State of New Mexico
Energy, Minerals and Natural Resources Department

Kate Kaufman - Sr. Environmental Specialist
Hilcorp Energy Company
1111 Travis Street
Houston, TX 77002

RE: Conditional Approval of Soil Vapor Extraction (SVE) Remediation Method for Hare 014M (API #: 30-045-33566; Incident #: NRM2028852747; Application ID: 68678)

Ms. Kaufman,

The Oil Conservation Division (OCD) has reviewed and approved the subject work plan with the following conditions;

1. Hilcorp's SVE system must be designed to have a minimum of 90% operational runtime, 24/7, start to finish.
2. On-site analog or digital runtime counter must be installed and viewable to OCD personnel. Any alternative method must be explained and pre-approved by OCD.
3. The following field data measurement parameters will be required and reported (prior to reaching vacuum pump);
    a. Total Extracted Flow Rate via a Flow Meter
    b. Flow Rates from each vapor extraction point/well (VEP)
    c. Volatile Organic Compound (VOC) Concentrations for each VEP and/or VEP cluster being implemented via Handheld Gas Analyzer (e.g. – Photo Ionization Detector (PID)
    d. Record vacuum pressure at each VEP and/or VEP cluster being implemented
    e. Oxygen (O_2) and carbon di-oxide (CO_2) levels via hand-held analyzers from each VEP and/or VEP cluster being implemented, prior to reaching vacuum pump and at discharge orifice or vent stack
4. The following minimum timeline will be required for the above data recordings;
    a. Daily for the first week
    b. Weekly during the next three (3) months
    c. Monthly thereafter for the first calendar year
    d. Then contingent upon the recorded data output
5. Any water condensation will be categorized as oil field waste and must be disposed of accordingly. System modifications to address increased water collection and disposal must be pre-approved by OCD.
6. Extracted vapor sampling (prior to reaching vacuum pump) for laboratory testing will be required as follows;
    a. Approximately 15-30 minutes and 8-10 hours after startup (at the end of the same day if initial sample collected in early morning), one full round of sampling for constituents noted in b, c, & d below
    b. BTEX per US EPA Method 8021B or 8260B
    c. TPH per US EPA Method 8015M
    d. O_2 and CO_2

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7. The following timeline will be required for the above laboratory sampling elements;
    a. Weekly - next three (3) weeks (first month)
    b. Bi-weekly – next two (2) months (first quarter)
    c. Bi-Monthly - next nine (9) months (first year)
    d. Quarterly – Year #2 and beyond until diminishing returns has been consistently documented
8. Hilcorp must submit to OCD quarterly reports for the first 2 years of operation, then bi-annual thereafter, detailing the following;
    a. Summary of remediation activity
    b. Chart of O_2 & CO_2 levels over time
    c. SVE runtime
    d. SVE mass removal
    e. Product recovery, if applicable
    f. Laboratory air sample analysis, if applicable
9. Hilcorp must notify OCD prior to its initial system startup which is required within 60 days of this approval. If this cannot be achieved, Hilcorp must verify the delay within its request for a time extension.
10. Hilcorp must submit to OCD a closure plan prior to initiating confirmation sampling for final remediation termination

These conditions by the OCD does not relieve Hilcorp of responsibility for compliance with any federal, state, or local law.

If you have any questions, please contact Nelson Velez of the Environmental Incident Group at (505) 469-6146 or by email at *nelson.velez@emnrd.nm.gov.*

Respectfully,

Michael Bratcher
Incident Group Supervisor
(575) 626-0857

Nelson Velez
Environmental Specialist – Adv
(505) 469-6146

District I
1625 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	OGRID 372171
Contact Name Clara Cardoza	Contact Telephone 505.564.0733
Contact email ccardoza@hilcorp.com	Incident # *(assigned by OCD)*
Contact mailing address 382 CR 3100, Aztec NM 87410	

Location of Release Source

Latitude 36.74621 Longitude -107.87812
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Hare 14M	Site Type Well Site
Date Release Discovered 7/16/2020	API# *(if applicable)* 30-045-33566

Unit Letter	Section	Township	Range	County
D	10	29N	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) 36	Volume Recovered (bbls) 0
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release
Release was caused by vandalism in the form of a bullet hole to the tank. No volume was recovered but the condensate remained in the bermed area.

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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? An unauthorized release of a volume in excess of 25 barrels.

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?
NMOCD – Cory Smith – contacted by Clara Cardoza via phone on 7/16/20 at 3:05 p.m. and via email 7/16/20 at 3:18 p.m (copied Jim Griswold).
BLM – Emmanuel Adeloye – contacted by Clara Cardoza left a voicemail on 7/16/20 at 3:07 p.m. and via email 7/16/20 at 3:18 p.m.

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: Clara Cardoza Title: Environmental Specialist

Signature: Clara Cardoza Date: 07/30/2020

email: ccardoza@hilcorp.com Telephone: 505.564.0733

OCD Only

Received by: Date:

District I
1625 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

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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?	<50 (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: ***Each of the following items must be included in the report.***

☒ 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

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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.

