqNo: **2823082** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	490	26	129.1	343.2	110	80	120			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A83**
22-Sep-21

Client: Marathon
Project: Well Installations 2021

Sample ID: **2.5ug gro lcs**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **C80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815823** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	93.8	70	130			
Surr: BFB	480		500.0		96.8	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **C80017**	RunNo: **80017**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815824** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	490		500.0		98.9	70	130			

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **R80062**	RunNo: **80062**
Prep Date:	Analysis Date: **7/23/2021**	SeqNo: **2817654** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	510		500.0		102	70	130			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Marathon** Work Order Number: **2107A83** RcptNo: **1**

Received By: **Kasandra Payan** **7/21/2021 4:10:00 PM**

Completed By: **Desiree Dominguez** **7/21/2021 4:30:26 PM**

Reviewed By: KPG 7/22/21

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Approved by client.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☐ No ☐ NA ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by: JR 7/22/21

Special Handling (if applicable)

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

Person Notified: Date:
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	11.6	Good				

Chain-of-Custody Record

Client: Marathon - Gallup Refinery

Mailing Address:

Phone #: 970-481-0718

email or Fax#: Lalexander@trihydro.com

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☒ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush

Project Name: Well Installations - 2021

Project #: 697-092-001

Project Manager: Lesli Alexander

Sampler: M. Swift, W. Glenn

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 11.8 - 0.2 = 11.6 (°C)

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

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2107A83
7/19/21	1200	S	OW-66-18	glass/4	Methanol	-001
↓	1150	↓	OW-66-26	↓	↓	-002
↓	1555	↓	OW-13A-14	↓	↓	-003
↓	1545	↓	OW-13A-25.5	↓	↓	-004
7/20/21	1715	↓	OW-68-22	↓	↓	-005
↓	1520	↓	OW-68-26	↓	↓	-006
↓	1210	↓	OW-67-17	↓	↓	-007
↓	1225	↓	OW-67-26	↓	↓	-008
			trip blank	glass/1	MeOH	-009
7/21/21	1210	S	OW-69-26	glass/a	↓	-010
↓	1215	↓	OW-69-6	glass/a	↓	-011

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
	X				X		X	X	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	↓				↓		↓	↓	
	X				X		X	X	
	↓				↓		↓	↓	

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
7/21/21	1400	M. Swift		Courier	7/21/21	16:10
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:

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

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 89784

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 89784
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
jburdine	Accepted for Record Retention Purposes-Only	11/23/2022