



848 East Second Avenue Durango, Colorado 81301 970,385,1096

May 13, 2019

Mr. Cory Smith
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410



RE:

Stage 1 Abatement Plan (AP-126-0) – April 2019 Update and Supplemental Report

**Hilcorp Energy Company** 

Standard #1

API # 30-045-08718 NCS1735235018

San Juan County, New Mexico

Accepted For Record

PJEG1821432884

Dear Mr. Smith:

LT Environmental, Inc. (LTE), on behalf of Hilcorp Energy Company (Hilcorp), presents the following update and supplemental report to the Stage 1 Abatement Plan (AP-126-0; Abatement Plan) associated with subsurface hydrocarbon impacts encountered at the Standard #1 natural gas production well (Site) (Figure 1). This report details the activities conducted since approval of the Abatement Plan which received status as "administratively complete" by the New Mexico Oil Conservation Division (NMOCD) on January 22, 2019. This report proposes the necessary additional delineation activities with continued monitoring and provides a proposed schedule for subsequent submittal of the Stage 2 Abatement Plan per New Mexico Administrative Code (NMAC) 19.15.30.

## **STAGE 1 ABATEMENT PLAN**

On November 30, 2018, LTE, on behalf of Hilcorp, submitted the Abatement Plan to the NMOCD and was approved on January 22, 2019. Public notice was served followed by a 30-day public comment period according to 19.15.30.15 NMAC. The Abatement Plan proposed additional soil boring investigation and quarterly groundwater monitoring.

## Additional Investigation

From March 19, 2019, to March 21, 2019, LTE conducted additional soil and groundwater assessment activities at the Site. A total of eight boreholes were advanced at the Site ranging from 20 feet to 35 feet below ground surface (bgs). Soil borings were advanced north, east, and south of the known impacted area to define the lateral extent of previously identified impacted soil and groundwater. The soil borings were logged by an LTE geologist who inspected the soil for the presence or absence of petroleum hydrocarbon odor and/or staining. The soil was





characterized by visually inspecting the soil samples and field screening the soil headspace using a photo-ionization detector (PID) to monitor for the presence of volatile organic vapors (VOCs). Groundwater monitoring wells were constructed in each borehole by installing screened casing across the groundwater interface and solid casing to surface. Monitoring wells were constructed out of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 2-inch Schedule 40 PVC 0.010-inch slotted screen. Wells were completed with 10-20 silica sand pack to two feet above the screened interval, then two feet of hydrated bentonite seal, and then bentonite-cement slurry grout to ground surface. The wells were completed aboveground with a locking, steel protective casing cemented into the ground.

After construction, LTE surveyed the new groundwater monitoring wells with a Trimble® GeoExplorer® 3000 series Global Positioning System (GPS) to determine the latitude and longitude. Top-of-casing elevations were surveyed using a Dewalt® DW074 Rotary Laser Level to an accuracy of no less than plus or minus (±) 0.01 feet so that groundwater flow direction and gradient could be determined relative to mean seal level. Once the top of well casing was surveyed, the depth to groundwater or phase separated hydrocarbon (PSH) below top of casing was measured with an oil/water interface probe. The wells were developed by purging a minimum of ten casing volumes, or until the well was purged dry. Eight additional monitoring wells were installed in an effort to delineate impacted soil and groundwater. Newly installed monitoring well locations are depicted on Figure 2. Soil boring logs and monitoring well construction diagrams are included as Attachment 1.

## **Soil Sampling**

Two soil samples from each soil boring were submitted for laboratory analysis: the most impacted sample based on field screening techniques and the terminus of the boring above the field identified groundwater table. Each sample was analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using United States Environmental Protection Agency (US EPA) Method 8021 and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO), diesel range organics (DRO), and motor-oil range organics (MRO) via US EPA Method 8015.

Concentrations of benzene, BTEX, and TPH were similar to previously reported results. No samples exceeded the NMOCD remediation action level for benzene of five milligrams per kilogram (mg/kg). Laboratory analytical results indicated two soil samples exceeded the NMOCD remediation action level for total BTEX concentration of 50 mg/kg: MW15 @ 18'-20' and MW18 @ 25'-27', with concentrations of 104.53 mg/kg and 152.30 mg/kg, respectively. Concentrations of TPH exceeded the NMOCD remediation action level of 100 mg/kg in borings MW15, MW18, and MW19, with TPH concentrations ranging from 119 mg/kg in MW18 @ 18'-20' to 1,590 mg/kg in MW18 @ 25'-27'. The soil analytical results from existing and newly advanced soil borings are summarized and compared to the NMOCD remediation action levels in Figure 3 and Table 1. The laboratory analytical reports for the newly collected soil samples are included as Attachment 2.





# **Groundwater Monitoring**

As required in the Abatement Plan, LTE conducted quarterly groundwater monitoring on all monitoring wells (newly installed and existing) on March 26, 2019. Static groundwater level monitoring included measuring depth to groundwater and/or depth to PSH in 22 monitoring wells with an oil/water interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with deionized water prior to each measurement.

Monitoring wells MW01, MW02, MW06, MW10, and MW14 contained measurable PSH. When PSH was measured in a monitoring well, a correction factor of 0.8 was applied to the elevation to account for the depression of the water column caused by the weight of the overlying PSH. Groundwater elevations and PSH thickness are summarized in Table 2 and depicted on Figure 4.

PSH removal was completed using a dedicated bailer and total volume removed was recorded. All PSH was disposed of in the onsite pit tank. A total of 2.4 gallons of PSH was removed from seven different monitoring wells. MW01 and MW06 generally have the greatest PSH thickness and, therefore, PSH recovery, which is nearly double the volume recovered from the other wells. The occurrence of PSH is greatest near the original release location but extends as far northeast as MW14. PSH thickness measurements are summarized in Table 2 and displayed on Figure 4.

Presence of groundwater is variable. Nine monitoring wells are dry and have never contained groundwater. No saturated sediments were observed during soil boring advancement. Groundwater elevation data indicate that when groundwater is present, flow direction trends to the northwest at the Site. There is evidence of a distinct groundwater high along MW01, MW02, MW06, and MW11 with a groundwater depression at MW03. This discrepancy in groundwater elevations suggest that MW03 may be hydraulically separate from the surrounding wells, similar to the dry wells, or may be influenced by the presence of the open excavation. Lithologic controls are not evident in the existing borehole/lithologic data. It appears groundwater is discontinuous, with isolated pockets or channels forming preferential pathways for any liquid migration that are difficult to identify or predict.

On March 29, 2019, groundwater samples were collected and submitted for analysis of BTEX from eight monitoring wells (MW03, MW05, MW11, MW12, MW16, MW19, MW20, and MW22) that had adequate volume of groundwater for sampling and did not contain PSH. Groundwater samples were submitted under strict chain-of-custody protocol to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico, for analysis of BTEX by US EPA Method 8021B. LTE used low-flow sampling methods and a submersible pump to collect groundwater samples in monitoring wells that had a suitable water column. LTE used a YSI 556 hand-held multi-probe water quality field meter to record pH, electric conductivity (EC), and temperature of the groundwater. During low-flow sampling monitoring wells were purged until these properties stabilized, or until the well was purged dry, indicating that the purge water was representative





of aquifer conditions. Stabilization was defined as three consecutive stable readings for each water property (plus or minus (±) 0.4 units for pH, ±10 percent for EC, and ±2 degrees Celsius (°C) for temperature. The water column in monitoring wells MW03, MW16, MW20 and MW22 was inadequate for low-flow sampling; therefore, grab samples were collected from these monitoring wells using new disposable polyethylene bailers. The interface probe and submersible pump were decontaminated with Alconox™ soap and rinsed with de-ionized water prior to each use to prevent cross-contamination.

Laboratory analytical results of groundwater samples indicated benzene concentrations exceeded the New Mexico Water Quality Control Commission (NMWQCC) standard in MW03, MW05, MW12, MW16, MW19, and MW20 with concentrations ranging from 870 micrograms per liter ( $\mu$ g/L) in MW12 to 21,000  $\mu$ g/L in MW03. Toluene concentrations exceeded the NMWQCC standard in MW05, MW16, MW19, and MW20 ranging from 880  $\mu$ g/L in MW05 to 14,000  $\mu$ g/L in MW16. Ethylbenzene concentrations exceeded the NMWQCC standard in MW12, MW16, and MW19 ranging from 930  $\mu$ g/L in MW19 to 1,200  $\mu$ g/L in MW12. Total xylenes concentrations exceeded the NMWQCC standard in MW03, MW05, MW12, MW16, and MW19 range from 1,500  $\mu$ g/L in MW12 to 11,000  $\mu$ g/L in MW03. The groundwater analytical results as compared to the NMWQCC standards are presented on Figure 5 and summarized in Table 3. The laboratory analytical reports are included in Attachment 2.

## PROPOSED ADDITIONAL DELINEATION

Impact to soil and groundwater is delineated by borings from which soil and groundwater samples contain concentrations of constituents of concern below the applicable remediation action levels or by soil borings from which soil samples contain concentrations of constituents of concern below applicable remediation action levels and no groundwater. Impact to soil is not delineated to the northeast of MW18. Groundwater is not delineated west or northwest of monitoring wells MW19 and MW20, southwest of MW10, north and northeast of MW16, or southeast of MW03 and MW05 (Figures 3 and 5).

LTE proposes to install a minimum of four soil borings to fill these data gaps. The soil borings will be logged by an LTE geologist who will inspect the soil for the presence or absence of petroleum hydrocarbon odor and/or staining. The soil will be characterized by visually inspecting the soil samples and field screening the soil headspace using a PID to monitor for the presence of VOCs. Two soil samples from each soil boring will be submitted for laboratory analysis: the most impacted sample based on field screening techniques and the terminus of the borehole. Soil samples will be submitted to Hall for analysis of BTEX by USEPA 8260 and TPH-GRO, TPH-DRO, and TPH-MRO by USEPA Method 8015. If groundwater is encountered, monitoring wells will be constructed by installing screened casing across the groundwater interface and solid casing to surface. Upon completion of additional boreholes, groundwater monitoring wells will be





developed and tied into the existing survey data. To develop the wells, depth to water will be measured and ten casing volumes will be purged or until dry. At least 48 hours after development, the new groundwater monitoring wells will be sampled with a disposable bailer after three casing volumes have been purged. Groundwater samples will be submitted to Hall for analysis of BTEX by USEPA Method 8260. Proposed borehole locations are depicted on Figure 3 and Figure 5. Additional borings and monitoring wells will be installed as needed to complete delineation of any field identified impacts. Prior to drilling activities, all additional proposed borehole locations will be permitted with the New Mexico Office of the State Engineer.

### PROPOSED GROUNDWATER MONITORING

LTE will continue quarterly groundwater monitoring at the Site beginning after the new monitoring wells are installed. Existing monitoring wells will be sampled concurrently with new monitoring wells. Fluid-level measurements will be monitored in all wells using an oil/water interface probe. Based on fluid-level measurements, wells containing sufficient groundwater will be purged and sampled. Each well will be purged of three well casing volumes or until the well is purged dry. Groundwater samples will be collected from each monitoring and submitted for laboratory analysis of BTEX by USEPA 8260. Wells with measurable PSH will not be sampled and PSH recovery will be conducted.

# **QUALITY ASSURANCE**

Sampling and analytical techniques have been identified in the text above and conform with the references identified in Subsection B of 20.6.2.3107 NMAC and with 20.6.4.14 NMAC of the water quality standards for interstate and intrastate surface waters in New Mexico.

## **PROPOSED SCHEDULE**

The additional delineation activities are proposed to be completed by July 30, 2019. Prior to any fieldwork, LTE and/or Hilcorp will provide the NMOCD with 48-hour notification. Following the proposed additional delineation activities, LTE will assess and present the results to the NMOCD in a supplemental report to the Stage 1 Abatement Plan within three weeks after receipt of the analytical reports. If the subsurface impacts are fully defined, and the geology and hydrology are fully understood, LTE will design and submit remediation options as part of the Stage 2 Abatement Plan for approval from the NMOCD within 60 days of the director's approval of the final site investigation report per NMAC 19.15.30.13.D (1).

LTE appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this update to the Stage 1 Abatement Plan, do not hesitate to contact me at (970) 385-1096 or via email at <a href="mailto:dburns@ltenv.com">dburns@ltenv.com</a> or Jennifer Deal at (505) 324-5128 or at <a href="mailto:jdeal@hilcorp.com">jdeal@hilcorp.com</a>.





Sincerely,

LT ENVIRONMENTAL, INC.

Danny Burns Project Geologist

Ashley Ager, P.G. Senior Geologist

ashley L. ager

cc: Jennifer Deal, Hilcorp Energy Company

## Attachments:

Figure 1 – Site Location Map

Figure 2 – Monitoring Well Locations

Figure 3 – Soil Analytical Results

Figure 4 – March 2019 Groundwater Potentiometric and PSH Thickness Map

Figure 5 – March 2019 Groundwater Analytical Results

Table 1 – Soil Analytical Results

Table 2 – Groundwater Elevations

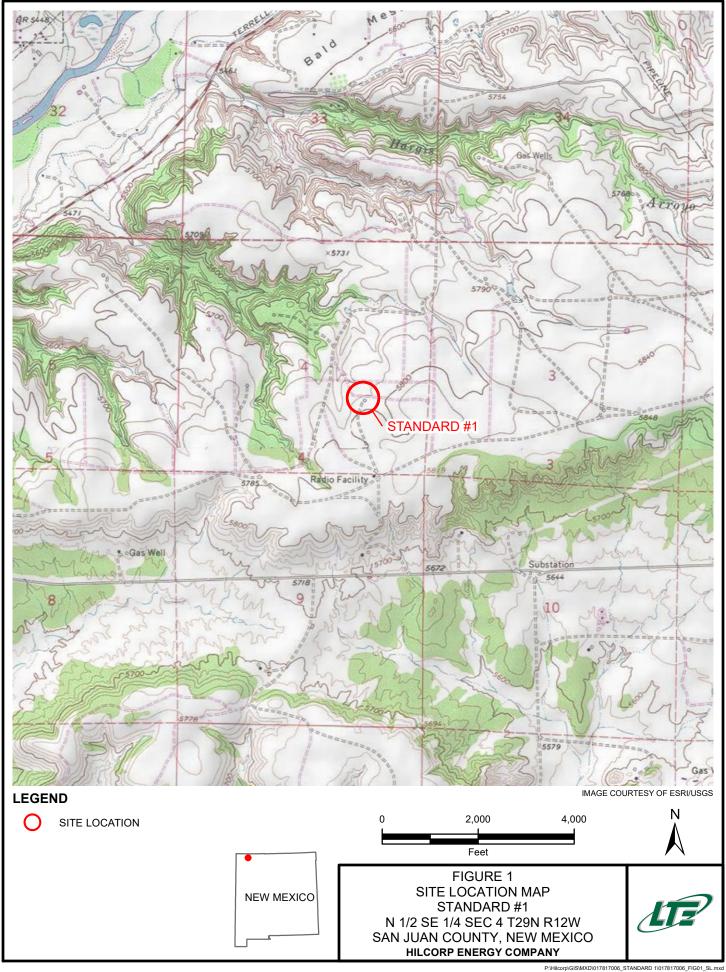
Table 3 – Groundwater Analytical Results

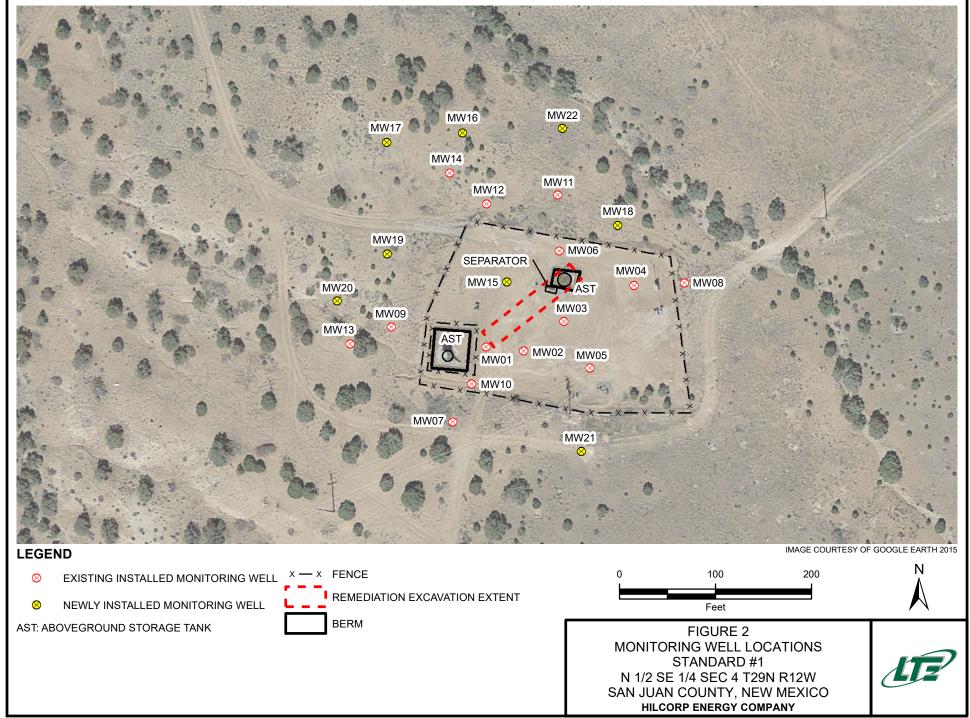
Attachment 1 – Soil Boring Logs

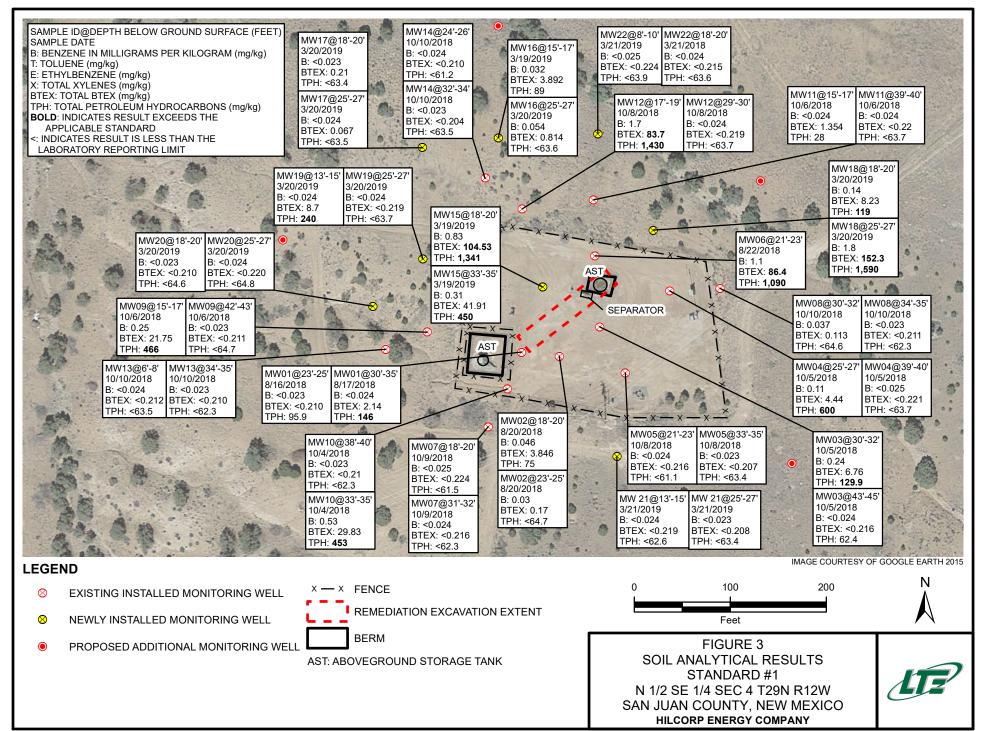
Attachment 2 – Laboratory Analytical Reports

