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LT Environmental, Inc.

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Durango, Colorado 81301
970.385.1096

March 5, 2020

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

RE: Venturi SVE Remediation Update and Proposed Workplan
Hilcorp Energy Company
Lambe 2C
API # 30-045-30747
Incident # NVF1836050592
San Juan County, New Mexico

Dear Mr. Smith

LT Environmental, Inc. (LTE), on behalf of Hilcorp Energy Company (Hilcorp), presents the following quarterly summary report discussing the Venturi soil vapor extraction (SVE) events performance at the Lambe 2C natural gas production well (Site).

BACKGROUND

On December 18, 2018, Hilcorp personnel discovered a pinhole leak due to corrosion in the bottom of a condensate tank. The leak resulted in approximately 97 barrels (bbls) of condensate draining onto the ground and infiltrating the subsurface. Following the discovery of the leak, multiple subsurface investigations and an excavation began. Hilcorp excavated 5,000 cubic yards of soil removing the majority of the impacted soil. Delineation and excavation activities are summarized in an earlier report submitted to the New Mexico Oil Conservation Division (NMOCD) August 30, 2019. In-situ remediation via SVE was proposed and approved as a practical remediation method to address any remaining subsurface soil impacts left in place after the excavation. Venturi SVE events were conducted on September 24, 2019, September 25, 2019, October 1, 2019, and October 14, 2019, to remediate remaining subsurface soil impacts.

GROUNDWATER SAMPLING

During excavation activities, a limited amount of groundwater was observed in the base of the excavation; likely due to recent precipitation events and the accumulation of stormwater runoff into the open excavation. However, a groundwater sample collected from this open excavation indicated elevated benzene concentrations, requiring the additional installation of monitoring wells during the subsurface delineation. Previous groundwater results are summarized in the August 30, 2019 report.

Depth to groundwater was measured in each monitoring well before each Venturi SVE events, and again on December 10, 2019. Groundwater was observed in monitoring wells MW01, MW02, MW03, MW06, and MW07. Depth to water and groundwater elevation is attached as Table 1.

Groundwater samples were collected on September 24, 2019. Groundwater samples were labeled with the date and time of collection, well designation, project name, sample collector's name, and parameters to be analyzed. They were immediately sealed, packed on ice, and submitted to Hall Environmental Analyses Laboratory (Hall) for analysis of volatile organic compounds (VOC) by United States Environmental Protection Agency (EPA) Method 8260, common anions by EPA Method 300.0, dissolved metals by EPA Method 6010B and total dissolved solids (TDS) by Standard Method (SM) 2540C. Proper chain-of-custody (COC) procedures were followed documenting the date and time sampled, sample number, type of sample, sample collector's name, preservative used, analyses required, and sample collector's signature.

VENTURI SVE EVENTS

LTE used a portable air compressor and installed Venturi-style "T" fittings on the SVE wells. The Venturi "T" contains a nozzle that increases air velocity through the fitting. When air flow is applied, the air velocity increases which creates a pressure differential that induces vacuum and air flow from the SVE well. The resulting vacuum draws hydrocarbon impacts from the subsurface towards the SVE well. The exhaust of the SVE well was piped into a 55-gallon drum which acted as a knockout tank to capture and contain any fluids recovered while SVE operations were conducted. Induced vacuum gauge, volumetric air flow, and PID field screening were recorded during each event.

An initial air sample was collected on September 25, 2019, from the Venturi SVE system. A subsequent air sample was collected on October 14, 2019 (Table 4). Samples were collected in Tedlar® bags and submitted to Hall for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021, and total volatile petroleum hydrocarbons (TVPH) via EPA Method 8015.

RESULTS

Groundwater benzene concentrations in monitoring wells MW01 and MW07 exceeded New Mexico Water Quality Control Commission (NMWQCC) standards with concentrations of 93 micrograms per liter (µg/L) and 400 µg/L respectively. Chloride, sulfate, and TDS concentrations exceeded NMWQCC standards in all monitoring wells sampled; ranging from 260 milligrams per liter (mg/L) to 1,100 mg/L for chloride, 720 mg/L to 1,300 mg/L for sulfate, and 2,760 mg/L to 3,900 mg/L for TDS. Groundwater analytical results are presented in Attachment A.

Vacuum gauge readings ranged from 4.9 inches of water column (in. H_2O) to 6.2 in. H_2O. The volumetric air flow through the Venturi "T" ranged from 55 pounds per square inch (psi) to 60 psi. Observations from the Venturi SVE events are presented in Table 3.

For the initial air sample collected on September 25, 2019, concentrations were 6.1 µg/L benzene, 42 µg/L toluene, and 56 µg/L total xylenes. Ethylbenzene concentrations were below laboratory detection limits. The subsequent air sample collected on October 14, 2019, exhibited concentrations of 7.3 µg/L benzene, 26 µg/L toluene, 2.6 µg/L ethylbenzene, and 36 µg/L total xylenes. TVPH concentrations on October 14, 2019, for the air sample were 3,600 µg/L. Air sample analytical results are attached as Table 4 and laboratory analytical reports are included in Attachment A.

CONCLUSIONS

SVE events were successful at removing hydrocarbons impacts from the subsurface as indicated by the concentrations reported in the laboratory analytical results. However, there was not a significant volume of hydrocarbons removed to warrant closure sampling, and additional remediation is needed at the Site.

The water observed at the Site behaves as a low volume aquifer sourced by infiltration of seasonal precipitation. No water bearing lithology was observed in soil borings during delineation and monitoring well installation. All of the monitoring wells with detectable volumes of water are within the footprint of the previous excavation extent. The water column ranges from 0.38 feet in thickness to 3.66 feet with water column thickness increasing after major precipitation events. The primary source of recharge is seasonal precipitation, and during the dry seasons the water column is likely to decrease and possibly be non-existent, as observed in August 2019.

The minimal water observed is the result of infiltration of precipitation through a course of cobbles and backfill material, eventually accumulating on top of an impermeable clay layer in the previous excavation extent. During dry periods, or in different lithologic conditions, it is unlikely the water would accumulate at all. The limited volume of water prohibits use of the water for domestic, industrial, and agricultural water supply, as evidenced by the absence of nearby wells targeting the water. Beneficial use is obtained some 700 feet deeper.

In the groundwater, the identified TDS, sulfate, and chloride concentrations suggest that the water is a results of stormwater infiltration through the previous open excavation. The elevated benzene is likely a result of the percolating groundwater coming into contact with the residual soil impacts at the base of the excavation extent. Hilcorp will assess water quality once soil standards are met and determine if, and how additional groundwater remediation should be accomplished.

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RECOMMENDATIONS

LTE recommends installation of a solar SVE system at the Site. The lithology at the Site is loose sand and gravel observed during delineation activities. Venturi SVE events proved hydrocarbon impacts can be removed from the subsurface with SVE remediation technologies. Sufficient vacuum influence from the Venturi SVE was observed at the other monitoring wells during the Venturi SVE events conducted at monitoring well MW01. Due to the observed vacuum and hydrocarbon removal during the Venturi SVE solar SVE is viable remediation technology to address hydrocarbon impacts at the Site. To make use of the existing monitoring wells and observed radius of influence monitoring wells will be converted to SVE wells during installation of the solar SVE.

Hilcorp proposes that the solar SVE system will be installed and operational within 60 days of approval of this remediation update and recommendation.

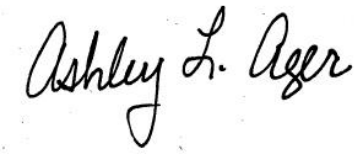
Hilcorp will collect air samples quarterly for BTEX by EPA Method 8021 and TVPH by EPA Method 8021, with one annual sample collected for full VOC by EPA Method 8260 and for fixed gas analysis . Quarterly SVE progress reports will be submitted under separate cover to include all field visits, runtime, mass removal, and sampling analytical results.

Hilcorp will continue to gauge for groundwater in all monitoring wells on a quarterly basis. If sufficient water is observed, samples will be collected and submitted for analysis of full VOC by EPA Method 8260, TDS by SM 2540C, pH by SM 4500, and common anions by EPA Method 300.0, and dissolved metals by EPA Method 6010B.

LTE appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at dburns@ltenv.com or Jennifer Deal at (505) 324-5128 or at jdeal@hilcorp.com.

Sincerely,

LT ENVIRONMENTAL, INC.



