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

October 27, 2021

Mr. Kevin Pierard, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

RE: Flare KOD Caustic Release Investigation Report
Western Refining Southwest LLC, Marathon Gallup Refinery
EPA ID #NMD000333211
HWB-WRG-20-003

Dear Mr. Pierard,

Attached please find the Investigation Report for the Flare KOD Pump Sodium Hydroxide Release as requested in the New Mexico Environment Department (NMED) Approval with Modifications letter dated February 21, 2020.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at (505) 722-0205.

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, Marathon Gallup Refinery

Ruth A. Cade

Ruth Cade
Vice President

Enclosure

cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
L. Barr, NMOCD
L. King, EPA Region 6
G. McCartney, Marathon Petroleum Company
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
FLARE KOD CAUSTIC RELEASE
INVESTIGATION REPORT

OCTOBER 27, 2021

Executive Summary

The Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this investigation report for sampling of the soil in the area of the flare knockout drum (KOD) to determine if caustic impacts persist following an April 20, 2017 release from the KOD. Trihydro Corporation conducted sampling on July 20, 2021, September 17, 2021, and September 20, 2021. Sampling was conducted in accordance with an approved work plan submitted to the New Mexico Environment Department (NMED) on November 30, 2020 (MPC 2020b) and approved with modifications by NMED on December 21, 2020. Samples were evaluated to determine if excavation was required in the area following release response cleanup conducted on April 27, 2021.

As detailed in the "Release Action Report, Flare KOD Pump Sodium Hydroxide Release" (MPC 2020a), on April 20, 2017, an operator noticed the hose to the sandpiper pump had ruptured spraying caustic (20-30 percent sodium hydroxide) from the hose. The initial estimate of the release was 4 barrels (bbls). After mass balance calculations of the KOD tank on the morning of April 21, 2017, the release volume was estimated to be 80 bbls.

Field work conducted in July and September 2021 consisted of:

- Collection of samples at 10 locations for field screening of volatile organic compounds with a photoionization detector.
- Collection of samples at 21 locations for field screening of pH.
- Collection of samples at 10 locations for submittal for laboratory analysis at the shallowest sample depth at which the pH field screening measurement was not greater than 12.5 standard units (SU).
- Inspection and classification of soils obtained in general accordance with American Society for Testing and Materials D4287 (Unified Soil Classification System) and D2488 (Description and Identification of Soils).

The analytical samples were collected using a hand auger and analyzed for total petroleum hydrocarbons for gasoline range organics, diesel range organics, and oil range organics. The results were compared with NMED Industrial Soil Screening Levels (SSLs). There were six samples results that exceeded the Industrial SSLs. However, these exceedances are assumed to be related to impacts from Solid Waste Management Unit #14 – Old American Petroleum Institute Separator. Investigations following a 2013 release indicated that hydrocarbon impacts existed in this area, prior to the 2017 caustic release.

Because the release was a strong base, pH field screening values were used to determine the horizontal and vertical extents of caustic impacts. Based on field screening values of pH on July 20, 2021, additional pH samples were collected on September 17 and September 20, 2021 to complete the horizontal delineation of the caustic impacts for a total of 21 pH samples. Based on the soil characterization data, pH field screening data were used to delineate impacted soils to determine the extent of the proposed excavation. The Refinery plans to proceed with excavation of approximately 40 cubic yards pending NMED approval of this report.

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List of Acronyms and Abbreviations

bbls	barrels
bgs	below ground surface
DRO	Diesel Range Organics
ft	foot or feet
GRO	Gasoline Range Organics
KOD	knockout drum
NMED	New Mexico Environment Department
ORO	Oil Range Organics
PID	photoionization detector
ppm_v	parts per million by volume
QA/QC	quality assurance/quality control
Refinery	Western Refining Southwest LLC D/B/A Marathon Gallup Refinery
SSL	soil screening level
SU	standard units
SWMU	Solid Waste Management Unit
TPH	Total Petroleum Hydrocarbons
Trihydro	Trihydro Corporation
USEPA	United States Environmental Protection Agency

1.0 Introduction

The Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Refinery) in Gallup, New Mexico, is submitting this investigation report (Report) for the investigation of soils around the flare knockout drum (KOD) sodium hydroxide (caustic) pump, located on the western portion of the Refinery. A leak in April 2017 caused caustic liquid to be released to the ground. The flare KOD area is located on the west side of the Refinery (Figure 1). The location of the caustic release is further defined on Figures 2, 3, and 4.

1.1 Background

The Refinery is located approximately 17 miles east of Gallup, McKinley County, New Mexico along the north side of Interstate Highway I-40. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Refinery property covers approximately 810 acres and is currently indefinitely idled.

As detailed in the "Release Action Report, Flare KOD Pump Sodium Hydroxide Release" (MPC 2020a), on April 20, 2017, an operator noticed the hose to the sandpiper pump had ruptured spraying caustic (20-30 percent [%] sodium hydroxide) from the hose. The sandpiper pump was turned off and blocked in. Maintenance personnel used a vacuum truck with approximately 100 gallons of water in the tank, to collect approximately 20-30 gallons of caustic. The collected water/caustic mixture, with a pH value of 8, was discharged via a sewer drain to tank T-35. Maintenance personnel also sprayed water on surrounding equipment in an attempt to clean the equipment of caustic. Pumping and transfer of the caustic from the sandpiper pump was switched to the east caustic pump.

The initial estimate of the release was 4 barrels (bbls). After further investigation on April 21, 2017 and mass balance calculations of the KOD tank, where the caustic was stored, the release volume was estimated to be 80 bbls.

1.2 Historic Sampling and Results

No soil confirmation sampling was conducted at the time of the release (MPC 2020a). Therefore, no previous analytical results were available for evaluation of soil impacts related to the flare KOD caustic release.

Previous groundwater and soil sampling has been conducted in the area of the flare KOD caustic release and has been summarized in the "Investigation Report, Solid Waste Management Unit (SWMU) No. 1 – Aeration Basin and SWMU No. 14 – Old API Separator" (Investigation Report) (Western 2013). The Investigation Report was revised in June 2014 and August 2015. A revised Investigation Report was submitted on April 26, 2016. NMED approved the revised Investigation Report in a letter dated January 11, 2017 (NMED 2017).

1.3 Planned Sampling Activities

The "Flare KOD Pump Caustic Release Soil Sampling Investigation Work Plan" (Work Plan) (MPC 2020b) was submitted and approved with modifications by the New Mexico Environment Department (NMED) in a letter dated December 21, 2020 (NMED 2020). A response to the approval with modification was submitted on April 30, 2021 (MPC 2021). The Work Plan proposed the following major elements:

- Soil samples will be collected at 10 to 20 locations for pH field screening, photoionization detector (PID) readings, and, if necessary, free liquid percentage to delineate horizontal and vertical extent of caustic and hydrocarbon impacts.
- Field analysis will consist of soil pH measurements and PID screening.
- The shallowest sample not exceeding a pH of 12.5 standard units (SU) at the proposed sampling locations will also be submitted for laboratory analysis.
- Laboratory analyses will consist of:
    - Total Petroleum Hydrocarbons (TPH) - Oil Range Organics (ORO), United States Environmental Protection Agency (USEPA) Method 8015M/D
    - TPH - Diesel Range Organics (DRO), USEPA Method 8015M/D
    - TPH - Gasoline Range Organics (GRO), USEPA Method 8015D
- Analytical data will be screened against NMED Industrial soil screening levels (SSLs).

2.0 Field Investigation Results

Trihydro Corporation (Trihydro) conducted the analytical sampling on July 20, 2021. The samples were collected from 10 locations (KOD-1 through KOD-10). Samples were collected from 1 foot (ft) below ground surface (bgs) (Table 1). The samples were generally collected in the locations presented in the Work Plan (MPC 2020b), but deviated slightly based on the conditions observed in the flare KOD area during the sampling (e.g., location of concrete pads).

Trihydro conducted field screenings for pH and PID values at the same 10 locations on July 20, 2021. After reviewing the pH values, it was determined that additional pH samples were needed to complete the horizontal delineation of potential soils impacts from the KOD release. Eleven additional pH samples (KOD-11 through KOD-21) were collected on September 17 and September 20, 2021 (Figure 2).

2.1 Summary of Field Sampling Activities

A total of 10 samples plus 1 duplicate sample and 1 trip blank were collected for TPH analyses from the release area in July 2021. PID levels and pH measurements were also recorded for the 10 samples at the time of sample collection. Eleven additional samples were collected for field screening of pH in September 2021. A summary of samples and locations are shown on Figure 2 and in Table 1.

Soil samples were collected using a hand trowel or a hand auger. Samples were collected at 1 ft bgs and placed in a 1-gallon Ziploc® bag, letting the soils warm to approximately 70 degrees Fahrenheit. The head space was measured for petroleum hydrocarbons with a PID, as required in the Work Plan. In addition, the sample was also wetted and a field pH was taken. The PID levels and pH measurements were recorded in a field notebook. If the soil pH field screening was greater than or equal to 12.5 SU at the proposed sampling locations, soil samples were collected at 2.5-ft intervals and screened for pH until the pH no longer exceeded 12.5 SU. Once the sampling location's pH no longer exceeded 12.5 SU, a soil sample was collected for laboratory hydrocarbon analysis. As stated in the Work Plan, the shallowest sample not exceeding a pH of 12.5 SU was submitted for laboratory analysis. Because all 10 samples collected from 1 ft bgs had a pH lower than 12.5 SU, no analytical samples were collected from deeper than 1 ft bgs.