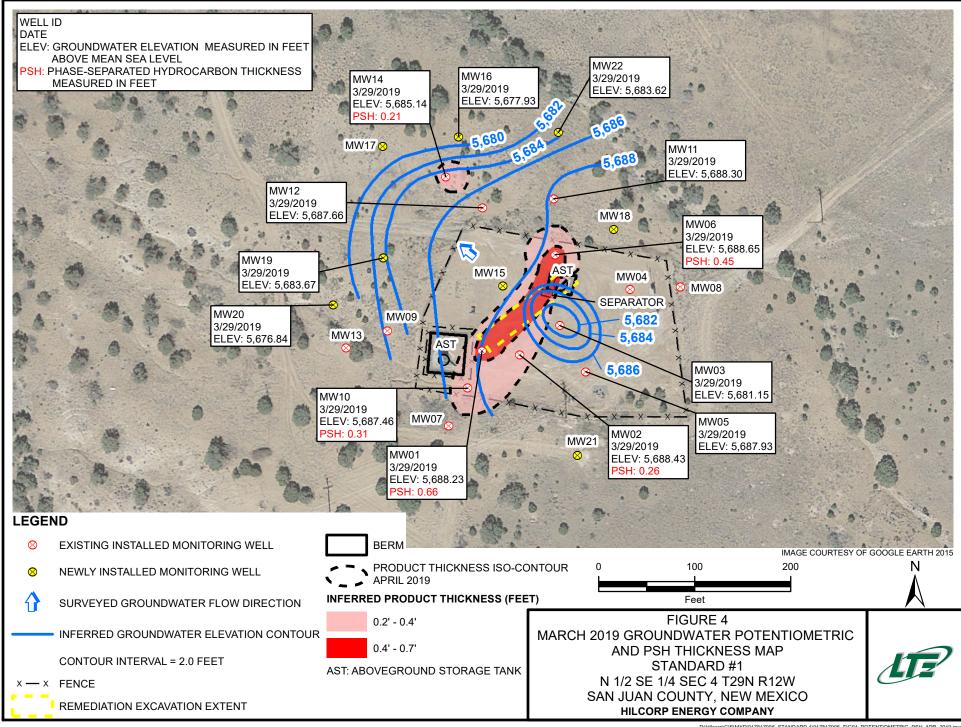


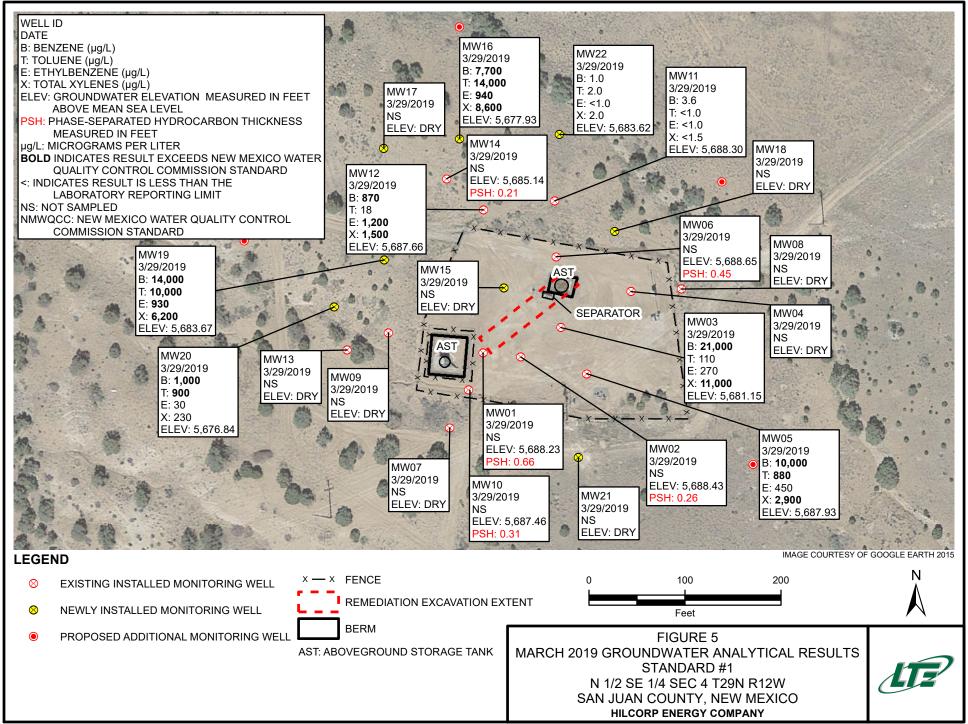














# TABLE 1 SOIL ANALYTICAL RESULTS

# STANDARD #1 SAN JUAN COUNTY, NEW MEXICO HILCORP ENERGY COMPANY

Soil Sample Identification	Sample Date	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
MW01 @ 23' - 25'	8/16/2018	111	<0.023	<0.047	<0.047	< 0.093	<0.210	9.9	16	70	95.9
MW01 @ 30' - 35'	8/17/2018	67.3	<0.024	0.20	0.14	1.8	2.14	46	26	74	146
MW02 @ 18' - 20'	8/20/2018	1,809	0.046	0.64	0.26	2.9	3.85	38	37	<49	75
MW02 @ 23' - 25'	8/20/2018	11.0	0.030	0.14	<0.047	< 0.094	0.17	<4.7	<10	<50	<64.7
MW03 @ 30' - 32'	10/5/2018	24.79	0.24	1.7	0.42	4.4	6.76	120	9.9	<49	129.9
MW03 @ 43' - 45'	10/5/2018	11.8	<0.024	<0.048	<0.048	< 0.096	<0.216	<4.8	<9.6	<48	62.4
MW04 @ 25' - 27'	10/5/2018	2,014	0.11	0.82	0.31	3.2	4.44	150	330	120	600
MW04 @ 39' - 40'	10/5/2018	51.4	<0.025	< 0.049	<0.049	<0.098	<0.221	<4.9	<9.8	<49	<63.7
MW05 @ 21' - 23'	10/8/2018	496.7	<0.024	<0.048	<0.048	< 0.096	<0.216	<4.8	<9.3	<47	<61.1
MW05 @ 33' - 35'	10/8/2018	19.2	<0.023	<0.046	<0.046	< 0.092	<0.207	<4.6	<9.8	<49	<63.4
MW06 @ 21' - 23'	8/22/2018	233	1.1	25	5.3	55	86.4	950	140	<49	1,090
MW07 @ 18' - 20'	10/9/2018	18.6	<0.025	<0.050	<0.050	< 0.099	<0.224	<5.0	<9.5	<47	<61.5
MW07 @ 31' - 32'	10/9/2018	4.2	<0.024	<0.048	<0.048	< 0.096	<0.216	<4.8	<9.5	<48	<62.3
MW08 @ 30' - 32'	10/10/2018	11.5	0.037	0.076	<0.047	< 0.095	0.113	<4.7	<9.9	<50	<64.6
MW08 @ 34' - 35'	10/10/2018	10.6	<0.023	<0.047	<0.047	< 0.094	<0.211	<4.7	<9.6	<48	<62.3
MW09 @ 15' - 17'	10/6/2018	1,821	0.25	3.0	1.5	17	21.75	430	36	<46	466
MW09 @ 42' - 43'	10/6/2018	5.6	<0.023	< 0.047	<0.047	< 0.094	<0.211	<4.7	<10	<50	<64.7
MW10 @ 33' - 35'	10/4/2018	2,615	0.53	8.2	2.1	19	29.83	360	93	<48	453
MW10 @ 38' - 40'	10/4/2018	6.5	<0.023	< 0.047	<0.047	< 0.093	<0.21	<4.7	<9.6	<48	<62.3
MW11 @ 15' - 17'	10/6/2018	32.8	<0.024	0.060	0.094	1.2	1.354	28	<9.5	<47	28
MW11 @ 39' - 40'	10/6/2018	8	<0.024	<0.049	<0.049	<0.098	<0.22	<4.9	<9.8	<49	<63.7
MW12 @ 17' - 19'	10/8/2018	28.9	1.7	19	6.0	57	83.7	1,300	130	<46	1,430
MW12 @ 29' - 30'	10/8/2018	10	<0.024	<0.049	<0.049	< 0.097	<0.219	<4.9	<9.8	<49	<63.7
MW13 @ 6' - 8'	10/10/2018	10	<0.024	<0.047	<0.047	< 0.094	<0.212	<4.7	<9.8	<49	<63.5
MW13 @ 34' - 35'	10/10/2018	3	<0.023	<0.047	<0.047	< 0.093	<0.210	<4.7	<9.6	<48	<62.3
MW14 @ 24' - 26'	10/10/2018	18.8	<0.024	<0.047	<0.047	<0.095	<0.210	<4.7	<9.5	<47	<61.2
MW14 @ 32' - 34'	10/10/2018	2.3	<0.023	<0.046	<0.046	<0.092	<0.204	<4.6	<9.9	<49	<63.5
MW15 @ 18' - 20'	3/19/2019	1,569	0.83	23	6.7	74	104.53	800	231	310	1,341
MW15 @ 33' - 35'	3/19/2019	129.7	0.31	8.9	2.7	30	41.91	350	100	<47	450
MW16 @15' - 17'	3/19/2019	1,417	0.032	0.28	0.28	3.3	3.892	55	34	<50	89
MW16 @ 25' - 27'	3/20/2019	4.6	0.054	0.38	<0.048	0.38	0.814	<4.8	<9.8	<49	<63.6



Standard #1 - Soil Results Page 1 of 2

# TABLE 1 SOIL ANALYTICAL RESULTS

# STANDARD #1 SAN JUAN COUNTY, NEW MEXICO HILCORP ENERGY COMPANY

Soil Sample Identification	Sample Date	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
MW17 @ 18' - 20'	3/20/2019	12.8	<0.023	0.11	<0.046	0.10	0.210	<4.6	<9.8	<49	<63.4
MW17 @ 25' - 27'	3/20/2019	11.5	<0.024	0.067	<0.048	< 0.097	0.067	<4.8	<9.7	<49	<63.5
MW18 @ 18' - 20'	3/20/2019	2,642	0.14	1.9	0.19	6.0	8.23	48	71	<48	119
MW18 @ 25' - 27'	3/20/2019	2,222	1.8	41	9.5	100	152.30	1,400	190	<48	1,590
MW19 @ 13' - 15'	3/20/2019	2,580	<0.024	1.3	0.7	6.7	8.7	220	20	<49	240
MW19 @ 25' - 27'	3/20/2019	11.3	<0.024	<0.049	<0.049	< 0.097	<0.219	<4.9	<9.8	<49	<63.7
MW20 @ 18' - 20'	3/20/2019	26.3	<0.023	<0.047	<0.047	< 0.093	<0.210	<4.7	<9.9	<50	<64.6
MW20 @ 25' - 27'	3/20/2019	26.0	<0.024	<0.049	<0.049	<0.098	<0.220	<4.9	<9.9	<50	<64.8
MW21 @ 13' - 15'	3/21/2019	2.6	<0.024	<0.049	<0.049	< 0.097	<0.219	<4.9	<9.7	<48	<62.6
MW21 @ 25' - 27'	3/21/2019	2.3	<0.023	<0.046	<0.046	< 0.093	<0.208	<4.6	<9.8	<49	<63.4
MW22 @ 8' - 10'	3/21/2019	0.6	<0.025	<0.050	<0.050	< 0.099	<0.224	<5.0	<9.9	<49	<63.9
MW22 @ 18' - 20'	3/21/2018	0.3	<0.024	<0.048	<0.048	< 0.095	<0.215	<4.8	<9.8	<49	<63.6
NMOCD Remedi	NMOCD Remediation Action Level			NE	NE	NE	50	NE	NE	NE	100

#### NOTES:

BTEX - benzene, toluene, ethylbenzene, and total xylenes analyzed by US EPA Method 8021B

DRO - diesel range organics analyzed by US EPA Method 8015D

GRO - gasoline range organics analyzed by US EPA Method 8015D

mg/kg - milligrams per kilogram

MRO - motor oil range organics analyzed by US EPA method 8015D

NA - not applicable

NE - not established

NMOCD - New Mexico Oil Conservation Division

PID - photo-ionization detector

ppm - parts per million

Table 1 - Closure Criteria for Soils Impacted by a Release per 19.15.19 August 2018

TPH - total petroleum hydrocarbons (sum of GRO, DRO, and MRO)

< - indicates result is less than the stated laboratory reporting limit

**Bold** - indicates value exceeds stated NMOCD standard



Standard #1 - Soil Results Page 2 of 2

# TABLE 2 GROUNDWATER ELEVATION SUMMARY

# STANDARD #1 SAN JUAN COUNTY, NEW MEXICO HILCORP ENERGY COMPANY

Well Name	Date	Top of Casing Elevation (feet)	Depth to Product (feet BTOC)	Depth to Groundwater (feet BTOC)	Product Thickness (feet)	Groundwater Elevation (feet)
	10/17/2018		20.85	21.00	0.15	5,688.17
MW01	10/22/2018	5,709.05	20.80	20.97	0.17	5,688.22
	3/29/2019		20.69	21.35	0.66	5,688.23
	10/17/2018			21.22		5,688.11
MW02	10/22/2018	5,709.33		21.12		5,688.21
	3/29/2019		20.85	21.11	0.26	5,688.43
	10/17/2018			32.52		5,679.53
MW03	10/22/2018	5,712.05		DRY		DRY
	3/29/2019			30.90		5,681.15
	10/17/2018			31.84		5,680.49
MW04	10/22/2018	5,712.33		31.80		5,680.53
	3/29/2019			DRY		DRY
	10/17/2018			28.54		5,684.04
MW05	10/22/2018	5,712.58		28.39		5,684.19
	3/29/2019			24.65		5,687.93
	10/17/2018		24.60	24.93	0.33	5,687.62
MW06	10/22/2018	5,712.29	24.08	24.48	0.40	5,688.13
	3/29/2019		23.55	24.00	0.45	5,688.65
	10/17/2018			DRY		DRY
MW07	10/22/2018	5,711.08		DRY		DRY
	3/29/2019			DRY		DRY
	10/17/2018			DRY		DRY
MW08	10/22/2018	5,712.42		DRY		DRY
	3/29/2019			DRY		DRY
	10/17/2018			DRY		DRY
MW09	10/22/2018	5,706.12		DRY		DRY
	3/29/2019			DRY		DRY
	10/17/2018			DRY		DRY
MW10	10/22/2018	5,709.25		32.26		5,676.99
	3/29/2019		21.73	22.04	0.31	5,687.46



# TABLE 2 GROUNDWATER ELEVATION SUMMARY

# STANDARD #1 SAN JUAN COUNTY, NEW MEXICO HILCORP ENERGY COMPANY

Well Name	Date	Top of Casing Elevation (feet)	Depth to Product (feet BTOC)	Depth to Groundwater (feet BTOC)	Product Thickness (feet)	Groundwater Elevation (feet)
	10/17/2018			20.00		5,687.93
MW11	10/22/2018	5,707.93		19.89		5,688.04
	3/29/2019	,		19.63		5,688.30
	1 40/47/2040					5 607 64
MW12	10/17/2018	F 700 F4		21.90 21.77		5,687.64
IVIVV12	10/22/2018 3/29/2019	5,709.54		21.77		5,687.77 5,687.66
	3/29/2019			21.88		5,687.66
	10/17/2018			DRY		DRY
MW13	10/22/2018	5,705.12		DRY		DRY
	3/29/2019			DRY		DRY
	10/17/2018			DRY		DRY
MW14	10/22/2018	5,705.44		22.87		5,682.57
	3/29/2019		20.26	20.47	0.21	5,685.14
MW15	3/29/2019	5,712.21		DRY		DRY
MW16	3/29/2019	5,706.52		28.59		5,677.93
MW17	3/29/2019	5,705.22		DRY		DRY
MW18	3/29/2019	5,709.31		DRY		DRY
MW19	3/29/2019	5,703.27		19.60		5,683.67
MW20	3/29/2019	5,706.45		29.61		5,676.84
MW21	3/29/2019	NA		DRY		DRY
MW22	3/29/2019	5,706.18		22.56		5,683.62

# Notes:

BTOC - below top of casing

NA- not assessed

A product density factor of 0.8 was used to account for the presence of free product.