Danny Burns
Project Geologist

Ashley Ager, M.S.
Senior Geologist

cc: jdeal@hilcorp.com

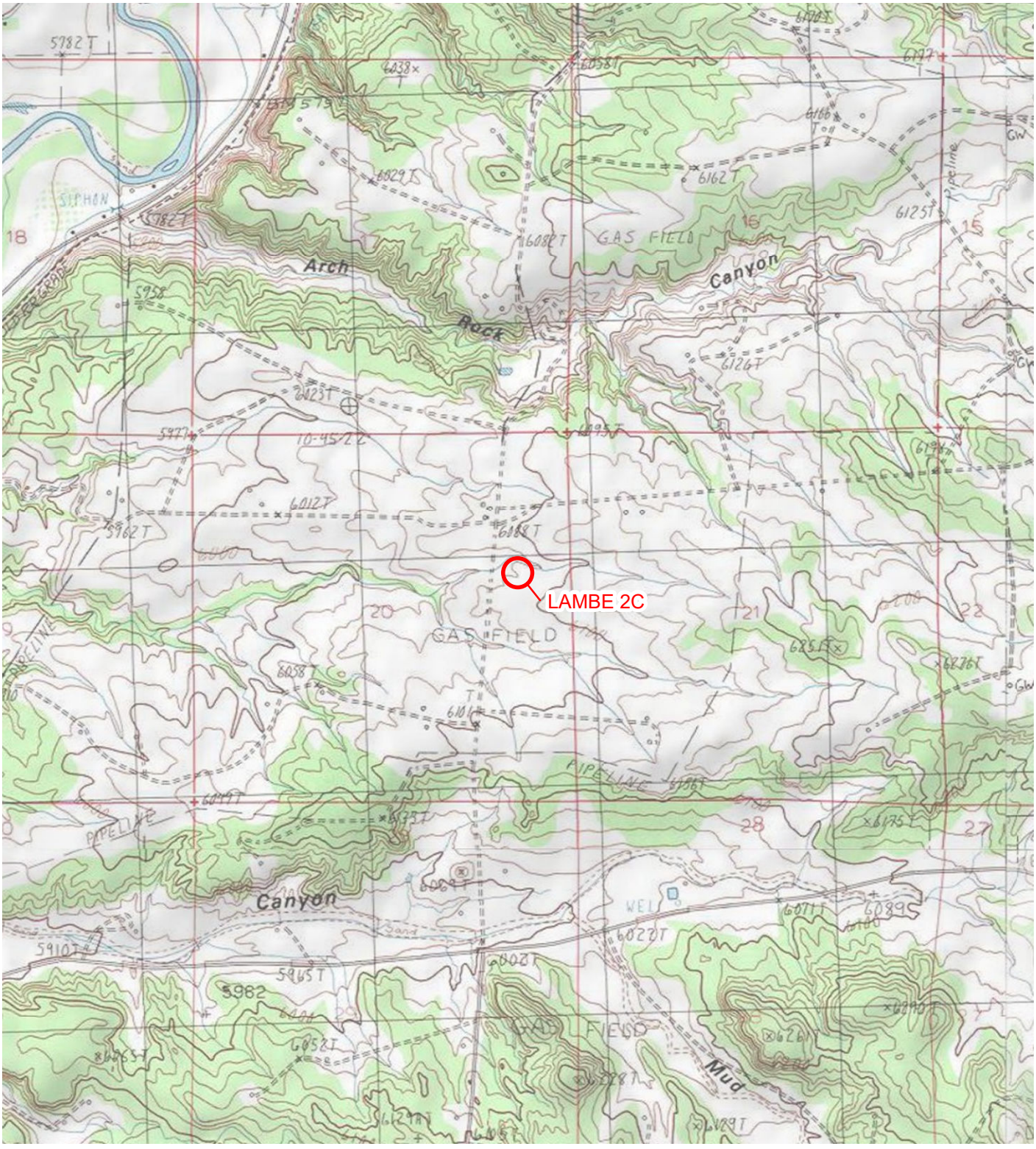
Attachments:

Figure 1 - Site Location
Figure 2 – Monitoring Well Location Map

Table 1 – Groundwater Elevation Summary
Table 2 – Groundwater Laboratory Analytical Results
Table 3 – Venturi Observations
Table 4 – Air Sample Analytical Results

Attachment 1 – Laboratory Analytical Results

FIGURES



LEGEND

IMAGE COURTESY OF ESRI/USGS

SITE LOCATION

0 2,000 4,000

Feet

N

NEW MEXICO

FIGURE 1
SITE LOCATION MAP
LAMBE 2C
SENE SEC 20 T31N R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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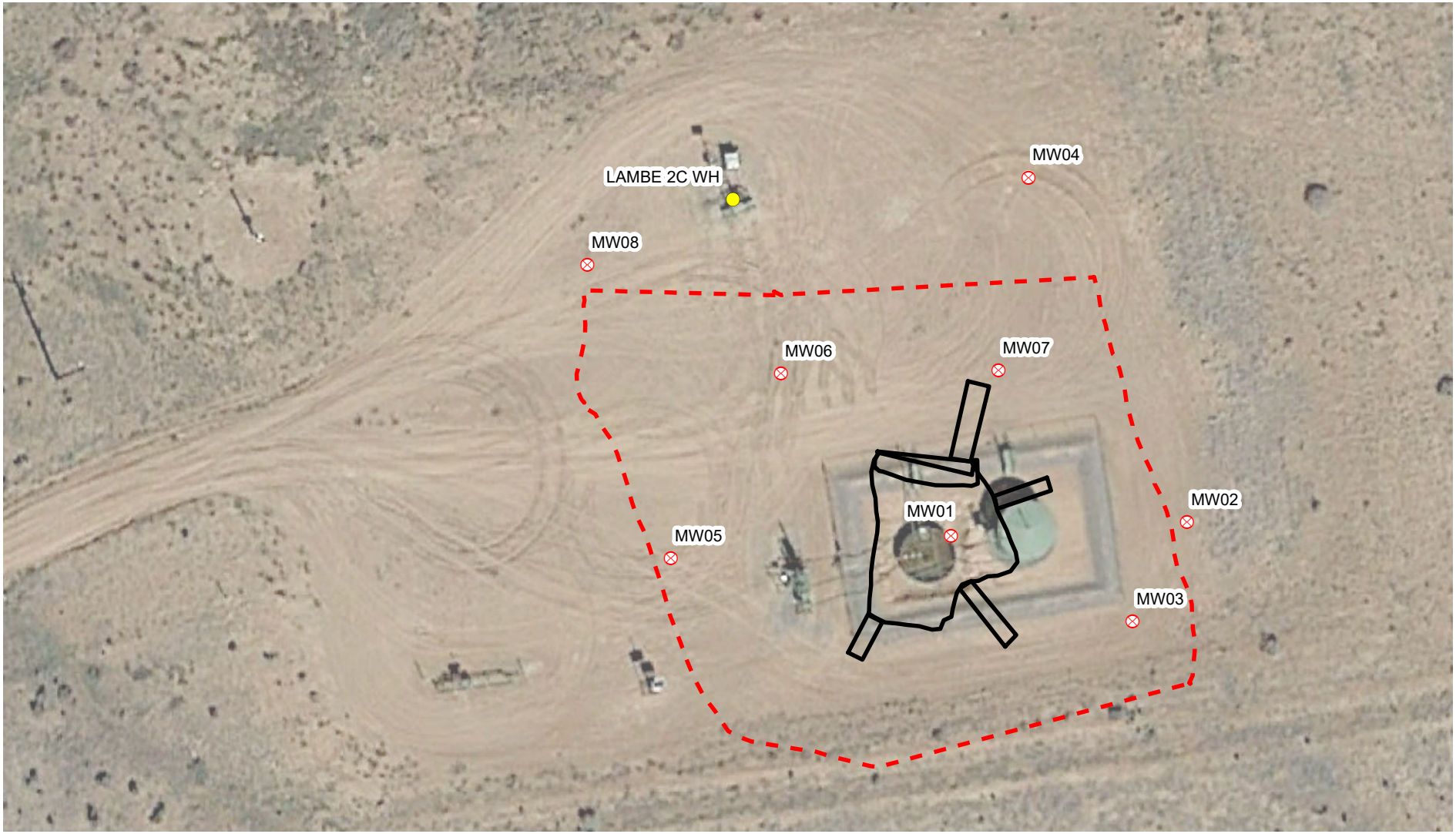

IMAGE COURTESY OF GOOGLE EARTH 2015

LEGEND

- MONITORING WELL
- WELLHEAD
- EXCAVATION EXTENT 05/03/2019
- BASE OF EXCAVATION

0 40 80

Feet

N

FIGURE 2
MONITORING WELL LOCATIONS MAP
LAMBE 2C
SENE SEC 20 T31N R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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TABLES

TABLE 1
GROUNDWATER ELEVATION SUMMARY

LAMBE 2C
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)	Total Depth (feet)
MW01	7/25/2019	6,096.12	NA	Dry	NA	NA	38.51
	8/1/2019		NA	Dry	NA	NA	38.51
	9/24/2019		NA	37.05	NA	6,059.07	38.52
	10/1/2019		NA	37.75	NA	6,058.37	38.57
	10/14/2019		NA	37.32	NA	6,058.80	38.52
	12/10/2019		NA	36.41	NA	6,059.71	38.52
MW02	7/25/2019	6,096.17	NA	Dry	NA	NA	38.73
	8/1/2019		NA	Dry	NA	NA	38.73
	9/24/2019		NA	35.81	NA	NA	38.76
	10/1/2019		NA	37.41	NA	6,058.76	38.75
	10/14/2019		NA	37.48	NA	6,058.69	38.76
	12/10/2019		NA	35.62	NA	6,060.55	38.76
MW03	7/25/2019	6,097.44	NA	Dry	NA	NA	38.82
	8/1/2019		NA	Dry	NA	NA	38.82
	9/24/2019		NA	Dry	NA	NA	38.64
	10/1/2019		NA	38.26	NA	6,059.18	38.64
	10/14/2019		NA	37.91	NA	6,059.53	38.64
	12/10/2019		NA	36.67	NA	6,060.77	38.78
MW04	7/25/2019	6,096.12	NA	Dry	NA	NA	38.59
	8/1/2019		NA	Dry	NA	NA	38.59
	9/24/2019		NA	Dry	NA	NA	38.44
	10/1/2019		NA	Dry	NA	NA	38.44
	10/14/2019		NA	Dry	NA	NA	38.44
	12/10/2019		NA	Dry	NA	NA	38.55
MW05	7/25/2019	6,095.51	NA	Dry	NA	NA	38.63
	8/1/2019		NA	Dry	NA	NA	38.63
	9/24/2019		NA	Dry	NA	NA	38.64
	10/1/2019		NA	Dry	NA	NA	38.64
	10/14/2019		NA	Dry	NA	NA	38.64
	12/10/2019		NA	Dry	NA	NA	38.62

TABLE 1
GROUNDWATER ELEVATION SUMMARY

LAMBE 2C
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)	Total Depth (feet)
MW06	7/25/2019	6,095.90	NA	Dry	NA	NA	39.06
	8/1/2019		NA	Dry	NA	NA	39.06
	9/24/2019		NA	38.42	NA	6,057.48	39.20
	10/1/2019		NA	38.67	NA	6,057.23	39.20
	10/14/2019		NA	37.14	NA	6,058.76	39.20
	12/10/2019		NA	37.14	NA	6,057.26	39.23
MW07	7/25/2019	6,095.67	NA	Dry	NA	NA	38.01
	8/1/2019		NA	Dry	NA	NA	38.01
	9/24/2019		NA	35.18	NA	6,060.49	38.84
	10/1/2019		NA	37.00	NA	6,058.67	38.84
	10/14/2019		NA	37.66	NA	6,058.01	38.84
	12/10/2019		NA	35.77	NA	6,058.01	38.64
MW08	7/25/2019	6,095.36	NA	Dry	NA	NA	38.46
	8/1/2019		NA	Dry	NA	NA	38.46
	9/24/2019		NA	Dry	NA	NA	38.45
	10/1/2019		NA	Dry	NA	NA	38.45
	10/14/2019		NA	Dry	NA	NA	38.45
	12/10/2019		NA	Dry	NA	NA	38.45

Notes:

BTOC - below top of casing

NA- not assessed

TABLE 2
GROUNDWATER LABORATORY ANALYTICAL RESULTS

LAMBE 2C
SAN JUAN COUNTRY, NEW MEXICO
HILCORP ENERGY COMPANY

Analyte	NMWQCC Standard	Unit	MW01	MW02	MW06	MW07
			9/24/19	9/24/19	9/24/19	9/24/19
USEPA Method 8260B - Volatiles						
benzene	**10**	µg/L	**93**	<1.0	<1.0	**400**
toluene	**750**	µg/L	220	<1.0	<1.0	490
ethylbenzene	**750**	µg/L	12	<1.0	<1.0	20
methyl tert-butyl ether (MTBE)	**NE**	µg/L	<1.0	<1.0	1.3	<10
1,2,4-trimethylbenzene	**620**	µg/L	36	<1.0	<1.0	11
1,3,5-trimethylbenzene	**NE**	µg/L	32	<1.0	<1.0	440
1,2-dichloroethane (EDC)	**10**	µg/L	<1.0	<1.0	<1.0	<10
1,2-dibromoethane (EDB)	**NE**	µg/L	<1.0	<1.0	<1.0	<10
naphthalene	**NE**	µg/L	<2.0	<2.0	<2.0	<20
1-methylnaphthalene	**NE**	µg/L	<4.0	<4.0	<4.0	<40
2-methylnaphthalene	**NE**	µg/L	<4.0	<4.0	<4.0	<40
acetone	**NE**	µg/L	<10	<10	<10	<100
bromobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
bromodichloromethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
bromoform	**NE**	µg/L	<1.0	<1.0	<1.0	<10
bromomethane	**NE**	µg/L	<3.0	<3.0	<3.0	<30
2-butanone	**NE**	µg/L	<10	<10	<10	<100
carbon disulfide	**NE**	µg/L	<10	<10	<10	<100
carbon tetrachloride	**10**	µg/L	<1.0	<1.0	<1.0	<10
chlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
chloroethane	**NE**	µg/L	<2.0	<2.0	<2.0	<20
chloroform	**100**	µg/L	<1.0	<1.0	<1.0	<10
chloromethane	**NE**	µg/L	<3.0	<3.0	<3.0	<30
2-chlorotoluene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
4-chlorotoluene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
cis-1,2-DCE	**NE**	µg/L	<1.0	<1.0	<1.0	<10
cis-1,3-dichloropropene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,2-dibromo-3-chloropropane	**NE**	µg/L	<2.0	<2.0	<2.0	<20
dibromochloromethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
dibromomethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,2-dichlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,3-dichlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,4-dichlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
dichlorodifluoromethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,1-dichloroethane	**25**	µg/L	<1.0	<1.0	<1.0	<10
1,1-dichloroethene	**5**	µg/L	<1.0	<1.0	<1.0	<10
1,2-dichloropropane	**NE**	µg/L	<1.0	<1.0	<1.0	<10

TABLE 2
GROUNDWATER LABORATORY ANALYTICAL RESULTS

LAMBE 2C
SAN JUAN COUNTRY, NEW MEXICO
HILCORP ENERGY COMPANY

Analyte	NMWQCC Standard	Unit	MW01	MW02	MW06	MW07
			9/24/19	9/24/19	9/24/19	9/24/19
1,3-dichloropropane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
2,2-dichloropropane	**NE**	µg/L	<2.0	<2.0	<2.0	<20
1,1-dichloropropene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
hexachlorobutadiene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
2-hexanone	**NE**	µg/L	<10	<10	<10	<100
isopropylbenzene	**NE**	µg/L	3.7	<1.0	<1.0	<10
4-isopropytoluene	**NE**	µg/L	<1.0	<1.0	<1.0	17
4-methyl-2-pentanone	**NE**	µg/L	<10	<10	<10	<100
methylene chloride	**100**	µg/L	<3.0	<3.0	<3.0	<30
n-butylbenzene	**NE**	µg/L	<3.0	<3.0	<3.0	<30
n-propylbenzene	**NE**	µg/L	2.0	<1.0	<1.0	<10
sec-butylbenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
styrene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
tert-butylbenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,1,1,2-tetrachloroethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,1,2,2-tetrachloroethane	**10**	µg/L	<2.0	<2.0	<2.0	<20
tetrachloroethene (PCE)	**20**	µg/L	<1.0	<1.0	<1.0	<10
trans-1,2-DCE	**NE**	µg/L	<1.0	<1.0	<1.0	<10
trans-1,3-dichloropropene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,2,3-trichlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,2,4-trichlorobenzene	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,1,1-trichloroethane	**60**	µg/L	<1.0	<1.0	<1.0	<10
1,1,2-trichloroethane	**10**	µg/L	<1.0	<1.0	<1.0	<10
trichloroethene (TCE)	**100**	µg/L	<1.0	<1.0	<1.0	<10
trichlorofluoromethane	**NE**	µg/L	<1.0	<1.0	<1.0	<10
1,2,3-trichloropropane	**NE**	µg/L	<2.0	<2.0	<2.0	<20
vinyl chloride	**1**	µg/L	<1.0	<1.0	<1.0	<10
xylenes, total	**620**	µg/L	600	<1.5	<1.5	**820**
USEPA Method 300.0: Anions						
bromide	**NE**	mg/L	5.7	4.1	0.86	5.3
chloride	**250**	mg/L	**1,100**	**330**	**260**	**980**
sulfate	**600**	mg/L	**830**	**1,300**	**1,000**	**720**
fluoride	**1.6**	mg/L	<0.50	<0.50	<0.50	<0.50
nitrate + nitrite as N	**NE**	mg/L	14	34	34	<3.0
phosphorus, orthophosphate (As P)	**NE**	mg/L	<2.5	<2.5	<2.5	<2.5

TABLE 2
GROUNDWATER LABORATORY ANALYTICAL RESULTS

LAMBE 2C
SAN JUAN COUNTRY, NEW MEXICO
HILCORP ENERGY COMPANY

Analyte	NMWQCC Standard	Unit	MW01	MW02	MW06	MW07
			9/24/19	9/24/19	9/24/19	9/24/19
USEPA Method 6010B: Dissolved Metals						
calcium	**NE**	mg/L	540	330	360	420
magnesium	**NE**	mg/L	100	65	57	80
potassium	**NE**	mg/L	11	8.0	8.6	7.3
sodium	**NE**	mg/L	530	480	480	500
USEPA Method SM4500-H+B: pH						
pH	**6-9**	pH units	7.37	7.85	7.63	7.25
USEPA Method SM2540C Modified: Total Dissolved Solids						
total dissolved solids	**1,000**	mg/L	**3,900**	**2,760**	**2,900**	**3,490**

Notes:

BOLD - indicates concentration exceeds the NMWQCC standard
mg/L - milligrams per liter
NMWQCC - New Mexico Water Quality Control Commission
USEPA - United States Environmental Protection Agency
µg/L - micrograms per liter
mg/L - milligrams per liter
NE - not established

TABLE 3
VENTURI OBSERVATIONS

LAMBE 2C
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Date	Hours	Well	PID (ppm)	Flow (PSI)	Vacuum (inH_2O)
9/24/2019	0:15	MW01	693	55	5.9
9/24/2019	0:30	MW01	710	55	6.1
9/24/2019	0:45	MW01	669	55	6.2
9/25/2019	0:15	MW01	697	60	5.9
9/25/2019	0:30	MW01	782	60	5.9
9/25/2019	5:00	MW01	415	60	6.0
9/25/2019	6:00	MW01	370	60	6.0
9/25/2019	7:00	MW01	401	60	5.9
9/25/2019	8:00	MW01	397	60	6.0
10/1/2019	0:10	MW01	536	60	6.0
10/1/2019	0:20	MW01	888	60	6.0
10/1/2019	0:30	MW01	786	60	5.9
10/1/2019	0:40	MW01	724	60	5.9
10/1/2019	0:50	MW01	715	60	5.9
10/1/2019	1:00	MW01	656	60	6.0
10/1/2019	5:05	MW01	433	60	5.9
10/1/2019	5:35	MW01	587	60	6.0
10/1/2019	6:05	MW01	511	60	6.0
10/1/2019	6:35	MW01	492	60	5.9
10/1/2019	7:05	MW01	479	60	6.0
10/1/2019	7:35	MW01	447	60	6.0
10/1/2019	8:05	MW01	418	60	6.0
10/14/2019	0:00	MW01	389	60	6.2
10/14/2019	2:30	MW01	223	60	4.9
10/14/2019	8:00	MW01	430	60	6.1

NOTES:

inH_2O - inches of water column

PID - photo-ionizing detector

ppm - parts per million

PSI - pounds per square inch

TABLE 4
AIR SAMPLE ANALYTICAL RESULTS

LAMBE 2C
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Sample ID	Sample Date	Vapor (ppm)	Benzene (µg/L)	Toluene (µ/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
Influent 9/25	9/25/2019	782	6.1	42	<5.0	56	NA
Influent-MW01	10/14/2019	431	7.3	26	2.6	36	3,600
	Percent change	-45%	20%	-38%	NA	-36%	NA

NOTES:

µg/L - micrograms per liter

NA - not analyzed

ppm - parts per million

TVPH- total volatile petroleum hydrocarbons

Italics denote that the laboratory method detection limit was used for calculations for a non-detected result

ATTACHMENT 1: LABORATORY ANALYTICAL REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