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: Kathryn Kaufman Title: Environmental Specialist

Signature: Date: 12.23.2021

email: kkaufman@hilcorp.com Telephone: 346-237-2275

OCD Only

Received by: Date:

State of New Mexico
Oil Conservation Division

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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: ___Kathryn Kaufman_____ Title: _____Environmental Specialist_____

Signature: ____ _____ Date: _12.23.2021_____

email: _____kkaufman@hilcorp.com_____ Telephone: _____346-237-2275_____

OCD Only

Received by: _____ Date: _____

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

Signature: Nelson Velez Date: 11/07/2022

From: Smith, Cory, EMNRD
To: Kate Kaufman
Cc: Hyde, Stuart; Hencmann, Devin
Subject: RE: [EXTERNAL] Hilcorp Energy, Hare 14M (Incident ID NRM2028852747)
Date: Thursday, November 4, 2021 3:46:57 PM

Kate,

Thank you for the update.. as we discussed on the phone I am going to go ahead and reject the October 2020 remediation work plan as we discussed because its going to be outdated with the new one that your proposing to submit.

Please include this email chain and submit your updated remediation plan to the OCD Permitting portal no later than December 24, 2021.

Thank you.

Cory Smith • Environmental Specialist Supervisor
Environmental Bureau
EMNRD - Oil Conservation Division
5200 Oakland Avenue N.E Suite 100 | Albuquerque, NM 87113
505.419.2687 | Cory.Smith@state.nm.us
http://www.emnrd.state.nm.us/OCD/

From: Kate Kaufman <kkaufman@hilcorp.com>
Sent: Thursday, November 4, 2021 9:03 AM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Cc: Hyde, Stuart <Stuart.Hyde@wsp.com>; Hencmann, Devin <Devin.Hencmann@wsp.com>
Subject: [EXTERNAL] Hilcorp Energy, Hare 14M (Incident ID NRM2028852747)

Good morning Cory,

I wanted to provide you an update on the Hare 14M site (Incident ID NRM2028852747). Hilcorp submitted a site characterization and remediation work plan to OCD in October 2020. At this time, the NMOCD has not commented or approved the October 2020 report. Since that time, a site visit conducted during regular quarterly monitoring of sites in the area revealed that two of the proposed SVE wells had product in them. Hilcorp and WSP has conducted manual product recovery in these two wells and have documented a substantial decrease in product thickness over time. Additionally, groundwater has not been encountered during drilling and has not accumulated in any of the SVE wells installed at the site. Based on this discovery, Hilcorp drilled additional borings at the location in September 2021 to fully delineate the release. Based on the additional delineation results and reduction in product levels by manual bailing, SVE remains the proposed remedial technology for the Site. As such, we plan to conduct an SVE pilot test at the site next week. Once that is complete, we will prepare an updated remediation work plan and submit to the NMOCD within 45 days after completion of the pilot test.

Please let me know if you have any questions or require additional information.

Thank you,
Kate

Kate Kaufman | Environmental Specialist | Hilcorp Energy Company
O: 346-237-2275 | C: 907-244-8292 | kkaufman@hilcorp.com
1111 Travis St. | Houston | TX | 77002

December 23, 2021

New Mexico Energy, Minerals and Natural Resources Department
New Mexico Oil Conservation Division
1000 Rio Brazos
Aztec, New Mexico 87410

Subject: **Site Characterization Report and Remediation Work Plan**
Hare 14M
San Juan County, New Mexico
NMOCD Incident Number: NRM2028852747

To Whom It May Concern:

On behalf of Hilcorp Energy Company (Hilcorp), WSP USA Inc. (WSP) has prepared this *Site Characterization Report and Remediation Work Plan* for a release at the Hare 14M production well (Site). The Site is located on Bureau of Land Management (BLM) surface, approximately 460 feet west of Slane Canyon in Unit D of Section 10 of Township 29 North, Range 10 West, San Juan County, New Mexico. The Site is approximately 3.3 miles northwest of Blanco, New Mexico, west of New Mexico State Road 575 (Figure 1).

On July 16, 2020, a release of natural-gas condensate was discovered at the Site during routine maintenance. The release was caused by a bullet hole near the bottom of the condensate aboveground storage tank. Approximately 36 barrels (bbls) of condensate were released from the tank but retained inside of the secondary containment berm. Upon discovery, Hilcorp gave notice to the New Mexico Oil Conservation Division (NMOCD) and the United States Bureau of Land Management (BLM) via telephone and email communication on July 16, 2020. Hilcorp subsequently submitted a Release Notification Form C-141 to the NMOCD on July 30, 2020. The NMOCD has assigned the Site incident number NRM2028852747.

SITE CHARACTERIZATION

As part of the site investigation, local geology/hydrogeology and nearby sensitive receptors were accessed in accordance with 19.15.29.11 of the New Mexico Administrative Code (NMAC). This information is further discussed below.