# TABLE 3 GROUNDWATER ANALYTICAL RESULTS

# STANDARD #1 SAN JUAN COUNTY, NEW MEXICO HILCORP ENERGY COMPANY

Monitoring Well Identification	Sample Date	Benzene (μg/L)	Toluene (μg/L)	Ethylbenzene (µg/L)	Total Xylenes (μg/L)
MW02	10/22/2018	14,000	7,100	1,200	12,000
MW03	3/29/2019	21,000	110	270	11,000
MW05	3/29/2019	10,000	880	450	2,900
MW10	10/22/2018	22,000	21,000	1,600	13,000
MW11	10/22/2018 3/29/2019	<1.0 3.6	<1.0 <1.0	<1.0 <1.0	<1.5 <1.5
MW12	10/22/2018 3/29/2019	2,400 870	<b>3,800</b> 18	1,100 1,200	5,000 1,500
MW14	10/22/2018	13,000	26,000	1,100	10,000
MW16	3/29/2019	7,700	14,000	940	8,600
MW19	3/29/2019	14,000	10,000	930	6,200
MW20	3/29/2019	1,000	900	30	230
MW22	3/29/2019	1.0	2.0	<1.0	2.0
NMWQCC	NMWQCC Standard		750	750	620

## NOTES:

μg/L - micrograms per liter

NMWQCC - New Mexico Water Quality Control Commission

< - indicates result is less than the stated laboratory reporting limit

**Bold** - indicates value exceeds stated NMWQCC standard





	300	3.00	Pon .				1	L	Advancing 0	pportunity	
				P. La	. /		IN		848 E. 2nd	Ave	<u>,</u>
****			.2					BORING		<i>Colorado 81301</i> G WELL COMPLETIC	ON DIAGRAM
4 40 4	1 80	L	• • • •	.07				oring/Well N	Number: MW15	Project: Standar	rd #1
0.5%	100	.0 0						ate:	3/19/2019	Project Number: 017817	7006
Google Earth		3 10				3.		ogged By:	Eric Carroll	Drilled By:  Casca	nde
Elevation: 5 Gravel Pack:	5,795		Detector:		PID			Drilling Meth Seal:	Sonic	Sampling Method: Contin	uous
10-20 S Casing Type:	Silica S	Sand	(25'	- 37')					ntonite Chips (23' - 24')	Bentonite Slurry Hole Diameter:	(0' - 23')  Depth to Liquid:
Schedu Screen Type:	ıle 40 l	PVC		Slot:				Diameter:		6" Total Depth:	NA Depth to Water:
Schedu	ıle 40		ç.;	0.0	10"	l		2		37'	28'
Penetration Resistance	Moisture	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology	//Remarks	Well Completion
	Dry Moist	<ul><li>5.6</li><li>7.2</li></ul>	No No		0   1   2   3   4   5   6   7   8   9   10   11   12   13   13   14   15   15   15   15   15   15   15	1		SW-SM	Dry, Compact, light r sorted sand, so SAA no s Moist, loose, sandy gra- stain/	ome silt <30% stain/odor vel, cobbles up to 6" no	Stick Up
M	loist	30.1	No		14 <u> </u>	<u> </u>		GP	SAA no s	stain/odor	+

								Boring/Well #			
			7						Project:	MW15 Standard #1	
			Ad	vanoi	na Or	norti	un	itu	Project #	017817006	
			Au	varici	ng Op	νρυπι	וווג	<i></i>	Date	3/19/2019	
Penetrat Resistar	Moistu: Conter	Vapoi (ppm)	Stainin	Sample	Depth (ft. bgs.)	Sample Run	Recove	Soil/Ro Type	Lithology/Remarks		Well Completion
					15						
					16 <u> </u>	- -				-	+
					17	- -				-	<del>-</del>
					18	-				-	<del>-</del>
	Moist	1569	Yes	MW15	19	-		GP	Loose, dark brown	coarse sand with gravel and	<del>-</del>
				@ 18' -	20					eter, HC staining and strong	<del>-</del>
				20'	21	-				odor -	<del>-</del>
					22	-				-	+ +
					23	=				-	<del>-</del>
	Moist	1452	No		24	-		SC	Compact light vel	llow brown, sand some clay	
	Wioist	1132	110		25			Se		staining, slight odor	-
					26	-				-	‡
					27	-				-	‡
					28	-					‡ 🗏
	Moist	497.50	No		29	=		SC	~	<u>.</u>	‡
					30				SAA	no stain/odor -	‡ ∏ ∥
					31					-	‡ ∏ ∥
					32	-					‡
					33	-					‡ #
	Moist	129.7	No	MW15	34				Compact light v	ellow brown, clayey sand,	‡
	1110151	127.1	110	@ 33' - 35'	35	-				tone, no stain, slight odor	‡ #
					36					TD at 37'	‡ 🛱 🎚
					37						

	4. 300	100	No. of		*		1 N	L	Advancing (	Opportunity	
				Park.					848 E. 2nd Durango.	d Ave Colorado 81301	
							1	Section 1	G LOG/MONITORING	G WELL COMPLETI	ON DIAGRAM
	0, 80			202			•	oring/Well I	Number: MW16	Project: Standa	ard #1
0.00	0	.0 4		•		•		ate:	3/19/2019	Project Number: 01781 Drilled By:	7006
Google Earth								ogged By:	Eric Carroll	Case Sampling Method:	cade
Elevation: Gravel Paci	5,795		Detector:		PID			Drilling Meth Seal:	Sonic	Conti	nuous
	0 Silica	Sand	(15'	- 27')					ntonite Chips (14' - 15')  Length:	Bentonite Slurry	(0' - 14')  Depth to Liquid:
	dule 40	PVC		Slot:				Diameter:		6" Total Depth:	NA Depth to Water:
Sche	dule 40		ر ن	0.0	10"		I	2		27'	18'
Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Litholog	y/Remarks	Well Completion
	Dry	0.0	No No		0   1   2   3   4   5   6   7   8   9   10   11   12   13   13   14   15   15   15   15   15   15   15	2		SW-SM	Dry, loose sand and grastain	sh brown, poorly sorted race clay to 3'  avel, trace silt <10%, no //odor	Stick Up
	Moist	39.6	No		14 _	<del> </del>  -		GP		rown, sand and gravel leter, no stain/odor	<del>+</del>

						Boring/Well#	MW16		
						Project:	Standard #1		
	/ n.d.	ionoi	na Onnarti	ın	itu	Project #	017817006		
	AUI	allUl	ng Opportu	1111	ıy	Date	3/19/2019		
Penetrat Resistar Moistu Conter Vapoi (ppm)	Stainin	Sample	Depth Sample (ft. bgs.) Run	Recove	Soil/Ro Type	Lithology/Remarks		Well Completion	
Moist 1417  Moist 1200  Moist 6.9  Moist 4.6	Yes	MW16 @15'- 17'	15	R	ĞP SC	>6" diameter, F  Loose, reddish brov >6" diameter, F  Dense, yellow b  mottles	wn, sand and gravel cobbles IC staining, strong odor wn, sand and gravel cobbles IC staining, strong odor  brown, sandy clay, white s, no stain/odor  no stain/odor		

Coopetary Elevation:	Detector:					G LOG/MONITORING W Number: MW17  3/20/2019  Eric Carroll	ve Iorado 81301	d #1 006
5,795 Gravel Pack:	(15) 250	PID			Seal:	Sonic	Grout:	
10-20 Silica Sand Casing Type: Schedule 40 PVC	(15' - 27')				Diameter:	ntonite Chips (14' - 15')  Length: 2" 20'	Bentonite Slurry  Hole Diameter:  6"	(0' - 14')  Depth to Liquid:  NA
Screen Type: Schedule 40 PVC	Slot:	010"			Diameter:	Length: 10'	Total Depth:	Depth to Water:
Resistance Moisture Content	HC Staining?		Sample Run	Recovery	Soil/Rock Type	Lithology/Re		Well Completion
Dry 0.0  Dry 2.7  Dry 2.0  Moist 5.8	No No	0   1   2   3   4   5   6   7   8   10   11   12   13   14   2   15	2		SM SM	Dry, loose, light brown, poor with gravel, trace cobbles <10%, no stainin SAA, no stain SAA, no stain SAA, very light brown, diameter, no stain diameter, no stain Moist, loose, dark reddish with gravel cobbles > 8" diameter state of the st	up to 4" diameter g, no odor  n/odor  cobbles up to 8" nin/odor  brown, silty sand	Stick Up

								Boring/Well #	MW17		
									Project:	Standard #1	
	14								Project #	017817006	
	4/6	2	Aa	vanci	ng up	porti	ını	ITY	Date	3/20/2019	
					I D 4	1.0					XX7 11
Penetrat Resistar	Moistu Conter	Vаро (ррт	Stainir	Sample	(ft. bgs.)	Sample Run	20Ve	Soil/Ro_Type	Litho	ology/Remarks	Well Completion
Pen Res	ğζ	> <del>1</del>	Sta	Saı	(it. ogs.)	Run	Re	Soi			Completion
					15					_	
						LI.					ļ       <b> </b>
					16	H				_	+
					17	-					†
					_	4				<del>-</del>	
					18	H				_	├  -
					19	-				<del> </del>	
	Moist	12.8	No	MW17		Ħ		SC	Compact, dark ye	llow brown, sandy clay, no	<u>†</u> [
				@18' -	20				:	stain/odor	
				20'	21	-					┼ ├ <del> </del>
					_	Ħ				<del>-</del>	†   <del> </del>
					22					_	
					23	- 5				•	⊦  -  II
					25 _	Н				<del>-</del>	<del>├</del> ├┤ Ⅱ
					24					_	
	Moist	11.5	No	MW17	25	-		SC	SAA, light yell	ow brown, no stain/odor	↓
				@ 25'- 27'	25					-	├
					26	6				•	t
					<u>-</u> -	Π °			SAA	, no stain/odor	I 🖂 II
					27	1				,	
					28	-				•	<del> </del>
					_					<del>-</del>	[
					29	H				-	<b>├</b>
					30	H				•	†   <b> </b>
					_	Ĭ				- -	<u>†</u>
					31	H				<u>-</u>	ļ   <b> </b>
					20	H					ļ   <b> </b>
					32	H				-	<del> </del>
					33	j				•	<u>†</u>
					_					<del>-</del>	<u> </u>
					34	H				-	├
					35	H				•	†
					_	Į				-	Ţ   <b> </b>
					36	H				-	<b>├</b>
					37	H					<del> </del>
	<u>I</u>	1		<u> </u>	51		<u> </u>	1	1		-

	4. 300	3700	No.			X	1 N		Advancing Oppo	rtunity	
			. 7			1			848 E. 2nd Av		·
***		17	.2					RODING	<i>Durango, Col</i> G LOG/MONITORING WI		N DIA CRAM
4 4 6	9.00							Boring/Well N	Number:	Project:	
	0,00				0.0			Date:	MW18	Standard Project Number:	d #1
	0	3	<b>)</b> ,	•				Logged By:	3/20/2019	017817 Drilled By:	006
Google Earth	Ca .			. , 1					Eric Carroll	Casca	de
Elevation:	5,795		Detector:		PID			Drilling Meth	od: Sonic	Sampling Method:  Continu	ous
Gravel Pack 10-20	c: O Silica	Sand	(15'	- 27')				Seal: Bei	ntonite Chips (14' - 15')	Grout: Bentonite Slurry	(0' - 14')
Casing Typ								Diameter:	Length:	Hole Diameter:	Depth to Liquid: NA
Screen Typ	e:			Slot:	10"			Diameter:	Length:	Total Depth:	Depth to Water:
	dule 40		9.3	0.0	10"			2	10'	27'	18'
ratio	Moisture Content	udd)	Staining?	Sample #	Depth	Sample	very	oil/Rock Type	Lithology/Rei	narke	Well
Penetration Resistance	Mois Con	Vapor (ppm)	HC St	Sam	(ft. bgs.)	Run	Recovery	Soil/Rock Type	Lithology/Rei	narks	Completion
F	Moist	0.0	H No		0	II		SC		1.000	Stick Up
	Wioist	0.0	140		<u>'</u>	<u> </u>		50	Moist, brown, sandy clay, t no staining, no	-	Otlok Op
					1 _	H			5	_	
					2	1				- -	<u> </u>
					3					<u>.</u>	
					4 -	-					<u> </u>
	Dry	0.8	No		_			SM	Dry, light brown, silty sand		<del> -</del>  -
					5 _				no stain/od	or _	
					6					- -	<u> </u>
					7					<u>.</u>	
					8	- 2					<u> </u>
					_					<del>-</del>	<del> </del>  -
					9 _	H		SM	G.A.A	<u>-</u>	
		2.1			10				SAA, trace clay < 10%	, no stain/odor -	<del> </del>
	Moist	2.1	No		11	-		SP	Moist, brown, poorly grade	_	<u> </u>
									<40%, cobbles up to 5" dian	neter, no stain/odor	
					12	3				<u>-</u>	
					13					<u>-</u>	<del> </del>
	XX7-4	4.7	NT.		14			an ac		- -	
	Wet	4.7	No		15	-		SP-SC	SAA, with clay <25%,	no stain/odor	

									T		
									Boring/Well #	MW18	
							Project:	Project:         Standard #1           Project #         017817006			
	<b>/7</b> /		Adv	<i>rancii</i>	าด Оп	norti	ıni	tv	Date 3/20/2019		
Advancing Opportunity							Date	3/20/2019			
Penetrat Resistar	Penetrat Resistar Conter Conte						Lithology/Remarks		Well Completion		
Pe R	Moist	2642	Yes, gray and	MW18 @ 18'- 20'	15   16   17   18   19   20   21   21   15   15   15   15   15   15	4	R	SP-SC	gravel and silt <2 Moist, tan brown, s	graded sand with clay, trace 20%, no staining, HC odor andy clay, trace gravel <5%, staining, strong HC odor	
	Moist	2222	Yes, dark gray	MW18 @ 25'- 27'	22 - 23 - 24 - 25 - 26 - 27 -	5		CL		with light brown mottling, aining and strong HC odor	
					28					-	

#### Advancing Opportunity 848 E. 2nd Ave Durango, Colorado 81301 BORING LOG/MONITORING WELL COMPLETION DIAGRAM Boring/Well Number: Project: MW19 Standard #1 Project Number: 3/20/2019 017817006 Drilled By: Logged By: Eric Carroll Cascade Drilling Method: Sampling Method: PID Sonic Continuous Gravel Pack: Seal: Grout: (15' - 27')Bentonite Chips (14' - 15') Bentonite Slurry (0' - 14')10-20 Silica Sand Casing Type: Diameter: Length: Hole Diameter: Depth to Liquid: Schedule 40 PVC 20' 6" NA Slot: Diameter: Length: Total Depth: Depth to Water: Screen Type: Schedule 40 PVC 0.010" 10' 18' HC Staining? Vapor (ppm) Penetration Resistance Soil/Rock Type Moisture Content Sample # Recovery Depth Sample Well Lithology/Remarks Run (ft. bgs.) Completion Moist 0 SC Stick Up Moist, brown, sandy clay, trace silt <10%, no staining, no odor 2 1 3 Dry, brown, silty sand with gravel <40%, Dry 18.8 No SMcobbles up to 6" diameter, no stain/odor 5 6 2 8 9 SM SAA, no stain/odor Dry 18.9 10 No 11 12 13 3 14 SP Moist, brown, poorly graded sand with gravel, Moist 2580 MW19 Yes, @ 13'trace clay <10%, trace orange staining, slight 15 orange 15' HC odor

					D ' /W/ 11 //	NOVIO	
					Boring/Well #	MW19 Standard #1	
			Project:         Standard #1           Project #         017817006				
	dvanci	ng Opportu					
	a v ai i i i i i	ig oppoitu	1116		Date	3/20/2019	
Penetrat Resistat Moistu Contet Vapo (ppm	Sample	Depth Sample (ft. bgs.) Run	Recove	Soil/Rock Type	Litho	ology/Remarks	Well Completion
Moist 87.2 Ye gra an orar	y I ge	15		SP  CL-SC  CL	Moist, tan brown tests of the state of the s	olor with dark gray staining, trong HC odor  to dark gray, clay with sand and orange staining, slight HC odor  olor with trace gray staining and HC odor  gray staining, no odor	

		370	100				1 N	L	Advancing Oppo				
								Durango, Colorado 81301					
4 4 6	1 10	Ri					*	BORIN Boring/Well	G LOG/MONITORING W	ELL COMPLETIO	N DIAGRAM		
	0,00			11					MW20	Standard	l #1		
100		.0 0		•			•	Date:	3/20/2019	Project Number: 0178170	006		
03								Logged By:	Eric Carroll	Drilled By:  Cascao	ile		
Google Earth Elevation:	5.705		Detector:	190	DID	1 12 - 185		Drilling Meth	od:	Sampling Method:			
Gravel Pacl					PID			Seal:	Sonic	Grout:			
10-20 Casing Typ	O Silica	Sand	(15' -	- 27')				Be Diameter:	ntonite Chips (14' - 15')  Length:	Bentonite Slurry Hole Diameter:	(0' - 14') Depth to Liquid:		
	dule 40	PVC		Slot:					20'	6" Total Depth:	NA Depth to Water:		
	dule 40	PVC		0.01	10"				Length:	27'	NA		
Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Rer	marks	Well Completion		
	Moist	0.0	No		0			SC	Moist, brown, sandy clay wit	th gravel <30%, no_	Stick Up		
	Dry	13.8	Yes, slight orange and reddish- brown		1	2		SM SM	staining, no o	with gravel <35%, or  lish-brown staining			
	Moist	31.0	No		14 <u> </u>	-		CL	Moist, dark gray with mottle sand, no stain/		-		

			Boring/Well #	MW20	
		Project:			
	dvancing Opport	Project # 017817006			
	availoning opport	Date	3/20/2019	, <u> </u>	
Penetrat Resistat Moistu Contel Vapo (ppm	Depth Sample (ft. bgs.)	Lithology/Remarks		Well Completion	
Dry 26.0 No	@ 18'- 20' 21 22 23 24 5	CL CL	sand, r	brown and gray, clay with no stain/no odor  no stain/odor  no stain/odor  no stain/odor  no stain/odor  no stain/odor	