The samples were placed in laboratory provided sample containers, labeled, and placed in a cooler, iced, and delivered to Hall Environmental Laboratories for analysis for TPH-ORO and TPH-DRO by USEPA Method 8015D/M and TPH-GRO by USEPA Method 8015D.

2.2 Field Observations

The flare KOD is located on the southeastern part of the investigation area (Figure 2) and is elevated approximately 4 ft higher than the rest of the investigation area by a cement retaining wall. All upgradient samples (e.g, sample locations KOD-6 through KOD-10) were collected from red clay under a gravel layer. There were no obvious impacts or noticeable odor in these samples.

The old American Petroleum Institute separator was located on the north side of the investigation area, downgradient of the cement retaining wall. Water collects and ponds in this area after rain events. The samples collected in this area were red clay on the surface but became black at 1 ft bgs with hydrocarbon odor. This odor was observed in sample locations KOD-3, KOD-4, and KOD-5. A cement containment for two caustic circulation pumps, installed during fourth quarter 2019, is located between sample locations KOD-1 and KOD-2. However, it should be noted that these two pumps were never in service. There is gravel sloping up to this containment. Sample locations KOD-1 and KOD-2 are located in this gravel and there were no visual impacts or noticeable odor.

Additional pH sample locations collected on September 17 and 20, 2021 were located downgradient of the cement retaining wall (KOD-11 through KOD-21). Sample locations KOD-11, KOD-12, KOD-13, KOD-14, KOD-19, and KOD-20 were red clay that became black at 1 ft bgs with a hydrocarbon odor. Samples were not collected deeper than 1 ft bgs because pH results were less than 12.5 SU. Sample locations KOD-15, KOD-16, KOD-17, KOD-18, and KOD-21 were collected from the gravel area with no visual impacts or noticeable odor.

2.3 Deviations from Approved Work Plan

There are no deviations from the Work Plan approved by NMED (NMED 2020). It should be noted that the Work Plan required a field paint filter test for saturated samples to determine the percentage of the free liquids and to establish whether the waste is hazardous based on the corrosivity (i.e., 20% free liquids or more). However, there were no saturated samples; therefore, field paint filter tests were not conducted.

3.0 Sample Results

Results for the various parameters are presented in the following tables:

- Table 2 – Analytical Results
- Table 3 – Field Screening Results

The analytical laboratory report is included in Appendix A. The ranges of detected concentrations of analytes are summarized in the following sections. An interpretation of the results, including a comparison to the standards, is also presented. The sample locations are shown on Figure 2 and summarized in Table 1. Analytical results are shown on Figure 3, and pH results are shown on Figure 4.

3.1 Laboratory Analytical Results

A complete summary of analytical sample results and comparisons to NMED Industrial and Residential SSLs are provided in Table 2. The NMED Industrial SSL for DRO and ORO is 3,000 milligrams per kilogram (mg/kg) and 500 mg/kg for GRO. The NMED Residential SSL is 1,000 mg/kg for DRO and ORO and 100 mg/kg for GRO. Six sample results exceeded the NMED Industrial SSLs: TPH-DRO and TPH-ORO at KOD-10; TPH-DRO, TPH-GRO, and TPH-ORO at KOD-4; and TPH-GRO at KOD-8 (Table 2; Figure 3). No other sample results exceeded the NMED Industrial SSLs. It is assumed that these exceedances are related to impacts from Solid Waste Management Unit (SWMU) 14 – Old American Petroleum Institute Separator, which is in the same footprint as the caustic release. SWMU 14 impacts are petroleum-related and would therefore be detected in TPH samples, whereas sodium hydroxide would not be detected in TPH samples. Therefore, the analytical results are most likely not associated with the flare KOD caustic release. The data will be used in future SWMU 14 investigations.

3.2 Field Screening Results

PID and pH were screened in the field at the time of sampling. The results are summarized in Table 3. PID results were compared to the TPH analytical results from the same sample locations. Sample locations with results that exceeded NMED Industrial SSLs had PID readings greater than 390 parts per million by volume (ppm_v). An elevated PID reading (422.5 ppm_v) was measured at KOD-3, although, analytical results from KOD-3 did not exceed the Industrial SSLs. The field screening pH results were also compared to the PID results and the TPH analytical results. There appears to be an inverse relationship between pH results and the other parameters. In general, samples with elevated PID and analytical results had a lower pH, and samples with lower PID and analytical results had a higher pH.

Samples with elevated analytical results and PID readings were collected from areas that had black soil with a hydrocarbon order. Samples with elevated pH readings were collected from the gravel area surrounding the circulation pumps containment. These findings indicate that the TPH impacts are most likely related to the pre-existing SWMU 14 impacts and the elevated pH in the gravel area is most likely related to the caustic release. Elevated pH values (i.e., higher than 9 SU) delineate the horizontal extent

of the release (Figure 4). Therefore, pH field screening results will be used during excavation to confirm that impacted soil from the caustic release has been excavated from the area.

3.3 Quality Assurance/ Quality Control Samples

Quality assurance/quality control (QA/QC) samples were recorded in a field notebook. One field duplicate sample was collected from sampling location KOD-8 at 1 ft bgs.

One methanol blank sample was provided by the laboratory as a trip blank. This sample was sent in the coolers by the laboratory and was not altered between sampling and analysis. There were no analytes detected in the trip blank sample.

Tier II data validation was performed on the data package provided by the laboratory (Appendix B). The Tier II data validation included a review of the completeness of the data packages, chain of custody forms, sample condition receipts, sample preservations, holding times, the case narrative, and the quality control summary. Several notations were provided in the quality control summary provided by the laboratory, but the laboratory determined that the precision, accuracy, validity, and usability of the data were not compromised, and that corrective actions were not necessary. Following a review of the Tier II data validation parameters, it was determined that the data set was generally complete.

3.4 Sample Results Summary

Six of the ten sample locations had TPH results that exceeded their respective SSLs. These sample locations also had elevated PID readings. These petroleum-related impacts are assumed to be from SWMU 14 and are, therefore, outside the scope of this investigation. These impacts will be addressed under future investigations.

Six of 21 sample locations had a pH value greater than 9 SU, indicating impacts from this caustic release. These sample locations, as shown on Figure 4, bound the horizontal and vertical impacts of this release. Therefore, these data were used to determine the proposed excavation extents in this area (Figure 4). Additionally, field screening pH tests will be used during excavation to confirm that all impacted soils have been removed.

4.0 Conclusions

This investigation was conducted to determine the extent of impacts that remain following the caustic release. Vertical and horizontal delineation of impacts was achieved. Significant findings include:

- Two TPH-DRO exceedances at sample locations KOD-4 and KOD-10
- Two TPH-GRO exceedances at sample locations KOD-4 and KOD-8
- Two TPH-ORO detection limit exceedances at sample locations KOD-4 and KOD-10
- Six pH results greater than 9 SU at sample locations KOD-1, KOD-2, KOD-11, KOD-12, KOD-16, and KOD-21.

Following NMED's review of these results and approval of this Report, the Refinery plans to proceed with excavation of soils impacted due to the KOD release. The proposed excavation is estimated to be 40 cubic yards; the proposed excavation extent is shown on Figure 4. The Refinery plans to engage a contractor for the excavation and soil disposal. Once the contractor is identified, waste acceptance criteria will be identified based on the contractor's proposed method of treatment and disposal. Post-excavation sampling will be completed to confirm that the pH impacted soil has been removed. One pH sample will be collected every 250 ft along the perimeter of the excavation, and six floor samples will be collected from the excavation area. Sample results will be submitted to NMED for review prior to backfill.

5.0 References

Marathon Petroleum Corporation (MPC). 2020a. Release Action Report, Flare KOD Pump Sodium Hydroxide Release, Marathon Petroleum Company, LP, Gallup Refining Division, Gallup, New Mexico, EPA ID# NMD000333211. January 14.

MPC. 2020b. Flare KOD Pump Caustic Release Soil Sampling Investigation Work Plan, Marathon Petroleum Corporation, Gallup Refining Division. November 30.

MPC. 2021. Response to Comments, Approval with Modifications, Flare KOD Pump Sodium Hydroxide Release Investigation Work Plan, Marathon Petroleum Company LP, Gallup Refinery (dba Western Refining Southwest LLC), EPA # NMD000333211, HWB-WRG-20-020. April 30.

New Mexico Environment Department (NMED). 2017. Approval, Revised Investigation Report, Solid Waste Management Unit (SWMU) No. 1 Aeration Basin and SWMU No. 14 Old API Separator, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD00333211, HWB-WRG-13-001

NMED. 2020. Approval with Modifications, Flare KOD Pump Sodium Hydroxide Release Investigation Work Plan, Marathon Petroleum Company LP, Gallup Refinery (dba Western Refining Southwest LLC), EPA # NMD000333211, HWB-WRG-20-020. December 21.

Western Refining Company, Southwest, Inc. 2013. Investigation Report, Solid Waste Management Unit (SWMU) No. 1 – Aeration Basin and SWMU No. 14 – Old API Separator, Western Refining Company, Southwest, Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-11-002. February.