GEOLOGY AND HYDROGEOLOGY

Based on United States Geological Survey (USGS) geologic mapping, the Site is located within the Tertiary Nacimiento Formation. In the report titled “Hydrogeology and Water Resources of San Juan Basin, New Mexico” (Stone, et. al., 1983), the Nacimiento Formation as characterized by interbedded black carbonaceous mudstones and white, coarse-grained sandstones. This formation ranges in thickness from 418 to 2,232 feet. The Nacimiento Formation overlies the Ojo Alamo sandstone formation, which is the shallowest water-bearing unit beneath the Site (Stone et. al., 1983).

SITE RECEPTORS

Assessment of potential nearby receptors was conducted through desktop reviews of topographic maps, Federal Emergency Management Administration (FEMA) Geographic Information System (GIS) maps, United States Geological Survey (USGS) GIS maps, New Mexico Office of the State Engineer database, and aerial photographs, as well as site-specific observations.

Borings at the Site indicate groundwater is not present at depths up to 45 feet below ground surface (bgs). However, based on the proximity and elevation difference to Slane Canyon, as well as depth-to-groundwater information at the

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848 EAST 2ND AVENUE
DURANGO CO 81301

Tel.: 970-385-1096
wsp.com

nearby Hare 15 natural gas production well (25 feet bgs, located 1,000 feet north of the Site), groundwater is potentially present near the site at depths less than 50 feet bgs. No wellhead protection areas, springs, or domestic/stock wells are located within a half mile from the site (Figure 2). The nearest significant watercourse to the Site is Slane Canyon, located approximately 460 feet to the east (Figures 2 and 3). The Site is greater than 200 feet from any lakebed, sinkhole, or playa lake, and greater than 300 feet from any wetland (Figure 3).

SITE CLOSURE CRITERIA

WSP characterized the Site according to *Table 1, Closure Criteria for Soils Impacted by a Release* in 19.15.29.12 NMAC. Due to the Site having a depth to groundwater potentially less than 50 feet, the following NMOCD Table 1 Closure Criteria apply to the Site:

- Benzene: 10 milligrams per kilogram (mg/kg)
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX): 50 mg/kg
- Total petroleum hydrocarbons (TPH)-gasoline range organics (GRO), TPH-diesel range organics (DRO), and TPH-motor oil range organics (MRO): 100 mg/kg
- Chloride: 600 mg/kg

SITE INVESTIGATION ACTIVITIES

After the discovery of the release, Hilcorp retained WSP to conduct site investigations to define the vertical and lateral extent of the impacts to soil. WSP conducted drilling and soil sampling activities using a 75 Central Mining Equipment (CME) hollow-stem auger drilling rig. Boring locations were recorded using a handheld Global Positing System (GPS) unit.

Soil lithology was logged by a WSP geologist and described based on the Unified Soil Classification System (USCS) as specified in American Society for Testing and Materials (ASTM) D2488. Soil also was inspected for visual staining and the presence or absence of odor. The soil was characterized by visually inspecting the soil samples and field screening the soil headspace using a photoionization detector (PID) to monitor for the presence of organic vapors. Drilling and sampling equipment were decontaminated prior to each use.

Figure 4 presents the delineation boring locations. In total, 13 borings were advanced at the Site ranging in depth from 40 to 45 feet bgs. Delineation activities and results are further described below.

SOIL BORING RESULTS

In general, brown, poorly sorted, medium grained sand and silty sand were encountered between the ground surface and approximately 20 feet bgs. The sand/silty sand was underlain by interbedded layers of gray silty sand/sandy silt grading to sandstone and siltstone to the terminal depths of each boring. Groundwater and/or saturated soils were not encountered in any of the borings during drilling. Boring logs are attached as Enclosure A.

SOIL SAMPLING ACTIVITIES AND RESULTS

Based on field screening of soils, at least two soil samples from each boring were submitted for laboratory analysis (with the exception of BH08). For borings BH01 through BH09, one soil sample was collected for laboratory analysis from the most impacted soil interval based on field screening results. One additional sample was collected for analysis near the terminus of each borehole. Additional samples were collected from borings BH02, BH05, and BH06 to obtain better resolution of concentrations at depth intervals between 35 and 45 feet bgs. Additionally, only one sample was analyzed from boring BH08 at a depth interval of 35 to 40 feet bgs. This was the only sample analyzed because it obtained the highest field screening result from that boring and was also near the terminus of the boring (analytical results from sample BH08@35’-40’ indicated that BTEX, TPH, and chloride concentrations were all below NMOCD Table 1 Closure Criteria. Because of these results, sample BH08@40’-45’ was not analyzed by the laboratory).