October 18, 2019

Jennifer Deal

Hilcorp Energy
PO Box 61529
Houston, TX 77208-1529
TEL: (337) 276-7676
FAX

RE: Lambe 2C OrderNo.: 1909E85

Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 5 sample(s) on 9/26/2019 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
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW01
Project: Lambe 2C
Collection Date: 9/24/2019 1:00:00 PM
Lab ID: 1909E85-001 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Fluoride	ND	0.50		mg/L	5	9/26/2019 12:56:35 PM	R63250
Chloride	1100	50	*	mg/L	100	10/10/2019 12:15:25 PM	R63597
Nitrogen, Nitrite (As N)	<3.0	0.50	*	mg/L	5	9/26/2019 12:56:35 PM	R63250
Bromide	5.7	0.50		mg/L	5	9/26/2019 12:56:35 PM	R63250
Nitrogen, Nitrate (As N)	14	0.50	*	mg/L	5	9/26/2019 12:56:35 PM	R63250
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	9/26/2019 12:56:35 PM	R63250
Sulfate	830	50	*	mg/L	100	10/10/2019 12:15:25 PM	R63597
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMT**	
Total Dissolved Solids	3900	40.0	*D	mg/L	1	10/2/2019 7:43:00 AM	47824
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.37		H	pH units	1	10/1/2019 10:52:07 AM	R63331
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **bcv**	
Calcium	540	10		mg/L	10	10/10/2019 4:39:43 PM	B63599
Magnesium	100	5.0		mg/L	5	10/1/2019 12:05:04 PM	D63324
Potassium	11	1.0		mg/L	1	10/1/2019 12:03:27 PM	D63324
Sodium	530	10		mg/L	10	10/10/2019 4:39:43 PM	B63599
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	93	10		µg/L	10	10/2/2019 3:05:00 PM	R63376
Toluene	220	10		µg/L	10	10/2/2019 3:05:00 PM	R63376
Ethylbenzene	12	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2,4-Trimethylbenzene	36	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,3,5-Trimethylbenzene	32	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Naphthalene	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1-Methylnaphthalene	ND	4.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
2-Methylnaphthalene	ND	4.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Acetone	ND	10		µg/L	1	9/30/2019 11:46:00 PM	R63345
Bromobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Bromodichloromethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Bromoform	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Bromomethane	ND	3.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
2-Butanone	ND	10		µg/L	1	9/30/2019 11:46:00 PM	R63345
Carbon disulfide	ND	10		µg/L	1	9/30/2019 11:46:00 PM	R63345
Carbon Tetrachloride	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Chlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW01
Project: Lambe 2C
Collection Date: 9/24/2019 1:00:00 PM
Lab ID: 1909E85-001 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Chloroethane	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Chloroform	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Chloromethane	ND	3.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
2-Chlorotoluene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
4-Chlorotoluene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
cis-1,2-DCE	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Dibromochloromethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Dibromomethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2-Dichlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,3-Dichlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,4-Dichlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Dichlorodifluoromethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1-Dichloroethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1-Dichloroethene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2-Dichloropropane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,3-Dichloropropane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
2,2-Dichloropropane	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1-Dichloropropene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Hexachlorobutadiene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
2-Hexanone	ND	10		µg/L	1	9/30/2019 11:46:00 PM	R63345
Isopropylbenzene	3.7	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
4-Isopropyltoluene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
4-Methyl-2-pentanone	ND	10		µg/L	1	9/30/2019 11:46:00 PM	R63345
Methylene Chloride	ND	3.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
n-Butylbenzene	ND	3.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
n-Propylbenzene	2.0	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
sec-Butylbenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Styrene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
tert-Butylbenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
trans-1,2-DCE	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,1,1-Trichloroethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW01
Project: Lambe 2C
Collection Date: 9/24/2019 1:00:00 PM
Lab ID: 1909E85-001 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,1,2-Trichloroethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Trichloroethene (TCE)	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Trichlorofluoromethane	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
1,2,3-Trichloropropane	ND	2.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Vinyl chloride	ND	1.0		µg/L	1	9/30/2019 11:46:00 PM	R63345
Xylenes, Total	600	15		µg/L	10	10/2/2019 3:05:00 PM	R63376
Surr: 1,2-Dichloroethane-d4	93.7	70-130		%Rec	1	9/30/2019 11:46:00 PM	R63345
Surr: 4-Bromofluorobenzene	95.5	70-130		%Rec	1	9/30/2019 11:46:00 PM	R63345
Surr: Dibromofluoromethane	96.7	70-130		%Rec	1	9/30/2019 11:46:00 PM	R63345
Surr: Toluene-d8	96.7	70-130		%Rec	1	9/30/2019 11:46:00 PM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW02
Project: Lambe 2C
Collection Date: 9/24/2019 12:15:00 PM
Lab ID: 1909E85-002 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Fluoride	ND	0.50		mg/L	5	9/26/2019 11:17:50 AM	R63250
Chloride	330	10	*	mg/L	20	9/26/2019 11:30:10 AM	R63250
Nitrogen, Nitrite (As N)	<3.0	0.50	*	mg/L	5	9/26/2019 11:17:50 AM	R63250
Bromide	4.1	0.50		mg/L	5	9/26/2019 11:17:50 AM	R63250
Nitrogen, Nitrate (As N)	34	2.0	*	mg/L	20	9/26/2019 11:30:10 AM	R63250
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	9/26/2019 11:17:50 AM	R63250
Sulfate	1300	25	*	mg/L	50	10/10/2019 12:28:17 PM	R63597
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMT**	
Total Dissolved Solids	2760	100	*D	mg/L	1	10/2/2019 7:43:00 AM	47824
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.85		H	pH units	1	10/1/2019 10:56:37 AM	R63331
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Calcium	330	5.0		mg/L	5	10/1/2019 12:08:10 PM	D63324
Magnesium	65	1.0		mg/L	1	10/1/2019 12:06:34 PM	D63324
Potassium	8.0	1.0		mg/L	1	10/1/2019 12:06:34 PM	D63324
Sodium	480	5.0		mg/L	5	10/1/2019 12:08:10 PM	D63324
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Toluene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Ethylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Naphthalene	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
2-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Acetone	ND	10		µg/L	1	10/1/2019 12:58:00 AM	R63345
Bromobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Bromodichloromethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Bromoform	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Bromomethane	ND	3.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
2-Butanone	ND	10		µg/L	1	10/1/2019 12:58:00 AM	R63345
Carbon disulfide	ND	10		µg/L	1	10/1/2019 12:58:00 AM	R63345
Carbon Tetrachloride	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Chlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW02
Project: Lambe 2C
Collection Date: 9/24/2019 12:15:00 PM
Lab ID: 1909E85-002 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Chloroethane	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Chloroform	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Chloromethane	ND	3.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
2-Chlorotoluene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
4-Chlorotoluene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
cis-1,2-DCE	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Dibromochloromethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Dibromomethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1-Dichloroethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1-Dichloroethene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2-Dichloropropane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,3-Dichloropropane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
2,2-Dichloropropane	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Hexachlorobutadiene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
2-Hexanone	ND	10		µg/L	1	10/1/2019 12:58:00 AM	R63345
Isopropylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
4-Isopropyltoluene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
4-Methyl-2-pentanone	ND	10		µg/L	1	10/1/2019 12:58:00 AM	R63345
Methylene Chloride	ND	3.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
n-Butylbenzene	ND	3.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
n-Propylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
sec-Butylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Styrene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
tert-Butylbenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
trans-1,2-DCE	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW02
Project: Lambe 2C
Collection Date: 9/24/2019 12:15:00 PM
Lab ID: 1909E85-002 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Trichlorofluoromethane	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Vinyl chloride	ND	1.0		µg/L	1	10/1/2019 12:58:00 AM	R63345
Xylenes, Total	ND	1.5		µg/L	1	10/1/2019 12:58:00 AM	R63345
Surr: 1,2-Dichloroethane-d4	95.6	70-130		%Rec	1	10/1/2019 12:58:00 AM	R63345
Surr: 4-Bromofluorobenzene	96.1	70-130		%Rec	1	10/1/2019 12:58:00 AM	R63345
Surr: Dibromofluoromethane	98.1	70-130		%Rec	1	10/1/2019 12:58:00 AM	R63345
Surr: Toluene-d8	94.1	70-130		%Rec	1	10/1/2019 12:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW06
Project: Lambe 2C
Collection Date: 9/24/2019 12:50:00 PM
Lab ID: 1909E85-003 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Fluoride	ND	0.50		mg/L	5	9/26/2019 12:07:12 PM	R63250
Chloride	260	10	*	mg/L	20	9/26/2019 12:19:32 PM	R63250
Nitrogen, Nitrite (As N)	<6.0	0.50	*	mg/L	5	9/26/2019 12:07:12 PM	R63250
Bromide	0.86	0.50		mg/L	5	9/26/2019 12:07:12 PM	R63250
Nitrogen, Nitrate (As N)	34	0.50	*	mg/L	5	9/26/2019 12:07:12 PM	R63250
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	9/26/2019 12:07:12 PM	R63250
Sulfate	1000	25	*	mg/L	50	10/10/2019 1:58:19 PM	R63597
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMT**	
Total Dissolved Solids	2900	100	*D	mg/L	1	10/2/2019 7:43:00 AM	47824
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.63		H	pH units	1	10/1/2019 11:00:46 AM	R63331
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Calcium	360	5.0		mg/L	5	10/1/2019 12:16:26 PM	D63324
Magnesium	57	1.0		mg/L	1	10/1/2019 12:14:46 PM	D63324
Potassium	8.6	1.0		mg/L	1	10/1/2019 12:14:46 PM	D63324
Sodium	480	5.0		mg/L	5	10/1/2019 12:16:26 PM	D63324
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Toluene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Ethylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Methyl tert-butyl ether (MTBE)	1.3	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Naphthalene	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
2-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Acetone	ND	10		µg/L	1	10/1/2019 1:46:00 AM	R63345
Bromobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Bromodichloromethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Bromoform	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Bromomethane	ND	3.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
2-Butanone	ND	10		µg/L	1	10/1/2019 1:46:00 AM	R63345
Carbon disulfide	ND	10		µg/L	1	10/1/2019 1:46:00 AM	R63345
Carbon Tetrachloride	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Chlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW06
Project: Lambe 2C
Collection Date: 9/24/2019 12:50:00 PM
Lab ID: 1909E85-003 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Chloroethane	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Chloroform	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Chloromethane	ND	3.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
2-Chlorotoluene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
4-Chlorotoluene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
cis-1,2-DCE	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Dibromochloromethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Dibromomethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1-Dichloroethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1-Dichloroethene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2-Dichloropropane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,3-Dichloropropane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
2,2-Dichloropropane	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Hexachlorobutadiene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
2-Hexanone	ND	10		µg/L	1	10/1/2019 1:46:00 AM	R63345
Isopropylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
4-Isopropyltoluene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
4-Methyl-2-pentanone	ND	10		µg/L	1	10/1/2019 1:46:00 AM	R63345
Methylene Chloride	ND	3.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
n-Butylbenzene	ND	3.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
n-Propylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
sec-Butylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Styrene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
tert-Butylbenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
trans-1,2-DCE	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW06
Project: Lambe 2C
Collection Date: 9/24/2019 12:50:00 PM
Lab ID: 1909E85-003 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Trichlorofluoromethane	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Vinyl chloride	ND	1.0		µg/L	1	10/1/2019 1:46:00 AM	R63345
Xylenes, Total	ND	1.5		µg/L	1	10/1/2019 1:46:00 AM	R63345
Surr: 1,2-Dichloroethane-d4	93.1	70-130		%Rec	1	10/1/2019 1:46:00 AM	R63345
Surr: 4-Bromofluorobenzene	98.1	70-130		%Rec	1	10/1/2019 1:46:00 AM	R63345
Surr: Dibromofluoromethane	98.2	70-130		%Rec	1	10/1/2019 1:46:00 AM	R63345
Surr: Toluene-d8	91.8	70-130		%Rec	1	10/1/2019 1:46:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW07
Project: Lambe 2C
Collection Date: 9/24/2019 12:40:00 PM
Lab ID: 1909E85-004 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Fluoride	ND	0.50		mg/L	5	9/26/2019 11:42:31 AM	R63250
Chloride	980	50	*	mg/L	100	10/10/2019 2:11:10 PM	R63597
Nitrogen, Nitrite (As N)	<3.0	0.50	*	mg/L	5	9/26/2019 11:42:31 AM	R63250
Bromide	5.3	0.50		mg/L	5	9/26/2019 11:42:31 AM	R63250
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	9/26/2019 11:42:31 AM	R63250
Phosphorus, Orthophosphate (As P)	ND	2.5		mg/L	5	9/26/2019 11:42:31 AM	R63250
Sulfate	720	10	*	mg/L	20	9/26/2019 11:54:52 AM	R63250
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMT**	
Total Dissolved Solids	3490	200	*D	mg/L	1	10/2/2019 7:43:00 AM	47824
SM4500-H+B / 9040C: PH						Analyst: **JRR**	
pH	7.25		H	pH units	1	10/1/2019 11:08:54 AM	R63331
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **ELS**	
Calcium	420	5.0		mg/L	5	10/1/2019 12:19:23 PM	D63324
Magnesium	80	1.0		mg/L	1	10/1/2019 12:17:59 PM	D63324
Potassium	7.3	1.0		mg/L	1	10/1/2019 12:17:59 PM	D63324
Sodium	500	10		mg/L	10	10/10/2019 4:41:29 PM	B63599
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Benzene	400	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Toluene	490	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Ethylbenzene	20	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2,4-Trimethylbenzene	11	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,3,5-Trimethylbenzene	440	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2-Dichloroethane (EDC)	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2-Dibromoethane (EDB)	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Naphthalene	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
1-Methylnaphthalene	ND	40		µg/L	10	10/1/2019 2:58:00 AM	R63345
2-Methylnaphthalene	ND	40		µg/L	10	10/1/2019 2:58:00 AM	R63345
Acetone	ND	100		µg/L	10	10/1/2019 2:58:00 AM	R63345
Bromobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Bromodichloromethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Bromoform	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Bromomethane	ND	30		µg/L	10	10/1/2019 2:58:00 AM	R63345
2-Butanone	ND	100		µg/L	10	10/1/2019 2:58:00 AM	R63345
Carbon disulfide	ND	100		µg/L	10	10/1/2019 2:58:00 AM	R63345
Carbon Tetrachloride	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Chlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW07
Project: Lambe 2C
Collection Date: 9/24/2019 12:40:00 PM
Lab ID: 1909E85-004 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
Chloroethane	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
Chloroform	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Chloromethane	ND	30		µg/L	10	10/1/2019 2:58:00 AM	R63345
2-Chlorotoluene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
4-Chlorotoluene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
cis-1,2-DCE	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
cis-1,3-Dichloropropene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
Dibromochloromethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Dibromomethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2-Dichlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,3-Dichlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,4-Dichlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Dichlorodifluoromethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1-Dichloroethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1-Dichloroethene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2-Dichloropropane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,3-Dichloropropane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
2,2-Dichloropropane	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1-Dichloropropene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Hexachlorobutadiene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
2-Hexanone	ND	100		µg/L	10	10/1/2019 2:58:00 AM	R63345
Isopropylbenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
4-Isopropyltoluene	17	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
4-Methyl-2-pentanone	ND	100		µg/L	10	10/1/2019 2:58:00 AM	R63345
Methylene Chloride	ND	30		µg/L	10	10/1/2019 2:58:00 AM	R63345
n-Butylbenzene	ND	30		µg/L	10	10/1/2019 2:58:00 AM	R63345
n-Propylbenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
sec-Butylbenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Styrene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
tert-Butylbenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
Tetrachloroethene (PCE)	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
trans-1,2-DCE	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
trans-1,3-Dichloropropene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2,3-Trichlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2,4-Trichlorobenzene	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,1,1-Trichloroethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: MW07
Project: Lambe 2C
Collection Date: 9/24/2019 12:40:00 PM
Lab ID: 1909E85-004 **Matrix:** AQUEOUS **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **CCM**	
1,1,2-Trichloroethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Trichloroethene (TCE)	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Trichlorofluoromethane	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
1,2,3-Trichloropropane	ND	20		µg/L	10	10/1/2019 2:58:00 AM	R63345
Vinyl chloride	ND	10		µg/L	10	10/1/2019 2:58:00 AM	R63345
Xylenes, Total	820	15		µg/L	10	10/1/2019 2:58:00 AM	R63345
Surr: 1,2-Dichloroethane-d4	91.9	70-130		%Rec	10	10/1/2019 2:58:00 AM	R63345
Surr: 4-Bromofluorobenzene	95.9	70-130		%Rec	10	10/1/2019 2:58:00 AM	R63345
Surr: Dibromofluoromethane	92.0	70-130		%Rec	10	10/1/2019 2:58:00 AM	R63345
Surr: Toluene-d8	95.0	70-130		%Rec	10	10/1/2019 2:58:00 AM	R63345