Figures

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EXPLANATION

KOD KNOCKOUT DRUM

N

0 500'

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

FIGURE 1

REFINERY AND FLARE KOD LOCATION
FLARE KOD CAUSTIC RELEASE INVESTIGATION

WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

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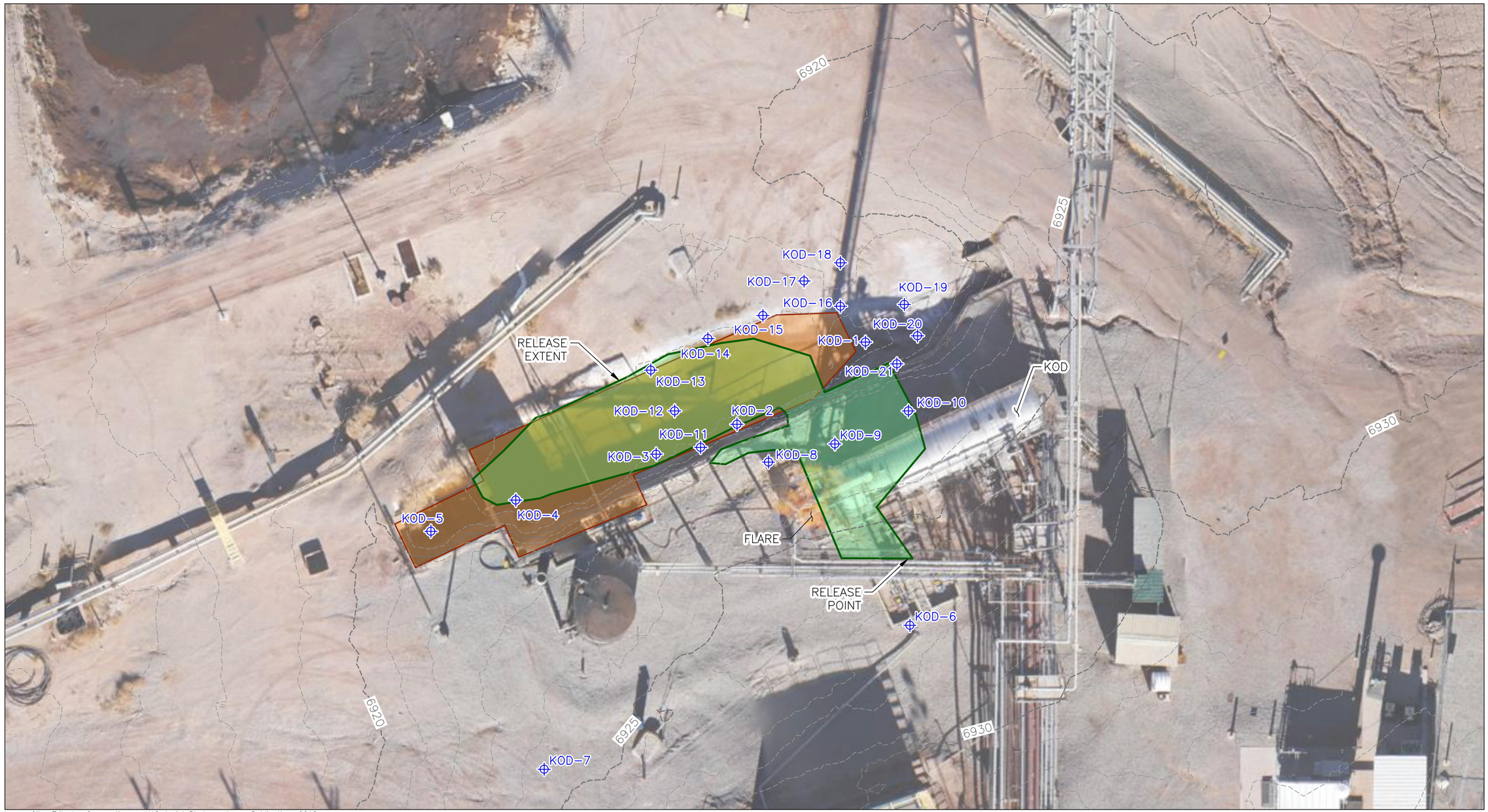

Image Cite: Trihydro Corporation – UAS Aerial Photography – Publication: 2018

EXPLANATION

KOD–7	SOIL SAMPLE AND DESIGNATION
	RELEASE EXTENT
	FORMER LOCATION OF OLD API SEPARATOR
6935	EXISTING CONTAINMENT ELEVATION CONTOURS (INTERVAL = 1')
API	AMERICAN PETROLEUM INSTITUTE
KOD	KNOCKOUT DRUM

N

0 20'

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

FIGURE 2

SAMPLE LOCATIONS
FLARE KOD CAUSTIC RELEASE INVESTIGATION

WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

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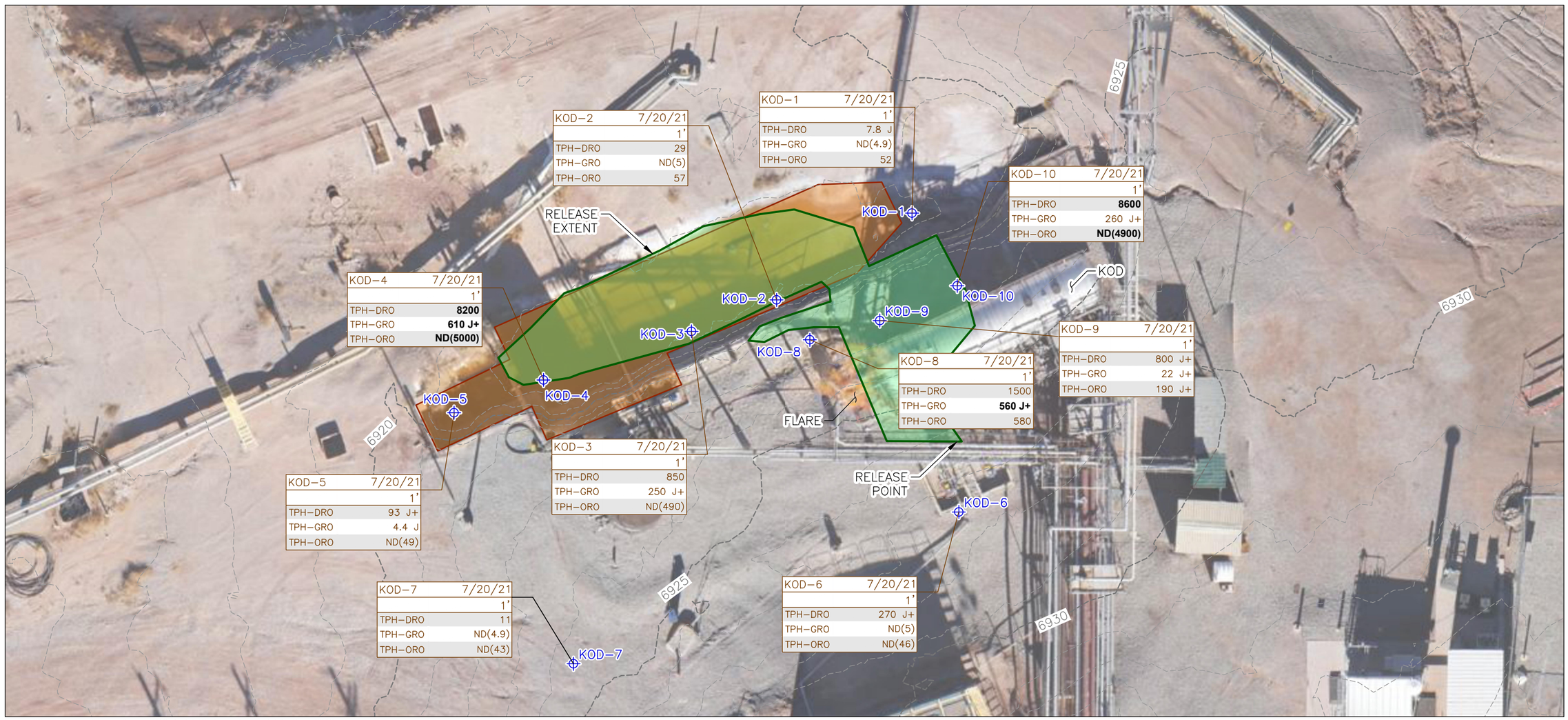

Image Cite: Trihydro Corporation – UAS Aerial Photography – Publication: 2018

NOTES:

1. ALL VALUES ARE IN MILLIGRAMS PER KILOGRAM (mg/kg).
2. VALUES IN **BOLD AND BLACK COLOR** EXCEED NMED INDUSTRIAL SOIL SCREENING LEVELS
3. ND = NOT DETECTED
4. NMED = NEW MEXICO ENVIRONMENT DEPARTMENT
5. SSL = NMED INDUSTRIAL SOIL SCREENING LEVEL
6. FT-BGS = FEET BELOW GROUND SURFACE
7. TPH = TOTAL PETROLEUM HYDROCARBONS
8. J = ESTIMATED CONCENTRATION
9. J+ = ESTIMATED CONCENTRATION, POSSIBLY BIASED HIGH

EXPLANATION

KOD-7	SOIL SAMPLE AND DESIGNATION
	RELEASE EXTENT
	FORMER LOCATION OF OLD API SEPARATOR
6935	EXISTING CONTAINMENT ELEVATION CONTOURS (INTERVAL = 1')
API	AMERICAN PETROLEUM INSTITUTE
KOD	KNOCKOUT DRUM

ANALYTE TABLE EXPLANATION

Soil Sample Designation →	KOD-4	7/20/21 ← Sample Date
		1' ← FT-BGS
TPH-Diesel Range Organics →	TPH-DRO	3000
TPH-Gasoline Range Organics →	TPH-GRO	500
TPH-Oil Range Organics →	TPH-ORO	3000

Values shown are Industrial SSLs

N

0 20'

Trihydro CORPORATION
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Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 3