For borings BH10 through BH13, soil samples were collected every 5 feet from ground surface to the terminus of each boring. Soil samples were submitted for laboratory analysis of BTEX (benzene, toluene, ethylbenzene, and

xylene compounds) by United States Environmental Protection Agency (EPA) method 8021, TPH-gasoline range organics (GRO), TPH-diesel range organics (DRO), TPH-motor oil range organics (MRO) by EPA Method 8015, and chloride by EPA method 300.0.

Laboratory analytical results indicate that soil collected from borings BH01 and BH06 contained concentrations of total BTEX and/or TPH that exceeded the NMOCD Table 1 Closure Criteria. All other samples collected during the site investigation were either detected below the Table 1 Closure Criteria or were below laboratory detection limits for the listed parameters. The soil analytical results, as compared to the NMOCD closure criteria, are summarized in Table 1 and presented on Figure 4. The laboratory analytical reports are included as Enclosure B.

INTERIM PSH RECOVERY

After the initial investigation in August 2020, phase separated hydrocarbon (PSH) was discovered accumulating in remediation wells installed at borings BH02 (well SVE03 and BH06 (well SVE08). Since the discovery of the PSH, WSP has conducted several PSH-recovery events using a disposable bailer. Additionally, absorbent product recovery socks have been placed in these wells and replaced as necessary, since October 2020. To date, 28.425 gallons of PSH have been removed from the two remediation wells via manual bailing and disposable product-recovery socks. No other Site remediation wells have accumulated PSH as of the last Site visit on December 8, 2021. Table 2 presents a summary of PSH recovered.

CONCLUSIONS

Petroleum-hydrocarbon impacted soil has been delineated at the Site. Figure 4 presents soil sample results, in which all outer lateral points are compliant with the NMOCD closure criteria and the total vertical depth of impact in all boring locations have been determined. Additionally, Figures 5A and 5B presents cross sections for the Site that display vertical impacts at the Site. Field screening and elevated PID results in borings BH05 and BH11 suggest that soil may be impacted near these areas. However, analytical results indicate that TPH and BTEX concentrations in these borings are below the NMOCD Table 1 Closure Criteria. Based on these results, it is believed that the edge of soil impacts extend to areas near BH05 and BH11 and that elevated PID readings are a result of soil-vapors migrating from the edge of the plume into the pore space of surrounding soil (as opposed to residual petroleum hydrocarbons entrained in the soil matrix).

Impacted soil appears to be primarily located to the east of the AST and along the southeastern edge of the well pad. Additionally, soil impacts are present at depths between ground surface and 40 feet bgs near the release representing a shallow subsurface impacted area. With distance from the AST, impacts are restricted to a deeper interval near 35 feet to 40 feet bgs, which is likely representative of potential subsurface migration. Based on the above conclusions, approximately 1,700 cubic yards of subsurface soil are estimated to have been impacted by the release.

REMEDIATION WORK PLAN

Based on the depths of soil impacts and site lithology, WSP proposes remediation by soil vapor extraction (SVE). SVE technology remediates petroleum-hydrocarbon impacts in situ by applying a vacuum to wells drilled into the impacted area. The applied vacuum initiates air flow from the subsurface and into the SVE wells. The subsurface air flow enhances petroleum-hydrocarbon volatilization and the vapors are pulled out by a blower/vacuum pump on the surface. The removed petroleum hydrocarbons are typically emitted directly into the atmosphere unless air permitting thresholds or sensitive receptors require air treatment with petroleum hydrocarbon removal. SVE wells are drilled into the subsurface and screened to provide air flow evenly throughout the impacted interval. When determining the number of wells and screen intervals, heterogeneities in the geology are considered to prevent air being pulled only through the most permeable zones. SVE systems typically operate for 1 to 10 years until cleanup goals are achieved.

SVE SYSTEM INSTALLATION AND PILOT TESTING

At the completion of drilling, 14 borings were completed as permanent SVE wells at the Site, as shown on Figures 6A and 6B. Table 3 presents SVE well-construction information including total depth of the boring and the depth of the screened interval for each SVE well. SVE wells were constructed by installing screened casing at depths with the

highest TPH impact (based on analytical results and/or field PID results) and solid casing to the ground surface. In addition, nested SVE wells were installed in borings BH01, BH05, and BH06 to target multiple depth intervals in these areas. In general, SVE wells were installed at different depth intervals to target "shallow zone" impacted soil (ground surface up to 25 feet bgs) and "deep zone" impacted soil (soil up to 43 feet bgs).

SVE wells were constructed out of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 2-inch Schedule 40 PVC 0.010-inch slotted screen. Wells were completed with 10-20 silica sand pack to three feet above the screened interval, then two feet of hydrated bentonite seal, and then grouted to ground surface. SVE well locations are depicted on Figures 6A and 6B. Boring logs with well completion diagrams are included as Enclosure A.

SVE SYSTEM PILOT TEST

To evaluate the design of an SVE system, WSP conducted a pilot test to determine the flow rate and applied vacuum required to influence the subsurface and cause volatilization of the petroleum hydrocarbons entrained in the soil. Pilot test data was also used to determine specific site design radius-of-influence (ROI) and radius-of-effect (ROE). Further information regarding the pilot test procedures and results are presented below.