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Influent 9/25
Project: Lambe 2C
Collection Date: 9/25/2019 9:30:00 AM
Lab ID: 1909E85-005 **Matrix:** AIR **Received Date:** 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	6.1	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Toluene	42	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Ethylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Methyl tert-butyl ether (MTBE)	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2,4-Trimethylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,3,5-Trimethylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2-Dichloroethane (EDC)	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2-Dibromoethane (EDB)	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Naphthalene	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1-Methylnaphthalene	ND	20	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
2-Methylnaphthalene	ND	20	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Acetone	ND	50	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Bromobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Bromodichloromethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Bromoform	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Bromomethane	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
2-Butanone	ND	50	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Carbon disulfide	ND	50	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Carbon tetrachloride	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Chlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Chloroethane	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Chloroform	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Chloromethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
2-Chlorotoluene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
4-Chlorotoluene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
cis-1,2-DCE	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
cis-1,3-Dichloropropene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2-Dibromo-3-chloropropane	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Dibromochloromethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Dibromomethane	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2-Dichlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,3-Dichlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,4-Dichlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Dichlorodifluoromethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1-Dichloroethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1-Dichloroethene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2-Dichloropropane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,3-Dichloropropane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
2,2-Dichloropropane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479

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

Qualifiers:

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

Analytical Report
Lab Order **1909E85**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Client Sample ID: Influent 9/25
Project: Lambe 2C
Collection Date: 9/25/2019 9:30:00 AM
Lab ID: 1909E85-005 **Matrix:** AIR
Received Date: 9/26/2019 8:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Hexachlorobutadiene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
2-Hexanone	ND	50	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Isopropylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
4-Isopropyltoluene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
4-Methyl-2-pentanone	ND	50	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Methylene chloride	ND	15	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
n-Butylbenzene	ND	15	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
n-Propylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
sec-Butylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Styrene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
tert-Butylbenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1,1,2-Tetrachloroethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1,2,2-Tetrachloroethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Tetrachloroethene (PCE)	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
trans-1,2-DCE	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
trans-1,3-Dichloropropene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2,3-Trichlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2,4-Trichlorobenzene	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1,1-Trichloroethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,1,2-Trichloroethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Trichloroethene (TCE)	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Trichlorofluoromethane	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
1,2,3-Trichloropropane	ND	10	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Vinyl chloride	ND	5.0	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Xylenes, Total	56	7.5	D	µg/L	50	10/7/2019 1:07:39 PM	W63479
Surr: Dibromofluoromethane	97.5	53.9-127	D	%Rec	50	10/7/2019 1:07:39 PM	W63479
Surr: 1,2-Dichloroethane-d4	91.3	70-130	D	%Rec	50	10/7/2019 1:07:39 PM	W63479
Surr: Toluene-d8	107	70-130	D	%Rec	50	10/7/2019 1:07:39 PM	W63479
Surr: 4-Bromofluorobenzene	88.8	70-130	D	%Rec	50	10/7/2019 1:07:39 PM	W63479

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
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ANALYTICAL SUMMARY REPORT

October 02, 2019

Hall Environmental
4901 Hawkins St NE Ste D
Albuquerque, NM 87109-4372

Work Order: G19090594

Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 1 sample for Hall Environmental on 9/27/2019 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G19090594-001	1909E85-005B; Influent 9/25	09/25/19 9:30	09/27/19	Gas	Natural Gas Analysis - BTU Natural Gas Analysis - Compressibility Factor Natural Gas Analysis - GPM Natural Gas Analysis - Molecular Weight Natural Gas Analysis - Routine Natural Gas Analysis - Pressure Base Natural Gas Analysis - Psuedo-Critical Pressure Natural Gas Analysis - Psuedo-Critical Temperature Natural Gas Analysis - Specific Gravity Natural Gas Analysis - Temperature Base

The analyses presented in this report were performed by Energy Laboratories, Inc., 400 W. Boxelder Rd., Gillette, WY 82718, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these tests results, please contact your Project Manager.

