

District I
25 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural
Resources Department

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

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party Hilcorp Energy Company	OGRID 372171
Contact Name Jennifer Deal	Contact Telephone 505-801-6517
Contact email jdeal@hilcorp.com	Incident # NVF 1836050592
Contact mailing address 382 Road 3100, Aztec NM 87410	

NMOC

Location of Release Source

Latitude 36.88592353 Longitude -107.8994293
(NAD 83 in decimal degrees to 5 decimal places)

DEC 24 2018

DISTRICT III

Site Name Lambe 2C	Site Type Gas Well
Date Release Discovered 12/17/18 @ 10:30am	API# 30-045-30747

Unit Letter	Section	Township	Range	County
H	20	31N	10W	San Juan

Surface Owner: ☐ State ☒ Federal ☐ Tribal ☐ Private (Name: _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☐ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☐ No
☒ Condensate	Volume Released (bbls) 97	Volume Recovered (bbls) 0
	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

A release of ~97bbls of oil/condensate was released due to corrosion on the tank. MSO arrived on location and noticed oil in oil tank containment. MSO inspected tank and found corrosion on the bottom of the tank and a hole where the oil was leaking. Release remained inside the berm.

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Adrienne Sandoval, Division Director
Oil Conservation Division



September 9, 2019

Jennifer Deal
Hilcorp Energy Company
382 Road 3100
Aztec, New Mexico 87401
jdeal@hilcorp.com

RE: Lambe 2C (30-045-30747) Site Characterization and Remediation plan

Ms. Deal,

The New Mexico Oil Conservation Division (OCD) has received the site characterization and remediation plan for the Lambe 2C on August 30, 2019 for the Lambe 2C release and has approved the plan with the following conditions of approval:

- HEC will start SVE remediation no later than October 1, 2019
- HEC will achieve a run time of 90% or better of the proposed 8 hours per event.
- HEC will collect an initial gas sample for laboratory analysis shortly after startup of SVE operations after the initial gas sample an annual sample is required. The air sample must be collected prior to the inlet of the vacuum pump but, after the convergence of all SVE wells or alternatively an air sample from each SVE well is acceptable.
 - o The gas sample will be analyzed for EPA Method 8260 Full List and include Carbon Dioxide and Oxygen.
- HEC quarterly report (If needed) will include at a minimum
 - o Summary of remediation activity for the quarter
 - o SVE Run time
 - o SVE mass removal
 - o Field notes (VOC readings, water/product recovery, inspection dates etc)
 - o Amount of liquids/product recovered if any (This will be recorded from the knock out drum since ground water is not expected to be encountered)
- HEC will submit a detailed closure plan via email for OCD approval prior to the collection of any confirmation Borehole samples. The Closure plan will include at a minimum bore hole locations, sampling method and frequency.

OCD's approval of the characterization and remediation plan does not relieve Hilcorp of any other requirements imposed by any other regulatory agencies.

Respectfully,

Cory Smith
Environmental Specialist

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
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Was this a major release as defined by 19.15.29.7(A) NMAC?

☒ Yes ☐ No

If YES, for what reason(s) does the responsible party consider this a major release?

This is a major release as the amount is >25bbls

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?

Immediate notification was given by Jennifer Deal by email on 12/17/2018 @ 1:02pm to Cory Smith, Vanessa Fields, and Jim Griswold with NMOCD, and Whitney Thomas and Emmanuel with BLM.

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

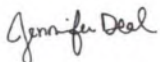
- ☒ The source of the release has been stopped.
- ☒ The impacted area has been secured to protect human health and the environment.
- ☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.
- ☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Jennifer Deal Title: Environmental Specialist

Signature:  Date: 12/21/2018

email: jdeal@hilcorp.com Telephone: 505-801-6517

OCD Only

Received by:  Date: 12/24/2018

Incident ID	NVF1836050592
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>50-100</u> (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☒ Yes ☐ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas not on an exploration, development, production, or storage site?	☐ Yes ☒ No

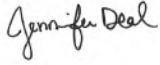
Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: <i>Each of the following items must be included in the report.</i> ☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells. ☒ Field data ☒ Data table of soil contaminant concentration data ☒ Depth to water determination ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release ☒ Boring or excavation logs ☒ Photographs including date and GIS information ☒ Topographic/Aerial maps ☒ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

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I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Jennifer Deal Title: Environmental Specialist
Signature:  Date: 8/30/19
email: jdeal@hilcorp.com Telephone: 505-801-6517

OCD Only

Received by: _____ Date: _____

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

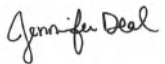
Remediation Plan Checklist: *Each of the following items must be included in the plan.*

- ☒ Detailed description of proposed remediation technique
- ☒ Scaled sitemap with GPS coordinates showing delineation points
- ☒ Estimated volume of material to be remediated
- ☒ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☒ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: *Each of the following items must be confirmed as part of any request for deferral of remediation.*

- ☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- ☐ Extents of contamination must be fully delineated.
- ☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

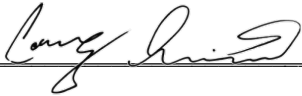
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Jennifer Deal Title: Environmental Specialist
 Signature:  Date: 8/30/19
 email: jdeal@hilcorp.com Telephone: 505-801-6517

OCD Only

Received by: OCD Date: 8/30/19

☐ Approved ☒ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature:  Date: 9/9/19

August 30, 2019

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

**RE: Soil Delineation and Proposed Remediation 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 summary report and remediation workplan discussing delineation soil sampling, monitoring well installation, and groundwater sampling activities conducted at the Lambe 2C natural gas production well (Site). The Site is on a mesa between Arch Rock Canyon and Hart Canyon, south of Cedar Hill, New Mexico, in Unit H of Section 20 of Township 31 North and Range 10 West in San Juan County (Figure 1). The purpose of the investigation was to evaluate potential hydrocarbon impacts in the subsurface following the discovery of a condensate release.

Background

On December 17, 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. The release was contained within the earthen berm, but no liquids were recovered. The defective tank was immediately shut-in, drained of remaining liquids, and taken out of service. The release was reported to the New Mexico Oil Conservation Division (NMOCD) by Hilcorp on a Form C-141 Release Notification and Corrective Action Form dated December 24, 2018.

The nearest permitted water well (SJ-01198) is approximately 0.7 miles to the northwest. The permitted water well is used for one household domestic purposes and total depth is listed at 158 feet below ground surface (bgs). Depth to water in the water well is listed as 97 feet bgs. During excavation activities conducted during release response, water was encountered in the base of the excavation at 29 feet bgs. Additional investigation through groundwater monitoring wells did not identify groundwater and LTE estimates groundwater to be between 51 and 100 feet bgs based on nearby topographic features. Arch Rock Canyon is approximately 138 feet



lower in elevation than the Site, but Hart Canyon, to the south, is 91 feet lower in elevation. The nearest surface water feature is an unnamed, fourth-order tributary of the Animas River and 150 feet to the northwest. There is no lakebed, sinkhole, playa lake, wetland, mine, residence or other building nearby. The Site is not in an unstable area or the 100-year floodplain. Due to the proximity of the significant watercourse, the remediation action levels applied to the Site are 100 milligrams per kilogram (mg/kg) total petroleum hydrocarbons (TPH), 10 mg/kg benzene, 50 mg/kg total for the sum of benzene, toluene, ethylbenzene, and total xylenes (BTEX), and 600 mg/kg chloride.

Release Response

Hilcorp responded to the release by conducting a preliminary delineation investigation to determine the extent of subsurface hydrocarbon impact. In January of 2019, soil samples were collected from soil borings via hand auger and a hollow-stem auger CME55 drill rig. Borings were advanced until refusal in cobbles at depths ranging from 9 feet to 12 feet bgs.

Upon encountering refusal with the hollow-stem drill rig due to cobbles at a relatively shallow depth, Hilcorp initiated remediation activities via excavation. Between January and May 2019, an estimated total of 5,000 cubic yards of impacted soil was excavated and hauled for disposal. The extent of the excavation is depicted in Figure 2 and pictures are included in a photo log in Attachment 1. The excavation depth ranged from 23 feet to 29 feet bgs, which required significant sloping of the sidewalls. The footprint of the excavation is included in Figure 2, and the actual excavation to full depth is differentiated from the footprint to better represent actual conditions. During excavation activities, potential groundwater was encountered at the base of the excavation at 29 feet bgs on May 3, 2019.

Based on the size of the excavation and the presence of water, a second attempt at subsurface delineation was conducted with a sonic drill rig on July 22, 2019. On June 22 through June 24, 2019, LTE used a sonic drill rig to advance boreholes (MW01 through MW08) to collect soil samples for laboratory analysis and determine the lateral and vertical impacts outside of the existing excavation extent. In anticipation of encountering groundwater, monitoring wells were permitted with the New Mexico Office of the State Engineer (NMOSE) and were installed following soil boring activities.

Subsurface Investigations

LTE conducted soil sampling during all phases of the release response. The following section provides a chronology of site work and describes methods used for sampling.





Hand Auger Investigation

LTE personnel collected soil samples via hand auger on January 4, 2019, to characterize soil impacts immediately within the bermed area. A hand auger was used to complete a borehole to a depth of 11.5 feet bgs within the bermed area containing the faulty condensate tank and a below grade tank. The borehole was advanced until refusal immediately next to the below grade tank and is identified as HA-1 on Figure 2.

Continuous soil samples were logged by an LTE geologist and described using the Unified Soil Classification System (USCS). Soil samples were field screened with a photo-ionization detector (PID) at one-foot intervals until refusal was encountered with the hand auger at just below 11 feet bgs. Two soil samples were collected from the hand auger borehole; one at the highest observed PID reading and one at the terminus of the boring. A soil boring log is included as Attachment 2.

Soil samples were labeled with the date and time of collection, sample name, sampler's name, and parameters to be analyzed. All samples collected were placed on ice to maintain a temperature of approximately 4 degrees Celsius (°C) and sealed in a cooler for delivery to Hall Environmental Analysis Laboratory (Hall), of Albuquerque, New Mexico, for analysis. Strict chain-of-custody procedures were documented including the date and time sampled, sample number, type of sample, sampler's name and signature, preservative used, and analyses required. Samples were analyzed for BTEX by United States Environmental Protection Agency (EPA) Method 8021 and TPH-gasoline range organics (GRO), TPH-diesel range organics (DRO), and TPH-motor oil range organics (MRO) by EPA Method 8015. Due to the condensate source, chloride was not analyzed.

Hollow-Stem Auger Investigation

Since hand augering was insufficient for penetrating the subsurface deeper than 11 feet bgs, four boreholes (BH-1 to BH-4) were advanced via hollow-stem auger outside of the bermed area in each cardinal direction from the known impacted area on January 4, 2019. Boreholes were advanced to 9 feet to 12 feet bgs before refusal was encountered at what was determined to be a cobble layer. Soil in the boreholes was described and field screened. No impacts were observed via field screening and no soil samples were collected from the hollow-stem boreholes. Soil boring logs are included as Attachment 2.

Excavation

While vertical delineation was not obtained during the previous investigations, the borings suggested lateral impact was restricted to the bermed area, so Hilcorp initiated excavation. Approximately 5,000 cubic yards of soil were removed between January and May of 2019. During





excavation activities, potential groundwater was encountered at the base of the excavation on May 3, 2019.

LTE personnel sampled the groundwater (GW01) and collected two grab samples (GR01 and GR02) from the sidewalls of the existing open excavation for characterization of the remaining impacts. LTE recommended additional excavation and investigation by trenching laterally outward in three directions. On May 29, 2019, discrete grab samples were collected from the investigation trenches (GR03, GR04, GR05), excavation soil samples (GR06, GR07, GR08, GR09, and GR10) were collected from the sidewalls, and a 5-point composite soil sample was collected from the floor of the excavation (FS01). All samples were handled as previously described. Soil samples were analyzed for BTEX and TPH. The groundwater sample was analyzed for BTEX by EPA Method 8260B. Based on results from the soil sampling that indicated a significant amount of clean overburden would be required to be removed before reaching impacted soil at depth, excavation activities were suspended, and additional subsurface delineation was scheduled following backfilling activities.

Sonic Drilling Investigation

A second attempt at subsurface delineation was conducted with a sonic drill rig on July 22, 2019. In anticipation of encountering groundwater, monitoring wells were permitted with the New Mexico Office of the State Engineer (NMOSE) and were installed following soil boring activities. On June 22 through June 24, 2019, LTE used a sonic drill rig to advance boreholes (MW01 through MW08) to collect soil samples for laboratory analysis and determine the lateral and vertical impacts outside of the existing excavation extent. Soil samples were collected in a continuous soil sampler by an LTE geologist, described, and field screened with a PID at six-inch to one-foot intervals based on sample recovery. Samples were collected and submitted for laboratory analysis at the depths where elevated field screening results were observed and at the bottom of the boring. The borings and monitoring well locations are identified in Figure 3. Soil boring logs are included as Attachment 1. Samples were analyzed for BTEX and TPH by methods previously listed.

The monitoring wells were constructed with 2-inch inside diameter (ID) schedule 40 polyvinyl chloride (PVC) casing and screen. The screen was factory-slotted with a slot size of 0.010 inches. The screened interval for each monitoring well was 15 feet in length. A 10-20 size silica sand pack was used to fill the annular space from the bottom of the screen to approximately 2 feet above the top of screen. The sand pack was overlain by hydrated bentonite chips to the ground surface. The monitoring wells were completed as stick-ups with approximately 3 feet of PVC riser extending above the excavation floor.





Results

The geology at the Site consists of dark reddish-brown, dry, silty sand to approximately 14 feet bgs, followed by a loose, dry, sand and gravel with cobbles greater than eight inches in diameter to approximately 25 feet bgs. From approximately 25 feet to 35 feet bgs, a dense, light brown, slightly moist, sandy silt was encountered. Moist sediments were encountered near 30 feet bgs, but no saturated sediments were observed and no clear water table was identified in the soil borings. LTE set the groundwater monitoring wells with screened intervals corresponding to the moist intervals and the depth of the excavation where potential groundwater was previously observed.