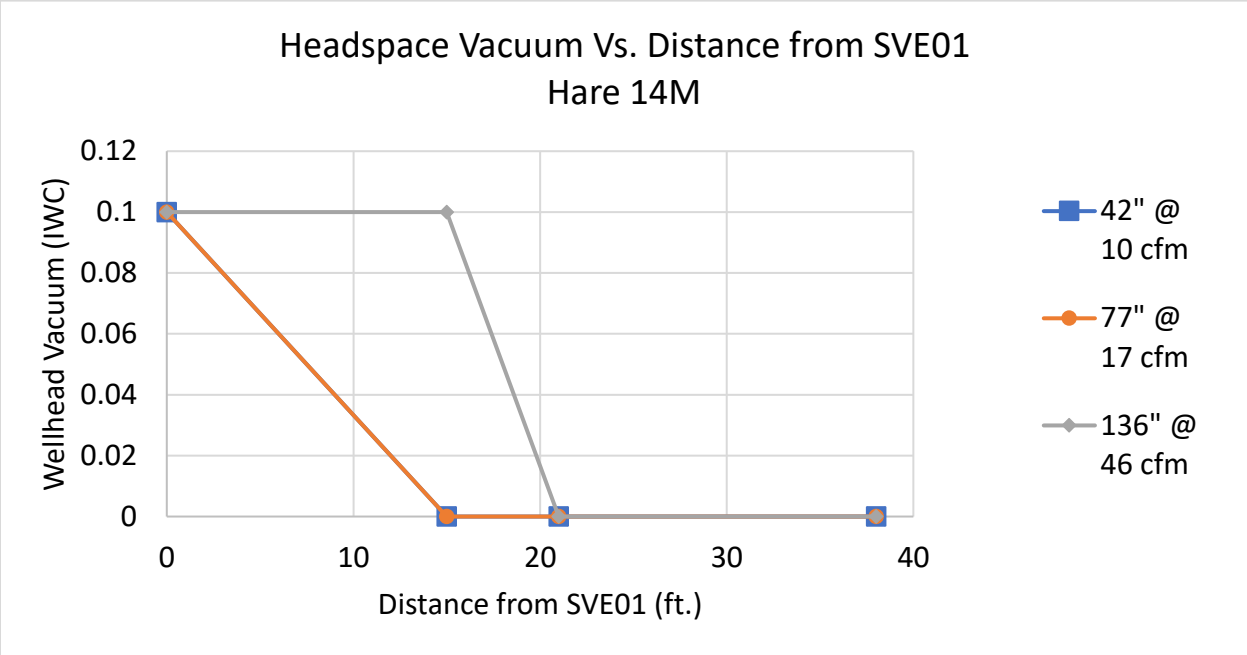
PILOT TEST PROCEDURES

SVE01, screened from 5 to 15 feet bgs in the silty sand encountered onsite, was used as the extraction well during the pilot test. A vacuum truck was used to apply a negative pressure to the pilot testing well. The existing equipment manifold was used to control the vacuum being applied and to collect flow, vacuum, and PID measurements at the extraction well. Observation wells (SVE02, SVE05, SVE07, and SVE09), having similar screened intervals, were used to collect SVE pilot test monitoring data. The SVE well locations are presented on Figures 6A and 6B. The following list summarizes the procedure of the SVE pilot test:

- Measured the distances from the extraction well to each observation well.
- Collected background VOCs measurements using a PID at the SVE and observation wells.
- Connected the vacuum truck to the extraction well via a flexible hose and manifold. Slowly opened the valve and monitored the vacuum and flow.
- Applied a low vacuum at approximately 20 inches water column (IWC). Then increasing the vacuum/flow rate until influence is observed.
- Tested several vacuums in increasing magnitude based on site response observed. Tested at least three different vacuums for the pilot test.
- Collected at least two rounds of stabilized measurements per vacuum/flow rate. Measured the vacuum and the PID headspace at the observation wells. Recorded readings approximately 15 minutes apart.
- All test forms and calculations are provided as Enclosure C.

SVE TEST RESULTS AND CONCLUSIONS

Pilot test data indicates that SVE is a viable technology to remediate the Site if equipment is sized correctly. The vacuum response from the pilot test well SVE01 and observation wells SVE02, SVE05, SVE07, and SVE09 is shown below. Observation wells ranged in distance of 0 feet to 38 feet from the SVE test well (SVE01). Vacuum influence was observed at SVE02 and SVE09 at a distance of 15 feet as shown on the figure below.



The above figure illustrates that vacuum influence was observed at a distance of 15 feet at 136 IWC at 46 standard cubic feet per minute (scfm). Vacuum response was not observed at 21 feet. Based on the vacuum observations a ROI of 15 to 20 feet can be assumed.