Report Approved By:

Julie Weisz
Gillette QA Officer

Digitally signed by
Julie L. Weisz
Date: 2019.10.02 08:28:36 -06:00

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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 1909E85-005B; Influent 9/25
Location:
Lab ID: G19090594-001

Report Date: 10/02/19
Collection Date: 09/25/19 09:30
Date Received: 09/27/19
Sampled By: Not Provided

Analyses	Result	Units	Qualifier	Method	Analysis Date / By
NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT					
Oxygen	11.962	Mol %		GPA 2261	10/01/19 13:06 / djb
Nitrogen	85.294	Mol %		GPA 2261	10/01/19 13:06 / djb
Carbon Dioxide	2.731	Mol %		GPA 2261	10/01/19 13:06 / djb
Hydrogen Sulfide	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Methane	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Ethane	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Propane	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Isobutane	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
n-Butane	< 0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Isopentane	0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
n-Pentane	0.001	Mol %		GPA 2261	10/01/19 13:06 / djb
Hexanes plus	0.011	Mol %		GPA 2261	10/01/19 13:06 / djb
GPM @ STD COND/1000 CU.FT., MOISTURE FREE GAS					
GPM Ethane	< 0.0003	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Propane	< 0.0003	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Isobutane	< 0.0003	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM n-Butane	< 0.0003	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Isopentane	< 0.0004	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM n-Pentane	< 0.0004	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Hexanes plus	0.0050	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Pentanes plus	0.0060	gal/MCF		GPA 2261	10/01/19 13:06 / djb
GPM Total	0.0060	gal/MCF		GPA 2261	10/01/19 13:06 / djb
CALCULATED PROPERTIES					
Calculation Pressure Base	14.730	psia		GPA 2261	10/01/19 13:06 / djb
Calculation Temperature Base	60	°F		GPA 2261	10/01/19 13:06 / djb
Compressibility Factor, Z	1.0000	unitless		GPA 2261	10/01/19 13:06 / djb
Molecular Weight	28.94	unitless		GPA 2261	10/01/19 13:06 / djb
Pseudo-critical Pressure, psia	538	psia		GPA 2261	10/01/19 13:06 / djb
Pseudo-critical Temperature, deg R	243	deg R		GPA 2261	10/01/19 13:06 / djb
Specific Gravity (air=1.000)	1.002	unitless		GPA 2261	10/01/19 13:06 / djb
Gross BTU per cu ft @ std cond, dry	0.65	BTU/cu ft		GPA 2261	10/01/19 13:06 / djb
Gross BTU per cu ft @ std cond, wet	0.64	BTU/cu ft		GPA 2261	10/01/19 13:06 / djb

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental **Work Order:** G19090594 **Report Date:** 10/02/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261									Analytical Run: R253209
Lab ID: ICV-1910011111	Initial Calibration Verification Standard								10/01/19 11:11
Oxygen	0.397	Mol %	0.001	83	75	110			
Nitrogen	5.005	Mol %	0.001	99	90	110			
Carbon Dioxide	4.905	Mol %	0.001	99	90	110			
Hydrogen Sulfide	0.127	Mol %	0.001	126	100	136			
Methane	73.107	Mol %	0.001	100	90	110			
Ethane	5.017	Mol %	0.001	101	90	110			
Propane	5.132	Mol %	0.001	101	90	110			
Isobutane	2.022	Mol %	0.001	100	90	110			
n-Butane	1.999	Mol %	0.001	99	90	110			
Isopentane	0.995	Mol %	0.001	100	90	110			
n-Pentane	0.988	Mol %	0.001	99	90	110			
Hexanes plus	0.306	Mol %	0.001	101	90	110			
Lab ID: CCV-1910011119	Continuing Calibration Verification Standard								10/01/19 11:19
Oxygen	0.572	Mol %	0.001	95	90	110			
Nitrogen	1.236	Mol %	0.001	88	85	110			
Carbon Dioxide	0.963	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.022	Mol %	0.001	88	70	130			
Methane	93.621	Mol %	0.001	100	90	110			
Ethane	1.027	Mol %	0.001	102	90	110			
Propane	1.013	Mol %	0.001	101	90	110			
Isobutane	0.505	Mol %	0.001	101	90	110			
n-Butane	0.491	Mol %	0.001	98	90	110			
Isopentane	0.201	Mol %	0.001	100	90	110			
n-Pentane	0.196	Mol %	0.001	98	90	110			
Hexanes plus	0.153	Mol %	0.001	101	90	110			
Lab ID: CCV-1910011439	Continuing Calibration Verification Standard								10/01/19 14:39
Oxygen	0.601	Mol %	0.001	100	90	110			
Nitrogen	1.329	Mol %	0.001	95	85	110			
Carbon Dioxide	0.969	Mol %	0.001	97	90	110			
Hydrogen Sulfide	0.024	Mol %	0.001	96	70	130			
Methane	93.461	Mol %	0.001	100	90	110			
Ethane	1.029	Mol %	0.001	102	90	110			
Propane	1.025	Mol %	0.001	102	90	110			
Isobutane	0.507	Mol %	0.001	101	90	110			
n-Butane	0.498	Mol %	0.001	100	90	110			
Isopentane	0.202	Mol %	0.001	101	90	110			
n-Pentane	0.199	Mol %	0.001	99	90	110			
Hexanes plus	0.156	Mol %	0.001	103	90	110			
Method: GPA 2261									Batch: R253209
Lab ID: G19090594-001ADUP	Sample Duplicate				Run: Varian GC_191001A				10/01/19 13:10
Oxygen	11.965	Mol %	0.001				0.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental **Work Order:** G19090594 **Report Date:** 10/02/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261									Batch: R253209
Lab ID: G19090594-001ADUP	Sample Duplicate				Run: Varian GC_191001A				10/01/19 13:10
Nitrogen	85.290	Mol %	0.001				0.0	10	
Carbon Dioxide	2.733	Mol %	0.001				0.1	10	
Hydrogen Sulfide	< 0.001	Mol %	0.001					10	
Methane	< 0.001	Mol %	0.001					10	
Ethane	< 0.001	Mol %	0.001					10	
Propane	< 0.001	Mol %	0.001					10	
Isobutane	< 0.001	Mol %	0.001					10	
n-Butane	< 0.001	Mol %	0.001					10	
Isopentane	0.001	Mol %	0.001				0.0	10	
n-Pentane	0.001	Mol %	0.001				0.0	10	
Hexanes plus	0.010	Mol %	0.001				9.5	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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Work Order Receipt Checklist

Hall Environmental

G19090594

Login completed by: Misty Stephens
Reviewed by: Kasey Vidick
Reviewed Date: 9/30/2019

Date Received: 9/27/2019
Received by: tla
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Applicable ☑
Container/Temp Blank temperature:	°C		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

SUB CONTRATOR: Energy Laboratories	COMPANY: Energy Laboratories	PHONE: (888) 690-2218	FAX:
ADDRESS: 415 Graham Rd		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: College Station, TX 77845			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1909E85-005B	Influent 9/25	TEDLAR	Air	9/25/2019 9:30:00 AM	1	Natural Gas Analysis

19090594

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 9/26/2019	Time: 10:05 AM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	9/27/19	12:46

TAT: Standard ☑ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples ____ °C Attempt to Cool ? ____
Comments: ____

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **MB** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW** Batch ID: **R63250** RunNo: **63250**
Prep Date: Analysis Date: **9/26/2019** SeqNo: **2158467** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P	ND	0.50								
Sulfate	ND	0.50								

Sample ID: **LCS** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW** Batch ID: **R63250** RunNo: **63250**
Prep Date: Analysis Date: **9/26/2019** SeqNo: **2158468** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.53	0.10	0.5000	0	107	90	110			
Chloride	4.7	0.50	5.000	0	94.4	90	110			
Nitrogen, Nitrite (As N)	0.96	0.10	1.000	0	96.0	90	110			
Bromide	2.4	0.10	2.500	0	96.6	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	98.6	90	110			
Phosphorus, Orthophosphate (As P	4.6	0.50	5.000	0	91.9	90	110			
Sulfate	9.8	0.50	10.00	0	98.1	90	110			

Sample ID: **MB** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW** Batch ID: **R63597** RunNo: **63597**
Prep Date: Analysis Date: **10/10/2019** SeqNo: **2172771** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID: **LCS** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW** Batch ID: **R63597** RunNo: **63597**
Prep Date: Analysis Date: **10/10/2019** SeqNo: **2172772** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.9	0.50	5.000	0	97.4	90	110			
Sulfate	9.8	0.50	10.00	0	98.0	90	110			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **1909e85-005a dup** SampType: **DUP** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **Influent 9/25** Batch ID: **W63479** RunNo: **63479**
Prep Date: Analysis Date: **10/7/2019** SeqNo: **2168429** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	6.0	5.0						1.07	20	D
Toluene	42	5.0						0.467	20	D
Ethylbenzene	ND	5.0						0	20	D
Methyl tert-butyl ether (MTBE)	ND	5.0						0	20	D
1,2,4-Trimethylbenzene	ND	5.0						0	20	D
1,3,5-Trimethylbenzene	ND	5.0						0	20	D
1,2-Dichloroethane (EDC)	ND	5.0						0	20	D
1,2-Dibromoethane (EDB)	ND	5.0						0	20	D
Naphthalene	ND	10						0	20	D
1-Methylnaphthalene	ND	20						0	20	D
2-Methylnaphthalene	ND	20						0	20	D
Acetone	ND	50						0	20	D
Bromobenzene	ND	5.0						0	20	D
Bromodichloromethane	ND	5.0						0	20	D
Bromoform	ND	5.0						0	20	D
Bromomethane	ND	10						0	20	D
2-Butanone	ND	50						0	20	D
Carbon disulfide	ND	50						0	20	D
Carbon tetrachloride	ND	5.0						0	20	D
Chlorobenzene	ND	5.0						0	20	D
Chloroethane	ND	10						0	20	D
Chloroform	ND	5.0						0	20	D
Chloromethane	ND	5.0						0	20	D
2-Chlorotoluene	ND	5.0						0	20	D
4-Chlorotoluene	ND	5.0						0	20	D
cis-1,2-DCE	ND	5.0						0	20	D
cis-1,3-Dichloropropene	ND	5.0						0	20	D
1,2-Dibromo-3-chloropropane	ND	10						0	20	D
Dibromochloromethane	ND	5.0						0	20	D
Dibromomethane	ND	10						0	20	D
1,2-Dichlorobenzene	ND	5.0						0	20	D
1,3-Dichlorobenzene	ND	5.0						0	20	D
1,4-Dichlorobenzene	ND	5.0						0	20	D
Dichlorodifluoromethane	ND	5.0						0	20	D
1,1-Dichloroethane	ND	5.0						0	20	D
1,1-Dichloroethene	ND	5.0						0	20	D
1,2-Dichloropropane	ND	5.0						0	20	D
1,3-Dichloropropane	ND	5.0						0	20	D
2,2-Dichloropropane	ND	5.0						0	20	D