Field-identified soil impacts consisting of visual staining, hydrocarbon odors, and/or elevated field screening results were observed in the hand auger borehole HA-1 (9 to 11.5 ft bgs), excavation grab samples (GR01 @ 28', GR04 @ 28', GR05 @ 28', and GR06 @ 28'), and in monitoring well borehole sample MW01 @ 25'-30'. The TPH concentrations exceeding the NMOCD remediation action level ranged from 180 mg/kg in monitoring well borehole MW01 @ 25'-30' to 11,100 mg/kg in hand auger borehole HA-1 @ 11'. A benzene concentration of 20 mg/kg was detected in hand auger borehole HA-1 @ 11'. Total BTEX concentrations exceeding the NMOCD remediation action level ranged from 276 mg/kg in excavation grab sample GR06 @ 28' to 1,061 mg/kg in hand auger borehole HA-1 @ 11'.

All other soil samples were compliant with NMOCD remediation action levels for benzene, BTEX, and TPH, or were below laboratory detection limits for the listed parameters. The soil analytical results as compared to the NMOCD remediation action levels are presented in Table 1. The laboratory analytical reports are included as Attachment 3.

The grab sample of the groundwater accumulating in a trench at the lowest point of the excavation extent near 29 feet bgs exceeded the New Mexico Water Quality Control Commission (NMWQCC) standard for benzene, toluene, and total xylenes. Results are presented in Table 2 and the laboratory analytical report is in Attachment 3.

Monitoring Well Groundwater Gauging

Following installation, LTE personnel were onsite to gauge groundwater levels and develop the monitoring wells on June 26, 2019. During this event, groundwater was not observed in any of the wells. On August 1, 2019, LTE return to the Site to determine if groundwater had infiltrated the monitoring wells with enough of a volume to develop or collect groundwater samples. Again, no groundwater was observed in any of the monitoring wells.



Conclusions

Based on the excavation characterization soil samples and monitoring well borehole soil samples, impacts to soil have been laterally and vertically defined at the Site. Excluding the already excavated impacted material, an estimated 600 cubic yards of impacted soil remain in place. Impacts appears to be confined to the dense, sandy silt beneath the cobble matrix, from approximately 25 feet to 30 feet bgs. Soil sample results exceeding NMOCD remediation action levels were limited to hand auger borehole HA-1, excavation grab samples GR01 @ 28', GR04 @ 28', GR05 @ 28', GR06 @ 28', and monitoring well borehole MW01 @ 25'-30'. All remaining soils samples are in compliant with NMOCD remediation action levels. The extent of the remaining impacted soil is identified on Figure 3.

Impacts to groundwater were not observed beyond the initial water sample collected in the base of the excavation which exceeds NMWQCC standards. No groundwater has been observed in any of the monitoring wells since installation. Based on the lack of groundwater in the monitoring wells, it is anticipated that the observed water in the excavation was a result of precipitation infiltrating over time into the open excavation and adsorbing into the finer grained, confining sandy silt lithology. At this time, LTE has estimated groundwater at the Site to be between 50 and 100 feet bgs based on nearby topographic features.

RECOMMENDATIONS

Based on the limited area of impact that exceeds the NMOCD remediation action level and the existing locations of the de facto soil vapor extraction wells, LTE recommends a multi-tiered, in-situ, intermittent SVE remediation approach. Due to the lack of observed groundwater in the monitoring wells, LTE proposes using the existing wells as soil vapor extraction (SVE) wells. The wells were completed with 2-inch diameter schedule 40 polyvinyl chloride (PVC) casing with 0.010" slotted screened intervals placed in the zone where field identified impacts were observed.

LTE proposes utilizing a portable air compressor and installing 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 is piped into a 55-gallon drum which acts as a knockout tank to capture and contain any fluids recovered while SVE operations are conducted. Induced vacuum gauge, volumetric air flow, and PID field screening will be recorded during each event.

During the first SVE event, LTE proposes using the Venturi T on monitoring wells MW02, MW03, MM05, MW06, and MW07 to observe if any soil vapor is recovered from these wells and determine if additional soil vapor recovery locations are viable. While these monitoring wells did



not exhibit any soil impacts during installation, there is potential to recover soil vapor and remediate existing impacts within the radius of influence of the induced vacuum from the Venturi T.

Subsequent to the first testing event, LTE recommends conducting dual SVE/bioventing events with the portable air compressor every week for four weeks. During each event, the air compressor will be used for eight consecutive hours to induce vacuum via the Venturi T on all wells that demonstrated recoverable vapor. Wells that are not being pulled on or did not recovery vapors during the initial event will be used as biovent wells. Ambient air from the portable air compressor will be directed via a manifold into the biovent wells to introduce supplemental oxygen into the subsurface to promote biological activity and the biodegradation of recalcitrant hydrocarbon impacts. Indigenous aerobic bacterial activity is enhanced with the addition of oxygen and encourages the biodegradation of excess organic material, such as hydrocarbons, in an in-situ remediation method known as bioventing. Additionally, the bioventing wells will facilitate ambient air advection and optimize the SVE progress.

An air sample will be collected and submitted for laboratory analysis during the first and fourth SVE/bioventing event to determine the effective reduction and remediation of impacts. Once laboratory analytical results are received, LTE will propose additional SVE events or conduct confirmation closure sampling. If remediation progress and effectiveness are not observed within the first four events, LTE will propose alternative means of achieving cleanup at that time. However, SVE is a tested remediation technology and is well suited for this site-specific application.

If a significant decline in air sample laboratory analytical results is observed, indicating sufficient mass source removal, confirmation soil samples will be collected via hollow-stem auger in the areas where previous soil samples were collected that exceeded NMOCD remediation action levels. Soil samples will be submitted for laboratory analysis of BTEX and TPH. If laboratory analytical results indicate that confirmation soil sample TPH, benzene, and BTEX concentrations are compliant with NMOCD remediation action levels, Hilcorp will request that this Site be granted a No Further Action status. A letter report detailing closure sampling will be submitted under separate cover. Existing AS/SVE wells will be plugged with hydrated bentonite and abandoned in place following status approval.

During each of the SVE events, LTE will continue gauging the monitoring wells to determine if groundwater has infiltrated the wells. If groundwater is encountered in the monitoring wells, a grab sample will be collected and submitted for analysis of volatile organic compounds (full list VOCs) by EPA Method 8260, total dissolved solids, pH, and cations and anions by EPA Method 300.0.





SCHEDULE

Hilcorp will initiate the first remediation event within 3 weeks of approval of this remediation work plan.

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.

A blue ink signature of Danny Burns, consisting of stylized initials 'D.B.' followed by a horizontal line.

Danny Burns
Project Geologist

A blue ink signature of Ashley L. Ager, written in a cursive style.

Ashley Ager, M.S., P.G.
Senior Geologist

cc: Jennifer Deal, Hilcorp Energy Company

Attachments:

Figure 1 – Site Location Map
Figure 2 – Initial Site Investigation Map
Figure 3 – Monitoring Well Borehole Map
Table 1 – Soil Analytical Results
Table 2 – Water Analytical Results
Attachment 1 – Photo Log
Attachment 2 - Soil Boring Logs
Attachment 3 – Laboratory Analytical Reports



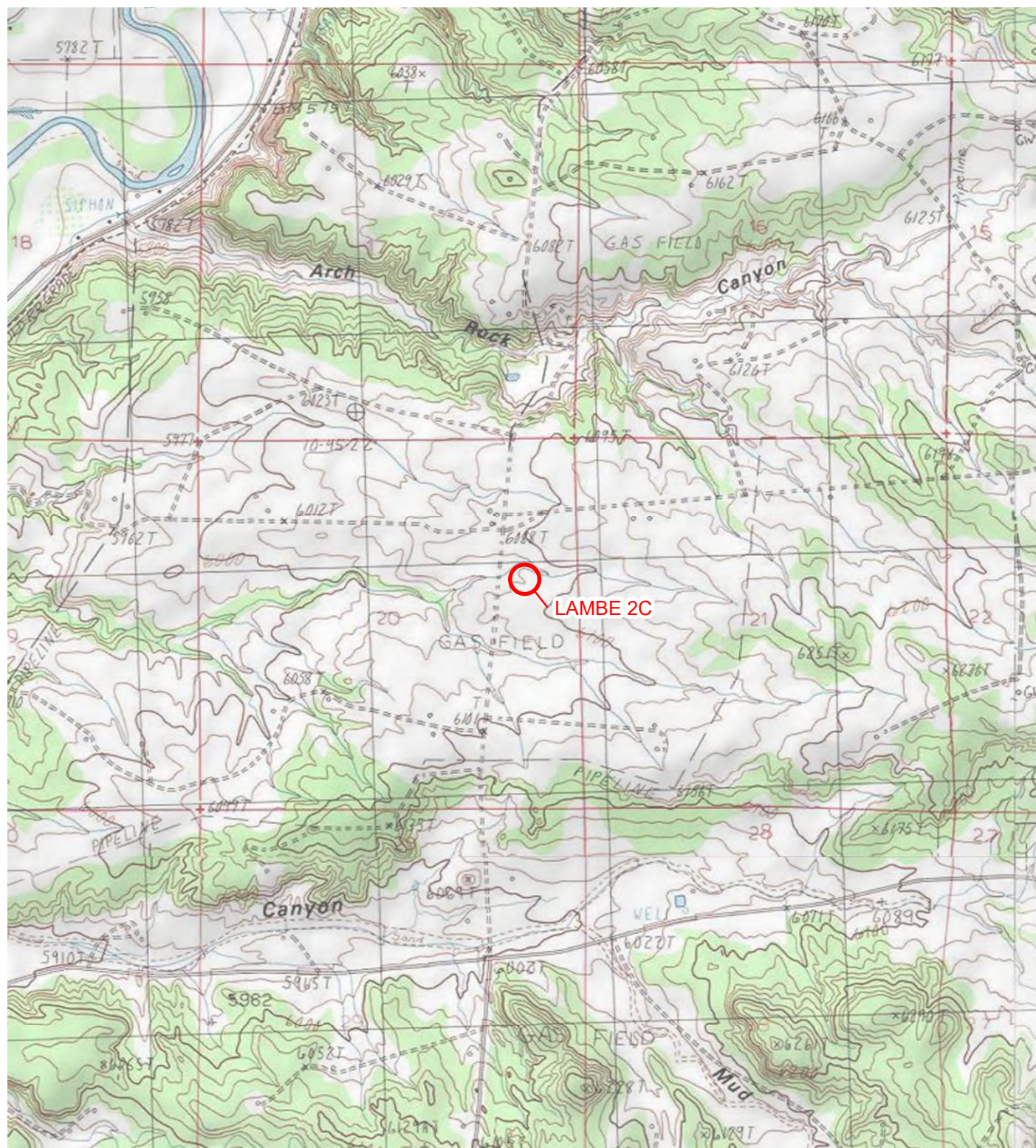


IMAGE COURTESY OF ESRI/USGS

LEGEND



SITE LOCATION

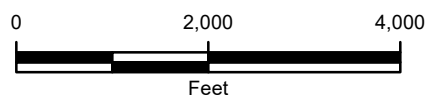
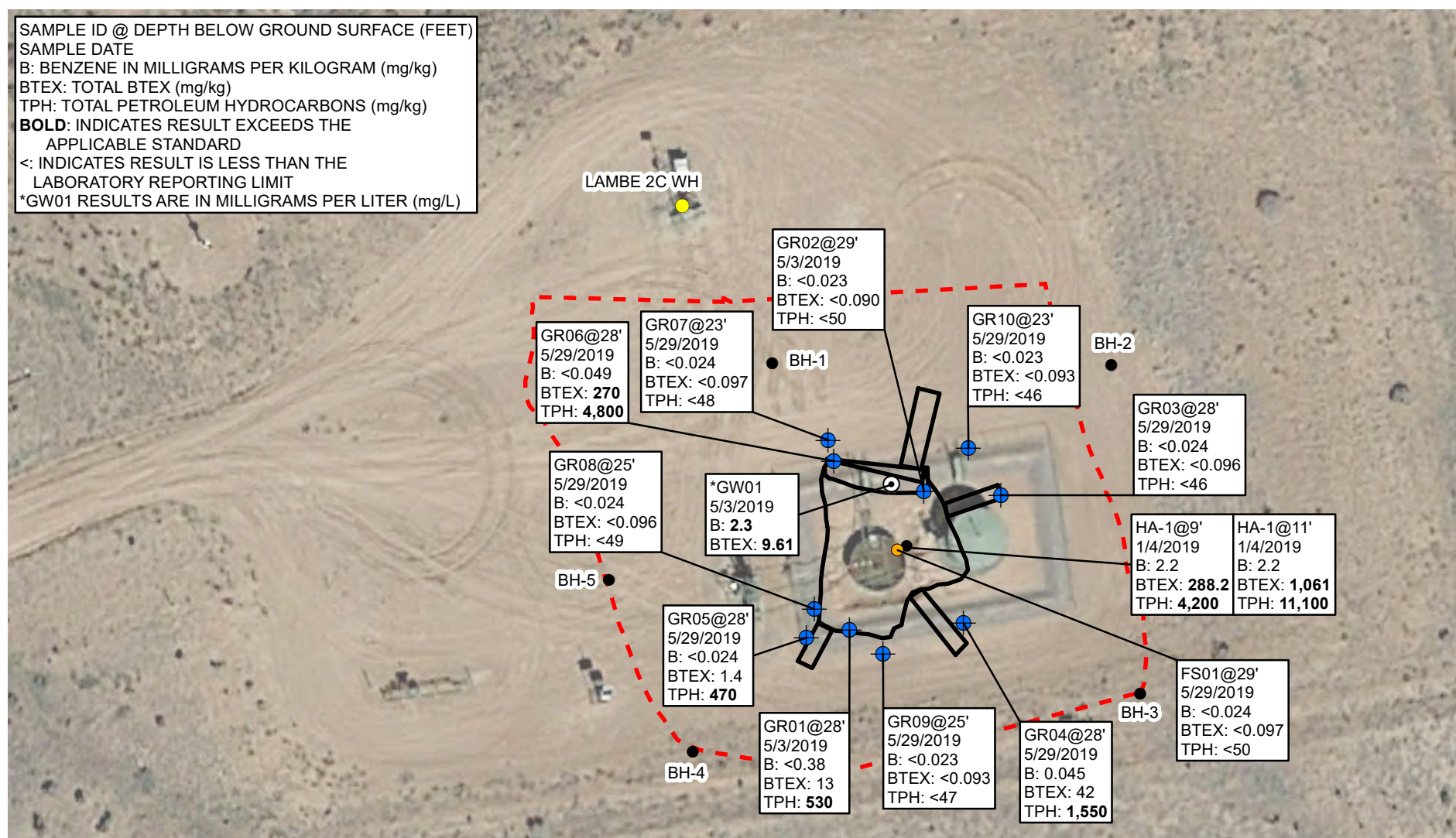