#### Advancing Opportunity 848 E. 2nd Ave Durango, Colorado 81301 BORING LOG/MONITORING WELL COMPLETION DIAGRAM Boring/Well Number: Project: MW21 Standard #1 Project Number: 3/20/2019 017817006 Drilled By: Logged By: Eric Carroll Cascade Drilling Method: Sampling Method: PID Sonic Continuous (15' - 27')Bentonite Chips (14' - 15') Bentonite Slurry (0' - 14')10-20 Silica Sand Depth to Liquid: Casing Type: Diameter: Length: Hole Diameter: Schedule 40 PVC 20' 6" NA Slot: Depth to Water: Total Depth: Screen Type: Diameter: Length: Schedule 40 PVC 0.010" 10' 27' NA HC Staining? Penetration Resistance Soil/Rock Type Sample # Moisture Content Sample Well Depth Lithology/Remarks Run (ft. bgs.) Completion Moist 0.0 No 0 SC Moist, brown, sandy clay with gravel <30%, no Stick Up staining, no odor 1 2 1 3 4 Dry, light brown, silty sand with gravel <45%, 3.7 SMDry No no stain/odor 5 SP-SC Light brown, poorly graded sand with clay <35% and gravel <30%, no stain/odor 6 2 8 10 SP-SC SAA, no stain/odor Dry 1.1 No 11 12 3 13 14 MW21 Dry 4.3 SM No Dry, brown, silty sand with gravel <45%, @ 13'cobbles up to 6" diameter, no stain/odor 15 15'

#### Advancing Opportunity 848 E. 2nd Ave Durango, Colorado 81301 BORING LOG/MONITORING WELL COMPLETION DIAGRAM Boring/Well Number: Project: MW22 Standard #1 Project Number: Date: 3/21/2019 017817006 Logged By: Drilled By: Eric Carroll Cascade Sampling Method: Drilling Method: PID Continuous Sonic Seal: Grout: 10-20 Silica Sand (15' - 27')Bentonite Chips (14' - 15') Bentonite Slurry (0' - 14')Depth to Liquid: Diameter: Hole Diameter: Casing Type: Length: 20' Schedule 40 PVC 6" NA Screen Type: Diameter: Length: Total Depth: Depth to Water: Schedule 40 PVC 0.010" 10' 20' NAHC Staining? Vapor (ppm) Penetration Resistance Moisture Content Soil/Rock Type Sample # Sample Depth Well Lithology/Remarks (ft. bgs.) Run Completion No SM Loose, dry, reddish-brown, silty sand, no Stick Up Dry 0 staining, no odor 2 1 3 4 Loose, dry, reddish-brown, silty sand with 0.4 No SMDry gravel, no stain/odor 5 6 8 2 MW22 Loose, moist, poorly graded sand and gravel, SP Moist 0.6 No 10 @ 8'cobbles up to 6" diameter, no stain/odor 10' SAA, no stain/odor SP 11 12 3 13 14 Moist 0.0 No CL-ML Dense, moist, dark yellow brown, silty clay, no stain/odor 15

		Boring/Well #	MW22	
		Project:	Standard #1	
Advant	cing Opportunity	Project # 017817006		
Advant		Date	3/21/2019	
Penetrat Resistan Moistu Contei Vapo (ppm) Stainir		Litho	ology/Remarks	Well Completion
Moist 0.3 No MW @ 13 20	8'-	SAA	, no stain/odor	





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

April 01, 2019

Jennifer Deal Hilcorp Energy PO Box 61529

Houston, TX 77208-1529 TEL: (337) 276-7676

FAX

RE: Standard 1 OrderNo.: 1903A69

#### Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 16 sample(s) on 3/22/2019 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman

Laboratory Manager

andy

4901 Hawkins NE

Albuquerque, NM 87109

### Lab Order **1903A69**

Date Reported: 4/1/2019

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 15 18-20'

 Project:
 Standard 1
 Collection Date: 3/19/2019 3:00:00 PM

 Lab ID:
 1903A69-001
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst	: JME
Diesel Range Organics (DRO)	230	9.7		mg/Kg	1	3/26/2019 9:26:35 AM	43859
Motor Oil Range Organics (MRO)	310	48		mg/Kg	1	3/26/2019 9:26:35 AM	43859
Surr: DNOP	101	70-130		%Rec	1	3/26/2019 9:26:35 AM	43859
EPA METHOD 8015D: GASOLINE RANGE						Analyst	: NSB
Gasoline Range Organics (GRO)	800	93		mg/Kg	20	3/28/2019 12:11:00 AM	43839
Surr: BFB	198	73.8-119	S	%Rec	20	3/28/2019 12:11:00 AM	43839
EPA METHOD 8021B: VOLATILES						Analyst	: NSB
Benzene	0.83	0.47		mg/Kg	20	3/28/2019 12:11:00 AM	43839
Toluene	23	0.93		mg/Kg	20	3/28/2019 12:11:00 AM	43839
Ethylbenzene	6.7	0.93		mg/Kg	20	3/28/2019 12:11:00 AM	43839
Xylenes, Total	74	1.9		mg/Kg	20	3/28/2019 12:11:00 AM	43839
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	20	3/28/2019 12:11:00 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 15 33-35'

 Project:
 Standard 1
 Collection Date: 3/19/2019 3:30:00 PM

 Lab ID:
 1903A69-002
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst	JME
Diesel Range Organics (DRO)	100	9.4		mg/Kg	1	3/26/2019 5:43:41 PM	43859
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	3/26/2019 5:43:41 PM	43859
Surr: DNOP	89.6	70-130		%Rec	1	3/26/2019 5:43:41 PM	43859
EPA METHOD 8015D: GASOLINE RANGE						Analyst	NSB
Gasoline Range Organics (GRO)	350	23		mg/Kg	5	3/28/2019 12:34:36 AM	43839
Surr: BFB	307	73.8-119	S	%Rec	5	3/28/2019 12:34:36 AM	43839
EPA METHOD 8021B: VOLATILES						Analyst	NSB
Benzene	0.31	0.12		mg/Kg	5	3/28/2019 12:34:36 AM	43839
Toluene	8.9	0.23		mg/Kg	5	3/28/2019 12:34:36 AM	43839
Ethylbenzene	2.7	0.23		mg/Kg	5	3/28/2019 12:34:36 AM	43839
Xylenes, Total	30	0.46		mg/Kg	5	3/28/2019 12:34:36 AM	43839
Surr: 4-Bromofluorobenzene	109	80-120		%Rec	5	3/28/2019 12:34:36 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

#### Lab Order **1903A69**

Date Reported: 4/1/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 16 15-17'

 Project:
 Standard 1
 Collection Date: 3/19/2019 6:20:00 PM

 Lab ID:
 1903A69-003
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst	: JME
Diesel Range Organics (DRO)	34	9.9		mg/Kg	1	3/26/2019 6:32:01 PM	43859
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/26/2019 6:32:01 PM	43859
Surr: DNOP	99.5	70-130		%Rec	1	3/26/2019 6:32:01 PM	43859
EPA METHOD 8015D: GASOLINE RANGE						Analyst	: NSB
Gasoline Range Organics (GRO)	55	5.0		mg/Kg	1	3/26/2019 2:38:12 AM	43839
Surr: BFB	307	73.8-119	S	%Rec	1	3/26/2019 2:38:12 AM	43839
EPA METHOD 8021B: VOLATILES						Analyst	: NSB
Benzene	0.032	0.025		mg/Kg	1	3/26/2019 2:38:12 AM	43839
Toluene	0.28	0.050		mg/Kg	1	3/26/2019 2:38:12 AM	43839
Ethylbenzene	0.28	0.050		mg/Kg	1	3/26/2019 2:38:12 AM	43839
Xylenes, Total	3.3	0.10		mg/Kg	1	3/26/2019 2:38:12 AM	43839
Surr: 4-Bromofluorobenzene	113	80-120		%Rec	1	3/26/2019 2:38:12 AM	43839

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

Qualifiers:

- Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Е

- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 16 25-27'

 Project:
 Standard 1
 Collection Date: 3/20/2019 8:45:00 AM

 Lab ID:
 1903A69-004
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	SANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	3/27/2019 6:00:44 PM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/27/2019 6:00:44 PM	43859
Surr: DNOP	97.6	70-130	%Rec	1	3/27/2019 6:00:44 PM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.8	mg/Kg	1	3/28/2019 12:58:09 AM	43839
Surr: BFB	94.4	73.8-119	%Rec	1	3/28/2019 12:58:09 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	0.054	0.024	mg/Kg	1	3/28/2019 12:58:09 AM	43839
Toluene	0.38	0.048	mg/Kg	1	3/28/2019 12:58:09 AM	43839
Ethylbenzene	ND	0.048	mg/Kg	1	3/28/2019 12:58:09 AM	43839
Xylenes, Total	0.38	0.097	mg/Kg	1	3/28/2019 12:58:09 AM	43839
Surr: 4-Bromofluorobenzene	95.3	80-120	%Rec	1	3/28/2019 12:58:09 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 17 18-20'

 Project:
 Standard 1
 Collection Date: 3/20/2019 11:15:00 AM

 Lab ID:
 1903A69-005
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS					Analyst	: JME
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	3/26/2019 8:09:32 PM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/26/2019 8:09:32 PM	43859
Surr: DNOP	97.1	70-130	%Rec	1	3/26/2019 8:09:32 PM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.6	mg/Kg	1	3/28/2019 1:21:43 AM	43839
Surr: BFB	90.2	73.8-119	%Rec	1	3/28/2019 1:21:43 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.023	mg/Kg	1	3/28/2019 1:21:43 AM	43839
Toluene	0.11	0.046	mg/Kg	1	3/28/2019 1:21:43 AM	43839
Ethylbenzene	ND	0.046	mg/Kg	1	3/28/2019 1:21:43 AM	43839
Xylenes, Total	0.10	0.093	mg/Kg	1	3/28/2019 1:21:43 AM	43839
Surr: 4-Bromofluorobenzene	92.5	80-120	%Rec	1	3/28/2019 1:21:43 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 17 25-27'

 Project:
 Standard 1
 Collection Date: 3/20/2019 11:25:00 AM

 Lab ID:
 1903A69-006
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS					Analyst	: JME
Diesel Range Organics (DRO)	ND	9.7	mg/Kg	1	3/26/2019 8:58:16 PM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/26/2019 8:58:16 PM	43859
Surr: DNOP	89.4	70-130	%Rec	1	3/26/2019 8:58:16 PM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.8	mg/Kg	1	3/28/2019 1:45:21 AM	43839
Surr: BFB	87.9	73.8-119	%Rec	1	3/28/2019 1:45:21 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.024	mg/Kg	1	3/28/2019 1:45:21 AM	43839
Toluene	0.067	0.048	mg/Kg	1	3/28/2019 1:45:21 AM	43839
Ethylbenzene	ND	0.048	mg/Kg	1	3/28/2019 1:45:21 AM	43839
Xylenes, Total	ND	0.097	mg/Kg	1	3/28/2019 1:45:21 AM	43839
Surr: 4-Bromofluorobenzene	90.0	80-120	%Rec	1	3/28/2019 1:45:21 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 18 18-20'

 Project:
 Standard 1
 Collection Date: 3/20/2019 1:30:00 PM

 Lab ID:
 1903A69-007
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	ANICS				Analyst	: JME
Diesel Range Organics (DRO)	71	9.7	mg/Kg	1	3/26/2019 9:47:02 PM	43859
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	3/26/2019 9:47:02 PM	43859
Surr: DNOP	93.1	70-130	%Rec	1	3/26/2019 9:47:02 PM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	48	24	mg/Kg	5	3/28/2019 2:08:53 AM	43839
Surr: BFB	113	73.8-119	%Rec	5	3/28/2019 2:08:53 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	0.14	0.12	mg/Kg	5	3/28/2019 2:08:53 AM	43839
Toluene	1.9	0.24	mg/Kg	5	3/28/2019 2:08:53 AM	43839
Ethylbenzene	0.49	0.24	mg/Kg	5	3/28/2019 2:08:53 AM	43839
Xylenes, Total	6.0	0.48	mg/Kg	5	3/28/2019 2:08:53 AM	43839
Surr: 4-Bromofluorobenzene	94.6	80-120	%Rec	5	3/28/2019 2:08:53 AM	43839

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

Qualifiers:

- Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Е

- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 18 25-27'

**Project:** Standard 1
 Collection Date: 3/20/2019 1:45:00 PM

 **Lab ID:** 1903A69-008
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst	: JME
Diesel Range Organics (DRO)	190	9.6		mg/Kg	1	3/26/2019 11:00:09 PM	43859
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	3/26/2019 11:00:09 PM	43859
Surr: DNOP	101	70-130		%Rec	1	3/26/2019 11:00:09 PM	43859
EPA METHOD 8015D: GASOLINE RANGE						Analyst	: NSB
Gasoline Range Organics (GRO)	1400	24		mg/Kg	5	3/28/2019 2:32:24 AM	43839
Surr: BFB	741	73.8-119	S	%Rec	5	3/28/2019 2:32:24 AM	43839
EPA METHOD 8021B: VOLATILES						Analyst	: NSB
Benzene	1.8	1.2		mg/Kg	50	3/28/2019 7:47:53 PM	43839
Toluene	41	2.4		mg/Kg	50	3/28/2019 7:47:53 PM	43839
Ethylbenzene	9.5	2.4		mg/Kg	50	3/28/2019 7:47:53 PM	43839
Xylenes, Total	100	4.8		mg/Kg	50	3/28/2019 7:47:53 PM	43839
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	50	3/28/2019 7:47:53 PM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

### Lab Order **1903A69**

Date Reported: 4/1/2019

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 19 13-15'

 Project:
 Standard 1
 Collection Date: 3/20/2019 3:00:00 PM

 Lab ID:
 1903A69-009
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst	: JME
Diesel Range Organics (DRO)	20	9.8		mg/Kg	1	3/26/2019 11:48:47 PM	43859
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	3/26/2019 11:48:47 PM	43859
Surr: DNOP	97.5	70-130		%Rec	1	3/26/2019 11:48:47 PM	43859
EPA METHOD 8015D: GASOLINE RANGE						Analyst	: NSB
Gasoline Range Organics (GRO)	220	4.7		mg/Kg	1	3/28/2019 2:56:02 AM	43839
Surr: BFB	469	73.8-119	S	%Rec	1	3/28/2019 2:56:02 AM	43839
EPA METHOD 8021B: VOLATILES						Analyst	: NSB
Benzene	ND	0.024		mg/Kg	1	3/28/2019 2:56:02 AM	43839
Toluene	1.3	0.047		mg/Kg	1	3/28/2019 2:56:02 AM	43839
Ethylbenzene	0.70	0.047		mg/Kg	1	3/28/2019 2:56:02 AM	43839
Xylenes, Total	6.7	0.095		mg/Kg	1	3/28/2019 2:56:02 AM	43839
Surr: 4-Bromofluorobenzene	115	80-120		%Rec	1	3/28/2019 2:56:02 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 19 25-27'

 Project:
 Standard 1
 Collection Date: 3/20/2019 3:15:00 PM

 Lab ID:
 1903A69-010
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS					Analyst	: JME
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	3/27/2019 12:37:19 AM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/27/2019 12:37:19 AM	43859
Surr: DNOP	90.2	70-130	%Rec	1	3/27/2019 12:37:19 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	3/28/2019 3:19:40 AM	43839
Surr: BFB	92.1	73.8-119	%Rec	1	3/28/2019 3:19:40 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.024	mg/Kg	1	3/28/2019 3:19:40 AM	43839
Toluene	ND	0.049	mg/Kg	1	3/28/2019 3:19:40 AM	43839
Ethylbenzene	ND	0.049	mg/Kg	1	3/28/2019 3:19:40 AM	43839
Xylenes, Total	ND	0.097	mg/Kg	1	3/28/2019 3:19:40 AM	43839
Surr: 4-Bromofluorobenzene	93.1	80-120	%Rec	1	3/28/2019 3:19:40 AM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 20 18-20'

 Project:
 Standard 1
 Collection Date: 3/20/2019 5:00:00 PM

 Lab ID:
 1903A69-011
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS					Analyst	: JME
Diesel Range Organics (DRO)	ND	9.9	mg/Kg	1	3/27/2019 1:25:47 AM	43859
Motor Oil Range Organics (MRO)	ND	50	mg/Kg	1	3/27/2019 1:25:47 AM	43859
Surr: DNOP	92.7	70-130	%Rec	1	3/27/2019 1:25:47 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.7	mg/Kg	1	3/28/2019 3:43:18 AM	43839
Surr: BFB	91.0	73.8-119	%Rec	1	3/28/2019 3:43:18 AM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.023	mg/Kg	1	3/28/2019 3:43:18 AM	43839
Toluene	ND	0.047	mg/Kg	1	3/28/2019 3:43:18 AM	43839
Ethylbenzene	ND	0.047	mg/Kg	1	3/28/2019 3:43:18 AM	43839
Xylenes, Total	ND	0.093	mg/Kg	1	3/28/2019 3:43:18 AM	43839
Surr: 4-Bromofluorobenzene	92.5	80-120	%Rec	1	3/28/2019 3:43:18 AM	43839

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

Qualifiers:

- Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Е

- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 20 25-27

 Project:
 Standard 1
 Collection Date: 3/20/2019 5:15:00 PM

 Lab ID:
 1903A69-012
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	SANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.9	mg/Kg	1	3/27/2019 2:14:15 AM	43859
Motor Oil Range Organics (MRO)	ND	50	mg/Kg	1	3/27/2019 2:14:15 AM	43859
Surr: DNOP	90.5	70-130	%Rec	1	3/27/2019 2:14:15 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	3/28/2019 8:11:23 PM	43839
Surr: BFB	94.6	73.8-119	%Rec	1	3/28/2019 8:11:23 PM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.024	mg/Kg	1	3/28/2019 8:11:23 PM	43839
Toluene	ND	0.049	mg/Kg	1	3/28/2019 8:11:23 PM	43839
Ethylbenzene	ND	0.049	mg/Kg	1	3/28/2019 8:11:23 PM	43839
Xylenes, Total	ND	0.098	mg/Kg	1	3/28/2019 8:11:23 PM	43839
Surr: 4-Bromofluorobenzene	97.3	80-120	%Rec	1	3/28/2019 8:11:23 PM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