SAMPLE LOCATIONS WITH ANALYTICAL RESULTS
FLARE KOD CAUSTIC RELEASE INVESTIGATION

WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

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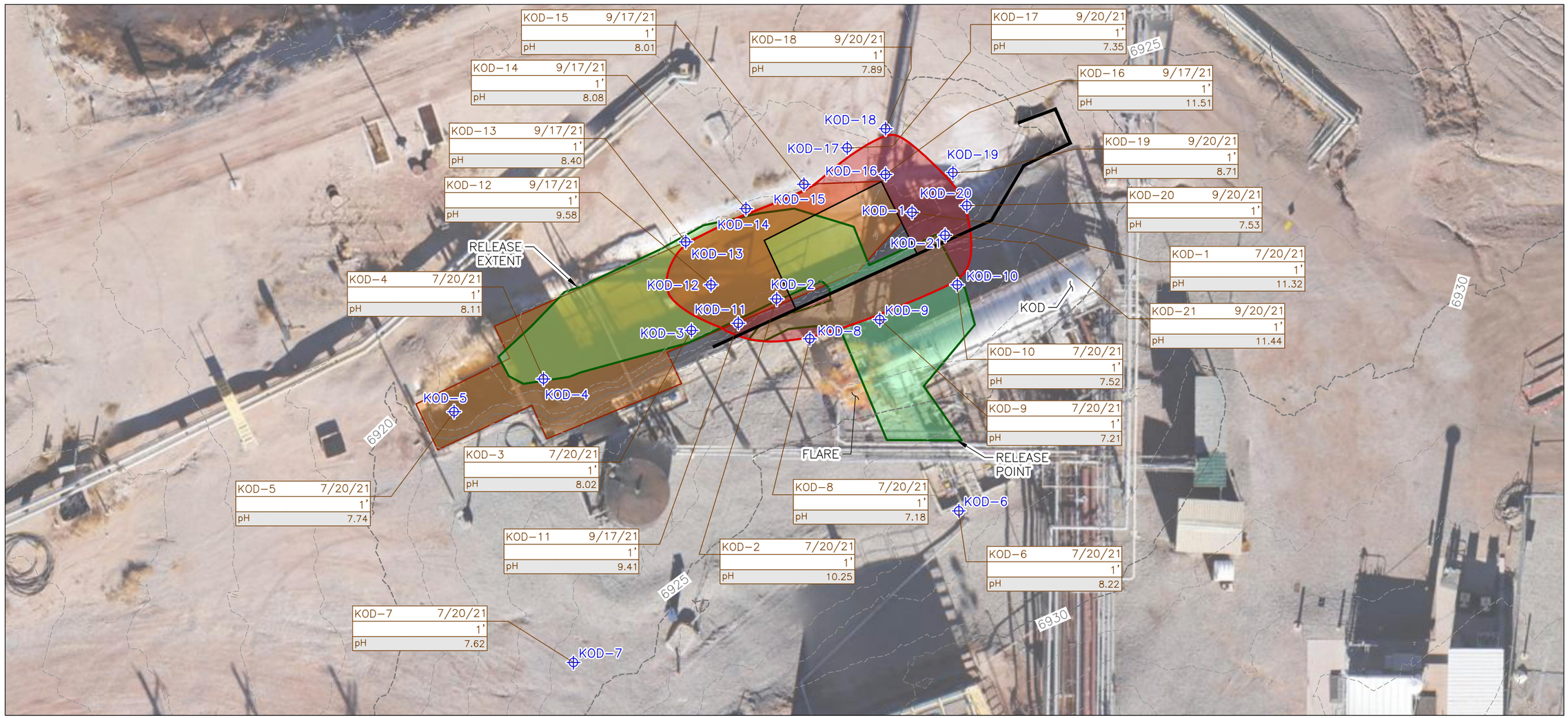

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EXPLANATION

KOD-7	SOIL SAMPLE AND DESIGNATION
	PROPOSED EXCAVATION EXTENT
	RELEASE EXTENT
	FORMER LOCATION OF OLD API SEPARATOR
	CONCRETE PAD
	CONCRETE RETAINING WALL
6935	EXISTING CONTAINMENT ELEVATION CONTOURS (INTERVAL = 1')
API	AMERICAN PETROLEUM INSTITUTE
KOD	KNOCKOUT DRUM

ANALYTE TABLE EXPLANATION

Soil Sample Designation → KOD-6 7/20/21 ← Sample Date
1' ← FT-BGS
pH

N

0 20'

NOTES:

1. ALL pH VALUES ARE IN STANDARD UNITS
2. FT-BGS = FEET BELOW GROUND SURFACE

Trihydro CORPORATION
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Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 4

SAMPLE LOCATIONS WITH pH RESULTS
FLARE KOD CAUSTIC RELEASE INVESTIGATION

WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: EC	Scale: 1" = 20'	Date: 9/22/2021	File: 697-KOD-PHRESULTS-2021

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Tables

TABLE 1. SAMPLING LOCATIONS AND DEPTHS
FLARE KOD CAUSTIC RELEASE INVESTIGATION
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location	Latitude	Longitude	Elevation (ft amsl)	Depth Sampled (ft)
KOD-1	35.49073002	-108.42928111	6855.219	1
KOD-2	35.49068403	-108.42936793	6854.876	1
KOD-3	35.49066721	-108.42942249	6847.667	1
KOD-4	35.49064122	-108.42951749	6847.150	1
KOD-5	35.49062371	-108.42957485	6847.433	1
KOD-6	35.49049211	-108.42949711	6854.139	1
KOD-7	35.49057314	-108.42924988	6885.582	1
KOD-8	35.49066317	-108.42934635	6856.805	1
KOD-9	35.49067348	-108.42930142	6858.030	1
KOD-10	35.49069199	-108.42925176	6856.936	1
KOD-11	35.49066827	-108.42938992	6845.535	1
KOD-12	35.49068475	-108.42940303	6846.299	1
KOD-13	35.49070628	-108.42939944	6857.645	1
KOD-14	35.49073645	-108.42937881	6846.975	1
KOD-15	35.49074841	-108.42933864	6845.964	1
KOD-16	35.49075934	-108.42928146	6857.535	1
KOD-17	35.49078039	-108.42931178	6849.663	1
KOD-18	35.49078196	-108.42928906	6848.551	1
KOD-19	35.49076608	-108.42925067	6848.240	1
KOD-20	35.49074156	-108.42924019	6848.054	1
KOD-21	35.49071904	-108.42926451	6857.161	1

Notes:
ft - foot
ft asml - feet above mean sea level
KOD - Knockout drum

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TABLE 2. ANALYTICAL RESULTS
FLARE KOD CAUSTIC RELEASE INVESTIGATION
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location ID	Date Sampled	TPH-DRO (mg/kg)	TPH-GRO (mg/kg)	TPH-ORO (mg/kg)
KOD-1 (1 ft)	07/20/21	7.8 J	ND(4.9)	52
KOD-2 (1 ft)	07/20/21	29	ND(5)	57
KOD-3 (1 ft)	07/20/21	850	*250 J+*	ND(490)
KOD-4 (1 ft)	07/20/21	**8200**	**610 J+**	**ND(5000)**
KOD-5 (1 ft)	07/20/21	93 J+	4.4 J	ND(49)
KOD-6 (1 ft)	07/20/21	270 J+	ND(5)	ND(46)
KOD-7 (1 ft)	07/20/21	11	ND(4.9)	ND(43)
KOD-8 (1 ft)	07/20/21	*1500*	**560 J+**	580
KOD-8 (1 ft) Dup	07/20/21	*1400*	*450 J+*	550
KOD-9 (1 ft)	07/20/21	800 J+	22 J+	190 J+
KOD-10 (1 ft)	07/20/21	**8600**	*260 J+*	**ND(4900)**
NMED Industrial SSL		3,000	500	3,000
NMED Residential SSL		1,000	100	1,000

Notes:
DRO - Diesel Range Organics
Dup - duplicate
ft - foot
GRO - Gasoline Range Organics
ID - identification
J+ - Estimated concentration, possibly biased high
J - Estimated concentration
KOD - Knockout drum
mg/kg - Milligrams per kilogram
ND - non-detect at the reporting limit
NMED - New Mexico Environment Department
ORO - Oil Range Organics
SSL - Soil screening level
TPH - Total Petroleum Hydrocarbons

1. Bold text indicates results that exceed both the NMED Industrial and Residential SSLs.
2. Italicized text indicates results that exceed the NMED Residential SSL, but not the NMED Industrial SSL.

TABLE 3. FIELD SCREENING RESULTS
FLARE KOD CAUSTIC RELEASE INVESTIGATION
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location	Sample Date	Sample Time	pH (Std. units)	PID reading (ppm_v)
KOD-1	7/20/2021	16:15	11.32	3.4
KOD-2	7/20/2021	8:00	10.25	1.2
KOD-3	7/20/2021	9:45	8.02	422.5
KOD-4	7/20/2021	16:30	8.11	584.4
KOD-5	7/20/2021	16:45	7.74	2.5
KOD-6	7/20/2021	14:20	8.22	0
KOD-7	7/20/2021	13:40	7.62	2.4
KOD-8	7/20/2021	11:35	7.18	394.7
KOD-9	7/20/2021	10:40	7.21	83.5
KOD-10	7/20/2021	10:15	7.52	580.1
KOD-11	9/17/2021	14:00	9.41	--
KOD-12	9/17/2021	14:15	9.58	--
KOD-13	9/17/2021	14:30	8.4	--
KOD-14	9/17/2021	14:45	8.08	--
KOD-15	9/17/2021	14:55	8.01	--
KOD-16	9/17/2021	15:15	11.51	--
KOD-17	9/20/2021	15:45	7.35	--
KOD-18	9/20/2021	16:00	7.89	--
KOD-19	9/20/2021	16:15	8.71	--
KOD-20	9/20/2021	16:25	7.53	--
KOD-21	9/20/2021	16:35	11.44	--

Notes:

-- - Data not available

KOD - Knockout Drum

PID - Photoionization detector

ppm_v - Parts per million by volume

Std. units - Standard units

Appendix A – Laboratory Analytical Report

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

August 04, 2021

Brian McLoughlin

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

RE: Flare KOD Sampling OrderNo.: 2107A85

Dear Brian McLoughlin:

Hall Environmental Analysis Laboratory received 12 sample(s) on 7/21/2021 for the analyses presented in the following report.