FIGURE 1
SITE LOCATION MAP
LAMBE 2C
SENE SEC 20 T31N R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



SAMPLE ID @ DEPTH BELOW GROUND SURFACE (FEET)
 SAMPLE DATE
 B: BENZENE IN MILLIGRAMS PER KILOGRAM (mg/kg)
 BTEX: TOTAL BTEX (mg/kg)
 TPH: TOTAL PETROLEUM HYDROCARBONS (mg/kg)
BOLD: INDICATES RESULT EXCEEDS THE
 APPLICABLE STANDARD
 <: INDICATES RESULT IS LESS THAN THE
 LABORATORY REPORTING LIMIT
 *GW01 RESULTS ARE IN MILLIGRAMS PER LITER (mg/L)



LEGEND

- WELLHEAD
- BOREHOLE
- COMPOSITE SOIL SAMPLE
- ⊕ DISCRETE SOIL SAMPLE
- GROUNDWATER GRAB SAMPLE

- EXCAVATION EXTENT 05/03/2019
- BASE OF EXCAVATION

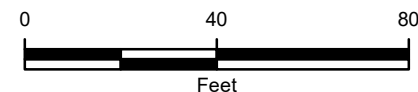
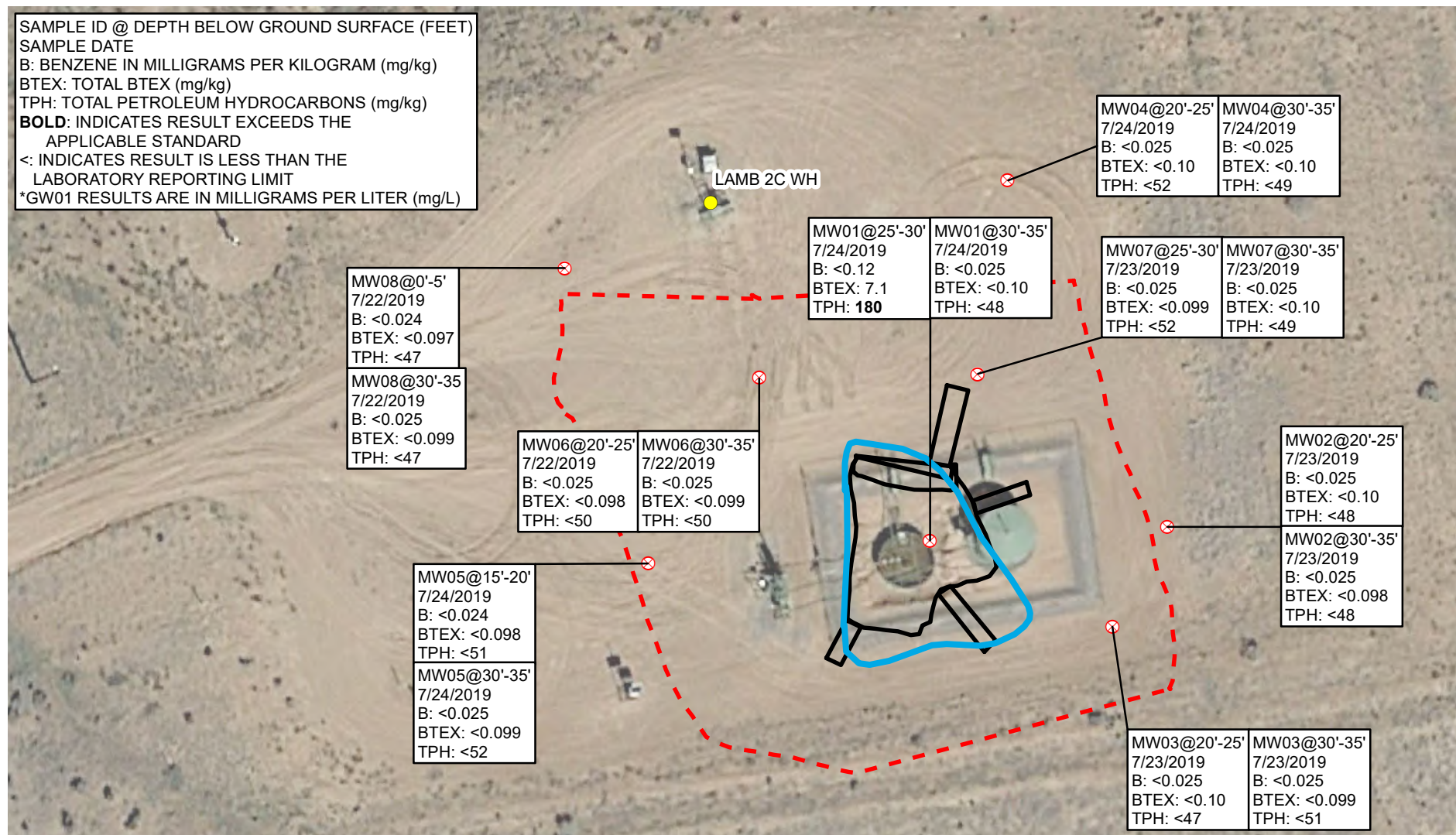


IMAGE COURTESY OF GOOGLE EARTH 2015

FIGURE 2
 INITIAL SITE INVESTIGATION AND RESULTS
 LAMBE 2C
 SENE SEC 20 T31N R10W
 SAN JUAN COUNTY, NEW MEXICO
 HILCORP ENERGY COMPANY



SAMPLE ID @ DEPTH BELOW GROUND SURFACE (FEET)
 SAMPLE DATE
 B: BENZENE IN MILLIGRAMS PER KILOGRAM (mg/kg)
 BTEX: TOTAL BTEX (mg/kg)
 TPH: TOTAL PETROLEUM HYDROCARBONS (mg/kg)
BOLD: INDICATES RESULT EXCEEDS THE
 APPLICABLE STANDARD
 <: INDICATES RESULT IS LESS THAN THE
 LABORATORY REPORTING LIMIT
 *GW01 RESULTS ARE IN MILLIGRAMS PER LITER (mg/L)



LEGEND

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

IMAGE COURTESY OF GOOGLE EARTH 2015

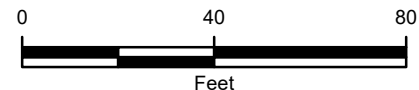


FIGURE 3
MONITORING WELL BOREHOLE RESULTS
LAMBE 2C
 SENE SEC 20 T31N R10W
 SAN JUAN COUNTY, NEW MEXICO
 HILCORP ENERGY COMPANY



**TABLE 1
SOIL ANALYTICAL RESULTS**

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

Soil Sample Identification	Sample Date	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
Initial Hand Auger Investigation Samples											
HA-1 @ 9'	1/4/2019	2,639	2.2	57	19	210.0	288.2	3,200	1,000	<490	4,200
HA-1 @ 11'	1/4/2019	1,760	20	270	61	710.0	1,061	7,300	3,800	<470	11,100
Open Excavation Grab/Characterization Samples											
GR01 @ 28'	5/3/2019	3,512	<0.38	0.89	0.81	11.0	12.70	200	330	<46	530
GR02 @ 29'	5/3/2019	98.1	<0.023	<0.045	<0.045	<0.090	<0.090	<4.5	<9.9	<50	<50
GR03 @ 28'	5/29/2019	3.2	<0.024	<0.048	<0.048	<0.096	<0.096	<4.8	<9.1	<46	<46
GR04 @ 28'	5/29/2019	4,852	0.045	2.5	2.5	37.0	42.05	550	1,000	<480	1,550
GR05 @ 28'	5/29/2019	2,460	<0.024	<0.048	<0.048	1.4	1.40	50	420	<46	470
GR06 @ 28'	5/29/2019	7,348	<0.49	35	21	220.0	276	2,600	2,200	<490	4,800
GR07 @ 23'	5/29/2019	3.8	<0.024	<0.048	<0.048	<0.097	<0.097	<4.8	<9.6	<48	<48
GR08 @ 25'	5/29/2019	3.1	<0.024	<0.048	<0.048	<0.096	<0.096	<4.8	<9.9	<49	<49
GR09 @ 25'	5/29/2019	3.1	<0.023	<0.047	<0.047	<0.093	<0.093	<4.7	<9.3	<47	<47
GR10 @ 23'	5/29/2019	2.4	<0.023	<0.046	<0.046	<0.093	<0.093	<4.6	<9.2	<46	<46
FS01 @ 29'	5/29/2019	3.5	<0.024	<0.049	<0.049	<0.097	<0.097	<4.9	<10	<50	<50
Monitoring Well Installation/Soil Boring Samples											
MW01 @ 25' - 30'	7/24/2019	>5,000	<0.12	0.36	0.56	6.2	7.1	120	60	<50	180
MW01 @ 30' - 35'	7/24/2019	18.6	<0.025	<0.050	<0.050	<0.10	<0.10	<5.0	<9.5	<48	<48
MW02 @ 20' - 25'	7/23/2019	3.5	<0.025	<0.050	<0.050	<0.10	<0.10	<5.0	<9.5	<48	<48
MW02 @ 30' - 35'	7/23/2019	1.1	<0.025	<0.049	<0.049	<0.098	<0.098	<4.9	<9.6	<48	<48
MW03 @ 20' - 25'	7/23/2019	7.5	<0.025	<0.025	<0.050	<0.10	<0.10	<5.0	<9.4	<47	<47
MW03 @ 30' - 35'	7/23/2019	5.3	<0.025	<0.050	<0.050	<0.099	<0.099	<5.0	<10	<51	<51
MW04 @ 20' - 25'	7/24/2019	7	<0.025	<0.050	<0.050	<0.10	<0.10	<5.0	<10	<52	<52
MW04 @ 30' - 35'	7/24/2019	2.2	<0.025	<0.050	<0.050	<0.10	<0.10	<5.0	<9.8	<49	<49
MW05 @ 15' - 20'	7/24/2019	19.9	<0.024	<0.024	<0.049	<0.049	<0.098	<4.9	<10	<51	<51
MW05 @ 30' - 35'	7/24/2019	7.2	<0.025	<0.049	<0.049	<0.099	<0.099	<4.9	<10	<52	<52



**TABLE 1
SOIL ANALYTICAL RESULTS**

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

Soil Sample Identification	Sample Date	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
MW06 @ 20' - 25'	7/22/2019	20	<0.025	<0.049	<0.049	<0.098	<0.098	<4.9	<10	<50	<50
MW06 @ 30' - 35'	7/22/2019	0.0	<0.025	<0.049	<0.049	<0.099	<0.099	<4.9	<10	<50	<50
MW07 @ 25' - 30'	7/23/2019	>5,000	<0.025	<0.050	<0.050	<0.099	<0.099	<5.0	<10	<52	<52
MW07 @ 30' - 35'	7/23/2019	42.3	<0.025	<0.050	<0.050	<0.10	<0.10	<5.0	<9.9	<49	<49
MW08 @ 0' - 5'	7/22/2019	11.8	<0.024	<0.049	<0.049	<0.097	<0.097	<4.9	<9.4	<47	<47
MW08 @ 30' - 35'	7/22/2019	3.0	<0.025	<0.050	<0.050	<0.099	<0.099	<5.0	<9.3	<47	<47
NMOCD Remediation Action Level			10	NE	NE	NE	50	NE	NE	NE	100

NOTES:

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

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

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

mg/kg - milligrams per kilogram

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

NE - not established

NMOCD - New Mexico Oil Conservation Division

PID - photo-ionization detector

ppm - parts per million

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

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

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

Bold - indicates value exceeds stated NMOCD standard

TABLE 2
WATER ANALYTICAL RESULTS

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

Sample Identification	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)
GW01	05/03/2019	2.3	4.5	0.210	2.6
NMWQCC Standard		0.01	0.750	0.750	0.620

NOTES: mg/L - milligrams per liter
NMWQCC - New Mexico Water Quality Control Commission
< - indicates result is less than the stated laboratory reporting limit
Bold - indicates value exceeds stated NMWQCC standard





Excavation Extent

	Lambe 2C Hilcorp Energy Company	 <i>Advancing Opportunity</i>
May 6, 2019	Photographic Log	



Cobbles in the subsurface

	Lambe 2C Hilcorp Energy Company	 <i>Advancing Opportunity</i>
May 6, 2019	Photographic Log	



Trenching Activities

	Lambe 2C Hilcorp Energy Company	 <i>Advancing Opportunity</i>
May 6, 2019	Photographic Log	





Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-1	Project: Lambe 2C
Date: 1-4-2019	Project Number: 017818055
Logged By: Josh Adams	Drilled By: Geomat

Elevation:	Detector: PID	Drilling Method: Hand Auger	Sampling Method: Continuous/Split Spoon
Gravel Pack:	Seal:	Grout:	
Casing Type:	Diameter: 2"	Length:	Hole Diameter:
Screen Type:	Slot:	Diameter: 2"	Length:
		Total Depth: 11.5	Depth to Liquid:
			Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				Hand Auger in BGT hole top 4-4.5' removed already	
					1					
					2					
					3					
					4					
					5			ML	7.5 YR 4/6 dark brown	
2133	M	N			6			ML		
1781	M	N			7			ML	7.5 YR 4/6 dark brown sandy silt, cohesive, plastic, no skin strong HC odor	
1863	M	N			8			ML		
2550	M	N			9			CL	7.5 YR 4/6 dark brown sandy lean clay very cohesive, plastic, no stain strong HC odor	
2639	M	N		HA2 @ 9' 1106	10					
2631	M	N			11				SAA w/ some gravel intermixed	
1760	M	N		HA2 @ 11' 1115	12				refusal @ 11.5' cobble	
					13					
					14					
					15					



Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-1	Project: Lambe 2C
Date: 1-3-2019	Project Number: 017818055
Logged By: Josh Adams	Drilled By: Geomat
Drilling Method: Hollow Stem	Sampling Method: Continuous/Split Spoon
Gravel Pack:	Seal:
Casing Type:	Diameter: 2" Length:
Screen Type:	Slot: Diameter: 2" Length:
	Hole Diameter: Depth to Liquid:
	Total Depth: 12' Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
					1	0-5			NR	
					2					
	M	0.6	N		3	0-5		ML	light brown/brown sandy silt, 2.5 YR 4/8, no shear or other cohesive, plastic SAA	
	M	0.4	N		4					
					5	0-5		ML		
	M	0.8	N		6	5-9		ML	SAA w/ light brown white/pink clays (10R 8/4) intermixed + Fe stain increased clay content	
					7					
	M	1.1	N		8	5-9		ML		
					9					
	D	0.8	N		10	9-10		SP	poorly graded sand w/ gravel - 9-10' sampled w/ split spoon due to increased penetration resistance	
	M	1.0	N		11	10-12		SP	SAA	
					12					
					13				refusal @ 12' cobbles	
					14					
					15					



Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: **BH-2** Project: **Lambe 2C**

Date: **1-3-2019** Project Number: **017818055**

Logged By: **Josh Adams** Drilled By: **Geomat**

Elevation: Detector: **PID** Drilling Method: **Hollow Stem** Sampling Method: **Continuous/Split Spoon**

Gravel Pack: Seal: Grout:

Casing Type: Diameter: **2"** Length: Hole Diameter: Depth to Liquid:

Screen Type: Slot: Diameter: **2"** Length: Total Depth: **10'** Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
	M	0.4	N		1	0.5'		ML	7.5YR 5/8 Brown silty sand cohesive, slightly plastic, no stain or odor	
					2					
	M	0.1	N		3	0.5'			SAA	
					4			ML		
					5					
					6	5-9'			gravel/cobbles encountered ~6' remove continuous sampler	
					7				NR	
					8				sampled 9-10' w/split spoon due to cobbles	
					9					
					10	7-10'		SP	No sample, cobble	
					11					
					12				refusal @ 10' cobble	
					13					
					14					
					15					



Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: **BH-3** Project: **Lambe 2C**

Date: **1-3-2019** Project Number: **017818005**

Logged By: **Josh Adams** Drilled By: **Geomat**

Drilling Method: **Hollow Stem** Sampling Method: **Continuous/Split Spoon**

Gravel Pack: Seal: Grout:

Casing Type: Diameter: 2" Length: Hole Diameter: Depth to Liquid:

Screen Type: Slot: Diameter: 2" Length: Total Depth: **4.5'** Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0	0-5	X	NR	7.5YR 5/8 Brown, sandy silt, cohesive, slightly plastic, no odor or stain	
					1					
	M	0.2	N		2	0-5		ML		
					3					
	M	0.3	N		4	0-5		ML	SAA	
					5					
	M	0.3	N		6	5-7.5		ML	SAA	
					7					
	P	0.1	N		8	5-7.5		SP	brown poorly graded sand w/ gravel	
					9				cobbles encountered, remake sampler, NR	
					10					
					11				refusal @ 9.5' cobbles	
					12					
					13					
					14					
					15					

		Advancing Opportunity 848 E. 2nd Ave Durango, Colorado 81301								
		BORING LOG/MONITORING WELL COMPLETION DIAGRAM								
		Boring/Well Number: BH-4	Project: Lambe 2C							
		Date: 1-3-2019	Project Number: 017818055							
Logged By: Josh Adams		Drilled By: Geomat								
Elevation: _____ Detector: PID		Drilling Method: Hollow Stem								
Gravel Pack: _____		Seal: _____								
Casing Type: _____		Diameter: 2"	Length: _____							
Screen Type: _____ Slot: _____		Diameter: 2"	Length: _____							
Hole Diameter: _____		Depth to Liquid: _____								
Total Depth: 9.0'		Depth to Water: _____								
Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0	0-5	X	NR	10YR 3/6 dark brown sandy silt cohesive, plastic no odor or stain	
					1					
	M	0.6	N		2	0-5		ML		
					3					
	M	0.4	N		4	0-5		ML	SAA	
					5					
					6	5-8	X		NR	
		0.4			7	5-8		CH	10YR 3/6 dark brown sandy fat clay some gravel @ bottom of sampler	
					8					
					9				cobbles/gravel encountered ~8' bgs, remove sampler	
					10					
					11				refusal @ 9' cobbles	
					12					
					13					
					14					
					15					



Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW01	Project: Lambe 2C
Date: 7/24/19	Project Number: 017818055
Logged By: E. Carrow	Drilled By: Cascade
Elevation:	Detector: PID
Gravel Pack: 10-20 Silica Sand	Drilling Method: Sonic
Casing Type: Schedule 40 PVC	Seal: Bentonite
Screen Type: Schedule 40 PVC	Grout: Bentonite
Slot: 0.010"	Hole Diameter: 6"
Diameter: 2"	Length: 25'
Diameter: 2"	Length: 15'
Total Depth: 35'	Depth to Liquid: NA
	Depth to Water: 28'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.6	NO		0			SP-SM	med. dense, red brown silty sand	
					1				Excavation backfill to ~20'	X
					2					X
					3					X
					4					X
	moist	1.6	NO		5					X
					6					X
					7					X
					8					X
					9					X
	moist	4.7	NO		10					X
					11					X
					12					X
					13					X
					14					X
	moist	6.3	NO		15					X



Advancing Opportunity

Boring/Well #

MW01

Project:

Lambe 2c

Project #

017818055

Date

7/24/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16				Excavation backfill	X
					17					X
					18					X
					19			SPSM		X
	moist	10.6	NO		20					X
					21			GP	Loose, lt brown, coarse sand and gravel cobbles > 8" diameter	X
					22	5				X
					23					X
					24					X
	Dry	14.3	NO		25					X
					26			SC	Dense, dark brown/black silty sand, some clay < 25% small band of staining, strong odor	X
					27	6				X
					28					X
					29					X
	moist	>5,000	yes small band ~1.5"		30					X
					31					X
					32					X
					33	7				X
					34					X
					35			SM	Dense, lt brown, silty sand trace clay < 10% no stain	X
	moist	18.6 18.6	NO		36					X
					37					X



Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW02	Project: Lambe 2C
Date: 7/23/19	Project Number: 017818055
Logged By: E. Carroll	Drilled By: Cascade
Drilling Method: Sonic	Sampling Method: Continuous
Seal: Bentonite	Grout: Bentonite
Diameter: 2"	Length: 25
Hole Diameter: 6"	Depth to Liquid: MA
Screen Type: Schedule 40 PVC	Slot: 0.010"
Diameter: 2"	Length: 15
Total Depth: 35'	Depth to Water: 29'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	NO		0			SP-SM	Dense, reddish brown coarse sand some gravel no stain/odor	X
					1					XX
					2					XX
					3	1				XX
					4					XX
	Dry	1.1	NO		5			SP-SM	SAA no stain/odor	XX
					6					XX
					7					XX
					8	2				XX
					9					XX
					10			SP-SM	SAA no stain/odor	XX
					11					XX
					12					XX
					13	3				XX
					14					XX
	Dry	0.8	NO		15			GP	Loose, 12 brown coarse sand and gravel cobbles 28" diameter	XX



Advancing Opportunity

Boring/Well #	MW02
Project:	Lambe SC
Project #	017818055
Date	7/23/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17	4				
					18					
	Dry	2.1	NO		19			GP	Loose, lt brown coarse Sand and gravel cobbles 7-8" diameter	
					20				no stain/odor	
					21					
					22					
					23	5				
	Dry	3.5	NO	MW02 20'-25' 1400	24			GP	SAA no stain/odor	
					25					
	Wet	0.6	NO		26			SM	Dense, lt brown, med. Sand some silt <15% no stain odor	
					27					
					28	6		GW		
					29					
	moist	0.4	NO		30					
					31			SM	compact, yellow brown sandy silt no stain/odor	
					32					
					33			SC	compact, dark brown/black, sandy silt, some clay <20% no stain/odor	
					34	7				
	moist	1.1	NO	MW02 30'-35' 1500	35			SM	compact, yellow brown, sandy silt no stain/odor	
					36					
					37					



**848 E. 2nd Ave
Durango, Colorado 81301**

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW03	Project: Lambe 2C
Date: 7/23/19	Project Number: 017818055
Logged By: E. Carroll	Drilled By: CASCADE
Elevation:	Drilling Method: sonic
Detector: PID	Sampling Method: continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Casing Type: Schedule 40 PVC	Grout: Bentonite
Screen Type: Schedule 40 PVC	Diameter: 2"
Slot: 0.010"	Length: 26'
	Hole Diameter: 6"
	Depth to Liquid: NA
	Total Depth: 35'
	Depth to Water: 27'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	NO		0			SP-SM	Dry med. dense, reddish brown Silty sand (backfill) no stain/odor	
					1					X
					2					X
					3	7				X
					4					X
	Dry	1.1	NO		5			SP-SM	SAA	X
					6					X
					7					X
					8	2				X
					9					X
	Dry	1.4	NO		10			SP-SM	SAA	X
					11					X
					12					X
					13	3				X
					14					X
	Dry 0.6	0.6	NO		15			SP-SM	SAA	X



Advancing Opportunity

Boring/Well #

MW03

Project:

Lambe 2c

Project #

017818055

Date

7/23/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15			SP-SM	SAA no stain/odor	X
					16					X
					17	4				X
					18					X
					19			GP	Loose, lt brown, sand and gravel Cobbles > 8"	X
					20				no stain/odor	X
					21					X
					22					X
					23	5				X
					24			GP	SAA no stain/odor	X
					25					X
					26			GP GW	Loose, dark red brown, coarse sand and gravel, wet no stain/odor	GW
					27					X
					28					X
					29	6		SM	dense, med silty sand, trace clay < 10% no stain/odor	X
					30					X
					31					X
					32			SC	compact, dark brown/black, silty sand some clay < 25% no stain/odor	X
					33					X
					34	7		SM	Dense, lt brown silty sand, trace clay < 10% no stain/odor	X
					35					X
					36				TD = 35'	
					37					



Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW04	Project: Lambe 2C
Date: 7/24/19	Project Number: 017818055
Logged By: E. Carroll	Drilled By: CASCADE
Elevation:	Detector: PID
Gravel Pack: 10-20 Silica Sand	Drilling Method: Sonic
Casing Type: Schedule 40 PVC	Seal: Bentonite
Screen Type: Schedule 40 PVC	Grout: Bentonite
Slot: 0.010"	Hole Diameter: 6"
Diameter: 2"	Length: 25'
Diameter: 2"	Length: 15'
Total Depth: 35'	Depth to Liquid: NA
	Depth to Water: 27'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	no		0			SP-SM	Dry, lt. reddish brown, silty sand	
					1					X
					2					X
					3	1				X
					4					X
	Dry	1.3	no		5			SP-SM	SAA no stain/odor	X
					6					X
					7					X
					8	2				X
					9					X
	Dry	1.1	no		10			SP-SM	SAA no stain/odor	X
					11					X
					12					X
					13	3				X
					14					X
	Dry	2.0	no		15			GP	Loose, lt. brown coarse sand and gravel cobbles > 8" diameter no stain/odor	X
										X



Advancing Opportunity

Boring/Well #

MW04

Project:

Lambe 2C

Project #

C17818055

Date

7/24/14

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					X
					17	4				X
					18					X
					19					X
	Dry	3.8	NO		20			GP	Loose, lt brown, Sand and gravel, cobbles 78" diameter no stain/odor	X
					21					
					22					
					23	5				
					24			GP	SAA, no stain/odor	
	Dry	6.6	NO		25					
					26					
					27					
	Wet	6.5	NO		28	6		GP	Loose, Saturated, coarse Sand and gravel, no stain/odor	
					29					
	moist	5.2	NO		30			SM	Dense, lt. brown silty sand, trace clay < 10% NO stain/odor	
					31					
					32	7				
					33					
					34			SM	SAA no stain/odor	
	moist	2.2	NO		35					
					36				TD = 35'	
					37					



Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW05	Project: Lambe 2C				
Date: 7/24/19	Project Number: 017818055				
Logged By: E. Carroll	Drilled By: CASCADE				
Drilling Method: SONIC	Sampling Method: Continuous				
Seal: Bentonite	Grout: Bentonite				
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 25'	Hole Diameter: 6"	Depth to Liquid: NA	
Screen Type: Schedule 40 PVC	Slot: 0.010"	Diameter: 2"	Length: 15'	Total Depth: 35'	Depth to Water: 26'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Wet	0.8	NO		0			SP-SM	Wet, dark reddish brown, silty sand no stain/odor	
					1					
					2					
					3	1				
					4					
	Dry	1.1	NO		5			SP-SM	SAA no stain/odor	
					6					
					7					
					8	2				
					9					
	Dry	1.3	NO		10			SP-SM	SAA no stain/odor	
					11					
					12					
					13	3				
					14					
	Dry	1.2	NO		15			GP	Loose, lt. brown, Sand and gravel cobbles > 8" diameter no stain/odor	



Advancing Opportunity

Boring/Well #

MW05

Project:

Lambe 7C

Project #

Date

7/24/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17	4				
					18					
					19			GP	SAA no stain/odor	
	Dry	19.9	NO	MW05 15'-20' 940	20					
					21					
					22					
					23	5		GP	SAA no stain/odor	
					24					
	Dry	13.4	NO		25					
					26			GW		
					27					
	Wet	6.7	NO		28			SM	Dense, lt. brown, Silty Sand trace Clay < 10% NO stain/odor	
					29	6				
	moist	7.8	NO		30			SC	Dense, dark brown black Silty Sand Some Clay < 25% NO stain/odor	
					31					
					32					
					33					
					34			SM	Dense, lb brown, Silty Sand, trace Clay < 10% NO stain/odor	
	moist	7.2	NO	MW05 30'-35' 1100	35					
					36					
					37					



Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:	MW06	Project:	Lambe 2C
Date:	7/22/19	Project Number:	017616055
Logged By:	E. Carroll	Drilled By:	Cascade
Elevation:		Drilling Method:	Sonic
Detector:	PID	Sampling Method:	Continuous
Gravel Pack:	10-20 Silica Sand	Seal:	Bentonite
Casing Type:	Schedule 40 PVC	Grout:	Bentonite
Screen Type:	Schedule 40 PVC	Diameter:	2"
Slot:	0.010"	Length:	25'
		Hole Diameter:	6"
		Depth to Liquid:	NA
		Total Depth:	35'
		Depth to Water:	28'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	NO		0			SP-SM	compact, lb. reddish brown, medium grain poorly sorted, trace silicified	X
					1					X
					2					X
					3	1				X
					4					X
					5			SP-SM	SAA no stain/odor	X
					6					X
					7					X
					8					X
	Dry	1.1	NO		9	2		GP	Loose, lb. brown, poorly sorted coarse sand and gravel, cobbles up to 8" diameter NO stain/odor	X
					10					X
					11					X
					12					X
					13	3				X
					14					X
					15			GP	SAA, cobbles < 8" diameter no stain/odor	X



Advancing Opportunity

Boring/Well #

MW06

Project:

Lambe 2C

Project #

017818055

Date

7/22/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17					
					18	4		GP	SAA no stain/odor	
	Dry	5.1	NO		19					
					20					
					21					
					22	5				
					23					
					24			GP	SAA no stain/odor	
	moist	19.9	NO	MW06 20-25' 8:15	25					
					26					
					27	GW		GP	SAA no stain/odor	
	wet				28	6				
					29					
	moist	1.6	NO		30			SM	Compact, dark brown black, fine sand and silt, some clay < 15% no stain/odor	
					31					
					32	7				
					33					
					34			SM	Compact, lt brown, fine sand & silt some clay < 15% no stain/odor	
	moist	0.0	NO	MW06 30-35' 9:00	35					
					36					
					37					



Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW07	Project: Lambe 2C
Date: 7/23/19	Project Number: 017818055
Logged By: E. Carroll	Drilled By: Cascade
Elevation:	Drilling Method: Sonic
Detector: PID	Sampling Method: continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Casing Type: Schedule 40 PVC	Grout: Bentonite
Screen Type: Schedule 40 PVC	Diameter: 2"
Slot: 0.010"	Length: 25
	Hole Diameter: 6"
	Depth to Liquid: NA
	Total Depth: 35
	Depth to Water: 28'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	DRY	0.0	NO		0			SP-SM	medium dense, 16 reddish brown coarse sand, some gravel < 20% (backfill) no stain/odor	
					1					
					2					
					3	1				
					4					
					5					
					6					
					7					
					8	2				
	Moist	2.3	NO		9			SP-SM	SAA no stain/odor	
					10					
					11					
					12					
					13	3				
					14			SP-SM	SAA no stain/odor	
	Moist	3.4	NO		15					



Advancing Opportunity

Boring/Well #	MW07
Project:	Lambe 2c
Project #	
Date	7/23/19

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17	4				
					18					
	moist	10.6	NO		19					
					20			GP	loose, lb brown, coarse sand and gravel cobbles > 8" no stain/odor	
					21					
					22					
					23	5				
					24			GP	SAA no stain/odor	
	moist	17.8	NO		25					
					26					
					27					
					28	6		GW		
	moist	>5000	NO	MW07 25'-30' 10:30	29			SM	Compact, fine sandy silt, trace clay <10%, no stain strong odor	GW
					30					
					31					
					32					
					33	7				
					34					
	moist	42.3	NO	MW07 30'-35' 11:00	35			SC	Compact, fine sandy silt some clay <20% no stain/odor	
					36					
					37				TD=35'	



Advancing Opportunity

848 E. 2nd Ave

Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: MW08	Project: Lambe 2C
Date: 7/22/2019	Project Number: 017618055
Logged By: E. Carroll	Drilled By: Cascade
Drilling Method: Sonic	Sampling Method: Continuous
Seal: Bentonite	Grout: Bentonite
Diameter: 2"	Length: 25'
Hole Diameter: 6"	Depth to Liquid: NA
Screen Type: Schedule 40 PVC	Slot: 0.010"
Diameter: 2"	Length: 15'
Total Depth: 35'	Depth to Water: 26'

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	9.0	NO		0			SP-SM	Compact, lt. reddish brown, medium	Stickup XX
					1				Poorly Sorted Sand, trace silt & clay	
					2	1				
					3					
					4					
	Dry	11.8	NO		5			SP-SM	SAN	
					6					
					7	2				
					8			GP	Loose, lt brown, poorly sorted	
					9				coarse sand and gravel, cobbles	
	Dry	4.7	NO		10				up to 8" diameter	
					11				no stain/odor	
					12					
					13	3				
					14			GP	SAN, cobbles greater than 8"	
	Dry	0.9	NO		15				no stain/odor	



Advancing Opportunity

Boring/Well #

MW08

Project:

Lambe 2C

Project #

017818055

Date

7/22/2019

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17	4				
					18					
	Dry	1.1	No		19			GP	SAA no stain/odor	
					20					
					21					
					22	5				
	Dry	3.6	No		23			GP	SAA no stain/odor	
					24					
					25					
					26			GW SM	Web, fine dark red coarse sand and gravel	GW
					27					
					28	6		SC	Very dense, yellow brown, platy clay and silt no stain/odor	
					29					
	moist	2.7	no		30					
					31					
					32					
					33					
					34	7		SC	SAA no stain/odor	
	moist	3.6	NP		35					
					36					
					37				TD = 35'	





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

January 11, 2019

Devin Hencmann
HILCORP ENERGY
PO Box 4700
Farmington, NM 87499
TEL: (505) 564-0733
FAX

RE: Lambe 2C

OrderNo.: 1901177

Dear Devin Hencmann:

Hall Environmental Analysis Laboratory received 2 sample(s) on 1/5/2019 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,

A handwritten signature in black ink, appearing to read 'Andy Freeman', with a stylized flourish at the end.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1901177

Date Reported: 1/11/2019

CLIENT: HILCORP ENERGY

Client Sample ID: HA-1@9'

Project: Lambe 2C

Collection Date: 1/4/2019 11:00:00 AM

Lab ID: 1901177-001

Matrix: SOIL

Received Date: 1/5/2019 11:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: irm
Diesel Range Organics (DRO)	1000	97		mg/Kg	10	1/9/2019 3:07:21 PM
Motor Oil Range Organics (MRO)	ND	490		mg/Kg	10	1/9/2019 3:07:21 PM
Surr: DNOP	0	50.6-138	S	%Rec	10	1/9/2019 3:07:21 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	3200	98		mg/Kg	20	1/9/2019 9:37:44 AM
Surr: BFB	376	73.8-119	S	%Rec	20	1/9/2019 9:37:44 AM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	2.2	0.49		mg/Kg	20	1/9/2019 9:37:44 AM
Toluene	57	0.98		mg/Kg	20	1/9/2019 9:37:44 AM
Ethylbenzene	19	0.98		mg/Kg	20	1/9/2019 9:37:44 AM
Xylenes, Total	210	2.0		mg/Kg	20	1/9/2019 9:37:44 AM
Surr: 4-Bromofluorobenzene	130	80-120	S	%Rec	20	1/9/2019 9:37:44 AM
EPA METHOD 300.0: ANIONS						Analyst: smb
Chloride	ND	30		mg/Kg	20	1/9/2019 12:25:07 PM

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 Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1901177

Date Reported: 1/11/2019

CLIENT: HILCORP ENERGY

Client Sample ID: HA-1@11'

Project: Lambe 2C

Collection Date: 1/4/2019 11:15:00 AM

Lab ID: 1901177-002

Matrix: SOIL

Received Date: 1/5/2019 11:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: irm
Diesel Range Organics (DRO)	3800	93		mg/Kg	10	1/9/2019 3:55:20 PM
Motor Oil Range Organics (MRO)	ND	470		mg/Kg	10	1/9/2019 3:55:20 PM
Surr: DNOP	0	50.6-138	S	%Rec	10	1/9/2019 3:55:20 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	7300	940		mg/Kg	200	1/9/2019 7:01:49 PM
Surr: BFB	182	73.8-119	S	%Rec	200	1/9/2019 7:01:49 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	20	0.47		mg/Kg	20	1/9/2019 10:01:11 AM
Toluene	270	9.4		mg/Kg	200	1/9/2019 7:01:49 PM
Ethylbenzene	61	0.94		mg/Kg	20	1/9/2019 10:01:11 AM
Xylenes, Total	710	19		mg/Kg	200	1/9/2019 7:01:49 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	200	1/9/2019 7:01:49 PM
EPA METHOD 300.0: ANIONS						Analyst: smb
Chloride	48	30		mg/Kg	20	1/9/2019 12:37:32 PM

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 Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901177

11-Jan-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID	MB-42496	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	42496	RunNo:	56853					
Prep Date:	1/8/2019	Analysis Date:	1/9/2019	SeqNo:	1902954	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		96.8	50.6	138			

Sample ID	LCS-42496	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	42496	RunNo:	56853					
Prep Date:	1/8/2019	Analysis Date:	1/9/2019	SeqNo:	1902975	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	100	70	130			
Surr: DNOP	4.6		5.000		91.3	50.6	138			

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 Quantitative Limit	RL Reporting Detection Limit
S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901177

11-Jan-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID	MB-42491		SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	PBS		Batch ID: 42491		RunNo: 56872					
Prep Date:	1/8/2019		Analysis Date: 1/9/2019		SeqNo: 1903162		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	980		1000		98.0	73.8	119			

Sample ID	LCS-42491		SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	LCSS		Batch ID: 42491		RunNo: 56872					
Prep Date:	1/8/2019		Analysis Date: 1/9/2019		SeqNo: 1903163		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	103	80.1	123			
Surr: BFB	1100		1000		110	73.8	119			

Sample ID	MB-42518		SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	PBS		Batch ID: 42518		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904141		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	970		1000		97.3	73.8	119			

Sample ID	LCS-42518		SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	LCSS		Batch ID: 42518		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904142		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		110	73.8	119			

Sample ID	MB-42514		SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	PBS		Batch ID: 42514		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904148		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	940		1000		94.1	73.8	119			

Sample ID	LCS-42514		SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range					
Client ID:	LCSS		Batch ID: 42514		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904149		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		110	73.8	119			

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 Quantitative Limit	RL Reporting Detection Limit
S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901177

11-Jan-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID	MB-42491	SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID:	PBS	Batch ID: 42491		RunNo: 56872						
Prep Date:	1/8/2019	Analysis Date: 1/9/2019		SeqNo: 1903187		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		99.9	80	120			

Sample ID	LCS-42491		SampType: LCS		TestCode: EPA Method 8021B: Volatiles					
Client ID:	LCSS		Batch ID: 42491		RunNo: 56872					
Prep Date:	1/8/2019		Analysis Date: 1/9/2019		SeqNo: 1903188		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.025	1.000	0	92.1	80	120			
Toluene	0.96	0.050	1.000	0	96.2	80	120			
Ethylbenzene	0.97	0.050	1.000	0	96.8	80	120			
Xylenes, Total	2.9	0.10	3.000	0	97.9	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Sample ID	MB-42518		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles					
Client ID:	PBS		Batch ID: 42518		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904170		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.99		1.000		99.4	80	120			

Sample ID	LCS-42518		SampType: LCS		TestCode: EPA Method 8021B: Volatiles					
Client ID:	LCSS		Batch ID: 42518		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904171		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Sample ID	MB-42514		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles					
Client ID:	PBS		Batch ID: 42514		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904177		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.96		1.000		95.8	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 Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Detection Limit
W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1901177

11-Jan-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID	LCS-42514		SampType: LCS		TestCode: EPA Method 8021B: Volatiles					
Client ID:	LCSS		Batch ID: 42514		RunNo: 56885					
Prep Date:	1/9/2019		Analysis Date: 1/10/2019		SeqNo: 1904178		Units: %Rec			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.96		1.000		96.0	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 Quantitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified



Hall Environmental Analysis Laboratory
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 FAR

Work Order Number: 1901177

RcptNo: 1

Received By: Anne Thorne 1/5/2019 11:50:00 AM

Completed By: Isaiah Ortiz 1/7/2019 3:12:49 PM

Reviewed By: ENM

1/7/19

Anne Thorne

I-OK

LB: DAD 1/7/19

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 $>0^{\circ}\text{C}$ 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 1/7/19

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	1.3	Good	Yes			



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

May 15, 2019

Jennifer Deal

Hilcorp Energy

PO Box 61529

Houston, TX 77208-1529

TEL: (337) 276-7676

FAX

RE: Lambe 2C

OrderNo.: 1905231

Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 3 sample(s) on 5/4/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905231

Date Reported: 5/15/2019

CLIENT: Hilcorp Energy

Client Sample ID: GW01

Project: Lambe 2C

Collection Date: 5/3/2019 2:00:00 PM

Lab ID: 1905231-001

Matrix: AQUEOUS

Received Date: 5/4/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: DJF
Benzene	2300	25		µg/L	50	5/7/2019 1:52:09 PM	R59702
Toluene	4500	25		µg/L	50	5/7/2019 1:52:09 PM	R59702
Ethylbenzene	210	25		µg/L	50	5/7/2019 1:52:09 PM	R59702
Xylenes, Total	2600	38		µg/L	50	5/7/2019 1:52:09 PM	R59702
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	50	5/7/2019 1:52:09 PM	R59702
Surr: 4-Bromofluorobenzene	92.5	70-130		%Rec	50	5/7/2019 1:52:09 PM	R59702
Surr: Dibromofluoromethane	101	70-130		%Rec	50	5/7/2019 1:52:09 PM	R59702
Surr: Toluene-d8	94.9	70-130		%Rec	50	5/7/2019 1:52:09 PM	R59702

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1905231**

Date Reported: 5/15/2019

CLIENT: Hilcorp Energy**Client Sample ID:** GR01@28'**Project:** Lambe 2C**Collection Date:** 5/3/2019 2:05:00 PM**Lab ID:** 1905231-002**Matrix:** MEOH (SOIL)**Received Date:** 5/4/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	330	9.1		mg/Kg	1	5/7/2019 2:17:16 PM	44736
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	5/7/2019 2:17:16 PM	44736
Surr: DNOP	97.8	70-130		%Rec	1	5/7/2019 2:17:16 PM	44736
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	200	76		mg/Kg	20	5/6/2019 11:25:08 AM	G59658
Surr: BFB	191	73.8-119	S	%Rec	20	5/6/2019 11:25:08 AM	G59658
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.38		mg/Kg	20	5/6/2019 11:25:08 AM	R59658
Toluene	0.89	0.76		mg/Kg	20	5/6/2019 11:25:08 AM	R59658
Ethylbenzene	0.81	0.76		mg/Kg	20	5/6/2019 11:25:08 AM	R59658
Xylenes, Total	11	1.5		mg/Kg	20	5/6/2019 11:25:08 AM	R59658
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	20	5/6/2019 11:25:08 AM	R59658

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905231

Date Reported: 5/15/2019

CLIENT: Hilcorp Energy

Client Sample ID: GR02@29'

Project: Lambe 2C

Collection Date: 5/3/2019 2:20:00 PM

Lab ID: 1905231-003

Matrix: MEOH (SOIL)