Additional calculations were performed to determine the ROE. These calculations are included in Enclosure C. To determine a ROE the annual pore volume exchange was calculated assuming an ROI of 20 feet at a flow rate of 46 scfm. The pore volumes calculated indicated an annual pore volume exchange of 3,207. The pore volume exchange meets literature values of at least 500 pore volume exchanges annually. To further verify that the ROE corresponds with the ROI, the pore velocity was calculated at the ROI of 20 feet. The calculated pore velocity was 88 feet per day (ft/day), which is above a recommended velocity of 3 ft/day. Current SVE research indicates that it is desirable to achieve pore-gas velocities throughout the treatment zone in excess of 0.001 cm/sec or ~3 ft/day (DiGiulo and Ravi, 1999).

A blower capable of significant vacuum is required for site remediation. Specifically, the blower chosen for the Site will need to produce at least 136 IWC of vacuum with at least 150 scfm. Based on pilot test results, a relatively high vacuum is required per well to achieve influence in the subsurface. The advantage to the high vacuum requirement is the vacuum would be significant enough to remove any PSH present in any of the SVE wells that are in operation. The blower has not been specified and will be determined based on electrical availability or electrical generation capacity available at this location. The system may also need to rotate wells in order to achieve the required pore volume exchange to remediate the Site. Vacuum applied to wells could be cycled on a monthly or quarterly basis to target different impacted areas of the Site. The need for rotating wells will be determined once the permanent system is installed at the Site.

Additionally, WSP recommends re-testing of ROI and ROE when the SVE system is installed at the Site to determine an optimal operational plan. With the new blower, WSP will test if a lower flow rate can achieve at least a 20-foot ROI and ROE over a longer time period. The ROI and ROE for the shallow and deep zones are presented on Figures 6A and 6B, respectively. Pilot test information is presented in Enclosure C.

SYSTEM INSTALLATION, STARTUP, AND MONITORING

Operation of wells SVE01, SVE02, SVE03, SVE08, and SVE09 is recommended to influence both the observed deep and shallow impacts. The other SVE wells are outside of the area of known impact and do not need to operate at this time. The cross sections provided as Figures 5A and 5B illustrate the vertical coverage of the SVE wells to influence the impact at depth. A full scale SVE system should be sized to supply a minimum of 136 IWC vacuum

and flow rate of 150 scfm. The system will be able to operate between three and five wells at a time and can be cycled as necessary between groups of wells. A general schematic of the proposed SVE system (including piping, manifold, knockout tank, vacuum blower, gauges, etc.) is presented in Enclosure D. Figures 6A and 6B present the estimated ROI/ROE for the Site based on the pilot testing performed.

Based on the measurements collected during the SVE pilot test, SVE equipment will be installed at the Site including piping, a manifold, knockout tank, and vacuum blower. After system startup, an air sample will be collected and submitted for laboratory analysis monthly for the first quarter of SVE operation, then quarterly thereafter, to monitor the effective reduction and remediation of soil impacts. Air samples will be collected quarterly submitted for analysis of volatile organic compounds (VOCs, including BTEX), TVPH, and fixed gases oxygen and carbon dioxide. WSP will submit a summary report of the first six months of operation to include analytical results and effective runtime, then quarterly reports thereafter. Quarterly reporting will document hydrocarbon mass recovery, system runtime, and air sample analysis.

OPERATIONS AND MAINTENANCE PLAN

During the operation of the SVE system, regular operation and maintenance (O&M) visits will be conducted semi-monthly (twice per month) by WSP and/or Hilcorp personnel. During O&M visits, personnel will ensure that the generator and SVE system are operating within normal working temperature, pressure, and vacuum range. System runtime will be recorded and vapor concentrations will be measured from a sampling port located on the inlet side of the blower motor using a PID. Vacuum, temperature, and flow measurements indicated on the SVE system gauges will also be recorded. An initial operational schedule for cycling operations between the wells will be established by evaluating the first quarter of system operational results. Changes to operating wells will be completed during O&M visits. Any deviations from normal operating parameters will be recorded and corrected by onsite personnel, if possible. In addition to routine O&M visits, the SVE system will be connected to Hilcorp's telemetry network. If the system experiences downtime, a Hilcorp environmental specialist will be notified via email immediately. Immediate notification will allow for quick response to maximize system runtime. An O&M form to be used during semi-monthly visits is attached in Enclosure E. A general Operations and Maintenance Manual is also attached in Enclosure E, to be used as guidance for performing O&M.

FUTURE RUN TIME CALCULATIONS AND PROPOSED REMEDIATION TIMELINE

The SVE system will be connected to on-Site power (either an electrical drop or natural gas generator) and able to run 24 hours per day. Based on 24 hours of available run time, to maintain a 90% runtime, the system will have to operate a minimum of 7,884 hours per year. Using an installed run-time meter on the SVE unit, Hilcorp will report system run time quarterly. The 90% runtime accounts for downtime related to regular maintenance of the SVE system. Downtime outside of Hilcorp's control (i.e., equipment failure) will be accounted for and the total available annual runtime hours will be adjusted. This information will be reported in the quarterly reports.