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

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

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-1
Project: Flare KOD Sampling
Collection Date: 7/20/2021 4:15:00 PM
Lab ID: 2107A85-001
Matrix: 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	4.6	9.3	J	mg/Kg	1	7/24/2021 2:14:02 PM	61499
Motor Oil Range Organics (MRO)	52	47	47		mg/Kg	1	7/24/2021 2:14:02 PM	61499
Surr: DNOP	128	0	70-130		%Rec	1	7/24/2021 2:14:02 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	3.3	4.9		mg/Kg	1	7/27/2021 5:12:00 PM	61491
Surr: BFB	117	0	70-130		%Rec	1	7/27/2021 5:12:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-2
Project: Flare KOD Sampling
Collection Date: 7/20/2021 8:00:00 AM
Lab ID: 2107A85-002
Matrix: 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)	29	4.7	9.5		mg/Kg	1	7/24/2021 2:38:08 PM	61499
Motor Oil Range Organics (MRO)	57	47	47		mg/Kg	1	7/24/2021 2:38:08 PM	61499
Surr: DNOP	128	0	70-130		%Rec	1	7/24/2021 2:38:08 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	3.3	5.0		mg/Kg	1	7/27/2021 5:32:00 PM	61491
Surr: BFB	118	0	70-130		%Rec	1	7/27/2021 5:32:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-3
Project: Flare KOD Sampling
Collection Date: 7/20/2021 9:45:00 AM
Lab ID: 2107A85-003
Matrix: 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)	850	48	97		mg/Kg	10	7/24/2021 3:02:21 PM	61499
Motor Oil Range Organics (MRO)	ND	490	490	D	mg/Kg	10	7/24/2021 3:02:21 PM	61499
Surr: DNOP	0	0	70-130	S	%Rec	10	7/24/2021 3:02:21 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	250	3.2	4.8		mg/Kg	1	7/27/2021 5:52:00 PM	61491
Surr: BFB	503	0	70-130	S	%Rec	1	7/27/2021 5:52:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-4
Project: Flare KOD Sampling
Collection Date: 7/20/2021 4:30:00 PM
Lab ID: 2107A85-004
Matrix: 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)	8200	490	1000		mg/Kg	100	7/24/2021 3:14:24 PM	61499
Motor Oil Range Organics (MRO)	ND	5000	5000	D	mg/Kg	100	7/24/2021 3:14:24 PM	61499
Surr: DNOP	0	0	70-130	S	%Rec	100	7/24/2021 3:14:24 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	610	16	24		mg/Kg	5	7/27/2021 6:12:00 PM	61491
Surr: BFB	344	0	70-130	S	%Rec	5	7/27/2021 6:12:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-5
Project: Flare KOD Sampling
Collection Date: 7/20/2021 4:45:00 PM
Lab ID: 2107A85-005
Matrix: 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)	93	4.9	9.8		mg/Kg	1	7/23/2021 12:09:58 PM	61499
Motor Oil Range Organics (MRO)	ND	49	49		mg/Kg	1	7/23/2021 12:09:58 PM	61499
Surr: DNOP	131	0	70-130	S	%Rec	1	7/23/2021 12:09:58 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	4.4	3.3	5.0	J	mg/Kg	1	7/27/2021 6:32:00 PM	61491
Surr: BFB	129	0	70-130		%Rec	1	7/27/2021 6:32:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-6
Project: Flare KOD Sampling
Collection Date: 7/20/2021 2:20:00 PM
Lab ID: 2107A85-006
Matrix: 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)	270	4.5	9.2		mg/Kg	1	7/23/2021 12:29:24 PM	61499
Motor Oil Range Organics (MRO)	ND	46	46		mg/Kg	1	7/23/2021 12:29:24 PM	61499
Surr: DNOP	136	0	70-130	S	%Rec	1	7/23/2021 12:29:24 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	3.3	5.0		mg/Kg	1	7/27/2021 6:52:00 PM	61491
Surr: BFB	110	0	70-130		%Rec	1	7/27/2021 6:52:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-7
Project: Flare KOD Sampling
Collection Date: 7/20/2021 1:40:00 PM
Lab ID: 2107A85-007
Matrix: 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)	11	4.3	8.6		mg/Kg	1	7/30/2021 1:47:50 PM	61499
Motor Oil Range Organics (MRO)	ND	43	43		mg/Kg	1	7/30/2021 1:47:50 PM	61499
Surr: DNOP	98.3	0	70-130		%Rec	1	7/30/2021 1:47:50 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	3.3	4.9		mg/Kg	1	7/27/2021 7:12:00 PM	61491
Surr: BFB	114	0	70-130		%Rec	1	7/27/2021 7:12:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-8
Project: Flare KOD Sampling
Collection Date: 7/20/2021 11:35:00 AM
Lab ID: 2107A85-008
Matrix: 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)	1500	47	95		mg/Kg	10	7/23/2021 12:58:37 PM	61499
Motor Oil Range Organics (MRO)	580	480	480		mg/Kg	10	7/23/2021 12:58:37 PM	61499
Surr: DNOP	0	0	70-130	S	%Rec	10	7/23/2021 12:58:37 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **CCM**	
Gasoline Range Organics (GRO)	560	6.6	10		mg/Kg	2	7/28/2021 9:56:00 AM	61491
Surr: BFB	519	0	70-130	S	%Rec	2	7/28/2021 9:56:00 AM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-9
Project: Flare KOD Sampling
Collection Date: 7/20/2021 10:40:00 AM
Lab ID: 2107A85-009
Matrix: 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)	800	4.9	9.8		mg/Kg	1	7/26/2021 5:21:09 PM	61499
Motor Oil Range Organics (MRO)	190	49	49		mg/Kg	1	7/26/2021 5:21:09 PM	61499
Surr: DNOP	149	0	70-130	S	%Rec	1	7/26/2021 5:21:09 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	22	3.2	4.9		mg/Kg	1	7/27/2021 7:52:00 PM	61491
Surr: BFB	239	0	70-130	S	%Rec	1	7/27/2021 7:52:00 PM	61491

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD-10
Project: Flare KOD Sampling
Collection Date: 7/20/2021 10:15:00 AM
Lab ID: 2107A85-010
Matrix: 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)	8600	480	980		mg/Kg	100	7/24/2021 4:27:40 PM	61499
Motor Oil Range Organics (MRO)	ND	4900	4900	D	mg/Kg	100	7/24/2021 4:27:40 PM	61499
Surr: DNOP	0	0	70-130	S	%Rec	100	7/24/2021 4:27:40 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	260	16	25		mg/Kg	5	7/24/2021 6:15:00 AM	61496
Surr: BFB	217	0	70-130	S	%Rec	5	7/24/2021 6:15:00 AM	61496

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD DUP 7/20/2021
Project: Flare KOD Sampling
Collection Date: 7/20/2021
Lab ID: 2107A85-011
Matrix: 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)	1400	48	97		mg/Kg	10	7/23/2021 1:28:00 PM	61499
Motor Oil Range Organics (MRO)	550	480	480		mg/Kg	10	7/23/2021 1:28:00 PM	61499
Surr: DNOP	0	0	70-130	S	%Rec	10	7/23/2021 1:28:00 PM	61499
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	450	16	24		mg/Kg	5	7/24/2021 7:15:00 AM	61496
Surr: BFB	307	0	70-130	S	%Rec	5	7/24/2021 7:15:00 AM	61496

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 **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD EB 7/20/2021
Project: Flare KOD Sampling
Collection Date: 7/20/2021 11:35:00 AM
Lab ID: 2107A85-012 **Matrix:** AQUEOUS **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							Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	0.39	1.0		mg/L	1	7/23/2021 3:34:09 PM	61493
Motor Oil Range Organics (MRO)	ND	1.9	5.0		mg/L	1	7/23/2021 3:34:09 PM	61493
Surr: DNOP	142	0	63.7-164		%Rec	1	7/23/2021 3:34:09 PM	61493
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	0.030	0.050		mg/L	1	7/22/2021 4:58:00 PM	R79989
Surr: BFB	119	0	68.5-136		%Rec	1	7/22/2021 4:58:00 PM	R79989
EPA METHOD 8260B: VOLATILES							Analyst: **CCM**	
Benzene	ND	0.23	0.50		µg/L	1	7/30/2021 11:22:00 AM	R80223
Toluene	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Ethylbenzene	ND	0.21	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Methyl tert-butyl ether (MTBE)	ND	0.39	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2,4-Trimethylbenzene	ND	0.12	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,3,5-Trimethylbenzene	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2-Dichloroethane (EDC)	ND	0.25	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2-Dibromoethane (EDB)	ND	0.30	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Naphthalene	ND	0.50	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1-Methylnaphthalene	ND	0.84	4.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
2-Methylnaphthalene	ND	0.69	4.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Acetone	6.3	2.5	10	J	µg/L	1	7/30/2021 11:22:00 AM	R80223
Bromobenzene	ND	0.28	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Bromodichloromethane	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Bromoform	ND	0.31	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Bromomethane	ND	0.85	3.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
2-Butanone	3.3	2.0	10	J	µg/L	1	7/30/2021 11:22:00 AM	R80223
Carbon disulfide	ND	0.59	10		µg/L	1	7/30/2021 11:22:00 AM	R80223
Carbon Tetrachloride	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Chlorobenzene	ND	0.16	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Chloroethane	ND	0.38	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Chloroform	ND	0.13	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Chloromethane	ND	0.41	3.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
2-Chlorotoluene	ND	0.13	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
4-Chlorotoluene	ND	0.34	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
cis-1,2-DCE	ND	0.39	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
cis-1,3-Dichloropropene	ND	0.36	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2-Dibromo-3-chloropropane	ND	0.59	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Dibromochloromethane	ND	0.28	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Dibromomethane	ND	0.31	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2-Dichlorobenzene	ND	0.15	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223