Received Date: 5/4/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	5/7/2019 2:39:16 PM	44736
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	5/7/2019 2:39:16 PM	44736
Surr: DNOP	93.9	70-130		%Rec	1	5/7/2019 2:39:16 PM	44736
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.5		mg/Kg	1	5/6/2019 11:47:50 AM	G59658
Surr: BFB	95.9	73.8-119		%Rec	1	5/6/2019 11:47:50 AM	G59658
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.023		mg/Kg	1	5/6/2019 11:47:50 AM	R59658
Toluene	ND	0.045		mg/Kg	1	5/6/2019 11:47:50 AM	R59658
Ethylbenzene	ND	0.045		mg/Kg	1	5/6/2019 11:47:50 AM	R59658
Xylenes, Total	ND	0.090		mg/Kg	1	5/6/2019 11:47:50 AM	R59658
Surr: 4-Bromofluorobenzene	92.7	80-120		%Rec	1	5/6/2019 11:47:50 AM	R59658

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1905231

15-May-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: LCS-44736	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 44736		RunNo: 59674							
Prep Date: 5/6/2019	Analysis Date: 5/7/2019		SeqNo: 2012068		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	10	50.00	0	96.9	63.9	124			
Surr: DNOP	4.0		5.000		79.8	70	130			

Sample ID: MB-44736	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 44736		RunNo: 59674							
Prep Date: 5/6/2019	Analysis Date: 5/7/2019		SeqNo: 2012069		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		97.0	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 Quantitative 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#: 1905231

15-May-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: 2.5UG GRO LCS	SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: LCSS	Batch ID: G59658		RunNo: 59658							
Prep Date:	Analysis Date: 5/6/2019		SeqNo: 2011127		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	87.5	80.1	123			
Surr: BFB	1000		1000		104	73.8	119			

Sample ID: RB	SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBS	Batch ID: G59658		RunNo: 59658							
Prep Date:	Analysis Date: 5/6/2019		SeqNo: 2011128		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	900		1000		89.9	73.8	119			

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 Quantitative 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#: 1905231

15-May-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: 100NG BTEX LCS	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: R59658	RunNo: 59658								
Prep Date:	Analysis Date: 5/6/2019	SeqNo: 2011130	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	109	80	120			
Toluene	0.93	0.050	1.000	0	93.1	80	120			
Ethylbenzene	0.91	0.050	1.000	0	91.2	80	120			
Xylenes, Total	2.7	0.10	3.000	0	89.7	80	120			
Surr: 4-Bromofluorobenzene	0.94		1.000		93.6	80	120			

Sample ID: RB	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: R59658	RunNo: 59658								
Prep Date:	Analysis Date: 5/6/2019	SeqNo: 2011140	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.89		1.000		88.5	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 Quantitative 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#: 1905231

15-May-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: rb	SampType: MBLK	TestCode: EPA Method 8260B: VOLATILES								
Client ID: PBW	Batch ID: R59702	RunNo: 59702								
Prep Date:	Analysis Date: 5/7/2019	SeqNo: 2012832			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	9.3		10.00		92.6	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.1	70	130			
Surr: Toluene-d8	9.4		10.00		94.3	70	130			

Sample ID: 100ng lcs	SampType: LCS	TestCode: EPA Method 8260B: VOLATILES								
Client ID: LCSW	Batch ID: R59702	RunNo: 59702								
Prep Date:	Analysis Date: 5/7/2019	SeqNo: 2012843			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	103	70	130			
Toluene	18	1.0	20.00	0	88.3	70	130			
Surr: 1,2-Dichloroethane-d4	9.2		10.00		92.5	70	130			
Surr: 4-Bromofluorobenzene	9.0		10.00		90.2	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.4	70	130			
Surr: Toluene-d8	9.2		10.00		91.7	70	130			

Sample ID: 1905231-001a ms	SampType: MS	TestCode: EPA Method 8260B: VOLATILES								
Client ID: GW01	Batch ID: R59702	RunNo: 59702								
Prep Date:	Analysis Date: 5/7/2019	SeqNo: 2012908			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	3400	50	1000	2324	106	70	130			
Toluene	5300	50	1000	4507	80.8	70	130			E
Surr: 1,2-Dichloroethane-d4	540		500.0		108	70	130			
Surr: 4-Bromofluorobenzene	470		500.0		94.6	70	130			
Surr: Dibromofluoromethane	510		500.0		103	70	130			
Surr: Toluene-d8	500		500.0		99.2	70	130			

Sample ID: 1905231-001a msd	SampType: MSD	TestCode: EPA Method 8260B: VOLATILES								
Client ID: GW01	Batch ID: R59702	RunNo: 59702								
Prep Date:	Analysis Date: 5/7/2019	SeqNo: 2012909			Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	3400	50	1000	2324	107	70	130	0.207	20	
Toluene	5200	50	1000	4507	67.4	70	130	2.56	20	ES

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 Quantitative 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#: 1905231

15-May-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: 1905231-001a msd		SampType: MSD		TestCode: EPA Method 8260B: VOLATILES						
Client ID: GW01		Batch ID: R59702		RunNo: 59702						
Prep Date:		Analysis Date: 5/7/2019		SeqNo: 2012909		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	540		500.0		108	70	130	0	0	
Surr: 4-Bromofluorobenzene	460		500.0		91.7	70	130	0	0	
Surr: Dibromofluoromethane	510		500.0		102	70	130	0	0	
Surr: Toluene-d8	470		500.0		94.9	70	130	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 Quantitative 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

Sample Log-In Check List

Client Name: **HILCORP ENERGY**

Work Order Number: **1905231**

RcptNo: **1**

Received By: **Isaiah Ortiz**
5/4/2019 8:50:00 AM
IOX

Completed By: **Yazmine Garduno**
5/4/2019 10:08:42 AM
Yazmine Garduno

Reviewed By:

YG 5/6/19
LB: JJC 5-6-19

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 $>0^{\circ}\text{C}$ 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:

JJC 5-6-19

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

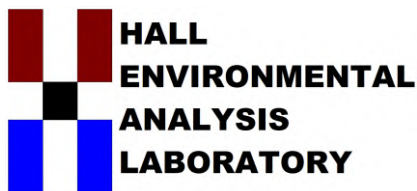
Regarding:

Client Instructions:

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.4	Good	Yes			



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

June 10, 2019

Jennifer Deal
HILCORP ENERGY
PO Box 4700
Farmington, NM 87499
TEL: (505) 564-0733
FAX:

RE: Lambe 2C

OrderNo.: 1905E09

Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 9 sample(s) on 5/30/2019 for the analyses presented in the following report.

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

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR03@28'

Project: Lambe 2C

Collection Date: 5/29/2019 10:30:00 AM

Lab ID: 1905E09-001

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	6/4/2019 12:31:15 PM	45307
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	6/4/2019 12:31:15 PM	45307
Surr: DNOP	120	70-130		%Rec	1	6/4/2019 12:31:15 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/3/2019 5:13:10 PM	45298
Surr: BFB	91.0	73.8-119		%Rec	1	6/3/2019 5:13:10 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/3/2019 5:13:10 PM	45298
Toluene	ND	0.048		mg/Kg	1	6/3/2019 5:13:10 PM	45298
Ethylbenzene	ND	0.048		mg/Kg	1	6/3/2019 5:13:10 PM	45298
Xylenes, Total	ND	0.096		mg/Kg	1	6/3/2019 5:13:10 PM	45298
Surr: 4-Bromofluorobenzene	94.7	80-120		%Rec	1	6/3/2019 5:13:10 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR04@28'

Project: Lambe 2C

Collection Date: 5/29/2019 10:35:00 AM

Lab ID: 1905E09-002

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	1000	95		mg/Kg	10	6/4/2019 12:55:30 PM	45307
Motor Oil Range Organics (MRO)	ND	480		mg/Kg	10	6/4/2019 12:55:30 PM	45307
Surr: DNOP	0	70-130	S	%Rec	10	6/4/2019 12:55:30 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	550	47		mg/Kg	10	6/4/2019 4:13:09 PM	45298
Surr: BFB	522	73.8-119	S	%Rec	10	6/4/2019 4:13:09 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	0.045	0.024		mg/Kg	1	6/3/2019 6:21:17 PM	45298
Toluene	2.5	0.047		mg/Kg	1	6/3/2019 6:21:17 PM	45298
Ethylbenzene	2.5	0.047		mg/Kg	1	6/3/2019 6:21:17 PM	45298
Xylenes, Total	37	0.94		mg/Kg	10	6/4/2019 4:13:09 PM	45298
Surr: 4-Bromofluorobenzene	386	80-120	S	%Rec	1	6/3/2019 6:21:17 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR05@28'

Project: Lambe 2C

Collection Date: 5/29/2019 10:40:00 AM

Lab ID: 1905E09-003

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	420	9.2		mg/Kg	1	6/4/2019 1:20:04 PM	45307
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	6/4/2019 1:20:04 PM	45307
Surr: DNOP	119	70-130		%Rec	1	6/4/2019 1:20:04 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	50	4.8		mg/Kg	1	6/3/2019 7:51:49 PM	45298
Surr: BFB	540	73.8-119	S	%Rec	1	6/3/2019 7:51:49 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/3/2019 7:51:49 PM	45298
Toluene	ND	0.048		mg/Kg	1	6/3/2019 7:51:49 PM	45298
Ethylbenzene	ND	0.048		mg/Kg	1	6/3/2019 7:51:49 PM	45298
Xylenes, Total	1.4	0.097		mg/Kg	1	6/3/2019 7:51:49 PM	45298
Surr: 4-Bromofluorobenzene	128	80-120	S	%Rec	1	6/3/2019 7:51:49 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR06@28'

Project: Lambe 2C

Collection Date: 5/29/2019 10:45:00 AM

Lab ID: 1905E09-004

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	2200	98		mg/Kg	10	6/4/2019 1:44:27 PM	45307
Motor Oil Range Organics (MRO)	ND	490		mg/Kg	10	6/4/2019 1:44:27 PM	45307
Surr: DNOP	0	70-130	S	%Rec	10	6/4/2019 1:44:27 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	2600	98		mg/Kg	20	6/3/2019 8:37:13 PM	45298
Surr: BFB	824	73.8-119	S	%Rec	20	6/3/2019 8:37:13 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.49		mg/Kg	20	6/3/2019 8:37:13 PM	45298
Toluene	35	0.98		mg/Kg	20	6/3/2019 8:37:13 PM	45298
Ethylbenzene	21	0.98		mg/Kg	20	6/3/2019 8:37:13 PM	45298
Xylenes, Total	220	20		mg/Kg	200	6/4/2019 4:36:26 PM	45298
Surr: 4-Bromofluorobenzene	158	80-120	S	%Rec	20	6/3/2019 8:37:13 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR07@23'

Project: Lambe 2C

Collection Date: 5/29/2019 11:10:00 AM

Lab ID: 1905E09-005

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	6/4/2019 2:08:55 PM	45307
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/4/2019 2:08:55 PM	45307
Surr: DNOP	126	70-130		%Rec	1	6/4/2019 2:08:55 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/3/2019 8:59:52 PM	45298
Surr: BFB	98.7	73.8-119		%Rec	1	6/3/2019 8:59:52 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	6/4/2019 4:59:44 PM	45298
Toluene	ND	0.048		mg/Kg	1	6/4/2019 4:59:44 PM	45298
Ethylbenzene	ND	0.048		mg/Kg	1	6/4/2019 4:59:44 PM	45298
Xylenes, Total	ND	0.097		mg/Kg	1	6/4/2019 4:59:44 PM	45298
Surr: 4-Bromofluorobenzene	92.8	80-120		%Rec	1	6/4/2019 4:59:44 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR08@25'

Project: Lambe 2C

Collection Date: 5/29/2019 11:15:00 AM

Lab ID: 1905E09-006

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	6/4/2019 2:33:11 PM	45307
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	6/4/2019 2:33:11 PM	45307
Surr: DNOP	117	70-130		%Rec	1	6/4/2019 2:33:11 PM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/3/2019 9:22:58 PM	45298
Surr: BFB	97.2	73.8-119		%Rec	1	6/3/2019 9:22:58 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/3/2019 9:22:58 PM	45298
Toluene	ND	0.048		mg/Kg	1	6/3/2019 9:22:58 PM	45298
Ethylbenzene	ND	0.048		mg/Kg	1	6/3/2019 9:22:58 PM	45298
Xylenes, Total	ND	0.096		mg/Kg	1	6/3/2019 9:22:58 PM	45298
Surr: 4-Bromofluorobenzene	91.0	80-120		%Rec	1	6/3/2019 9:22:58 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR09@25'

Project: Lambe 2C

Collection Date: 5/29/2019 11:20:00 AM

Lab ID: 1905E09-007

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	6/5/2019 8:27:34 AM	45307
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	6/5/2019 8:27:34 AM	45307
Surr: DNOP	100	70-130		%Rec	1	6/5/2019 8:27:34 AM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	6/3/2019 9:45:59 PM	45298
Surr: BFB	94.7	73.8-119		%Rec	1	6/3/2019 9:45:59 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	6/3/2019 9:45:59 PM	45298
Toluene	ND	0.047		mg/Kg	1	6/3/2019 9:45:59 PM	45298
Ethylbenzene	ND	0.047		mg/Kg	1	6/3/2019 9:45:59 PM	45298
Xylenes, Total	ND	0.093		mg/Kg	1	6/3/2019 9:45:59 PM	45298
Surr: 4-Bromofluorobenzene	92.1	80-120		%Rec	1	6/3/2019 9:45:59 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: GR10@23'

Project: Lambe 2C

Collection Date: 5/29/2019 11:25:00 AM

Lab ID: 1905E09-008

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	6/5/2019 8:52:56 AM	45307
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	6/5/2019 8:52:56 AM	45307
Surr: DNOP	95.3	70-130		%Rec	1	6/5/2019 8:52:56 AM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	6/3/2019 10:08:56 PM	45298
Surr: BFB	95.5	73.8-119		%Rec	1	6/3/2019 10:08:56 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.023		mg/Kg	1	6/3/2019 10:08:56 PM	45298
Toluene	ND	0.046		mg/Kg	1	6/3/2019 10:08:56 PM	45298
Ethylbenzene	ND	0.046		mg/Kg	1	6/3/2019 10:08:56 PM	45298
Xylenes, Total	ND	0.093		mg/Kg	1	6/3/2019 10:08:56 PM	45298
Surr: 4-Bromofluorobenzene	96.3	80-120		%Rec	1	6/3/2019 10:08:56 PM	45298

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1905E09

Date Reported: 6/10/2019

CLIENT: HILCORP ENERGY

Client Sample ID: FS01@29'