#### Lab Order **1903A69**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/1/2019

CLIENT: Hilcorp Energy Client Sample ID: MW 21 13-15'

**Project:** Standard 1
 Collection Date: 3/21/2019 9:00:00 AM

 **Lab ID:** 1903A69-013
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	ANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.7	mg/Kg	1	3/27/2019 3:02:36 AM	43859
Motor Oil Range Organics (MRO)	ND	48	mg/Kg	1	3/27/2019 3:02:36 AM	43859
Surr: DNOP	98.8	70-130	%Rec	1	3/27/2019 3:02:36 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	3/28/2019 8:34:59 PM	43839
Surr: BFB	97.4	73.8-119	%Rec	1	3/28/2019 8:34:59 PM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.024	mg/Kg	1	3/28/2019 8:34:59 PM	43839
Toluene	ND	0.049	mg/Kg	1	3/28/2019 8:34:59 PM	43839
Ethylbenzene	ND	0.049	mg/Kg	1	3/28/2019 8:34:59 PM	43839
Xylenes, Total	ND	0.097	mg/Kg	1	3/28/2019 8:34:59 PM	43839
Surr: 4-Bromofluorobenzene	101	80-120	%Rec	1	3/28/2019 8:34:59 PM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Hilcorp Energy

Client Sample ID: MW 21 25-27'

 Project:
 Standard 1
 Collection Date: 3/21/2019 9:30:00 AM

 Lab ID:
 1903A69-014
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	SANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	3/27/2019 3:50:49 AM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/27/2019 3:50:49 AM	43859
Surr: DNOP	92.8	70-130	%Rec	1	3/27/2019 3:50:49 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.6	mg/Kg	1	3/28/2019 8:58:35 PM	43839
Surr: BFB	91.2	73.8-119	%Rec	1	3/28/2019 8:58:35 PM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.023	mg/Kg	1	3/28/2019 8:58:35 PM	43839
Toluene	ND	0.046	mg/Kg	1	3/28/2019 8:58:35 PM	43839
Ethylbenzene	ND	0.046	mg/Kg	1	3/28/2019 8:58:35 PM	43839
Xylenes, Total	ND	0.093	mg/Kg	1	3/28/2019 8:58:35 PM	43839
Surr: 4-Bromofluorobenzene	93.5	80-120	%Rec	1	3/28/2019 8:58:35 PM	43839

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

Qualifiers:

- Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Е

- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 22 8-10'

 Project:
 Standard 1
 Collection Date: 3/21/2019 11:30:00 AM

 Lab ID:
 1903A69-015
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	ANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.9	mg/Kg	1	3/27/2019 4:38:58 AM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/27/2019 4:38:58 AM	43859
Surr: DNOP	94.9	70-130	%Rec	1	3/27/2019 4:38:58 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	5.0	mg/Kg	1	3/28/2019 9:22:05 PM	43839
Surr: BFB	93.1	73.8-119	%Rec	1	3/28/2019 9:22:05 PM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.025	mg/Kg	1	3/28/2019 9:22:05 PM	43839
Toluene	ND	0.050	mg/Kg	1	3/28/2019 9:22:05 PM	43839
Ethylbenzene	ND	0.050	mg/Kg	1	3/28/2019 9:22:05 PM	43839
Xylenes, Total	ND	0.099	mg/Kg	1	3/28/2019 9:22:05 PM	43839
Surr: 4-Bromofluorobenzene	95.8	80-120	%Rec	1	3/28/2019 9:22:05 PM	43839

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

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy Client Sample ID: MW 22 18-20'

 Project:
 Standard 1
 Collection Date: 3/21/2019 12:00:00 PM

 Lab ID:
 1903A69-016
 Matrix: SOIL
 Received Date: 3/22/2019 8:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORG	SANICS				Analyst	: JME
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	3/27/2019 5:26:58 AM	43859
Motor Oil Range Organics (MRO)	ND	49	mg/Kg	1	3/27/2019 5:26:58 AM	43859
Surr: DNOP	91.4	70-130	%Rec	1	3/27/2019 5:26:58 AM	43859
EPA METHOD 8015D: GASOLINE RANGE					Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.8	mg/Kg	1	3/28/2019 9:45:23 PM	43839
Surr: BFB	92.0	73.8-119	%Rec	1	3/28/2019 9:45:23 PM	43839
EPA METHOD 8021B: VOLATILES					Analyst	: NSB
Benzene	ND	0.024	mg/Kg	1	3/28/2019 9:45:23 PM	43839
Toluene	ND	0.048	mg/Kg	1	3/28/2019 9:45:23 PM	43839
Ethylbenzene	ND	0.048	mg/Kg	1	3/28/2019 9:45:23 PM	43839
Xylenes, Total	ND	0.095	mg/Kg	1	3/28/2019 9:45:23 PM	43839
Surr: 4-Bromofluorobenzene	95.1	80-120	%Rec	1	3/28/2019 9:45:23 PM	43839

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

Qualifiers:

- Value above quantitation range
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Е

- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- PQL Practical Quanitative Limit
- S % Recovery outside of range due to dilution or matrix

Hilcorp Energy

**Client:** 

### Hall Environmental Analysis Laboratory, Inc.

310

5.5

9.7

WO#: **1903A69** 

S

01-Apr-19

**Project:** Standard 1 Sample ID: MB-43859 SampType: MBLK TestCode: EPA Method 8015M/D: Diesel Range Organics Client ID: PBS Batch ID: 43859 RunNo: 58633 Prep Date: 3/25/2019 Analysis Date: 3/26/2019 SeqNo: 1969067 Units: mg/Kg PQL SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Analyte Result LowLimit Qual Diesel Range Organics (DRO) ND 10 Motor Oil Range Organics (MRO) ND 50 Surr: DNOP 10.00 92.4 70 9.2 130 Sample ID: LCS-43859 SampType: LCS TestCode: EPA Method 8015M/D: Diesel Range Organics Client ID: LCSS Batch ID: 43859 RunNo: 58633 Prep Date: 3/25/2019 Analysis Date: 3/26/2019 SeqNo: 1969068 Units: mg/Kg Analyte PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual 50.00 Diesel Range Organics (DRO) 44 10 88.0 63.9 124 Surr: DNOP 4.4 5.000 87.3 70 130 Sample ID: 1903A69-001AMS SampType: MS TestCode: EPA Method 8015M/D: Diesel Range Organics Client ID: MW 15 18-20' Batch ID: 43859 RunNo: 58633 Prep Date: 3/25/2019 Analysis Date: 3/26/2019 SeqNo: 1969427 Units: mg/Kg Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

Sample ID: 1903A69-001AMSE	SampT	уре: <b>М</b> S	SD	Tes	tCode: El	PA Method	8015M/D: Die	esel Range	e Organics	
Client ID: MW 15 18-20'	Batch	ID: <b>43</b> 8	859	R	tunNo: 5	8633				
Prep Date: 3/25/2019	Analysis D	ate: <b>3/</b>	26/2019	S	SeqNo: 19	969428	Units: mg/K	(g		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	290	10	49.90	234.0	106	53.5	126	6.93	21.7	
Surr: DNOP	5.4		4.990		108	70	130	0	0	

234.0

53.5

70

126

130

152

113

48.50

4.850

#### Qualifiers:

E Value above quantitation range

Diesel Range Organics (DRO)

Surr: DNOP

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified at testcode

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

# Hall Environmental Analysis Laboratory, Inc.

WO#: 1903A69

01-Apr-19

Client: Project:	Hilcorp I Standard										
Sample ID:	: MB-43828	SampT	уре: <b>МЕ</b>	BLK	Test	tCode: El	PA Method	8015D: Gaso	line Rang	е	
Client ID:	PBS	Batch	ID: <b>43</b>	828	R	tunNo: <b>5</b>	8605				
Prep Date:	3/22/2019	Analysis D	ate: 3/	25/2019	S	SeqNo: 1	967510	Units: %Red	3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB		970		1000		97.4	73.8	119			
Sample ID:	: LCS-43828	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8015D: Gaso	line Rang	е	
Client ID:	LCSS	Batch	ID: <b>43</b>	828	R	lunNo: 5	8605				
Prep Date:	3/22/2019	Analysis D	ate: 3/	25/2019	S	SeqNo: 1	967511	Units: %Red	3		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB		1100		1000		106	73.8	119			
Sample ID:	: MB-43839	SampT	ype: <b>ME</b>	BLK	Tes	tCode: El	PA Method	8015D: Gaso	line Rang	e	
Client ID:	PBS	Batch	ID: <b>43</b>	839	R	lunNo: 5	8605				
Prep Date:	3/22/2019	Analysis D	ate: 3/	25/2019	S	SeqNo: 1	967528	Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Rang Surr: BFB	ge Organics (GRO)	ND 1000	5.0	1000		104	73.8	119			
Sample ID:	: LCS-43839	SampT	ype: <b>LC</b>	S	Test	tCode: El	PA Method	8015D: Gaso	line Rang	е	
Sample ID:		•	ype: <b>LC</b> i ID: <b>43</b>			tCode: El tunNo: 5		8015D: Gaso	line Rang	e	
Client ID:		•	ID: <b>43</b>	839	R		8605	8015D: Gaso Units: mg/K	_	e	
Client ID:	LCSS	Batch	ID: <b>43</b>	839 25/2019	R	tunNo: <b>5</b> 8eqNo: <b>1</b> 9	8605		_	<b>e</b> RPDLimit	Qual
Client ID: Prep Date: Analyte Gasoline Rang	LCSS	Batch Analysis D Result	i ID: <b>43</b> i ate: <b>3/</b>	839 25/2019 SPK value 25.00	R	RunNo: <b>5</b> 8eqNo: <b>1</b> 98eqNo: <b>1</b> 98eqNo: <b>1</b> 98eqNo: <b>5</b> 8	8605 967529 LowLimit 80.1	Units: mg/K HighLimit	(g		Qual
Client ID: Prep Date: Analyte	LCSS 3/22/2019	Batch Analysis D Result	n ID: <b>43</b> 8 ate: <b>3/</b>	839 25/2019 SPK value	R S SPK Ref Val	dunNo: <b>5</b> SeqNo: <b>1</b> %REC	8605 967529 LowLimit	Units: <b>mg/K</b> HighLimit	(g		Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB	LCSS 3/22/2019	Batch Analysis D Result 24 1100	n ID: <b>43</b> 8 ate: <b>3/</b>	839 25/2019 SPK value 25.00 1000	SPK Ref Val	8unNo: <b>5</b> 8eqNo: <b>1</b> 98eqNo: <b>1</b> 96.8	8605 967529 LowLimit 80.1 73.8	Units: mg/K HighLimit	(g %RPD	RPDLimit	Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB	LCSS 3/22/2019 ge Organics (GRO)	Batch Analysis D Result 24 1100 SampT	ate: <b>3/</b> PQL 5.0	839 25/2019 SPK value 25.00 1000	SPK Ref Val 0	8unNo: <b>5</b> 8eqNo: <b>1</b> 98eqNo: <b>1</b> 96.8	8605 967529 LowLimit 80.1 73.8	Units: mg/K HighLimit 123 119	(g %RPD	RPDLimit	Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB Sample ID: Client ID:	LCSS 3/22/2019 ge Organics (GRO)	Batch Analysis D Result 24 1100 SampT	PQL 5.0 ype: MS	839 25/2019 SPK value 25.00 1000 6 839	SPK Ref Val 0	8unNo: 56 6eqNo: 19 8REC 96.8 107	8605 967529 LowLimit 80.1 73.8 PA Method 8605	Units: mg/K HighLimit 123 119	%RPD	RPDLimit	Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB Sample ID: Client ID: Prep Date: Analyte	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result	PQL 5.0  ype: MS 1ID: 436 ate: 3/ PQL 7.0  ppe: MS 2.1 PQL 7.0  PQL 7.0	839 25/2019 SPK value 25.00 1000 6 839 25/2019 SPK value	SPK Ref Val  0  Tess SPK Ref Val	RunNo: 56 ReqNo: 19 REC 96.8 107 RCode: El RunNo: 56 ReqNo: 19 ReqNo: 19	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit	%RPD	RPDLimit	Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang	LCSS 3/22/2019 ge Organics (GRO) : 1903A69-001AMS MW 15 18-20'	Batch Analysis D. Result 24 1100 SampTy Batch Analysis D. Result 840	PQL 5.0  ype: MS ate: 3/ ate: 3/	839 SPK value 25.00 1000 6 839 SPK value 22.87	SPK Ref Val 0 Test	RunNo: 56 ReqNo: 19 REC 96.8 107 RCode: El RunNo: 56 ReqNo: 19 REC -143	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit 69.1	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142	g %RPD line Rang	RPDLimit e	Qual ES
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000	PQL 5.0  ype: MS 1ID: 436 ate: 3/ PQL 7.0  ppe: MS 2.1 PQL 7.0  PQL 7.0	839 25/2019 SPK value 25.00 1000 6 839 25/2019 SPK value	SPK Ref Val  0  Tess  SPK Ref Val	RunNo: 56 ReqNo: 19 REC 96.8 107 RCode: El RunNo: 56 ReqNo: 19 ReqNo: 19	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit	g %RPD line Rang	RPDLimit e	Qual
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Sample ID:	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000 SampT	PQL 5.0  ype: MS ate: 3/ PQL 5.0  ype: MS ate: 3/ PQL 4.6	839 SPK value 25.00 1000 8 839 25/2019 SPK value 22.87 914.9	SPK Ref Val  0  Test SSPK Ref Val 871.1	RunNo: 56 ReqNo: 19 REC 96.8 107 RCOde: EI RunNo: 56 ReqNo: 19 REC -143 2670	8605 967529  LowLimit 80.1 73.8  PA Method 8605 967531  LowLimit 69.1 73.8  PA Method	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142	%RPD  line Rang  g  %RPD	RPDLimit  e  RPDLimit	Qual ES
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Client ID: Client ID:	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20'	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000 D SampT Batch	PQL 5.0  ype: MS 1ID: 436  A10: 436  PQL 5.0  ype: MS 246  PQL 4.6	839  25/2019  SPK value  25.00 1000  6  839  25/2019  SPK value  22.87 914.9  6D  839	SPK Ref Val  0  Tesi  R  SPK Ref Val  871.1	RunNo: 56 ReqNo: 19 REC 96.8 107 RCode: El RunNo: 56 ReqNo: 19 REC -143 2670 RCode: El RunNo: 56	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit 69.1 73.8 PA Method 8605	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142 119  8015D: Gaso	%RPD  line Rang  %RPD	RPDLimit  e  RPDLimit	Qual ES
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Client ID: Client ID:	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000 SampT	PQL 5.0  ype: MS 1ID: 436  A10: 436  PQL 5.0  ype: MS 246  PQL 4.6	839 SPK value 25.00 1000  8 839 SPK value 22.87 914.9  6D 839 25/2019	SPK Ref Val  0  Test R S SPK Ref Val 871.1	RunNo: 56 ReqNo: 19 REC 96.8 107 RCOde: EI RunNo: 56 ReqNo: 19 REC -143 2670	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit 69.1 73.8 PA Method 8605	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142 119	%RPD  line Rang  %RPD	RPDLimit  e  RPDLimit	Qual ES
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB  Sample ID: Client ID: Prep Date: Analyte Analyte Analyte Analyte	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000 D SampT Batch Analysis D Result	PQL 5.0  PQL 5.0  ype: MS 1ID: 43i ate: 3/ PQL 4.6  ype: MS 2 1ID: 43i ate: 3/ PQL 4.6  PQL 4.7	839  25/2019  SPK value  25.00 1000  6  839  25/2019  SPK value  22.87 914.9  6D  839  25/2019  SPK value	SPK Ref Val  0  Tess SPK Ref Val 871.1  Tess R SSPK Ref Val 871.1	RunNo: 56 ReqNo: 19 REC 96.8 107 RCode: EI RunNo: 56 ReqNo: 19 RCOde: EI RunNo: 56 REC -143 2670 RCode: EI RunNo: 56 ReqNo: 19 RCOde: EI RunNo: 56 ReqNo: 19	8605 967529  LowLimit 80.1 73.8  PA Method 8605 967531  LowLimit 69.1 73.8  PA Method 8605 967532  LowLimit	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142 119  8015D: Gaso Units: mg/K HighLimit	%RPD  Iline Rang  WRPD  Iline Rang	RPDLimit  e  RPDLimit	Qual ES S
Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB Sample ID: Client ID: Prep Date: Analyte Gasoline Rang Surr: BFB Sample ID: Client ID: Prep Date: Analyte Analyte Analyte	LCSS 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20' 3/22/2019  ge Organics (GRO)  : 1903A69-001AMS MW 15 18-20'	Batch Analysis D Result 24 1100 SampT Batch Analysis D Result 840 24000 D SampT Batch Analysis D	PQL 5.0  ype: MS 1D: 43i ate: 3/ PQL 4.6  PQL 4.6  PQL 4.6	839 SPK value 25.00 1000  8 839 SPK value 22.87 914.9  6D 839 25/2019	SPK Ref Val  0  Test R S SPK Ref Val 871.1	RunNo: 56 REC 96.8 107 RCode: EI RunNo: 56 REC -143 2670 RCode: EI RunNo: 56 REC -143 2670 RCode: EI RunNo: 56 REC -143 2670	8605 967529 LowLimit 80.1 73.8 PA Method 8605 967531 LowLimit 69.1 73.8 PA Method 8605 967532	Units: mg/K HighLimit 123 119  8015D: Gaso Units: mg/K HighLimit 142 119  8015D: Gaso Units: mg/K	%RPD  Iline Rang  WRPD  Iline Rang	RPDLimit  e  RPDLimit	Qual ES S