The US Army Corps of Engineers, Soil Vapor Extraction and Bioventing – Engineer Manual, dated June 3, 2002 states "Unless target cleanup goals are low or initial concentrations are very high, 1,000 to 1,500 pore volumes would be a good estimate of the required air exchanges". WSP recommends a minimum of 3,000 pore volume exchanges due to the presence of PSH in two wells at the Site. It is recommended to operate all wells at once, but the wells can be rotated if the system air flow capabilities are lower than anticipated during operation. The system will be able to achieve 3,000 pore volume exchanges over the entire site within 12 months if the system is rotated between two zones (isolating shallow and deep zones). With the presence of PSH, a conservative estimate of 12 to 24 months is estimated due to high TPH concentrations and potential operational constraints (i.e., equipment sizing). WSP will also assess air concentrations of TVPH from the system and if these become asymptotic before the anticipated closure date, then sampling will commence per the schedule below. The SVE system will remain at the Site full time until remediation is complete.

Based on the above assumptions, WSP anticipates that the system will operate at the Site for approximately one to two years to remediate soils impacted by TPH to below NMOCD Table 1 Closure Criteria. As air samples are collected, Hilcorp may present an updated remediation timeline after four quarters of monitoring and sampling of the system. However, the following general timeline is proposed with day 0 being the day this document is approved

by the NMOCD. Additionally, quarterly reporting will be conducted to keep the NMOCD informed on major site advancements and SVE system operations.

- Months 0 to 3 – System acquisition and installation;
- Months 4, 5, and 6 – Air sample collection monthly, perform system maintenance, and optimize system operation, as necessary;
- Month 6 through Year 1 – Semi-monthly O&M visits, quarterly air sample collection to monitor system efficacy, and quarterly system monitoring. Quarterly reporting;
- Years 1 to 1.5 – Assess system performance and collect quarterly air samples to assess system efficacy. Update remediation timeline based on quarterly sampling analytical results after one year of operation. At any point, if air concentrations of TVPH collected from the system become asymptotic and/or are below 1.0 milligrams per liter (mg/L), soil samples will be collected as described below to determine if concentrations are below NMOCD Table 1 Closure Criteria. If soil concentrations are above Closure Criteria, the system will be adjusted to maximize performance and address areas with remaining soil impacts. Continue quarterly air sample collection, monitoring, and reporting as necessary;
- Year 2 – Soil confirmation sampling. Prepare request for site closure if soil sample results are below NMOCD Table 1 Closure Criteria. If soil concentrations are above Closure Criteria, the system will be adjusted to maximize performance and address areas with remaining soil impacts. Continue quarterly air sample collection, monitoring, and reporting as necessary.

ONGOING PSH MONITORING AND RECOVERY

During SVE system operation, wells SVE03 and SVE08 will be monitored at least monthly for the presence of PSH. If present during O&M visits, recoverable volumes of PSH will be manually removed using a disposable bailer. The presence and volume removed over time will also be used to assess the SVE system performance.

CONFIRMATION SOIL SAMPLING

When a significant decline in air sample concentrations is observed, indicating sufficient mass source removal (air concentrations of TVPH collected from the system become asymptotic and/or are below 1.0 milligrams per liter), at least four borings will be advanced via hollow-stem auger drill rig in the vicinity of borings BH01, BH02, and BH06. Soil samples will be collected at 5-foot intervals from the ground surface to a depth of 40 feet bgs and submitted for TPH and BTEX. If the soil samples indicate hydrocarbon impacts have been reduced to below Table 1 Closure Criteria, WSP will present the confirmation laboratory analysis data in a report and request closure of the release. Should the results indicate that analytes in the soil exceed Table 1 Closure Criteria, WSP will continue to operate the system and make operational adjustments based on results of the sampling.

REFERENCES

DiGiulio, D., Ravi, V., & Brusseau, M., 1999. Evaluation of mass flux to and from ground water using a vertical flux model (VFLUX): application to the soil vacuum extraction closure problem. Ground water monitoring & remediation, 19, 96-104. doi: 10.1111/j.1745-6592.1999.tb00210.x

United States Army Corps of Engineers (USACE), 2002. Engineering and Design, Soil Vapor Extraction and Bioventing - Engineer Manual, Document EM 1110-1-4001. June 3.

If you have any questions or comments, please do not hesitate to contact Mr. Stuart Hyde at stuart.hyde@wsp.com, or at (970) 385-1096, or Kate Kaufman at kkaufman@hilcorp.com or at (346) 237-2275.