Qualifiers:

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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
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QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **1909e85-005a dup** SampType: **DUP** TestCode: **EPA Method 8260B: Volatiles**
Client ID: **Influent 9/25** Batch ID: **W63479** RunNo: **63479**
Prep Date: Analysis Date: **10/7/2019** SeqNo: **2168429** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	5.0						0	20	D
Hexachlorobutadiene	ND	5.0						0	20	D
2-Hexanone	ND	50						0	20	D
Isopropylbenzene	ND	5.0						0	20	D
4-Isopropyltoluene	ND	5.0						0	20	D
4-Methyl-2-pentanone	ND	50						0	20	D
Methylene chloride	ND	15						0	20	D
n-Butylbenzene	ND	15						0	20	D
n-Propylbenzene	ND	5.0						0	20	D
sec-Butylbenzene	ND	5.0						0	20	D
Styrene	ND	5.0						0	20	D
tert-Butylbenzene	ND	5.0						0	20	D
1,1,1,2-Tetrachloroethane	ND	5.0						0	20	D
1,1,2,2-Tetrachloroethane	ND	5.0						0	20	D
Tetrachloroethene (PCE)	ND	5.0						0	20	D
trans-1,2-DCE	ND	5.0						0	20	D
trans-1,3-Dichloropropene	ND	5.0						0	20	D
1,2,3-Trichlorobenzene	ND	5.0						0	20	D
1,2,4-Trichlorobenzene	ND	5.0						0	20	D
1,1,1-Trichloroethane	ND	5.0						0	20	D
1,1,2-Trichloroethane	ND	5.0						0	20	D
Trichloroethene (TCE)	ND	5.0						0	20	D
Trichlorofluoromethane	ND	5.0						0	20	D
1,2,3-Trichloropropane	ND	10						0	20	D
Vinyl chloride	ND	5.0						0	20	D
Xylenes, Total	57	7.5						2.30	20	D
Surr: Dibromofluoromethane	49		50.00		97.0	53.9	127	0	0	D
Surr: 1,2-Dichloroethane-d4	44		50.00		87.8	70	130	0	0	D
Surr: Toluene-d8	53		50.00		107	70	130	0	0	D
Surr: 4-Bromofluorobenzene	45		50.00		90.9	70	130	0	0	D

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **100ng lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R63345**	RunNo: **63345**
Prep Date:	Analysis Date: **9/30/2019**	SeqNo: **2162136** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	93.3	70	130			
Toluene	17	1.0	20.00	0	86.5	70	130			
Chlorobenzene	18	1.0	20.00	0	89.8	70	130			
1,1-Dichloroethene	18	1.0	20.00	0	88.6	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	88.7	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.2	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	10		10.00		103	70	130			
Surr: Toluene-d8	9.1		10.00		91.1	70	130			

Sample ID: **rb2**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R63345**	RunNo: **63345**
Prep Date:	Analysis Date: **9/30/2019**	SeqNo: **2162137** Units: **µg/L**

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **rb2** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **R63345** RunNo: **63345**
Prep Date: Analysis Date: **9/30/2019** SeqNo: **2162137** Units: **µg/L**

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **rb2** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **R63345** RunNo: **63345**
Prep Date: Analysis Date: **9/30/2019** SeqNo: **2162137** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.7		10.00		96.9	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		96.5	70	130			
Surr: Dibromofluoromethane	10		10.00		99.6	70	130			
Surr: Toluene-d8	9.4		10.00		93.5	70	130			

Sample ID: **1909E85-001ams** SampType: **MS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW01** Batch ID: **R63345** RunNo: **63345**
Prep Date: Analysis Date: **10/1/2019** SeqNo: **2162139** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	130	1.0	20.00	114.0	100	70	130			E
Toluene	250	1.0	20.00	236.7	85.7	70	130			E
Chlorobenzene	20	1.0	20.00	0	101	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	94.3	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	97.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.4	70	130			
Surr: 4-Bromofluorobenzene	9.5		10.00		95.0	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.8	70	130			
Surr: Toluene-d8	9.6		10.00		96.3	70	130			

Sample ID: **1909E85-001amsd** SampType: **MSD** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW01** Batch ID: **R63345** RunNo: **63345**
Prep Date: Analysis Date: **10/1/2019** SeqNo: **2162140** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	130	1.0	20.00	114.0	59.4	70	130	6.31	20	ES
Toluene	240	1.0	20.00	236.7	10.8	70	130	6.08	20	ES
Chlorobenzene	19	1.0	20.00	0	97.3	70	130	4.19	20	
1,1-Dichloroethene	17	1.0	20.00	0	85.6	70	130	9.69	20	
Trichloroethene (TCE)	18	1.0	20.00	0	91.4	70	130	5.93	20	
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.7	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.8		10.00		98.2	70	130	0	0	
Surr: Dibromofluoromethane	9.4		10.00		93.9	70	130	0	0	
Surr: Toluene-d8	9.7		10.00		97.1	70	130	0	0	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R63376**	RunNo: **63376**
Prep Date:	Analysis Date: **10/2/2019**	SeqNo: **2163948** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	88.3	70	130			
Toluene	20	1.0	20.00	0	100	70	130			
Surr: 1,2-Dichloroethane-d4	9.2		10.00		91.6	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		97.3	70	130			
Surr: Dibromofluoromethane	9.0		10.00		90.0	70	130			
Surr: Toluene-d8	10		10.00		102	70	130			

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R63376**	RunNo: **63376**
Prep Date:	Analysis Date: **10/2/2019**	SeqNo: **2163949** 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								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.0		10.00		90.3	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		97.2	70	130			
Surr: Dibromofluoromethane	9.1		10.00		90.8	70	130			
Surr: Toluene-d8	10		10.00		101	70	130			

Sample ID: **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W63479**	RunNo: **63479**
Prep Date:	Analysis Date: **10/7/2019**	SeqNo: **2168426** Units: **µg/L**

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

Qualifiers:

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S	% Recovery outside of range due to dilution or matrix
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J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **rb** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **W63479** RunNo: **63479**
Prep Date: Analysis Date: **10/7/2019** SeqNo: **2168426** Units: **µg/L**

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **rb** SampType: **MBLK** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW** Batch ID: **W63479** RunNo: **63479**
Prep Date: Analysis Date: **10/7/2019** SeqNo: **2168426** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.9		10.00		99.1	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		92.1	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	10		10.00		104	70	130			

Sample ID: **100ng lcs** SampType: **LCS** TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW** Batch ID: **W63479** RunNo: **63479**
Prep Date: Analysis Date: **10/7/2019** SeqNo: **2168427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	105	70	130			
Toluene	19	1.0	20.00	0	94.2	70	130			
Chlorobenzene	18	1.0	20.00	0	91.6	70	130			
1,1-Dichloroethene	17	1.0	20.00	0	86.7	70	130			
Trichloroethene (TCE)	17	1.0	20.00	0	87.4	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		103	70	130			
Surr: 4-Bromofluorobenzene	9.0		10.00		89.8	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.2	70	130			
Surr: Toluene-d8	9.9		10.00		98.7	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **MB-D**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **D63324**	RunNo: **63324**
Prep Date:	Analysis Date: **10/1/2019**	SeqNo: **2162324** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID: **LCS-D**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **D63324**	RunNo: **63324**
Prep Date:	Analysis Date: **10/1/2019**	SeqNo: **2162326** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	100	80	120			
Magnesium	50	1.0	50.00	0	101	80	120			
Potassium	50	1.0	50.00	0	99.1	80	120			
Sodium	50	1.0	50.00	0	101	80	120			

Sample ID: **MB-B**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B63599**	RunNo: **63599**
Prep Date:	Analysis Date: **10/10/2019**	SeqNo: **2173009** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Sodium	ND	1.0								

Sample ID: **LCS-B**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B63599**	RunNo: **63599**
Prep Date:	Analysis Date: **10/10/2019**	SeqNo: **2173011** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.4	80	120			
Sodium	50	1.0	50.00	0	99.0	80	120			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1909E85**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **MB-47824** SampType: **MBLK** TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW** Batch ID: **47824** RunNo: **63351**
Prep Date: **9/30/2019** Analysis Date: **10/2/2019** SeqNo: **2162583** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID: **LCS-47824** SampType: **LCS** TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW** Batch ID: **47824** RunNo: **63351**
Prep Date: **9/30/2019** Analysis Date: **10/2/2019** SeqNo: **2162584** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 1909E85 RcptNo: 1

Received By: **Desiree Dominguez** 9/26/2019 8:15:00 AM DD

Completed By: **Michelle Garcia** 9/26/2019 9:52:00 AM Michelle Garcia

Reviewed By: JO 9/26/19

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 Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☐ No ☑
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☑ ~~No ☑~~ DAD 9/26/19 NA ☐
9. VOA vials have zero headspace? Yes ☑ No ☐ No VOA Vials ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: 4 (<2 or >12 unless noted)
Adjusted? YES
Checked by: DAD 9/26/19

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: FOR metals analysis added ~0.4mL HNO3 to samples 004-004c

17. **Cooler Information** For pH <2.