#### Qualifiers:

E Value above quantitation range

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

Sample container temperature is out of limit as specified at testcode

Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

% Recovery outside of range due to dilution or matrix

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1903A69** 

01-Apr-19

Client:	Hilcorp E										
Project:	Standard	1									
Sample ID:	MB-43828	SampT	ype: <b>ME</b>	BLK	Tes	tCode: El	PA Method	8021B: Volat	iles		
Client ID:	PBS	Batch	ID: <b>43</b>	828	F	RunNo: <b>5</b>	8605				
Prep Date:	3/22/2019	Analysis D	ate: 3/	25/2019	5	SeqNo: 1	967549	Units: %Red	C		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Brom	nofluorobenzene	1.0		1.000		101	80	120			
Sample ID:	LCS-43828	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8021B: Volat	iles		
Client ID:	LCSS	Batch	ID: 43	828	F	RunNo: <b>5</b>	8605				
Prep Date:	3/22/2019	Analysis D	ate: <b>3/</b>	25/2019	\$	SeqNo: 1	967550	Units: %Red	C		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bron	nofluorobenzene	0.99		1.000		99.3	80	120			
Sample ID:	MB-43839	SampT	ype: <b>ME</b>	BLK	Tes	tCode: El	PA Method	8021B: Volat	tiles		
Client ID:	PBS	Batch	ID: 43	839	F	RunNo: 5	8605				
Prep Date:	3/22/2019	Analysis D	ate: <b>3/</b>	25/2019	\$	SeqNo: 1	967569	Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene		ND	0.025								
Toluene		ND	0.050								
Ethylbenzene		ND	0.050								
Xylenes, Total		ND	0.10								
Surr: 4-Brom	nofluorobenzene	1.0		1.000		102	80	120			
Sample ID:	LCS-43839	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8021B: Volat	iles		
Client ID:	LCSS	Batch	ID: 43	839	F	RunNo: 5	8605				
Prep Date:	3/22/2019	Analysis D	ate: <b>3/</b>	25/2019	5	SeqNo: 1	967570	Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene		0.95	0.025	1.000	0	94.7	80	120			
Toluene		0.99	0.050	1.000	0	98.7	80	120			
Ethylbenzene		0.99	0.050	1.000	0	99.1	80	120			
Xylenes, Total		3.0	0.10	3.000	0	101	80	120			
Surr: 4-Brom	nofluorobenzene	0.99		1.000		98.6	80	120			
Sample ID:	1903A69-002AMS	SampT	ype: <b>M</b> \$	3	Tes	tCode: El	PA Method	8021B: Volat	iles		
Client ID:	MW 15 33-35'	Batch	ID: 43	839	F	RunNo: 5	8605				
Prep Date:	3/22/2019	Analysis D	ate: <b>3/</b>	25/2019	5	SeqNo: 1	967573	Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene		1.0	0.023	0.9311	0.3000	76.2	63.9	127			
Toluene		7.2	0.047	0.9311	9.086	-204	69.9	131			ES
Ethylbenzene		3.2	0.047	0.9311	2.844	41.6	71	132			S
Xylenes, Total		26	0.093	2.793	28.09	-73.5	71.8	131			ES

#### Qualifiers:

E Value above quantitation range

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified at testcode

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

### Hall Environmental Analysis Laboratory, Inc.

1.5

WO#: **1903A69** 

01-Apr-19

Client: Hilcorp Energy
Project: Standard 1

Surr: 4-Bromofluorobenzene

Sample ID: 1903A69-002AMS SampType: MS TestCode: EPA Method 8021B: Volatiles

0.9276

Client ID: MW 15 33-35' Batch ID: 43839 RunNo: 58605

Prep Date: 3/22/2019 Analysis Date: 3/25/2019 SeqNo: 1967573 Units: mg/Kg

Analyte SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual Result S Surr: 4-Bromofluorobenzene 1.5 0.9311 164 80 120

Sample ID: 1903A69-002AMSD SampType: MSD TestCode: EPA Method 8021B: Volatiles MW 15 33-35' Batch ID: 43839 Client ID: RunNo: 58605 Prep Date: 3/22/2019 Analysis Date: 3/25/2019 SeqNo: 1967574 Units: mg/Kg PQL SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Analyte Result LowLimit Qual 20 Benzene 0.98 0.023 0.9276 0.3000 73.4 63.9 127 2.87 ES Toluene 6.6 0.046 0.9276 9.086 -265 69.9 131 8.16 20 Ethylbenzene 0.046 0.9276 2.844 14.8 71 132 8.07 20 S 3.0 Xylenes, Total 24 0.093 2.783 28.09 -164 71.8 131 10.1 20 ES

160

80

120

0

#### Qualifiers:

E Value above quantitation range

ND Not Detected at the Reporting Limit RL Reporting Detection Limit

W Sample container temperature is out of limit as specified at testcode

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

0

S



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Website: www.hallenvironmental.com

## Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 1903A69 RcptNo: 1 Received By: Leah Baca 3/22/2019 8:15:00 AM Completed By: Erin Melendrez 3/22/2019 9:33:25 AM 3/22/19 Reviewed By: ENM DAD 3/17/19 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 No 🗌 Yes 🗸 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? No 🗌 Yes 🗸 8. Was preservative added to bottles? No 🗸 Yes NA 🗌 9. VOA vials have zero headspace? Yes No 🗌 No VOA Vials 10. Were any sample containers received broken? Yes  $\square$ No 🗸 # of preserved bottles checked 11. Does paperwork match bottle labels? Yes 🗸 No 🗌 for pH: (Note discrepancies on chain of custody) (<2 or >12 unless noted) Adjusted? 12. Are matrices correctly identified on Chain of Custody? Yes 🗸 No 🗌 13. Is it clear what analyses were requested? Yes 🗸 No 🗌 Checked by: DAD 3/72/19 14. Were all holding times able to be met? Yes 🗸 No 🗌 (If no, notify customer for authorization.) 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 5.0 Good Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY www.hallenvironmental.com 4901 Hawkins NE - Albuquerque, NM 87109 Tel. 505-345-3975 Fax 505-345-4107 Analysis Request	8081 Pesticides/8082 PCB's EDB (Method 504.1) PAHs by 8310 or 8270SIMS RCRA 8 Metals CI, F, Br, NO <sub>3</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> 8250 (VOA) Total Coliform (Present/Absent)					Date Time Remarks:    Sulf   Sulf   Pleaselle   Please
4 -	BTEX / MTBE / TMB's (8021) TPH:8015D(GRO / DRO / MRO)	> x > x	$\times$ $\times$ $\times$		× × × × × × × × × × × × × × ×	Remarks.    Proposition   Prop
Turn-Around Time:	Project Manager:  Jennifer Deul - Hillorf  Danny Burns - LTE  Sampler: E. Carrell & M. Mrdsenpyich  On Ice: The Yes Doolers:  Cooler Temp(including cr): U. M. LO - S. O  Container Preservative HEAL No.  Type and # Type		5007	37.28	-0112	Via: Via: Com.19  Via: Com.19
I 2 :: 2	email or Fax#: Udent & Hillcorp. Com QA/QC Package:	1500 Soil 18115	3/14/19/1830 MAIL 15-17' 3/12/190845 MAIL 35-37'	1135 MWIT 35-27' 1330 MWIS 18-30' 1345 MWIS 25-37' 1500 MWIG 13-15'	1700 MW 20 18-20 1715 - MW 20 18-20	S-31-19 1511 M M M Date: Time: Relinquished by:  3-21-19 1535 M M Kecelved by:  Although the submitted to Hall Environmental may be subcontracted to other accounts.

For Energy   Peal   Deal   Deal   Deal   Peal   P	Chain-of-Custody Record	Turn-Around Time:				A	Ш	>	RON	HALL ENVIRONMENT	ITAL	
Project Name:	HILLOUP ENERSY					Z	YS	S	LAB	ORA-	LORY	
PO 80x 61529	fer	Project Name:				www.h	allenvir	onme	ntal.com		3	
Dearl Container   Project #	PO BOX	र्व म	7	490	l Hawki	ns NE	- Albu	auero	NM NM	87109		
Dear   @ hillorgo Com   Project Manager:   Joen   Level 4 (Full Validation)   Danny Burn's - LTE   Sampler:   Formation   Danny Burn's - LTE   Sampler:   Eric Corroll   Danny Burn's - LTE   Sampler:   Eric Corroll   Matrix Sample Name   Other   Matrix Sample Name   Type and # Type   Dear   Type and # Type   Dear   Type and # Type   Dear   Type   Type   Dear   Type   Dear   Type   Dear   Type   Ty	772	Project #:		Tel.	505-34	5-3975		× 50	5-345-4	107		
Deal & hiteorp. Com   Project Manager:   Joen   Hiteorp   Dean	Phone #:						Analys	is Re	quest			
Danyy Burn's LTE   Deal - Hillor   Danyy Burn's - LTE   Dan   Danyy Burn's - LTE   Danyy Burn's - LTE   Dan   Danyy Burn's - LTE   Dan   Danyy Burn's - LTE   Dan   Danyy Burn's - LTE   Danyy Burn's -	email or Fax#: J Deal @ hileorp. com	ger:				3	<sup>⊅</sup> O	-	(11			_
Level 4 (Full Validation)   Danny Burns - LTE	200	3	Hilcorp	MR	S.S	SV	S 'Þ		ıəsc			
Daz Compliance   Sampler: Eric Corroll   Matrix   Sample Name   Dolloe:	A 1000 A 1000		LTE	10	lD4	VISC	Ю		JΑ∖ŀ			
Other   PDE   POT		Eric	110	ם א		)\Z8	10 <sup>5</sup> '		Jəse			
Matrix   Sample Name		d Yes	No No	0				(A)				
Matrix Sample Name	_'	# of Coolers: (I)		AD)			103					
Matrix         Sample Name         Container         Preservative         Container         Preservative         Container         Preservative         Container         Preservative         Container         Preservative         Container         Preservative         Container         Containe		7	9+1.0-50	12D			۲, ۱					
Matrix         Sample Name         Type and # Type         I 40° = C001		Preservative		√08:F			Е, В					
Soil MW 31 13-15' 140° C001 -013 X X X X X X X X X X X X X X X X X X X	Matrix	Туре	(STORY)	ΙДТ			Cl'					
MW 22 8-10'  MW 22 8-10'  MW 22 18-20'  MW 22 18-20'  MW 23 18-20'  MW 23 18-20'  MW 23 18-20'  MW 23-31-19:15    Relinquished by:  Received by:  Received by:  Refinduished b	Soil MW21 13-15	20	-013			100						₩
Mw 32 8-10'	1 MW 21 25-		P10-							3		-
Mw 32 18-20	MW 22 8-1		015	_			14 E	2 g				-
Relinquished by:    Manage   Plant   P	J MW 32 18-30		-010-				To the second					+
Relinquished by:  Received by:			Managed Age of the company of the co									-
Relinquished by:  Received by:  Via:  Date Time Remarks:  PLOUSE CE:			A STATE OF THE STA									-
Relinquished by:  Received by:  Received by:  Received by:  Received by:  Nia:  Date Time Remarks:  Planse C.:  Planse C.:		State of the state								2 5		-
Relinquished by:  Received by:  Received by:  Received by:  Received by:  Nia:  Date Time Remarks:  PLOUSE CE:  PLOUSE CE:	S. Sept. S. Carlotte S. Carlot		to the second of the second of						- 3-		- 12	
Relinquished by:  Received by:  Received by:  Received by:  Nia:  Date Time Remarks:  PLOUSE CE:  PLOUSE CE:			And the second s				4.4		B. #	3		
Relinquished by:  Received by:  Received by:  Received by:  Via:  Date Time Remarks:  PLOUGE CC:  Relinquished by:  Nia:  Courtour Date  Time			See Street, Section of the Section o	n								
Relinquished by:  Received by:  Received by:  Received by:  Via:  Date Time Remarks:  PLOUSE CE:  Relinquished by:  Nia:  Court.or. Date Time  PLOUSE CE:					ķ	8						
Relinquished by:  Received by:  Received by:  Nia: Date Time Remarks:  Plance C:  Received by: Via: Course Time		-			7 10							
Relinquished by: Via: Course Date T	Time: <i>1511</i>	MW Via:		Remarks:	leas.	3		2000	SELL	env.c	wo	
	5	11	27.									
							, , , , , , , , , , , ,	()	מופת הו היי	didiyion.		



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

October 29, 2018

Jennifer Deal HILCORP ENERGY PO Box 4700 Farmington, NM 87499

TEL: (505) 564-0733

FAX

RE: Standard 1 OrderNo.: 1810B75

#### Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 5 sample(s) on 10/23/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> 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

andyl

4901 Hawkins NE

Albuquerque, NM 87109

#### Lab Order **1810B75**

Date Reported: 10/29/2018

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** HILCORP ENERGY Client Sample ID: MW-02

 Project:
 Standard 1
 Collection Date: 10/22/2018 1:32:00 PM

 Lab ID:
 1810B75-001
 Matrix: GROUNDWA
 Received Date: 10/23/2018 6:45:00 AM

Analyses	Result	PQL Qı	ıal Units	DF Date Analyzed	l Batch
EPA METHOD 8260: VOLATILES SHORT LIST				A	Analyst: <b>AG</b>
Benzene	14000	500	μg/L	500 10/24/2018 3:52	2:51 PM A55139
Toluene	7100	500	μg/L	500 10/24/2018 3:52	2:51 PM A55139
Ethylbenzene	1200	50	μg/L	50 10/24/2018 4:21	:34 PM A55139
Xylenes, Total	12000	75	μg/L	50 10/24/2018 4:21	:34 PM A55139
Surr: 1,2-Dichloroethane-d4	89.1	70-130	%Rec	50 10/24/2018 4:21	:34 PM A55139
Surr: 4-Bromofluorobenzene	99.1	70-130	%Rec	50 10/24/2018 4:21	:34 PM A55139
Surr: Dibromofluoromethane	92.3	70-130	%Rec	50 10/24/2018 4:21	:34 PM A55139
Surr: Toluene-d8	94.5	70-130	%Rec	50 10/24/2018 4:21	:34 PM A55139

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 1 of 7
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

#### Lab Order **1810B75**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 10/29/2018

CLIENT: HILCORP ENERGY Client Sample ID: MW-10

 Project:
 Standard 1
 Collection Date: 10/22/2018 1:48:00 PM

 Lab ID:
 1810B75-002
 Matrix: GROUNDWA
 Received Date: 10/23/2018 6:45:00 AM

Analyses	Result	PQL Q	ual Units	DF Date Analyzed	Batch
EPA METHOD 8260: VOLATILES SHORT LIST				Analys	t: <b>AG</b>
Benzene	22000	2000	μg/L	2E 10/24/2018 4:50:15 PM	A55139
Toluene	21000	2000	μg/L	2E 10/24/2018 4:50:15 PM	A55139
Ethylbenzene	1600	200	μg/L	200 10/24/2018 5:18:51 PM	A55139
Xylenes, Total	13000	300	μg/L	200 10/24/2018 5:18:51 PM	A55139
Surr: 1,2-Dichloroethane-d4	89.4	70-130	%Rec	200 10/24/2018 5:18:51 PM	A55139
Surr: 4-Bromofluorobenzene	97.0	70-130	%Rec	200 10/24/2018 5:18:51 PM	A55139
Surr: Dibromofluoromethane	87.7	70-130	%Rec	200 10/24/2018 5:18:51 PM	A55139
Surr: Toluene-d8	97.3	70-130	%Rec	200 10/24/2018 5:18:51 PM	A55139

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

#### **Qualifiers:** Value exceeds Maximum Contaminant Level. Analyte detected in the associated Method Blank D Sample Diluted Due to Matrix Е Value above quantitation range Analyte detected below quantitation limits Page 2 of 7 Н Holding times for preparation or analysis exceeded J ND Not Detected at the Reporting Limit P Sample pH Not In Range PQL Practical Quanitative Limit RL Reporting Detection Limit % Recovery outside of range due to dilution or matrix Sample container temperature is out of limit as specified

#### Lab Order **1810B75**

Date Reported: 10/29/2018

## Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY Client Sample ID: MW-11

 Project:
 Standard 1
 Collection Date: 10/22/2018 1:05:00 PM

 Lab ID:
 1810B75-003
 Matrix: GROUNDWA
 Received Date: 10/23/2018 6:45:00 AM

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8260: VOLATILES SHORT LIST					Anal	yst: <b>AG</b>
Benzene	ND	1.0	μg/L	1	10/25/2018 11:38:49	AM C55173
Toluene	ND	1.0	μg/L	1	10/25/2018 11:38:49	AM C55173
Ethylbenzene	ND	1.0	μg/L	1	10/25/2018 11:38:49	AM C55173
Xylenes, Total	ND	1.5	μg/L	1	10/25/2018 11:38:49	AM C55173
Surr: 1,2-Dichloroethane-d4	88.3	70-130	%Rec	1	10/25/2018 11:38:49	AM C55173
Surr: 4-Bromofluorobenzene	103	70-130	%Rec	1	10/25/2018 11:38:49	AM C55173
Surr: Dibromofluoromethane	89.4	70-130	%Rec	1	10/25/2018 11:38:49	AM C55173
Surr: Toluene-d8	99.8	70-130	%Rec	1	10/25/2018 11:38:49	AM C55173

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

#### **Qualifiers:** Value exceeds Maximum Contaminant Level. Analyte detected in the associated Method Blank D Sample Diluted Due to Matrix Е Value above quantitation range Analyte detected below quantitation limits Page 3 of 7 Н Holding times for preparation or analysis exceeded J ND Not Detected at the Reporting Limit P Sample pH Not In Range PQL Practical Quanitative Limit RL Reporting Detection Limit % Recovery outside of range due to dilution or matrix Sample container temperature is out of limit as specified

#### Lab Order **1810B75**

Date Reported: 10/29/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY Client Sample ID: MW-12