Project: Lambe 2C

Collection Date: 5/29/2019 11:30:00 AM

Lab ID: 1905E09-009

Matrix: SOIL

Received Date: 5/30/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	6/5/2019 9:16:47 AM	45307
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	6/5/2019 9:16:47 AM	45307
Surr: DNOP	90.2	70-130		%Rec	1	6/5/2019 9:16:47 AM	45307
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/3/2019 10:31:51 PM	45298
Surr: BFB	94.3	73.8-119		%Rec	1	6/3/2019 10:31:51 PM	45298
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	6/3/2019 10:31:51 PM	45298
Toluene	ND	0.049		mg/Kg	1	6/3/2019 10:31:51 PM	45298
Ethylbenzene	ND	0.049		mg/Kg	1	6/3/2019 10:31:51 PM	45298
Xylenes, Total	ND	0.097		mg/Kg	1	6/3/2019 10:31:51 PM	45298
Surr: 4-Bromofluorobenzene	95.7	80-120		%Rec	1	6/3/2019 10:31:51 PM	45298

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1905E09

10-Jun-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID: LCS-45307	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 45307		RunNo: 60359							
Prep Date: 5/31/2019	Analysis Date: 6/4/2019		SeqNo: 2041753		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	104	63.9	124			
Surr: DNOP	5.3		5.000		105	70	130			

Sample ID: MB-45307	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 45307		RunNo: 60359							
Prep Date: 5/31/2019	Analysis Date: 6/4/2019		SeqNo: 2041754		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		114	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 Quantitative 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#: 1905E09

10-Jun-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID: 1905E09-001AMS	SampType: MS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: GR03@28'	Batch ID: 45298	RunNo: 60348
Prep Date: 5/31/2019	Analysis Date: 6/3/2019	SeqNo: 2041015 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Gasoline Range Organics (GRO)	20	4.8 23.76 0 85.1 69.1 142
Surr: BFB	980	950.6 103 73.8 119

Sample ID: 1905E09-001AMSD	SampType: MSD	TestCode: EPA Method 8015D: Gasoline Range
Client ID: GR03@28'	Batch ID: 45298	RunNo: 60348
Prep Date: 5/31/2019	Analysis Date: 6/3/2019	SeqNo: 2041016 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Gasoline Range Organics (GRO)	21	4.7 23.65 0 86.9 69.1 142 1.67 20
Surr: BFB	980	946.1 103 73.8 119 0 0

Sample ID: LCS-45298	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: LCSS	Batch ID: 45298	RunNo: 60348
Prep Date: 5/31/2019	Analysis Date: 6/3/2019	SeqNo: 2041036 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Gasoline Range Organics (GRO)	22	5.0 25.00 0 87.1 80.1 123
Surr: BFB	1000	1000 102 73.8 119

Sample ID: MB-45298	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range
Client ID: PBS	Batch ID: 45298	RunNo: 60348
Prep Date: 5/31/2019	Analysis Date: 6/3/2019	SeqNo: 2041037 Units: mg/Kg
Analyte	Result	PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Gasoline Range Organics (GRO)	ND	5.0
Surr: BFB	890	1000 89.3 73.8 119

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 Quantitative 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#: 1905E09

10-Jun-19

Client: HILCORP ENERGY

Project: Lambe 2C

Sample ID: 1905E09-002AMS		SampType: MS		TestCode: EPA Method 8021B: Volatiles						
Client ID: GR04@28'		Batch ID: 45298		RunNo: 60348						
Prep Date: 5/31/2019		Analysis Date: 6/3/2019		SeqNo: 2041048			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.82	0.023	0.9363	0.04481	82.5	63.9	127			
Toluene	3.1	0.047	0.9363	2.450	69.2	69.9	131			S
Ethylbenzene	3.3	0.047	0.9363	2.481	87.3	71	132			
Xylenes, Total	35	0.094	2.809	35.25	5.72	71.8	131			ES
Surr: 4-Bromofluorobenzene	3.6		0.9363		386	80	120			S

Sample ID: 1905E09-002AMSD		SampType: MSD		TestCode: EPA Method 8021B: Volatiles						
Client ID: GR04@28'		Batch ID: 45298		RunNo: 60348						
Prep Date: 5/31/2019		Analysis Date: 6/3/2019		SeqNo: 2041049			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.78	0.024	0.9699	0.04481	76.2	63.9	127	4.24	20	
Toluene	3.6	0.048	0.9699	2.450	120	69.9	131	15.4	20	
Ethylbenzene	3.8	0.048	0.9699	2.481	136	71	132	14.1	20	S
Xylenes, Total	41	0.097	2.910	35.25	182	71.8	131	13.5	20	ES
Surr: 4-Bromofluorobenzene	4.0		0.9699		412	80	120	0	0	S

Sample ID: LCS-45298		SampType: LCS		TestCode: EPA Method 8021B: Volatiles						
Client ID: LCSS		Batch ID: 45298		RunNo: 60348						
Prep Date: 5/31/2019		Analysis Date: 6/3/2019		SeqNo: 2041067		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	100	80	120			
Toluene	1.1	0.050	1.000	0	105	80	120			
Ethylbenzene	1.0	0.050	1.000	0	103	80	120			
Xylenes, Total	3.0	0.10	3.000	0	101	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		106	80	120			

Sample ID: MB-45298		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID: PBS		Batch ID: 45298		RunNo: 60348						
Prep Date: 5/31/2019		Analysis Date: 6/3/2019		SeqNo: 2041068			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.97		1.000		96.5	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 Quantitative 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

Sample Log-In Check List

Client Name: HILCORP ENERGY FAR

Work Order Number: 1905E09

RcptNo: 1

Received By: Anne Thorne 5/30/2019 8:00:00 AM

Completed By: Erin Melendrez 5/30/2019 11:21:34 AM

Reviewed By: YG 5/30/19

Amu Thorne
Erin Melendrez

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 $>0^{\circ}\text{C}$ 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: _____

Thm
5-30-19

Special Handling (if applicable)

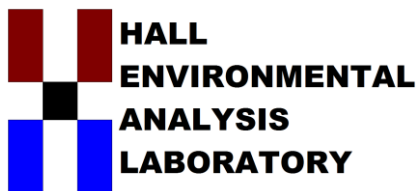
15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

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

16. Additional remarks:

17. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.6	Good	Yes			
2	2.6	Good	Yes			



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

August 07, 2019

Jennifer Deal

Hilcorp Energy

PO Box PO Box 4700

Farmington, NM 84701

TEL:

FAX

RE: Lambe 2C

OrderNo.: 1907D51

Dear Jennifer Deal:

Hall Environmental Analysis Laboratory received 16 sample(s) on 7/26/2019 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,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW08 0'-5'

Project: Lambe 2C

Collection Date: 7/22/2019 12:00:00 PM

Lab ID: 1907D51-001

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	8/1/2019 9:11:49 AM	46522
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/1/2019 9:11:49 AM	46522
Surr: DNOP	88.2	70-130		%Rec	1	8/1/2019 9:11:49 AM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 6:27:52 PM	46521
Surr: BFB	97.4	73.8-119		%Rec	1	8/1/2019 6:27:52 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 6:27:52 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 6:27:52 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 6:27:52 PM	46521
Xylenes, Total	ND	0.099		mg/Kg	1	8/1/2019 6:27:52 PM	46521
Surr: 4-Bromofluorobenzene	96.6	80-120		%Rec	1	8/1/2019 6:27:52 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907D51**Date Reported: **8/7/2019****CLIENT:** Hilcorp Energy**Client Sample ID:** MW08 30'-35'**Project:** Lambe 2C**Collection Date:** 7/22/2019 1:00:00 PM**Lab ID:** 1907D51-002**Matrix:** SOIL**Received Date:** 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	8/1/2019 3:50:56 PM	46522
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/1/2019 3:50:56 PM	46522
Surr: DNOP	81.6	70-130		%Rec	1	8/1/2019 3:50:56 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/1/2019 7:39:01 PM	46521
Surr: BFB	97.5	73.8-119		%Rec	1	8/1/2019 7:39:01 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	8/1/2019 7:39:01 PM	46521
Toluene	ND	0.049		mg/Kg	1	8/1/2019 7:39:01 PM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/1/2019 7:39:01 PM	46521
Xylenes, Total	ND	0.097		mg/Kg	1	8/1/2019 7:39:01 PM	46521
Surr: 4-Bromofluorobenzene	97.1	80-120		%Rec	1	8/1/2019 7:39:01 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW06 30'-35'

Project: Lambe 2C

Collection Date: 7/23/2019 9:00:00 AM

Lab ID: 1907D51-003

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: BRM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/5/2019 9:25:24 AM	46522
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	8/5/2019 9:25:24 AM	46522
Surr: DNOP	95.1	70-130		%Rec	1	8/5/2019 9:25:24 AM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/1/2019 8:50:14 PM	46521
Surr: BFB	95.6	73.8-119		%Rec	1	8/1/2019 8:50:14 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 8:50:14 PM	46521
Toluene	ND	0.049		mg/Kg	1	8/1/2019 8:50:14 PM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/1/2019 8:50:14 PM	46521
Xylenes, Total	ND	0.099		mg/Kg	1	8/1/2019 8:50:14 PM	46521
Surr: 4-Bromofluorobenzene	96.5	80-120		%Rec	1	8/1/2019 8:50:14 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW06 20'-25'

Project: Lambe 2C

Collection Date: 7/23/2019 8:15:00 AM

Lab ID: 1907D51-004

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/1/2019 4:35:29 PM	46522
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	8/1/2019 4:35:29 PM	46522
Surr: DNOP	74.0	70-130		%Rec	1	8/1/2019 4:35:29 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/1/2019 9:13:51 PM	46521
Surr: BFB	97.8	73.8-119		%Rec	1	8/1/2019 9:13:51 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 9:13:51 PM	46521
Toluene	ND	0.049		mg/Kg	1	8/1/2019 9:13:51 PM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/1/2019 9:13:51 PM	46521
Xylenes, Total	ND	0.098		mg/Kg	1	8/1/2019 9:13:51 PM	46521
Surr: 4-Bromofluorobenzene	97.4	80-120		%Rec	1	8/1/2019 9:13:51 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW02 20'-25'

Project: Lambe 2C

Collection Date: 7/23/2019 2:00:00 PM

Lab ID: 1907D51-005

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	8/1/2019 4:57:52 PM	46522
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	8/1/2019 4:57:52 PM	46522
Surr: DNOP	84.9	70-130		%Rec	1	8/1/2019 4:57:52 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 9:37:27 PM	46521
Surr: BFB	94.6	73.8-119		%Rec	1	8/1/2019 9:37:27 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 9:37:27 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 9:37:27 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 9:37:27 PM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/1/2019 9:37:27 PM	46521
Surr: 4-Bromofluorobenzene	94.3	80-120		%Rec	1	8/1/2019 9:37:27 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW02 30'-35'

Project: Lambe 2C

Collection Date: 7/23/2019 3:00:00 PM

Lab ID: 1907D51-006

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	8/1/2019 5:20:12 PM	46522
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	8/1/2019 5:20:12 PM	46522
Surr: DNOP	77.0	70-130		%Rec	1	8/1/2019 5:20:12 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/1/2019 10:01:01 PM	46521
Surr: BFB	97.0	73.8-119		%Rec	1	8/1/2019 10:01:01 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 10:01:01 PM	46521
Toluene	ND	0.049		mg/Kg	1	8/1/2019 10:01:01 PM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/1/2019 10:01:01 PM	46521
Xylenes, Total	ND	0.098		mg/Kg	1	8/1/2019 10:01:01 PM	46521
Surr: 4-Bromofluorobenzene	97.0	80-120		%Rec	1	8/1/2019 10:01:01 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW03 20'-25'

Project: Lambe 2C

Collection Date: 7/23/2019 4:20:00 PM

Lab ID: 1907D51-007

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	8/1/2019 5:43:01 PM	46522
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/1/2019 5:43:01 PM	46522
Surr: DNOP	73.5	70-130		%Rec	1	8/1/2019 5:43:01 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 10:24:41 PM	46521
Surr: BFB	94.7	73.8-119		%Rec	1	8/1/2019 10:24:41 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 10:24:41 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 10:24:41 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 10:24:41 PM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/1/2019 10:24:41 PM	46521
Surr: 4-Bromofluorobenzene	95.4	80-120		%Rec	1	8/1/2019 10:24:41 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907D51**Date Reported: **8/7/2019****CLIENT:** Hilcorp Energy**Client Sample ID:** MW03 30'-35'**Project:** Lambe 2C**Collection Date:** 7/23/2019 5:00:00 PM**Lab ID:** 1907D51-008**Matrix:** SOIL**Received Date:** 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/1/2019 6:05:32 PM	46522
Motor Oil Range Organics (MRO)	ND	51		mg/Kg	1	8/1/2019 6:05:32 PM	46522
Surr: DNOP	80.2	70-130		%Rec	1	8/1/2019 6:05:32 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 10:48:14 PM	46521
Surr: BFB	94.4	73.8-119		%Rec	1	8/1/2019 10:48:14 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 10:48:14 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 10:48:14 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 10:48:14 PM	46521
Xylenes, Total	ND	0.099		mg/Kg	1	8/1/2019 10:48:14 PM	46521
Surr: 4-Bromofluorobenzene	94.9	80-120		%Rec	1	8/1/2019 10:48:14 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW04 20'-25'

Project: Lambe 2C

Collection Date: 7/24/2019 3:50:00 PM

Lab ID: 1907D51-009

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/1/2019 6:28:12 PM	46522
Motor Oil Range Organics (MRO)	ND	52		mg/Kg	1	8/1/2019 6:28:12 PM	46522
Surr: DNOP	80.6	70-130		%Rec	1	8/1/2019 6:28:12 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 11:11:46 PM	46521
Surr: BFB	97.9	73.8-119		%Rec	1	8/1/2019 11:11:46 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 11:11:46 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 11:11:46 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 11:11:46 PM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/1/2019 11:11:46 PM	46521
Surr: 4-Bromofluorobenzene	98.6	80-120		%Rec	1	8/1/2019 11:11:46 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW04 30'-35'

Project: Lambe 2C

Collection Date: 7/24/2019 4:30:00 PM

Lab ID: 1907D51-010

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	8/1/2019 6:50:42 PM	46522
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/1/2019 6:50:42 PM	46522
Surr: DNOP	87.5	70-130		%Rec	1	8/1/2019 6:50:42 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/1/2019 11:35:22 PM	46521
Surr: BFB	95.6	73.8-119		%Rec	1	8/1/2019 11:35:22 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/1/2019 11:35:22 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/1/2019 11:35:22 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/1/2019 11:35:22 PM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/1/2019 11:35:22 PM	46521
Surr: 4-Bromofluorobenzene	95.1	80-120		%Rec	1	8/1/2019 11:35:22 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW05 15'-20'