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.4	Good	Yes			

Chain-of-Custody Record

Client: ~~Harvest Four Corners~~ HilCorp Energy

Jennifer Deal

Mailing Address: PO Box 61529

Houston, TX

Phone #: 505 324-5128

email or Fax#: jdeal@hilcorp.com

QA/QC Package:

☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other

☒ EDD (Type) PDF

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: Lambe 2C

Project #:

Project Manager: Danny Burns-LTE

Sampler: Eric Carroll

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 1.1 +0.3 = 1.4°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1908E85	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	pH	TDS	Cations	Anions	CO_2	O_2
9/24	1300	Gw	MW01	3 VOA 1250ml	HCl Cool	-001								X			X	X	X	X		
9/24	1215	Gw	MW02	5 VOA 1250ml	HCl Cool	-002								X			X	X	X	X		
9/24	1250	Gw	MW06	3 VOA 1250ml	HCl Cool	-003								X			X	X	X	X		
9/24	1240	Gw	MW07	5 VOA 1250ml	HCl Cool	-004								X			X	X	X	X		
9/25	0930	Air	Influent 9/25	2 Tedlar		-005								X							X	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9/25	1540	Eric Carroll	Chantz Walls		9/25/19	1546
9/25/19	1840	Chantz Walls		courier	9/26/19	8:15

Remarks: Lab to filter and preserve limited sample MW06, & MW02

Please CC: ecarroll@ltenv.com

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

October 18, 2019

Jennifer Deal

Hilcorp Energy
PO Box 61529
Houston, TX 77208-1529
TEL: (337) 276-7676
FAX

RE: Lambe 2C OrderNo.: 1910888

Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/16/2019 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

4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1910888**
Date Reported: **10/18/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy
Project: Lambe 2C
Lab ID: 1910888-001 **Matrix:** AIR

Client Sample ID: Influent-MW01
Collection Date: 10/14/2019 4:30:00 PM
Received Date: 10/16/2019 7:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	3600	250		µg/L	50	10/17/2019 10:10:19 AM	G63783
Surr: BFB	145	53-256		%Rec	50	10/17/2019 10:10:19 AM	G63783
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	7.3	5.0		µg/L	50	10/17/2019 10:10:19 AM	R63783
Toluene	26	5.0		µg/L	50	10/17/2019 10:10:19 AM	R63783
Ethylbenzene	2.6	2.5		µg/L	50	10/17/2019 10:10:19 AM	R63783
Xylenes, Total	36	10		µg/L	50	10/17/2019 10:10:19 AM	R63783
Surr: 4-Bromofluorobenzene	101	81.6-133		%Rec	50	10/17/2019 10:10:19 AM	R63783

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910888**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **1910888-001ADUP** SampType: **DUP** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **Influent-MW01** Batch ID: **G63783** RunNo: **63783**
Prep Date: Analysis Date: **10/17/2019** SeqNo: **2180018** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	3300	250						8.81	20	
Surr: BFB	140000		100000		140	53	256	0	0	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910888**
18-Oct-19

Client: Hilcorp Energy
Project: Lambe 2C

Sample ID: **1910888-001ADUP** SampType: **DUP** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **Influent-MW01** Batch ID: **R63783** RunNo: **63783**
Prep Date: Analysis Date: **10/17/2019** SeqNo: **2180066** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	6.8	5.0						8.21	20	
Toluene	24	5.0						8.97	20	
Ethylbenzene	2.4	2.0						7.87	20	
Xylenes, Total	33	10						10.2	20	
Surr: 4-Bromofluorobenzene	100		100.0		101	81.6	133	0	0	

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY** Work Order Number: **1910888** RcptNo: **1**

Received By: **Daniel Marquez** **10/16/2019 7:45:00 AM**

Completed By: **Erin Melendrez** **10/16/2019 8:22:38 AM**

Reviewed By: ENM 10/16/19

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

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

Adjusted? _____

Checked by: DAD 10/16/19

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	N/A	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp Energy Company
Jennifer Deal
Mailing Address:

Phone #: 505-324-5128
email or Fax#: jdeal@hilcorp.com
QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☑ EDD (Type) PDF

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: Lambe 2C
Project #:
Project Manager: LTE - Danny Burns 701-570-4727
Sampler: D. Burns
On Ice: ☐ Yes ☑ No
# of Coolers: 1
Cooler Temp(including CF): N/A

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1910888	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO/DRO/MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
10-14	16:30	Air	Influent - MW01	1L Tedlar	NA	-001	X	X								

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
10-15	1435				10/15/19	1435
10/15/19	1752			courier	10/16/19	0745

Remarks: cc: dburns@lteny.com

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.

NV

October 1, 2021

Ms. Emily Hernandez
Bureau Chief, Environmental
New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **Second Quarter 2020 - Quarterly SVE System Update**
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following second quarter 2020 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site). WSP submitted the *Soil Delineation and Proposed Remediation Work Plan* to the New Mexico Oil Conservation Division (NMOCD) on August 30, 2019 (submitted directly to Mr. Cory Smith via email) and approved by NMOCD on September 9, 2019. WSP then submitted the *Venturi SVE Remediation Update and Proposed Workplan* (PO#: HDK7K-190830-C-1410) on March 5, 2020. On June 3, 2020 (90 days from submittal), Hilcorp reminded the NMOCD of the submittal of the *Venturi SVE Remediation Update and Proposed Workplan* and asked if the report would need to be re-submitted. On June 4, 2020, the NMOCD responded and stated that re-submittal was not necessary, and the report would be reviewed by the NMOCD soon. This report is being submitted to comply with the quarterly reporting timelines and activities proposed in the *Venturi SVE Remediation Update and Proposed Workplan.*

At this time, Hilcorp is awaiting response from the NMOCD regarding the *Venturi SVE Remediation Update and Proposed Workplan*.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at devin.hencmann@wsp.com or Mitch Killough at (713)-757-5247 or at mkillough@hilcorp.com.

Kind regards,

Devin Hencmann
Senior Geologist

Ashley Ager, M.S., P.G.
Assistant Vice President

WSP USA
848 EAST 2ND AVENUE
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NV

October 1, 2021

Ms. Emily Hernandez
Bureau Chief, Environmental
New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **Third Quarter 2020 - Quarterly SVE System Update**
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following third quarter 2020 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site). WSP submitted the *Soil Delineation and Proposed Remediation Work Plan* to the New Mexico Oil Conservation Division (NMOCD) on August 30, 2019 (submitted directly to Mr. Cory Smith via email) and approved by NMOCD on September 9, 2019. WSP then submitted the *Venturi SVE Remediation Update and Proposed Workplan* (PO#: HDK7K-190830-C-1410) on March 5, 2020. On June 3, 2020 (90 days from submittal), Hilcorp reminded the NMOCD of the submittal of the *Venturi SVE Remediation Update and Proposed Workplan* and asked if the report would need to be re-submitted. On June 4, 2020, the NMOCD responded and stated that re-submittal was not necessary, and the report would be reviewed by the NMOCD soon. This report is being submitted to comply with the quarterly reporting timelines and activities proposed in the *Venturi SVE Remediation Update and Proposed Workplan.*

At this time, Hilcorp is awaiting response from the NMOCD regarding the *Venturi SVE Remediation Update and Proposed Workplan*.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at devin.hencmann@wsp.com or Mitch Killough at (713)-757-5247 or at mkillough@hilcorp.com.

Kind regards,

Devin Hencmann
Senior Geologist

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October 1, 2021

Ms. Emily Hernandez
Bureau Chief, Environmental
New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **Fourth Quarter 2020 - Quarterly SVE System Update**
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following fourth quarter 2020 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site). WSP submitted the *Soil Delineation and Proposed Remediation Work Plan* to the New Mexico Oil Conservation Division (NMOCD) on August 30, 2019 (submitted directly to Mr. Cory Smith via email) and approved by NMOCD on September 9, 2019. WSP then submitted the *Venturi SVE Remediation Update and Proposed Workplan* (PO#: HDK7K-190830-C-1410) on March 5, 2020. On June 3, 2020 (90 days from submittal), Hilcorp reminded the NMOCD of the submittal of the *Venturi SVE Remediation Update and Proposed Workplan* and asked if the report would need to be re-submitted. On June 4, 2020, the NMOCD responded and stated that re-submittal was not necessary, and the report would be reviewed by the NMOCD soon. This report is being submitted to comply with the quarterly reporting timelines and activities proposed in the *Venturi SVE Remediation Update and Proposed Workplan.*

At this time, Hilcorp is awaiting response from the NMOCD regarding the *Venturi SVE Remediation Update and Proposed Workplan*.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at devin.hencmann@wsp.com or Mitch Killough at (713)-757-5247 or at mkillough@hilcorp.com.

Kind regards,

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October 1, 2021

Ms. Emily Hernandez
Bureau Chief, Environmental
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New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **First Quarter 2021 - Quarterly SVE System Update**
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following first quarter 2021 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site). WSP submitted the *Soil Delineation and Proposed Remediation Work Plan* to the New Mexico Oil Conservation Division (NMOCD) on August 30, 2019 (submitted directly to Mr. Cory Smith via email) and approved by NMOCD on September 9, 2019. WSP then submitted the *Venturi SVE Remediation Update and Proposed Workplan* (PO#: HDK7K-190830-C-1410) on March 5, 2020. On June 3, 2020 (90 days from submittal), Hilcorp reminded the NMOCD of the submittal of the *Venturi SVE Remediation Update and Proposed Workplan* and asked if the report would need to be re-submitted. On June 4, 2020, the NMOCD responded and stated that re-submittal was not necessary, and the report would be reviewed by the NMOCD soon. This report is being submitted to comply with the quarterly reporting timelines and activities proposed in the *Venturi SVE Remediation Update and Proposed Workplan.*

At this time, Hilcorp is awaiting response from the NMOCD regarding the *Venturi SVE Remediation Update and Proposed Workplan*.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at devin.hencmann@wsp.com or Mitch Killough at (713)-757-5247 or at mkillough@hilcorp.com.

Kind regards,

Devin Hencmann
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October 1, 2021

Ms. Emily Hernandez
Bureau Chief, Environmental
New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: **Second Quarter 2021 - Quarterly SVE System Update**
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following second quarter 2021 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site). WSP submitted the *Soil Delineation and Proposed Remediation Work Plan* to the New Mexico Oil Conservation Division (NMOCD) on August 30, 2019 (submitted directly to Mr. Cory Smith via email) and approved by NMOCD on September 9, 2019. WSP then submitted the *Venturi SVE Remediation Update and Proposed Workplan* (PO#: HDK7K-190830-C-1410) on March 5, 2020. On June 3, 2020 (90 days from submittal), Hilcorp reminded the NMOCD of the submittal of the *Venturi SVE Remediation Update and Proposed Workplan* and asked if the report would need to be re-submitted. On June 4, 2020, the NMOCD responded and stated that re-submittal was not necessary, and the report would be reviewed by the NMOCD soon. This report is being submitted to comply with the quarterly reporting timelines and activities proposed in the *Venturi SVE Remediation Update and Proposed Workplan.*

At this time, Hilcorp is awaiting response from the NMOCD regarding the *Venturi SVE Remediation Update and Proposed Workplan*.

WSP appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at devin.hencmann@wsp.com or Mitch Killough at (713)-757-5247 or at mkillough@hilcorp.com.

Kind regards,

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Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 54566

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 54566
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 124692 for most updated status. Application contained 5 quarterly reports (1Q thru 4Q 2020, 1Q 2021).	9/27/2022