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

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

Analytical Report
Lab Order **2107A85**
Date Reported: **8/4/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon
Client Sample ID: KOD EB 7/20/2021
Project: Flare KOD Sampling
Collection Date: 7/20/2021 11:35:00 AM
Lab ID: 2107A85-012
Matrix: AQUEOUS
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: **CCM**	
1,3-Dichlorobenzene	ND	0.16	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,4-Dichlorobenzene	ND	0.21	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Dichlorodifluoromethane	ND	0.40	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1-Dichloroethane	ND	0.27	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1-Dichloroethene	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2-Dichloropropane	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,3-Dichloropropane	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
2,2-Dichloropropane	ND	0.26	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1-Dichloropropene	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Hexachlorobutadiene	ND	0.56	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
2-Hexanone	ND	1.8	10		µg/L	1	7/30/2021 11:22:00 AM	R80223
Isopropylbenzene	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
4-Isopropyltoluene	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
4-Methyl-2-pentanone	ND	0.88	10		µg/L	1	7/30/2021 11:22:00 AM	R80223
Methylene Chloride	ND	0.50	3.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
n-Butylbenzene	ND	0.25	3.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
n-Propylbenzene	ND	0.18	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
sec-Butylbenzene	ND	0.14	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Styrene	ND	0.14	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
tert-Butylbenzene	ND	0.24	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1,1,2-Tetrachloroethane	ND	0.27	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1,2,2-Tetrachloroethane	ND	0.27	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Tetrachloroethene (PCE)	ND	0.36	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
trans-1,2-DCE	ND	0.19	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
trans-1,3-Dichloropropene	ND	0.34	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2,3-Trichlorobenzene	ND	0.25	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2,4-Trichlorobenzene	ND	0.24	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1,1-Trichloroethane	ND	0.30	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,1,2-Trichloroethane	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Trichloroethene (TCE)	ND	0.20	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Trichlorofluoromethane	ND	0.16	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
1,2,3-Trichloropropane	ND	0.44	2.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Vinyl chloride	ND	0.32	1.0		µg/L	1	7/30/2021 11:22:00 AM	R80223
Xylenes, Total	ND	0.37	1.5		µg/L	1	7/30/2021 11:22:00 AM	R80223
Surr: 1,2-Dichloroethane-d4	93.0	0	70-130		%Rec	1	7/30/2021 11:22:00 AM	R80223
Surr: 4-Bromofluorobenzene	104	0	70-130		%Rec	1	7/30/2021 11:22:00 AM	R80223
Surr: Dibromofluoromethane	88.9	0	70-130		%Rec	1	7/30/2021 11:22:00 AM	R80223
Surr: Toluene-d8	100	0	70-130		%Rec	1	7/30/2021 11:22:00 AM	R80223

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A85**

04-Aug-21

Client: Marathon

Project: Flare KOD Sampling

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: **LCS-61655**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **61655**	RunNo: **80212**
Prep Date: **7/29/2021**	Analysis Date: **7/30/2021**	SeqNo: **2824813** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.5		5.000		110	70	130			

Sample ID: **MB-61655**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **61655**	RunNo: **80212**
Prep Date: **7/29/2021**	Analysis Date: **7/30/2021**	SeqNo: **2824814** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	11		10.00		114	70	130			

Qualifiers:

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E	Value above quantitation range
J	Analyte detected below quantitation limits
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RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A85**
04-Aug-21

Client: Marathon
Project: Flare KOD Sampling

Sample ID: **MB-61493** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **PBW** Batch ID: **61493** RunNo: **80052**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817053** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	0.76		0.5000		152	63.7	164			

Sample ID: **LCS-61493** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **LCSW** Batch ID: **61493** RunNo: **80052**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817054** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	2.9	1.0	2.500	0	117	70	130			
Surr: DNOP	0.34		0.2500		134	63.7	164			

Sample ID: **2107A85-012BMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **KOD EB 7/20/2021** Batch ID: **61493** RunNo: **80052**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817056** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	3.2	1.0	2.500	0	128	70	130			
Surr: DNOP	0.36		0.2500		144	63.7	164			

Sample ID: **2107A85-012BMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range**
Client ID: **KOD EB 7/20/2021** Batch ID: **61493** RunNo: **80052**
Prep Date: **7/22/2021** Analysis Date: **7/23/2021** SeqNo: **2817057** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	3.0	1.0	2.500	0	120	70	130	6.88	20	
Surr: DNOP	0.34		0.2500		134	63.7	164	0	0	

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A85**

04-Aug-21

Client: Marathon

Project: Flare KOD Sampling

Sample ID: **mb-61444**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **61444**	RunNo: **79989**							
Prep Date: **7/20/2021**	Analysis Date: **7/22/2021**	SeqNo: **2816099**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		104	70	130			

Sample ID: **lcs-61444**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **61444**	RunNo: **79989**							
Prep Date: **7/20/2021**	Analysis Date: **7/22/2021**	SeqNo: **2816100**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		114	70	130			

Sample ID: **mb-61491**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **61491**	RunNo: **80029**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2818753**	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	1200		1000		120	70	130			

Sample ID: **mb-61496**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **61496**	RunNo: **80029**							
Prep Date: **7/22/2021**	Analysis Date: **7/24/2021**	SeqNo: **2818754**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		113	70	130			

Sample ID: **lcs-61491**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **61491**	RunNo: **80029**							
Prep Date: **7/22/2021**	Analysis Date: **7/23/2021**	SeqNo: **2818755**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	96.1	78.6	131			
Surr: BFB	1300		1000		127	70	130			

Sample ID: **lcs-61496**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **61496**	RunNo: **80029**							
Prep Date: **7/22/2021**	Analysis Date: **7/24/2021**	SeqNo: **2818757**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	87.9	78.6	131			
Surr: BFB	1300		1000		126	70	130			

Qualifiers:

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PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
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QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A85**
04-Aug-21

Client: Marathon
Project: Flare KOD Sampling

Sample ID: **2107A85-010ams** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **KOD-10** Batch ID: **61496** RunNo: **80029**
Prep Date: **7/22/2021** Analysis Date: **7/24/2021** SeqNo: **2818759** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	270	25	24.98	260.2	59.1	61.3	114			S
Surr: BFB	11000		4995		213	70	130			S

Sample ID: **2107A85-010amsd** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **KOD-10** Batch ID: **61496** RunNo: **80029**
Prep Date: **7/22/2021** Analysis Date: **7/24/2021** SeqNo: **2818762** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	290	25	24.98	260.2	130	61.3	114	6.25	20	S
Surr: BFB	11000		4995		219	70	130	0	0	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#: **2107A85**

04-Aug-21

Client: Marathon

Project: Flare KOD Sampling

Sample ID: **MB-Water**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R79989**	RunNo: **79989**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815910** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	23		20.00		113	68.5	136			

Sample ID: **2.5ug GRO lcs**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R79989**	RunNo: **79989**
Prep Date:	Analysis Date: **7/22/2021**	SeqNo: **2815911** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.50	0.050	0.5000	0	99.2	80	120			
Surr: BFB	28		20.00		138	68.5	136			S

Qualifiers:

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J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2107A85**
04-Aug-21

Client: Marathon
Project: Flare KOD Sampling

Sample ID: **100ng 8260 lcs** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW** Batch ID: **R80223** RunNo: **80223**
Prep Date: Analysis Date: **7/30/2021** SeqNo: **2825205** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	95.2	70	130			
Toluene	20	1.0	20.00	0	98.0	70	130			
Chlorobenzene	19	1.0	20.00	0	96.2	70	130			
1,1-Dichloroethene	17	1.0	20.00	0	83.7	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	91.2	70	130			
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.8	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		105	70	130			
Surr: Dibromofluoromethane	8.7		10.00		87.1	70	130			
Surr: Toluene-d8	9.9		10.00		99.2	70	130			

Sample ID: **mb** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **R80223** RunNo: **80223**
Prep Date: Analysis Date: **7/30/2021** SeqNo: **2825206** Units: **µg/L**

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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#: **2107A85**
04-Aug-21

Client: Marathon
Project: Flare KOD Sampling

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R80223**	RunNo: **80223**
Prep Date:	Analysis Date: **7/30/2021**	SeqNo: **2825206** Units: **µg/L**

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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#: **2107A85**
04-Aug-21

Client: Marathon
Project: Flare KOD Sampling

Sample ID: **mb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R80223**	RunNo: **80223**
Prep Date:	Analysis Date: **7/30/2021**	SeqNo: **2825206** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.8	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		105	70	130			
Surr: Dibromofluoromethane	9.0		10.00		90.3	70	130			
Surr: Toluene-d8	9.8		10.00		97.7	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: **2107A85** RcptNo: **1**