Project: Lambe 2C

Collection Date: 7/24/2019 9:40:00 AM

Lab ID: 1907D51-011

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/1/2019 7:13:23 PM	46522
Motor Oil Range Organics (MRO)	ND	51		mg/Kg	1	8/1/2019 7:13:23 PM	46522
Surr: DNOP	80.1	70-130		%Rec	1	8/1/2019 7:13:23 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/2/2019 10:38:48 AM	46521
Surr: BFB	103	73.8-119		%Rec	1	8/2/2019 10:38:48 AM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	8/2/2019 10:38:48 AM	46521
Toluene	ND	0.049		mg/Kg	1	8/2/2019 10:38:48 AM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/2/2019 10:38:48 AM	46521
Xylenes, Total	ND	0.098		mg/Kg	1	8/2/2019 10:38:48 AM	46521
Surr: 4-Bromofluorobenzene	106	80-120		%Rec	1	8/2/2019 10:38:48 AM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907D51**Date Reported: **8/7/2019****CLIENT:** Hilcorp Energy**Client Sample ID:** MW05 30'-35'**Project:** Lambe 2C**Collection Date:** 7/24/2019 11:00:00 AM**Lab ID:** 1907D51-012**Matrix:** SOIL**Received Date:** 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/1/2019 7:35:47 PM	46522
Motor Oil Range Organics (MRO)	ND	52		mg/Kg	1	8/1/2019 7:35:47 PM	46522
Surr: DNOP	76.8	70-130		%Rec	1	8/1/2019 7:35:47 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/2/2019 11:02:19 AM	46521
Surr: BFB	102	73.8-119		%Rec	1	8/2/2019 11:02:19 AM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/2/2019 11:02:19 AM	46521
Toluene	ND	0.049		mg/Kg	1	8/2/2019 11:02:19 AM	46521
Ethylbenzene	ND	0.049		mg/Kg	1	8/2/2019 11:02:19 AM	46521
Xylenes, Total	ND	0.099		mg/Kg	1	8/2/2019 11:02:19 AM	46521
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	8/2/2019 11:02:19 AM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW01 25'-30'

Project: Lambe 2C

Collection Date: 7/24/2019 1:30:00 PM

Lab ID: 1907D51-013

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	60	10		mg/Kg	1	8/3/2019 10:57:45 AM	46522
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	8/3/2019 10:57:45 AM	46522
Surr: DNOP	91.2	70-130		%Rec	1	8/3/2019 10:57:45 AM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	120	25		mg/Kg	5	8/2/2019 3:45:32 PM	46521
Surr: BFB	263	73.8-119	S	%Rec	5	8/2/2019 3:45:32 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.12		mg/Kg	5	8/2/2019 3:45:32 PM	46521
Toluene	0.36	0.25		mg/Kg	5	8/2/2019 3:45:32 PM	46521
Ethylbenzene	0.56	0.25		mg/Kg	5	8/2/2019 3:45:32 PM	46521
Xylenes, Total	6.2	0.50		mg/Kg	5	8/2/2019 3:45:32 PM	46521
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	5	8/2/2019 3:45:32 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1907D51**Date Reported: **8/7/2019****CLIENT:** Hilcorp Energy**Client Sample ID:** MW01 30'-35'**Project:** Lambe 2C**Collection Date:** 7/24/2019 2:00:00 PM**Lab ID:** 1907D51-014**Matrix:** SOIL**Received Date:** 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	8/1/2019 8:20:28 PM	46522
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	8/1/2019 8:20:28 PM	46522
Surr: DNOP	77.4	70-130		%Rec	1	8/1/2019 8:20:28 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/2/2019 11:49:24 AM	46521
Surr: BFB	92.0	73.8-119		%Rec	1	8/2/2019 11:49:24 AM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/2/2019 11:49:24 AM	46521
Toluene	ND	0.050		mg/Kg	1	8/2/2019 11:49:24 AM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/2/2019 11:49:24 AM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/2/2019 11:49:24 AM	46521
Surr: 4-Bromofluorobenzene	93.0	80-120		%Rec	1	8/2/2019 11:49:24 AM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW07 25'-30'

Project: Lambe 2C

Collection Date: 7/23/2019 10:30:00 AM

Lab ID: 1907D51-015

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	8/3/2019 11:22:17 AM	46522
Motor Oil Range Organics (MRO)	ND	52		mg/Kg	1	8/3/2019 11:22:17 AM	46522
Surr: DNOP	93.4	70-130		%Rec	1	8/3/2019 11:22:17 AM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/2/2019 12:12:55 PM	46521
Surr: BFB	99.2	73.8-119		%Rec	1	8/2/2019 12:12:55 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/2/2019 12:12:55 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/2/2019 12:12:55 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/2/2019 12:12:55 PM	46521
Xylenes, Total	ND	0.099		mg/Kg	1	8/2/2019 12:12:55 PM	46521
Surr: 4-Bromofluorobenzene	94.5	80-120		%Rec	1	8/2/2019 12:12:55 PM	46521

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1907D51

Date Reported: 8/7/2019

CLIENT: Hilcorp Energy

Client Sample ID: MW07 30'-35'

Project: Lambe 2C

Collection Date: 7/23/2019 11:00:00 AM

Lab ID: 1907D51-016

Matrix: SOIL

Received Date: 7/26/2019 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	8/1/2019 9:05:11 PM	46522
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/1/2019 9:05:11 PM	46522
Surr: DNOP	83.0	70-130		%Rec	1	8/1/2019 9:05:11 PM	46522
EPA METHOD 8015D: GASOLINE RANGE							Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/2/2019 12:36:27 PM	46521
Surr: BFB	93.1	73.8-119		%Rec	1	8/2/2019 12:36:27 PM	46521
EPA METHOD 8021B: VOLATILES							Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	8/2/2019 12:36:27 PM	46521
Toluene	ND	0.050		mg/Kg	1	8/2/2019 12:36:27 PM	46521
Ethylbenzene	ND	0.050		mg/Kg	1	8/2/2019 12:36:27 PM	46521
Xylenes, Total	ND	0.10		mg/Kg	1	8/2/2019 12:36:27 PM	46521
Surr: 4-Bromofluorobenzene	94.0	80-120		%Rec	1	8/2/2019 12:36:27 PM	46521

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1907D51

07-Aug-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: LCS-46522	SampType: LCS			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: LCSS	Batch ID: 46522			RunNo: 61831						
Prep Date: 7/31/2019	Analysis Date: 8/1/2019			SeqNo: 2096112	Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	10	50.00	0	100	63.9	124			
Surr: DNOP	4.9		5.000		97.3	70	130			

Sample ID: MB-46522	SampType: MBLK			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: PBS	Batch ID: 46522			RunNo: 61831						
Prep Date: 7/31/2019	Analysis Date: 8/1/2019			SeqNo: 2096114	Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		102	70	130			

Sample ID: 1907D51-001AMS	SampType: MS			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: MW08 0'-5'	Batch ID: 46522			RunNo: 61831						
Prep Date: 7/31/2019	Analysis Date: 8/1/2019			SeqNo: 2096438	Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	11	53.30	0	85.0	57	142			
Surr: DNOP	3.9		5.330		73.0	70	130			

Sample ID: 1907D51-001AMSD	SampType: MSD			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: MW08 0'-5'	Batch ID: 46522			RunNo: 61831						
Prep Date: 7/31/2019	Analysis Date: 8/1/2019			SeqNo: 2096556	Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	10	52.19	0	91.3	57	142	5.00	20	
Surr: DNOP	4.0		5.219		76.4	70	130	0	0	

Sample ID: LCS-46535	SampType: LCS			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: LCSS	Batch ID: 46535			RunNo: 61831						
Prep Date: 8/1/2019	Analysis Date: 8/2/2019			SeqNo: 2097809	Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.7		5.000		94.9	70	130			

Sample ID: MB-46535	SampType: MBLK			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: PBS	Batch ID: 46535			RunNo: 61831						
Prep Date: 8/1/2019	Analysis Date: 8/2/2019			SeqNo: 2097811	Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

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 Quantitative 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#: 1907D51

07-Aug-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: MB-46535	SampType: MBLK			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: PBS	Batch ID: 46535			RunNo: 61831						
Prep Date: 8/1/2019	Analysis Date: 8/2/2019			SeqNo: 2097811	Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	13		10.00		135	70	130			S

Sample ID: LCS-46571	SampType: LCS			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: LCSS	Batch ID: 46571			RunNo: 61865						
Prep Date: 8/2/2019	Analysis Date: 8/5/2019			SeqNo: 2098678	Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.5		5.000		89.1	70	130			

Sample ID: MB-46571	SampType: MBLK			TestCode: EPA Method 8015M/D: Diesel Range Organics						
Client ID: PBS	Batch ID: 46571			RunNo: 61865						
Prep Date: 8/2/2019	Analysis Date: 8/5/2019			SeqNo: 2098679	Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.4		10.00		94.3	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 Quantitative 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#: 1907D51

07-Aug-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: 1907D51-002AMS		SampType: MS			TestCode: EPA Method 8015D: Gasoline Range					
Client ID: MW08 30'-35'		Batch ID: 46521			RunNo: 61828					
Prep Date: 7/31/2019		Analysis Date: 8/1/2019			SeqNo: 2096980		Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	102	69.1	142			
Surr: BFB	1100		1000		108	73.8	119			

Sample ID: 1907D51-002AMSD		SampType: MSD		TestCode: EPA Method 8015D: Gasoline Range						
Client ID: MW08 30'-35'		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2096981		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.9	24.73	0	102	69.1	142	1.13	20	
Surr: BFB	1100		989.1		109	73.8	119	0	0	

Sample ID: LCS-46521		SampType: LCS		TestCode: EPA Method 8015D: Gasoline Range						
Client ID: LCSS		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2096990			Units: mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	95.0	80.1	123			
Surr: BFB	1100		1000		110	73.8	119			

Sample ID: MB-46521		SampType: MBLK		TestCode: EPA Method 8015D: Gasoline Range							
Client ID: PBS		Batch ID: 46521		RunNo: 61828							
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2096991			Units: mg/Kg				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)		ND	5.0								
Surr: BFB		990		1000		99.0	73.8	119			

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 Quantitative 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#: 1907D51

07-Aug-19

Client: Hilcorp Energy

Project: Lambe 2C

Sample ID: 1907D51-001AMS		SampType: MS		TestCode: EPA Method 8021B: Volatiles						
Client ID: MW08 0'-5'		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2097157		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	0.9872	0	100	63.9	127			
Toluene	1.1	0.049	0.9872	0	107	69.9	131			
Ethylbenzene	1.1	0.049	0.9872	0	110	71	132			
Xylenes, Total	3.2	0.099	2.962	0	109	71.8	131			
Surr: 4-Bromofluorobenzene	0.98		0.9872		99.5	80	120			

Sample ID: 1907D51-001AMSD		SampType: MSD		TestCode: EPA Method 8021B: Volatiles						
Client ID: MW08 0'-5'		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2097158		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	0.9843	0	102	63.9	127	1.60	20	
Toluene	1.1	0.049	0.9843	0	109	69.9	131	2.01	20	
Ethylbenzene	1.1	0.049	0.9843	0	112	71	132	1.93	20	
Xylenes, Total	3.3	0.098	2.953	0	112	71.8	131	2.09	20	
Surr: 4-Bromofluorobenzene	0.97		0.9843		98.6	80	120	0	0	

Sample ID: LCS-46521		SampType: LCS		TestCode: EPA Method 8021B: Volatiles						
Client ID: LCSS		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2097168		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	1.000	0	95.5	80	120			
Toluene	1.0	0.050	1.000	0	101	80	120			
Ethylbenzene	1.0	0.050	1.000	0	101	80	120			
Xylenes, Total	3.1	0.10	3.000	0	102	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		99.6	80	120			

Sample ID: MB-46521		SampType: MBLK		TestCode: EPA Method 8021B: Volatiles						
Client ID: PBS		Batch ID: 46521		RunNo: 61828						
Prep Date: 7/31/2019		Analysis Date: 8/1/2019		SeqNo: 2097169		Units: mg/Kg				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.99		1.000		98.5	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
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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: 1907D51

RcptNo: 1

Received By: Anne Thorne

7/26/2019 8:00:00 AM

Completed By: Erin Melendrez

7/26/2019 8:47:32 AM

Reviewed By: DAD 7/30/19

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 $>0^{\circ}\text{C}$ 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: mg 07/30/19

Special Handling (if applicable)

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

Person Notified: Danny Burns

Date: 7/30/19

By Whom: Leah Baca

Via: ☒ eMail ☒ Phone ☐ Fax ☐ In Person

Regarding: Extra samples

Client Instructions: Add them

16. Additional remarks:

17. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.6	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp
Jennifer Deal
 Mailing Address:

Phone #: 505-324-5128
 email or Fax#: ideal@hilcorp.com

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

Accreditation: ☐ AZ Compliance
☐ NELAC ☐ Other

☒ EDD (Type) PDF

Date	Time	Matrix	Sample Name
7/24	1330	Soil	MW01 1330 25'-30'
7/24	1400	Soil	MW01 1400 30'-35'
7/23	1030	Soil	MW07 1030 25'-30'
7/23	1100	Soil	MW07 30'-35'
			LB per Danny Burns

Turn-Around Time:

☒ Standard ☐ Rush

Project Name:

Lambe 2C

Project #:

Project Manager:

Danny Burns - LTF

Sampler: Eric Carroll

On Ice: ☒ Yes ☐ No

of Coolers: 1

Cooler Temp (including CF): 1.5 to 0.1°C = 1.6°F

Container Type and #
 Preservative Type
 HEAL No. 1907D51

-013

-014

-015

-016

LB per Danny Burns

Date: 7/25 Time: 1115

Relinquished by: Eric Carroll

Date: 7/26 Time: 1820

Relinquished by: Christine Waack

Received by: Christine Waack

Date: 7/25/19

Time: 1115

Received by: Eric Carroll

Date: 7/26/19

Time: 0800

Remarks:

Please CC: dburns@itenv.com
ecarroll@itenv.com

No chloride



www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	CH ₄ , B ₂ , NO ₂ , NO ₃ , PO ₄ , SO ₄	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
☒ BTEX / ☒ MTBE / ☒ TMB's (8021)	☒	☒	☒	☒	☒	☒	☒	☒