 Project:
 Standard 1
 Collection Date: 10/22/2018 12:55:00 PM

 Lab ID:
 1810B75-004
 Matrix: GROUNDWA
 Received Date: 10/23/2018 6:45:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260: VOLATILES SHORT LIST					Analysi	: AG
Benzene	2400	50	μg/L	50	10/24/2018 5:47:32 PM	1 A55139
Toluene	3800	50	μg/L	50	10/24/2018 5:47:32 PM	A55139
Ethylbenzene	1100	50	μg/L	50	10/24/2018 5:47:32 PM	A55139
Xylenes, Total	5000	75	μg/L	50	10/24/2018 5:47:32 PM	A55139
Surr: 1,2-Dichloroethane-d4	89.0	70-130	%Rec	50	10/24/2018 5:47:32 PM	A55139
Surr: 4-Bromofluorobenzene	102	70-130	%Rec	50	10/24/2018 5:47:32 PM	A55139
Surr: Dibromofluoromethane	88.6	70-130	%Rec	50	10/24/2018 5:47:32 PM	A55139
Surr: Toluene-d8	96.2	70-130	%Rec	50	10/24/2018 5:47:32 PM	A55139

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

*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 4 of 7
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified
	D H ND	<ul> <li>D Sample Diluted Due to Matrix</li> <li>H Holding times for preparation or analysis exceeded</li> <li>ND Not Detected at the Reporting Limit</li> <li>PQL Practical Quanitative Limit</li> </ul>	D     Sample Diluted Due to Matrix     E       H     Holding times for preparation or analysis exceeded     J       ND     Not Detected at the Reporting Limit     P       PQL     Practical Quanitative Limit     RL

#### Lab Order **1810B75**

Date Reported: 10/29/2018

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY Client Sample ID: MW-14

 Project:
 Standard 1
 Collection Date: 10/22/2018 12:40:00 PM

 Lab ID:
 1810B75-005
 Matrix: GROUNDWA
 Received Date: 10/23/2018 6:45:00 AM

Analyses	Result	PQL Qua	al Units	DF Date Analyzed Batch
EPA METHOD 8260: VOLATILES SHORT LIST				Analyst: <b>AG</b>
Benzene	13000	500	μg/L	500 10/24/2018 6:16:13 PM A55139
Toluene	26000	500	μg/L	500 10/24/2018 6:16:13 PM A55139
Ethylbenzene	1100	100	μg/L	100 10/24/2018 6:44:54 PM A55139
Xylenes, Total	10000	150	μg/L	100 10/24/2018 6:44:54 PM A55139
Surr: 1,2-Dichloroethane-d4	87.2	70-130	%Rec	100 10/24/2018 6:44:54 PM A55139
Surr: 4-Bromofluorobenzene	101	70-130	%Rec	100 10/24/2018 6:44:54 PM A55139
Surr: Dibromofluoromethane	89.4	70-130	%Rec	100 10/24/2018 6:44:54 PM A55139
Surr: Toluene-d8	98.2	70-130	%Rec	100 10/24/2018 6:44:54 PM A55139

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

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 5 of 7
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

WO#: 1810B75

29-Oct-18

HILCORP ENERGY **Client:** 

**Project:** Standard 1

Standar	14 1									
Sample ID 100ng lcs2	SampT	ype: LC	s	Tes	Code: El	PA Method	8260: Volatile	es Short L	_ist	
Client ID: LCSW	Batch	n ID: <b>A5</b>	5139	R	unNo: 5	5139				
Prep Date:	Analysis D	Date: 10	0/24/2018	SeqNo: <b>1833385</b>			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	95.9	70	130			
Toluene	19	1.0	20.00	0	96.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		91.2	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.4	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.3	70	130			
Surr: Toluene-d8	9.6		10.00		95.8	70	130			
Sample ID rb2	SampT	уре: МЕ	BLK	Tes	Code: El	PA Method	8260: Volatile	es Short L	ist	
Client ID: PBW	Batch	n ID: A5	5139	R	unNo: 5	5139				
Prep Date:	Analysis D	oate: 10	0/24/2018	S	eqNo: 1	833404	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								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.7		10.00		87.3	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	8.8		10.00		87.5	70	130			
Surr: Toluene-d8	9.7		10.00		96.9	70	130			
Sample ID 100ng lcs	SampT	ype: <b>LC</b>	s	Tes	Code: El	PA Method	8260: Volatile	es Short L	_ist	
Client ID: LCSW	Batch	n ID: <b>C5</b>	5173	R	unNo: 5	5173				
Prep Date:	Analysis D	oate: 10	0/25/2018	S	eqNo: 1	834391	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	92.5	70	130			
Toluene	19	1.0	20.00	0	97.5	70	130			
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.6	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.4	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.3	70	130			
Surr: Toluene-d8	9.7		10.00		96.7	70	130			
Sample ID rb	SampType: MBLK			Tes	Code: El	PA Method	8260: Volatile	es Short L	ist	
Client ID: PBW	Batch	n ID: <b>C5</b>	5173	R	unNo: 5	5173				
Prep Date:	Analysis D	oate: 10	0/25/2018	S	eqNo: 1	834399	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								

#### Qualifiers:

Toluene

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Η Holding times for preparation or analysis exceeded

ND

1.0

- ND Not Detected at the Reporting Limit
- Practical Quanitative Limit
- % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RLReporting Detection Limit
- Sample container temperature is out of limit as specified

Page 6 of 7

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1810B75** 

29-Oct-18

Client: HILCORP ENERGY

**Project:** Standard 1

Sample ID rb	SampT	уре: МЕ	BLK	Tes	tCode: El	PA Method	8260: Volatile	es Short L	_ist	
Client ID: PBW	Batch	ID: <b>C5</b>	5173	RunNo: 55173						
Prep Date:	Analysis D	ate: 10	0/25/2018	8	SeqNo: 1	834399	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.9		10.00		88.5	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		110	70	130			
Surr: Dibromofluoromethane	9.0		10.00		90.1	70	130			
Surr: Toluene-d8	9.7		10.00		97.5	70	130			

#### Qualifiers:

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

Page 7 of 7



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

# Sample Log-In Check List

Received By: Anne Thorne 10/23/2018 6:45:00 AM	
Reviewed By:  Chain of Custody  1. Is Chain of Custody  1. Is Chain of Custody  2. How was the sample delivered?  Courier  Lag In  3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0°C  5. Sample(s) in proper container(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
Reviewed By:  Chain of Custody  1. Is Chain of Custody  1. Is Chain of Custody  2. How was the sample delivered?  Courier  Lag In  3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0°C  5. Sample(s) in proper container(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
Chain of Custody  1. Is Chain of Custody complete?  2. How was the sample delivered?  Courier  Log In  3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0" C to 6.0"C  Yes V  No  No  NA  NA  NA  Sample(s) in proper container(s)?  Are samples (except VOA and ONG) properly preserved?  Was preservative added to bottles?  Yes V  No  No  No  No  No  No  No  No  No  N	
Chain of Custody  1. Is Chain of Custody complete?  2. How was the sample delivered?  Courier  Log In  3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0° C  Sample(s) in proper container(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
2. How was the sample delivered?  Log In 3. Was an attempt made to cool the samples?  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)?  6. Sufficient sample volume for indicated test(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
Log In  3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0°C  Yes ✓ No No NA	
3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0°C  Yes  No  No  NA  Sample(s) in proper container(s)?  6. Sufficient sample volume for indicated test(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
3. Was an attempt made to cool the samples?  4. Were all samples received at a temperature of >0° C to 6.0°C  Yes  No  No  NA  Sample(s) in proper container(s)?  6. Sufficient sample volume for indicated test(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
5. Sample(s) in proper container(s)?  Yes V No   6. Sufficient sample volume for indicated test(s)?  7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  Yes V No No No VOA Vials   11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
6. Sufficient sample volume for indicated test(s)? 7. Are samples (except VOA and ONG) properly preserved? 8. Was preservative added to bottles? 9. VOA vials have zero headspace? 10. Were any sample containers received broken? 11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) 12. Are matrices correctly identified on Chain of Custody? 13. Is it clear what analyses were requested? 14. Were all holding times able to be met? (If no, notify customer for authorization.)	
7. Are samples (except VOA and ONG) properly preserved?  8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	
8. Was preservative added to bottles?  9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met? (If no, notify customer for authorization.)	
9. VOA vials have zero headspace?  10. Were any sample containers received broken?  11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met? (If no, notify customer for authorization.)	
10. Were any sample containers received broken?  Yes □ No □ # of preserved bottles checked for pH:  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody? Yes □ No □ Adjusted?  13. Is it clear what analyses were requested? Yes □ No □ Checked by □AD 10/23 (If no, notify customer for authorization.)	
# of preserved bottles checked for pH:  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)  # of preserved bottles checked for pH:  (<2 or >12 unless note of pH:  Adjusted?  No  Checked by: DAD 10/73	7
11. Does paperwork match bottle labels?  (Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)	/
(Note discrepancies on chain of custody)  12. Are matrices correctly identified on Chain of Custody?  13. Is it clear what analyses were requested?  14. Were all holding times able to be met?  (If no, notify customer for authorization.)  (<2 or >1/2 unless note Adjusted?  No □  Checked by DAD 10/73	
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.)	ted)
14. Were all holding times able to be met?  (If no, notify customer for authorization.)  Yes   No □  Checked by: DAD 10/73	
(If no, notify customer for authorization.)	
Special Handling (if applicable)	3/18
15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA 🗹	
Person Notified: Date	
By Whom: Via: eMail Phone Fax In Person	
Regarding:	
Client Instructions:	
16. Additional remarks:	
17. Cooler Information	
Cooler No Temp C Condition Seal Intact Seal No Seal Date Signed By  1 2.2 Good Yes	

ပ်	ain	-of-CL	Chain-of-Custody Record	Turn-Around Time:	Time:			-	_	-		1	5	ć		
Client:	0	0		X Standard	□ Rush		] [			Z Z	7 -		¥ .		AAL ENVIKONMENIAL	,
				Project Name:	3				_				1	á	AINALISIS LABORALORI	
Mailing Address:	dress	S. Jen. F.	to Dad	Stand	1# Pro			4901	AweH	www.na 4901 Hawkins NF		www.naiieflyironmentai.com	enta enta	MM N	7100	
				Project #:			_	Tol	505.2	Tol 505-345-3975		900	0 20	45 44	200	
Phone #:		966	8281 588 923							200	Ana	Analysis Request	Sedu	HSt.	10	1
email or Fax#:	ax#:	deal	O hillory, com	Project Manager:	ger.		_	_	-	t	H	(*		H		_
DA/QC Package	kage:	,	☐ Level 4 (Full Validation)	D. 8.	Buins						(SM	OS'*Oc	bCB,8			
Accreditation	uo	1		Sampler: C	Longs					000	10.07	10 <sup>5</sup> 'E		X		- 1
NELAP		- Other		On Ice:	A Yes	ON C			_	00000		η'ε <sub>(</sub>	- '			14 4
EDD (Type)	(adk			Sample Temperature: 2	1654	4-15-0.4-2.2					10.00	JN,	_			v ^
Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL NO.	TEX + MTI	TM + X3T8 88108 H97	PH (Metho	onteM) 80	9HY's (8310 9CRA 8 Mei	IO,4) enoin	ioiteeq 180	AOV) 803S -im98) 07S		soldduß ii
122 13	1332	GW	MW-02	Stay loa	HCL	100		0	100	100		4	-			▽
1/3	1348	_	MW-10	1	_	282					-		×			+
13	1305		Mw-11			703							X	1		-
12	1255		MW-12	_		102							X	./		-
17	1240	>	Mw - 14	>	>	3405					$\Box$		7			
>										+	_		+			_
								$\vdash$		H	$\Box$		H	+		
													+	+		
			-													
Time.	ia	application and a	har	o de la contraction de la cont												
30	7	3	20	What b	to	10/22/8 1540	Remarks: C: dbyns@Itm, com	چر چ چر چ	3	7	0,00	1				g.
ate: Ime: /22//3 [\$94	£ 6	Must.	L Walls	Received by:	11	Dete Time										
lf nece	yesary.	samples subm	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.	ontracted to other acc	redited laboratorie	s. This serves as notice of this	possibility	Any s	up-cout	acted da	a will be	clearly	notated	on the a	nalytical report.	



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

April 10, 2019

Jennifer Deal Hilcorp Energy PO Box 61529

Houston, TX 77208-1529 TEL: (337) 276-7676

FAX

RE: Standard #1 OrderNo.: 1904030

#### Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 8 sample(s) on 3/30/2019 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

## Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/10/2019

CLIENT: Hilcorp Energy Lab Order: 1904030

**Project:** Standard #1

**Lab ID:** 1904030-001 **Collection Date:** 3/29/2019 12:30:00 PM

Client Sample ID: MW03 Matrix: AQUEOUS

Analyses	Result	RL Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST					Anal	yst: <b>RAA</b>
Benzene	21000	500	μg/L	500	4/8/2019 4:28:00 PM	A58995
Toluene	110	10	μg/L	10	4/3/2019 11:36:40 F	M B58841
Ethylbenzene	270	10	μg/L	10	4/3/2019 11:36:40 F	M B58841
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	10	4/3/2019 11:36:40 F	M B58841
1,2,4-Trimethylbenzene	550	10	μg/L	10	4/3/2019 11:36:40 F	M B58841
1,3,5-Trimethylbenzene	240	10	μg/L	10	4/3/2019 11:36:40 F	M B58841
Xylenes, Total	11000	750	μg/L	500	4/8/2019 4:28:00 PM	A58995
Surr: 1,2-Dichloroethane-d4	84.9	70-130	%Rec	10	4/3/2019 11:36:40 F	M B58841
Surr: 4-Bromofluorobenzene	118	70-130	%Rec	10	4/3/2019 11:36:40 F	M B58841
Surr: Dibromofluoromethane	85.6	70-130	%Rec	10	4/3/2019 11:36:40 F	M B58841
Surr: Toluene-d8	96.7	70-130	%Rec	10	4/3/2019 11:36:40 F	M B58841

**Lab ID:** 1904030-002 **Collection Date:** 3/29/2019 12:40:00 PM

Client Sample ID: MW16 Matrix: AQUEOUS

	Δnalvet	
	7 triary 5	: RAA
μg/L 1	00 4/8/2019 4:52:00 PM	A58995
$\mu$ g/L 1	E+ 4/9/2019 12:55:00 PM	R59003
$\mu$ g/L 1	00 4/8/2019 4:52:00 PM	A58995
$\mu$ g/L 1	00 4/8/2019 4:52:00 PM	A58995
$\mu$ g/L 1	00 4/8/2019 4:52:00 PM	A58995
$\mu$ g/L 1	00 4/8/2019 4:52:00 PM	A58995
$\mu$ g/L 1	00 4/8/2019 4:52:00 PM	A58995
%Rec 1	00 4/8/2019 4:52:00 PM	A58995
%Rec 1	00 4/8/2019 4:52:00 PM	A58995
%Rec 1	00 4/8/2019 4:52:00 PM	A58995
%Rec 1	00 4/8/2019 4:52:00 PM	A58995
	µg/L 1 µg/L 1 µg/L 1 µg/L 1 µg/L 1 µg/L 1 %Rec 1 %Rec 1 %Rec 1	μg/L       1E+ 4/9/2019 12:55:00 PM         μg/L       100 4/8/2019 4:52:00 PM         %Rec       100 4/8/2019 4:52:00 PM

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

Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

## Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/10/2019

CLIENT: Hilcorp Energy Lab Order: 1904030

**Project:** Standard #1

**Lab ID:** 1904030-003 **Collection Date:** 3/29/2019 1:00:00 PM

Client Sample ID: MW20 Matrix: AQUEOUS

Analyses	Result	RL (	Qual Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST					Ana	lyst: RAA
Benzene	1000	100	μg/L	100	4/9/2019 1:19:00 PI	M R59003
Toluene	900	10	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
Ethylbenzene	30	10	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
1,2,4-Trimethylbenzene	ND	10	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
1,3,5-Trimethylbenzene	ND	10	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
Xylenes, Total	230	15	μg/L	10	4/8/2019 5:16:00 Pf	M A58995
Surr: 1,2-Dichloroethane-d4	103	70-130	%Rec	10	4/8/2019 5:16:00 Pf	M A58995
Surr: 4-Bromofluorobenzene	102	70-130	%Rec	10	4/8/2019 5:16:00 Pf	M A58995
Surr: Dibromofluoromethane	102	70-130	%Rec	10	4/8/2019 5:16:00 Pf	M A58995
Surr: Toluene-d8	97.2	70-130	%Rec	10	4/8/2019 5:16:00 Pf	M A58995

**Lab ID:** 1904030-004 **Collection Date:** 3/29/2019 1:15:00 PM

Client Sample ID: MW22 Matrix: AQUEOUS

Analyses	Result	RL Qua	al Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST					Analy	st: RAA
Benzene	1.0	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
Toluene	2.0	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
Ethylbenzene	ND	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	4/8/2019 5:40:00 PM	A58995
Xylenes, Total	2.0	1.5	μg/L	1	4/8/2019 5:40:00 PM	A58995
Surr: 1,2-Dichloroethane-d4	107	70-130	%Rec	1	4/8/2019 5:40:00 PM	A58995
Surr: 4-Bromofluorobenzene	98.7	70-130	%Rec	1	4/8/2019 5:40:00 PM	A58995
Surr: Dibromofluoromethane	107	70-130	%Rec	1	4/8/2019 5:40:00 PM	A58995
Surr: Toluene-d8	95.7	70-130	%Rec	1	4/8/2019 5:40:00 PM	A58995