Received By: **Scott Anderson** **7/21/2021 4:10:00 PM** SPL

Completed By: **Desiree Dominguez** **7/21/2021 4:51:48 PM** DD

Reviewed By: KPH 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 ☐
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	4.1	Good				

Released to Imaging: 11/22/2022 2:37:45 PM
Received by OCD: 10/27/2021 11:24:25 AM

Chain of Custody Record

Client: Marathon Petroleum Company	~~X~~ Standard ☐ Rush
Mailing Address: 92 Giant Crossing Rd. Jamestown, NM 87347	Project Name: Flare KOD sampling
Phone #: 808-640-1823	Project #: 697-087-001
email or Fax#: bmcloughlin@trihydro.com	Project Manager: Brian McLoughlin
QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation)	Sampler:
Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other	On Ice: ☑ Yes ☐ No
☐ EDD (Type)	# of Coolers: 1
	Cooler Temp(including CF): 4.3-0.2

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. 2107A85	Analysis Request: TPH - GRO, DRO, MRO		8260	GRO
7/20/2021	16:15	Soil	KOD-1	1		-001	X			
7/20/2021	8:00	Soil	KOD-2	1		-002	X			
7/20/2021	9:45	Soil	KOD-3	1		-003	X			
7/20/2021	16:30	Soil	KOD-4	1		-004	X			
7/20/2021	16:45	Soil	KOD-5	1		-005	X			
7/20/2021	14:20	Soil	KOD-6	1		-006	X			
7/20/2021	13:40	Soil	KOD-7	1		-007	X			
7/20/2021	11:35	Soil	KOD-8	1		-008	X			
7/20/2021	10:40	Soil	KOD-9	1		-009	X			
7/20/2021	10:15	Soil	KOD-10	1		-010	X			
7/20/2021		Soil	KOD DUP 7/20/2021	1		-011	X			
7/20/2021	11:35	Water	KOD EB 7/20/2021			-012			X	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
7/21/21	11:00		SPA	CDO	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.

Appendix B - Data Validation Report

Tier II Data Validation Report Summary

Client: Marathon Oil	Laboratory: Hall Environmental
Project Name: Western Refining SW, Gallup Flare KOD Sampling	Sample Matrix: Soil
Project Number: 697-087-001 Task: 0004	Sample Start Date: 07/20/2021
Date Validated: 08/27/2021	Sample End Date: 07/20/2021
Parameters Included: ▪ Volatile Organic Compounds (VOC) by Test Methods for Evaluating Solid Waste (SW-846) Method 8260B ▪ Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO) by SW-846 Method 8015D Modified ▪ TPH Diesel Range Organics (DRO) and Motor Oil Range Organics (MRO) by SW-846 Method 8015M/D	
Laboratory Project ID: 2107A85	
Data Validator: Charles Ballek, Senior Chemist	
Reviewer: Mike Phillips, Senior Chemist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services Group on the analytical data report packages generated by Hall Environmental Analysis Laboratory of Albuquerque, New Mexico, evaluating samples from the Marathon Oil site, located in Gallup, New Mexico.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values from:

- Field duplicate pairs
- Matrix spike (MS) and matrix spike duplicate (MSD) pairs

Laboratory accuracy was established by reviewing the demonstrated percent recoveries (%R) of the following items to verify that data are not biased.

- MS/MSD samples
- Laboratory control samples (LCS)
- Organic system monitoring compounds (surrogates)

Field accuracy was established by collecting and analyzing the following samples to monitor for possible ambient or cross contamination during sampling and transportation.

- Equipment blanks

Method compliance was established by reviewing sample integrity, holding times, detection limits, surrogate recoveries, laboratory blanks, initial and continuing calibrations (where applicable), and the LCS percent recoveries against method-specific requirements.

Completeness was evaluated by determining the overall ratio of the number of samples and analyses planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody (CoC), laboratory analytical methods, and other laboratory and field documents associated with this analytical data set.

Tier II Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
KOD-1	2107A85-001
KOD-2	2107A85-002
KOD-3	2107A85-003
KOD-4	2107A85-004
KOD-5	2107A85-005
KOD-6	2107A85-006
KOD-7	2107A85-007
KOD-8	2107A85-008
KOD-9	2107A85-009
KOD-10	2107A85-010
KOD DUP 7/20/2021	2107A85-011
KOD EB 7/20/2021	2107A85-012

Tier II Data Validation Report Summary

The laboratory data were reviewed to evaluate compliance with the methods and the quality of the reported data. Assessment of CoC completeness is included in Item 3 of the Data Validation Checklist. A check mark (✓) indicates that the referenced validation criteria were deemed acceptable, whereas a crossed circle (⊗) indicates validation criteria for which the data have been qualified by the data validator. An empty circle (○) indicates that the specified criterion does not apply to the reviewed data. Details are noted in the tables below.

Validation Criteria

- ✓ Data Completeness
- ✓ CoC Documentation (Item 3)
- ✓ Holding Times and Preservation (Items 6 and 7)
- ○ Initial and Continuing Calibrations (Items 9 and 10)
- ✓ Laboratory Blanks (Items 11 and 12)
- ✓ MS/MSD (Items 13 and 14)
- ✓ LCS (Items 15 and 16)
- ⊗ System Monitoring Compounds (i.e., Surrogates) (Item 17)
- ✓ Equipment Blanks (Items 18 and 19)
- ✓ Field Duplicates (Items 20 and 21)
- ○ Laboratory Duplicates (Item 22)
- ○ Data Relationships (Item 23)

Guidance References

Chemical data validation was conducted in accordance with the United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) National Functional Guidelines for the analyses listed below, or by the appropriate method if not covered in the National Functional Guidelines.

- Data for organic analyses were evaluated according to validation criteria set forth in the USEPA CLP National Functional Guidelines for Organic Superfund Methods Data Review, document number EPA-540-R-20-005, November 2020 with additional reference to the USEPA CLP National Functional Guidelines for Organic Data Review, document number EPA 540/R-99/008, October 1999.
- Review of field duplicates was conducted according to the USEPA Region 1 - New England Environmental Data Review Supplement for Region 1 Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement2, September 2020.
- Trihydro Data Validation Variance Documentation, February 2021.

Tier II Data Validation Report Summary

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Item 2 of the Validation Criteria Checklist.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data that are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R (rejected, data not usable), the data may be used for site evaluation; however, consideration should be given to the reasons for qualification when interpreting sample concentrations. Data points that are assigned an R qualifier should not be used for site evaluation purposes.

If applicable, text was identified in **bold font** in the Validation Criteria Checklist to indicate that further action and/or qualification of the data were required. Data may have been qualified with J data flags by the laboratory if the result was greater than or equal to the method detection limit (MDL) but less than the reporting limit (RL). These laboratory-applied J flags were preserved, if present, and included in the Data Qualification Summary table at the end of this report. If applicable, data validation qualifiers were added for the items noted with crossed circles in the Validation Criteria section above. Please see the Data Qualification Summary table at the end of this report for a complete list of samples and analytes qualified.

If data would be qualified with more than one flag, one qualifier was assigned based on the severity; however, all reasons for qualification were retained. Data that would be qualified with both J+ and J- flags were evaluated based on validation criteria and assigned the appropriate flag. The hierarchy of qualifiers from the most to least severe is as follows:

- R > JB/U > NJ > J+/J- > J/UJ

Data qualifiers used during this validation are included in the following table.

Qualifier	Definition
J	Estimated concentration
J+	The result is an estimated concentration, but may be biased high

Data Completeness

The analyses were performed as requested on the CoC records. The associated samples were received by the laboratory and analyzed properly unless otherwise noted in the Criteria Checklist below. The complete data package consisted of 33 data points. The data completeness calculation does not include any submitted blank sample results. Data points were not rejected. The data completeness measure for this data package is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST

1. Was the report free of non-conformances identified by the laboratory? Yes

Comments: The laboratory did not identify non-conformances regarding the analytical data.

2. Were the data free of data qualification flags and/or notes used by the laboratory? If no, define. No

Comments: The laboratory used the following data qualification flags with this data set.

J – Analyte detected below quantitation limits.

D – Sample Diluted Due to Matrix

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

3. Were sample CoC forms and custody procedures complete? Yes

Comments: The CoC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Custody seals were not present or required since the samples were delivered to the laboratory by a laboratory courier, and custody was maintained at all times.

4. Were detection limits in accordance with the quality assurance project plan (QAPP), permit, or method, or indicated as acceptable? Yes

Comments: The reporting limits for the data set were reviewed and appeared to be acceptable. The following dilutions were applied to the project samples.

Method	Sample(s)	Analyte(s)	Dilution Factor
8015	KOD-8	GRO	2
8015	KOD-4, KOD-10, KOD DUP 7/20/2021	GRO	5
8015	KOD-3, KOD-8, KOD DUP 7/20/2021	DRO, MRO	10
8015	KOD-4, KOD-10	DRO, MRO	100

5. Were the reported analytical methods and constituents in compliance with the QAPP, permit, or CoC? Yes

Comments: The reported analytical methods were in compliance with the CoC, and the laboratory reported the requested constituents in accordance with the CoC.

6. Were samples received in good condition within method-specified requirements? Yes

Comments: Samples were received on ice, in good condition, and with the cooler temperature within the recommended temperature range of 4°C ± 2°C at 4.1°C as noted on the *Sample Log-in Check List*.

7. Were samples extracted/digested and analyzed within method-specified or technical holding times? Yes

Comments: The samples were extracted and analyzed within method-specific holding times.