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

Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

## Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/10/2019

CLIENT: Hilcorp Energy Lab Order: 1904030

**Project:** Standard #1

**Lab ID:** 1904030-005 **Collection Date:** 3/29/2019 2:15:00 PM

Client Sample ID: MW12 Matrix: AQUEOUS

Analyses	Result	RL Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST					Ana	lyst: RAA
Benzene	870	10	μg/L	10	4/8/2019 6:04:00 PI	M A58995
Toluene	18	10	μg/L	10	4/8/2019 6:04:00 Pf	M A58995
Ethylbenzene	1200	100	μg/L	100	4/9/2019 1:43:00 PI	M R59003
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	10	4/8/2019 6:04:00 PI	M A58995
1,2,4-Trimethylbenzene	180	10	μg/L	10	4/8/2019 6:04:00 Pf	M A58995
1,3,5-Trimethylbenzene	83	10	μg/L	10	4/8/2019 6:04:00 PI	M A58995
Xylenes, Total	1500	15	μg/L	10	4/8/2019 6:04:00 Pf	M A58995
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	10	4/8/2019 6:04:00 PI	M A58995
Surr: 4-Bromofluorobenzene	103	70-130	%Rec	10	4/8/2019 6:04:00 PI	M A58995
Surr: Dibromofluoromethane	104	70-130	%Rec	10	4/8/2019 6:04:00 PI	M A58995
Surr: Toluene-d8	96.2	70-130	%Rec	10	4/8/2019 6:04:00 PI	M A58995

**Lab ID:** 1904030-006 **Collection Date:** 3/29/2019 2:00:00 PM

Client Sample ID: MW11 Matrix: AQUEOUS

Analyses	Result	RL Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST					Ana	lyst: <b>DJF</b>
Benzene	3.6	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
Toluene	ND	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
Ethylbenzene	ND	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	4/4/2019 2:56:20 Al	M B58841
Xylenes, Total	ND	1.5	μg/L	1	4/4/2019 2:56:20 Al	M B58841
Surr: 1,2-Dichloroethane-d4	84.0	70-130	%Rec	1	4/4/2019 2:56:20 Al	M B58841
Surr: 4-Bromofluorobenzene	105	70-130	%Rec	1	4/4/2019 2:56:20 Al	M B58841
Surr: Dibromofluoromethane	82.4	70-130	%Rec	1	4/4/2019 2:56:20 Al	M B58841
Surr: Toluene-d8	94.9	70-130	%Rec	1	4/4/2019 2:56:20 Al	M B58841

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

Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/10/2019

CLIENT: Hilcorp Energy Lab Order: 1904030

**Project:** Standard #1

**Lab ID:** 1904030-007 **Collection Date:** 3/29/2019 12:42:00 PM

Client Sample ID: MW05 Matrix: AQUEOUS

RL Qual Units DF Date Analyzed **Analyses** Result **Batch ID EPA METHOD 8260: VOLATILES SHORT LIST** Analyst: RAA μg/L Benzene 10000 1000 1E+ 4/9/2019 2:07:00 PM R59003 Toluene 880 100 μg/L 100 4/8/2019 6:28:00 PM A58995 Ethylbenzene 450 100 μg/L 100 4/8/2019 6:28:00 PM A58995 Methyl tert-butyl ether (MTBE) ND 100 μg/L 100 4/8/2019 6:28:00 PM A58995 1,2,4-Trimethylbenzene 360 100 μg/L 100 4/8/2019 6:28:00 PM A58995 1,3,5-Trimethylbenzene 140 100 100 4/8/2019 6:28:00 PM A58995 μg/L Xylenes, Total 2900 150 μg/L 100 4/8/2019 6:28:00 PM A58995 Surr: 1.2-Dichloroethane-d4 103 70-130 %Rec 100 4/8/2019 6:28:00 PM A58995 Surr: 4-Bromofluorobenzene 99.7 70-130 %Rec 100 4/8/2019 6:28:00 PM A58995 Surr: Dibromofluoromethane 103 70-130 %Rec 100 4/8/2019 6:28:00 PM A58995 Surr: Toluene-d8 70-130 98.4 %Rec 100 4/8/2019 6:28:00 PM A58995

**Lab ID:** 1904030-008 **Collection Date:** 3/29/2019 1:15:00 PM

Client Sample ID: MW19 Matrix: AQUEOUS

Analyses	Result	RL Q	ual Units	DF Date Analyzed	Batch ID
EPA METHOD 8260: VOLATILES SHORT LIST				Ana	lyst: RAA
Benzene	14000	1000	μg/L	1E+ 4/8/2019 6:52:00 PI	M A58995
Toluene	10000	1000	μg/L	1E+ 4/8/2019 6:52:00 PI	M A58995
Ethylbenzene	930	100	μg/L	100 4/8/2019 7:16:00 PI	M A58995
Methyl tert-butyl ether (MTBE)	ND	100	μg/L	100 4/8/2019 7:16:00 PI	M A58995
1,2,4-Trimethylbenzene	400	100	μg/L	100 4/8/2019 7:16:00 PI	M A58995
1,3,5-Trimethylbenzene	170	100	μg/L	100 4/8/2019 7:16:00 PI	M A58995
Xylenes, Total	6200	150	μg/L	100 4/8/2019 7:16:00 PI	M A58995
Surr: 1,2-Dichloroethane-d4	107	70-130	%Rec	100 4/8/2019 7:16:00 PI	M A58995
Surr: 4-Bromofluorobenzene	100	70-130	%Rec	100 4/8/2019 7:16:00 PI	M A58995
Surr: Dibromofluoromethane	105	70-130	%Rec	100 4/8/2019 7:16:00 PI	M A58995
Surr: Toluene-d8	98.1	70-130	%Rec	100 4/8/2019 7:16:00 PI	M A58995

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

Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1904030** 

10-Apr-19

Client: Hilcorp Energy
Project: Standard #1

Sample ID: 100ng lcs2	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8260: Volatile	s Short L	.ist	
Client ID: LCSW	Batch	n ID: <b>B5</b>	8841	F	RunNo: <b>5</b>	8841				
Prep Date:	Analysis D	ate: <b>4/</b>	3/2019	8	SeqNo: 1	980221	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	16	1.0	20.00	0	82.0	70	130			
Toluene	21	1.0	20.00	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	8.6		10.00		85.5	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		105	70	130			
Surr: Dibromofluoromethane	8.4		10.00		84.4	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

Sample ID: 1904030-004A MS	SampT	ype: MS	6	Tes	tCode: El	PA Method	8260: Volatile	s Short L	.ist	
Client ID: MW22	Batch	ID: <b>B5</b>	8841	F	RunNo: 5	8841				
Prep Date:	Analysis D	ate: <b>4/</b>	4/2019	5	SeqNo: 1	980235	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	17	1.0	20.00	1.030	79.0	70	130			
Toluene	22	1.0	20.00	2.699	95.6	70	130			
Surr: 1,2-Dichloroethane-d4	8.5		10.00		84.8	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		106	70	130			
Surr: Dibromofluoromethane	8.3		10.00		82.5	70	130			
Surr: Toluene-d8	9.6		10.00		95.8	70	130			

Sample ID: 1904030-004A M	SD SampT	ype: <b>MS</b>	SD	Tes	tCode: El	PA Method	8260: Volatile	s Short L	.ist	
Client ID: MW22	Batch	ID: <b>B5</b>	8841	F	RunNo: 5	8841				
Prep Date:	Analysis D	ate: <b>4/</b>	4/2019	5	SeqNo: 1	980236	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	16	1.0	20.00	1.030	75.9	70	130	3.81	20	•
Toluene	20	1.0	20.00	2.699	87.9	70	130	7.31	20	
Surr: 1,2-Dichloroethane-d4	8.6		10.00		86.5	70	130	0	0	
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130	0	0	
Surr: Dibromofluoromethane	8.3		10.00		83.1	70	130	0	0	
Surr: Toluene-d8	9.6		10.00		95.9	70	130	0	0	

Sample ID: rb1	SampT	уре: <b>МЕ</b>	BLK	Tes	tCode: El	PA Method	8260: Volatile	s Short L	.ist	
Client ID: PBW	Batch	ID: <b>B5</b>	8841	F	RunNo: 5	8841				
Prep Date:	Analysis D	ate: 4/	3/2019	9	SeqNo: 1	980249	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								

#### Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

Hilcorp Energy

Standard #1

**Client:** 

**Project:** 

## Hall Environmental Analysis Laboratory, Inc.

ND

ND

ND

ND

10

9.7

10

9.6

1.0

1.0

1.0

1.5

10.00

10.00

10.00

10.00

WO#: **1904030** 

10-Apr-19

Sample ID: rb1	SampT	ype: Mi	BLK	Tes	tCode: El	PA Method	8260: Volatil	es Short L	ist	
Client ID: PBW	Batch	n ID: <b>B5</b>	8841	F	RunNo: <b>5</b>	8841				
Prep Date:	Analysis D	ate: 4/	/3/2019	S	SeqNo: 1	980249	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.7		10.00		87.2	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	8.5		10.00		85.3	70	130			
Surr: Toluene-d8	9.6		10.00		96.3	70	130			
Sample ID: 100ng Ics	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8260: Volatil	es Short L	_ist	
Client ID: LCSW	Batch	n ID: A5	8995	F	RunNo: <b>5</b>	8995				
Prep Date:	Analysis D	ate: 4/	/8/2019	\$	SeqNo: 1	985094	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	106	70	130			
Toluene	21	1.0	20.00	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.4	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.0	70	130			
Surr: Toluene-d8	9.6		10.00		95.8	70	130			
Sample ID: rb	SampT	уре: М	BLK	Tes	tCode: El	PA Method	8260: Volatil	es Short L	ist	
Client ID: PBW	Batch	n ID: A5	8995	F	RunNo: <b>5</b> 8	8995				
Prep Date:	Analysis D	ate: 4/	/8/2019	S	SeqNo: 1	985095	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								

#### Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

Methyl tert-butyl ether (MTBE)

Surr: 1,2-Dichloroethane-d4

Surr: 4-Bromofluorobenzene

Surr: Dibromofluoromethane

1,2,4-Trimethylbenzene

1,3,5-Trimethylbenzene

Surr: Toluene-d8

Xylenes, Total

S % Recovery outside of range due to dilution or matrix

ND Not Detected at the Reporting Limit

102

97.1

100

95.8

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified at testcode

70

70

70

70

130

130

130

130

Hilcorp Energy

**Client:** 

# Hall Environmental Analysis Laboratory, Inc.

WO#: **1904030** 

10-Apr-19

Project: Standar	rd #1									
Sample ID: 100ng Ics	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8260: Volatile	es Short L	ist	
Client ID: LCSW	Batch	1D: <b>R5</b>	9003	F	RunNo: <b>5</b>	9003				
Prep Date:	Analysis D	ate: <b>4/</b>	9/2019	5	SeqNo: 1	985945	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0	111	70	130			
Toluene	21	1.0	20.00	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	11		10.00		108	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.2	70	130			
Surr: Dibromofluoromethane	11		10.00		105	70	130			
Surr: Toluene-d8	9.5		10.00		95.0	70	130			
Sample ID: rb	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260: Volatile	s Short L	ist	
Client ID: PBW	Batch	1D: <b>R5</b>	9003	F	RunNo: 5	9003				
Prep Date:	Analysis D	ate: 4/	9/2019	5	SeqNo: 1	985946	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								
Surr: 1,2-Dichloroethane-d4	11		10.00		107	70	130			
Surr: 4-Bromofluorobenzene	9.5		10.00		95.2	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	9.5		10.00		95.1	70	130			
Sample ID: 100ng lcs2	SampT	ype: <b>LC</b>	s	Tes	tCode: El	PA Method	8260: Volatile	es Short L	ist	
Client ID: LCSW	Batch	1D: <b>B5</b>	9003	F	RunNo: 5	9003				
Prep Date:	Analysis D	ate: 4/	10/2019	5	SeqNo: 1	986087	Units: %Rec	:		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	10		10.00		99.8	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.2	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.1	70	130			
Surr: Toluene-d8	9.4		10.00		94.4	70	130			
Sample ID: rb2	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260: Volatile	s Short L	ist	
Client ID: PBW	Batch	1D: <b>B5</b>	9003	F	RunNo: <b>5</b>	9003				
Prep Date:	Analysis D	ate: 4/	10/2019	5	SeqNo: 1	986088	Units: %Rec	:		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.2	70	130			

#### Qualifiers:

H Holding times for preparation or analysis exceeded

PQL Practical Quanitative Limit

Surr: Dibromofluoromethane

Surr: Toluene-d8

S % Recovery outside of range due to dilution or matrix

10

9.4

ND Not Detected at the Reporting Limit

101

94.2

RL Reporting Detection Limit

10.00

10.00

W Sample container temperature is out of limit as specified at testcode

70

70

130

130



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Website: www.hallenvironmental.com

# Sample Log-In Check List

Client Name:	HILCORP	ENERGY	Work Orde	er Number	1904030		RcptNo	: 1
Received By:	Anne Tho	orne	3/30/2019 9	:20:00 AM		anne Am	<b>~</b>	
Completed By:	Yazmine	Garduno	4/1/2019 11	:51:45 AM		Anne Am Nazneire Windeste		
Reviewed By:	YG.	3 Y6	41116			V * ·		
LB: E	TIL	1 4/1	119					
Chain of Cus	tody							
1. Is Chain of Co		olete?			Yes 🗸	No 🗆	Not Present	
2. How was the					Courier			
Z. How was the	sample deli	vereu:			Courier			
Log In								
<ol><li>Was an attern</li></ol>	npt made to	cool the samp	les?		Yes 🗸	No 🗌	NA 🗌	
4. Were all samp	oles received	d at a tempera	ture of >0° C to 6.0	0°C	Yes 🗸	No 🗀	NA 🗌	
5. Sample(s) in	proper conta	niner(s)?			Yes 🗸	No 🗌		
						AAAA AAAA		
6. Sufficient sam	ple volume	for indicated to	est(s)?		Yes 🗸	No 🗌		
7. Are samples (	except VOA	and ONG) pro	operly preserved?		Yes 🗸	No 🗌		
8. Was preserva	tive added to	bottles?			Yes $\square$	No 🗸	NA 🗌	
_								
9. VOA vials hav					Yes 🗸	No 📙	No VOA Vials	
10. Were any san	nple contain	ers received b	roken?		Yes 🗆	No 🗸	# of preserved	·C
11 D					· .	,, n	bottles checked	
<ol><li>11. Does paperwo</li><li>(Note discrepa</li></ol>			)		Yes 🗸	No 📙	for pH:	12 unless noted)
12. Are matrices of					Yes 🗸	No 🗌	Adjusted?	
13. Is it clear what					Yes 🗸	No 🗌		
14. Were all holdi	ng times abl	e to be met?			Yes 🗸	No 🗌	Checked by:	
(If no, notify co	ustomer for a	authorization.)						
Special Handl	ing (if ap	plicable)						
15. Was client no	otified of all o	liscrepancies	with this order?		Yes	No 🗌	NA 🗸	
Person	Notified:		AND DESCRIPTION OF THE PROPERTY OF THE PROPERT	Date				
By Who	om:	ĺ		Via:	eMail	Phone Fax	☐ In Person	
Regard	ing:		VALUE OF A STATE OF A					
Client In	nstructions:						of the same of the same of the same	
16. Additional re	marks:							
17 Cooler Infor	mation							
17. Cooler Infor	and the second s	Condition	Seal Intact   Se	al No   S	Seal Date	Signed By	Í	
1	1.0	Good	Yes					
2	1.0	Good	Yes					
3	1.0	Good	Yes					

Chain	-of-C	Chain-of-Custody Record	Turn-Around Time:	Lime:	Apple On the company of the property of the company					Z	5	80	ENVTRONMENT	Ž	<b>V</b>		
Client: Hilc	HILLORD E	Eneral	区 Standard	□ Rush	manage of the property of the			ANAL		YSIS	S	A	ABORATORY	S	Ö	2	
Jenn	nifer	Deal	Project Name:	= =				WW	.halle	enviro	nme	www.hallenvironmental.com	Ε				
Mailing Address:	S:		Standa	# pu	7	4901	4901 Hawkins NE	kins N	Ч.	Albuc	luerq	ue, N	Albuquerque, NM 87109	60			
			Project #:			Tel.	505-345-3975	45-3	375	Fa	200	Fax 505-345-4107	4107				1
Phone #: 97	970-385-	9601-							Ā	Analysis	s Re	Request					
email or Fax#:	Doleal	10 hillord. Com	Project Manager:						-	†O5		(ju					
QA/QC Package:			Jennifar	1-1-1-10	dio	/ WB	8 00	SWI		S ԠO		əsdA					
☑ Standard		☐ Level 4 (Full Validation)	Danny Bu	17 - 500	<i>u</i>	ВО			11	d ' <sup>7</sup>		/Jue					
Accreditation: ☐ NFI AC	☐ Az Cor☐ Other	☐ Az Compliance ☐ Other	Sampler: E	Evic Carrell	//o.	0 / D				ON '	(A(	-					
EDD (Type)			oler	3	0.135	สอ)											
			Cooler Temp(including CF):	ncluding CF): $/C$	Joe Ra	12D											
	;;		Container	Preservative Type	HEAL No.	7 X 3 TEX /	9081 P6 M) 803	d sHAc	3 AADS	CI, F, E	V) 0928 S) 0728	O lsto1	1				
2	Matilix (Lix/	MI/O3		526			_	-	_								Т
1 1240		MW			-007	*											
1300		NW 20		H	-003	<b>×</b>											
13/5		N8 22			h00-	×				_	_						
1415		MW 12			500-	×											
2041		MWII			-000-	>											
CHC1 1.	$\rightarrow$	MW 05	/	100	-001	×							_				
(3/5	-1	PI WW	>(		200-	×				$\dashv$	$\dashv$		$\dashv$	-			
							-			+	-			-			
					Z					+	-			+			
							-			+			. ,	-	_		
	Relinquished by:	led by:	Received by:	Via:	Date Time	Remarks:	╣,	_	1 .	+ ;	- '	] `	-	-	4		
2	Una (	" (wast	Month	Walk	5	2	Perse		6	CC. NOUNDS	22	B)	@ Itemly. Com	3	E		
Date: Time:	Relinquish	inquished by:	Received by:	Via:	03/30/19				8	Ecarroll @	10	<u>4</u>	Iten V. Colm	COM			
If necessar	y, samples su.	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.	contracted to other ac	credited laboratorie	es. This serves as notice of this	possibility. Ar	y sub-ca	ontracte	d data v	vill be cl	early no	otated on	the analy	ytical rep	port.		