8. Were reported units appropriate for the sample matrix/matrices and analytical method(s)? Specify if wet or dry units were used for soil. Yes

Comments: The results were reported in concentration units of milligrams per kilogram (mg/kg), which were acceptable for the sample matrix and the analyses requested. The results for the soil samples were reported on a wet weight basis. The results for the aqueous equipment blank sample were reported in units of micrograms per liter (µg/L) and milligrams per liter (mg/L).

9. Did the laboratory provide any specific initial and/or continuing calibration results? No

Comments: Initial and continuing calibration data were not included as part of this data set.

VALIDATION CRITERIA CHECKLIST

10. If initial and/or continuing calibration results were provided, were the results within acceptable limits? N/A

Comments: Initial and continuing calibration data were not included as part of this data set.

11. Was the total number of laboratory blank samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of laboratory blank samples prepared was equal to at least 5% of the total number of samples.

12. Were target analytes reported as not detected in the laboratory blanks? Yes

Comments: Target analytes were reported as not detected in the laboratory blanks.

13. Was the total number of MS samples prepared equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of matrix spike samples prepared was equal to at least 5% of the total number of samples, although MS samples were not prepared for all analyses and/or batches. The matrix spike sample source for each analytical batch in this sample set has been indicated below.

Method	Analytes	Batch	MS Sample Source
8015D	GRO	61491	Not Prepared
8015D	GRO	61496	KOD-10
8015D	GRO	R79989	Not Prepared
8015M/D	DRO, MRO	61493	KOD EB 7/20/2021
8015M/D	DRO, MRO	61499	Not Prepared
8260B	VOCs	R80223	Not Prepared

Not Prepared – Matrix spikes were not prepared for this batch.

14. For MS/MSDs prepared from project samples, were percent recoveries and RPDs within data validation or laboratory quality control (QC) limits? No

Comments: The percent recoveries and RPDs for the MS/MSD prepared from a project sample were within laboratory QC limits, with the following exceptions.

The reported recoveries for GRO in the MS and MSD for Method 8015D batch 61496 were outside the acceptance limits of 61.3-114% at 59.1% and 130%, respectively. However, the GRO concentration in the unspiked sample was greater than 4 times the spike added and, following EPA guidance, the spike data were not applicable for qualification of sample results.

15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples or analyzed as required by the method? Yes

Comments: The total number of LCS samples analyzed was equal to at least 5% of the total number of samples.

16. Were LCS/LCSD percent recoveries and LCS/LCSD RPDs within data validation or laboratory QC limits? Yes

Comments: The LCS percent recoveries were within laboratory QC limits. LCSDs were not analyzed as part of this data set.

VALIDATION CRITERIA CHECKLIST

17. Were surrogate recoveries within laboratory QC limits? No

Comments: Surrogate recoveries in the analyses of the submitted samples were within laboratory QC limits, with the following exceptions.

Method	Sample	Surrogate	Surrogate Recovery	QC Limits	Dilution
8015M/D	KOD-3	DNOP	0%	70-130%	10
8015D	**KOD-3**	**BFB**	**503%**	**70-130%**	**N/A**
8015M/D	KOD-4	DNOP	0%	70-130%	100
8015D	**KOD-4**	**BFB**	**344%**	**70-130%**	**N/A**
8015M/D	**KOD-5**	**DNOP**	**131%**	**70-130%**	**1**
8015M/D	**KOD-6**	**DNOP**	**136%**	**70-130%**	**1**
8015M/D	KOD-8	DNOP	0%	70-130%	10
8015D	**KOD-8**	**BFB**	**519%**	**70-130%**	**N/A**
8015M/D	**KOD-9**	**DNOP**	**149%**	**70-130%**	**1**
8015D	**KOD-9**	**BFB**	**239%**	**70-130%**	**N/A**
8015M/D	KOD-10	DNOP	0%	70-130%	100
8015D	**KOD-10**	**BFB**	**217%**	**70-130%**	**N/A**
8015M/D	KOD DUP 7/20/2021	DNOP	0%	70-130%	10
8015D	**KOD DUP 7/20/2021**	**BFB**	**307%**	**70-130%**	**N/A**

NA – Not Applicable (GRO surrogate BFB added after dilution).

GRO was detected in samples KOD-3, KOD-4, KOD-8, KOD-9, KOD-10, and KOD DUP 7/20/2021, and those results were assigned J+ qualifiers due to evidence of potential high bias.

DRO was detected in samples KOD-5, KOD-6, and KOD-9, and those results were assigned J+ qualifiers due to evidence of potential high bias. MRO was also detected in sample KOD-9, and the result was assigned a J+ qualifier. MRO was not detected in the remaining samples, and the results did not require qualification based on these non-conformances.

The DRO and MRO results for samples KOD-3, KOD-4, KOD-8, KOD-10, and KOD DUP 7/20/2021 were not qualified based on the surrogate non-conformances in the Method 8015M/D analyses since the applied dilutions of 10 to 100 times resulted in surrogate concentrations below routinely calibrated levels, and those results were deemed unreliable and possibly inaccurate.

Qualification of sample data was not required based on surrogate non-conformances in QC samples as the environmental samples were evaluated based on their specific surrogate recoveries.

18. Were the number of trip blank, field blank, and/or equipment blank samples collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit? Yes

Comments: The number of trip, field, and equipment blanks collected was equal to at least 10% of the total number of samples. One equipment blank sample, KOD EB 7/20/2021, was collected as part of this sample set.

19. Were target analytes reported as not detected in the trip blank, field blank, and/or equipment blank samples? No

Comments: Target analytes were reported as not detected in the equipment blank sample, with the following exceptions.

2-Butanone and acetone were detected in KOD EB 7/20/2021 at concentrations of 3.3 µg/L and 6.3 µg/L, respectively. These analytes were not included in the analyses of the remaining samples in this data set, and qualification of results was not required.

VALIDATION CRITERIA CHECKLIST	
20. Was the number of field duplicates collected equal to at least 10% of the total number of samples or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: The number of field duplicates collected was equal to at least 10% of the number of samples. • Sample KOD DUP 7/20/2021 was collected as a field duplicate of sample KOD-8.	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	Yes
Comments: As indicated in the Field Duplicate Summary Table at the end of this report, field duplicate RPD values were within the data validation QC limits of 0-50% for soil samples. Qualification of sample data was not required based on these results.	
22. For laboratory duplicates prepared from project samples, were RPDs within laboratory QC limits?	N/A
Comments: Laboratory duplicates were not prepared for the analyses in this data set.	
23. Were the following data relationships realistic and acceptable?	
• Target analytes were reported by more than one method (e.g., 8260/8270, EPH/8270), and the results were in agreement?	N/A
Comments: Target analytes were not reported by more than one method.	
• Both total and dissolved metals analyses were performed, and the total metals results were greater than or equal to the dissolved metals results?	N/A
Comments: Analyses for metals were not performed as part of this data set.	

FIELD DUPLICATE SUMMARY

Client Sample ID: KOD-8 Field Duplicate Sample ID: KOD DUP 7/20/2021				
Method	**Analyte**	**Laboratory Result**	**Duplicate Result**	**Relative Percent Difference (RPD)**
SW8015	TPH GRO	560 mg/kg	450 mg/kg	21.8%
SW8015	TPH DRO	1500 mg/kg	1400 mg/kg	6.9%
SW8015	TPH ORO	580 mg/kg	550 mg/kg	5.3% +/-RL

Field duplicate RPD control limits are not to exceed 50% for soil as established by USEPA Region 1 - New England Environmental Data Review Supplement for Region 1 Data Review Elements and Superfund Specific Guidance/Procedures, EQADR-Supplement2, September 2020.

+/-RL – Indicates that the detections in both of the samples were within two times the reporting limit. Qualification of data was not required.

DATA QUALIFICATION SUMMARY

Abbreviation	Reason
HR-SUR	The surrogate percent recovery was greater than the upper acceptable limit indicating a possible high bias.
MDLRL	Flagged by the laboratory: The result was greater than the MDL but less than the RL.

Analyte	Method	Field Sample ID	Lab Sample ID	Result	Limit	Units	Reviewer Qualifier	DV Flag Reasons
2-Butanone	SW8260B	KOD EB 7/20/2021	2107A85-012a	3.3	10	µg/L	J	MDLRL
Acetone	SW8260B	KOD EB 7/20/2021	2107A85-012a	6.3	10	µg/L	J	MDLRL
TPH DRO	SW8015	KOD-1	2107A85-001A	7.8	9.3	mg/kg	J	MDLRL
TPH DRO	SW8015	KOD-5	2107A85-005A	93	9.8	mg/kg	J+	HR-SUR
TPH DRO	SW8015	KOD-6	2107A85-006A	270	9.2	mg/kg	J+	HR-SUR
TPH DRO	SW8015	KOD-9	2107A85-009A	800	9.8	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD-3	2107A85-003a	250	4.8	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD-4	2107A85-004a	610	24	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD-5	2107A85-005a	4.4	5	mg/kg	J	MDLRL
TPH GRO	SW8015	KOD-8	2107A85-008a	560	10	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD-9	2107A85-009a	22	4.9	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD-10	2107A85-010a	260	25	mg/kg	J+	HR-SUR
TPH GRO	SW8015	KOD DUP 7/20/2021	2107A85-011a	450	24	mg/kg	J+	HR-SUR
TPH ORO	SW8015	KOD-9	2107A85-009A	190	49	mg/kg	J+	HR-SUR

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

CONDITIONS

Action 58143

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 58143
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
scwells	Accepted for Record Retention Purposes-Only	11/22/2022