Kind regards,

Stuart Hyde, L.G.
Senior Geologist

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

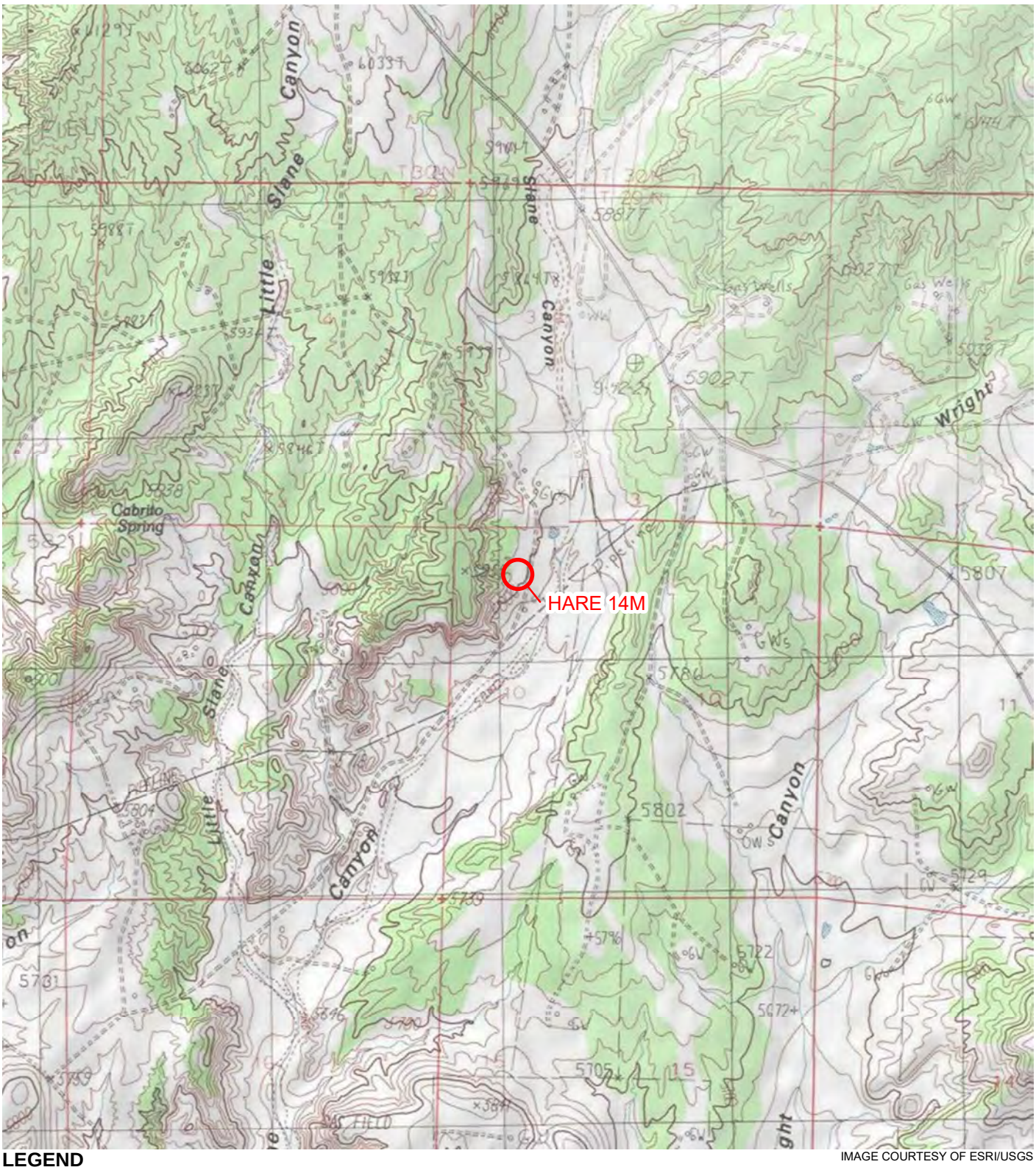
Robert Rebel, P.E.
Technical Principal, Lead Consultant

cc: Kate Kaufman, Hilcorp Energy Company

Enclosures

Figure 1:	Site Location Map
Figure 2:	Site Receptor Map
Figure 3:	Proximity to Watercourse, Lakebed, Sinkhole, or Playa Lake
Figure 4:	Soil Analytical Results
Figure 5A:	A to A' Cross Section
Figure 5B:	B to B' Cross Section
Figure 6A:	Shallow Zone Radius of Effect
Figure 6B:	Deep Zone Radius of Effect
Table 1:	Soil Analytical Results
Table 2:	PSH Recovery Summary
Table 3:	SVE Well Construction Information
Enclosure A:	Boring Logs
Enclosure B:	Laboratory Analytical Reports
Enclosure C:	Pilot Test Data
Enclosure D:	SVE System Diagram
Enclosure E:	SVE O&M Forms and Operations and Maintenance Manual

FIGURES



LEGEND

SITE LOCATION

IMAGE COURTESY OF ESRI/USGS

0 2,000 4,000

Feet

N

NEW MEXICO

FIGURE 1
SITE LOCATION MAP
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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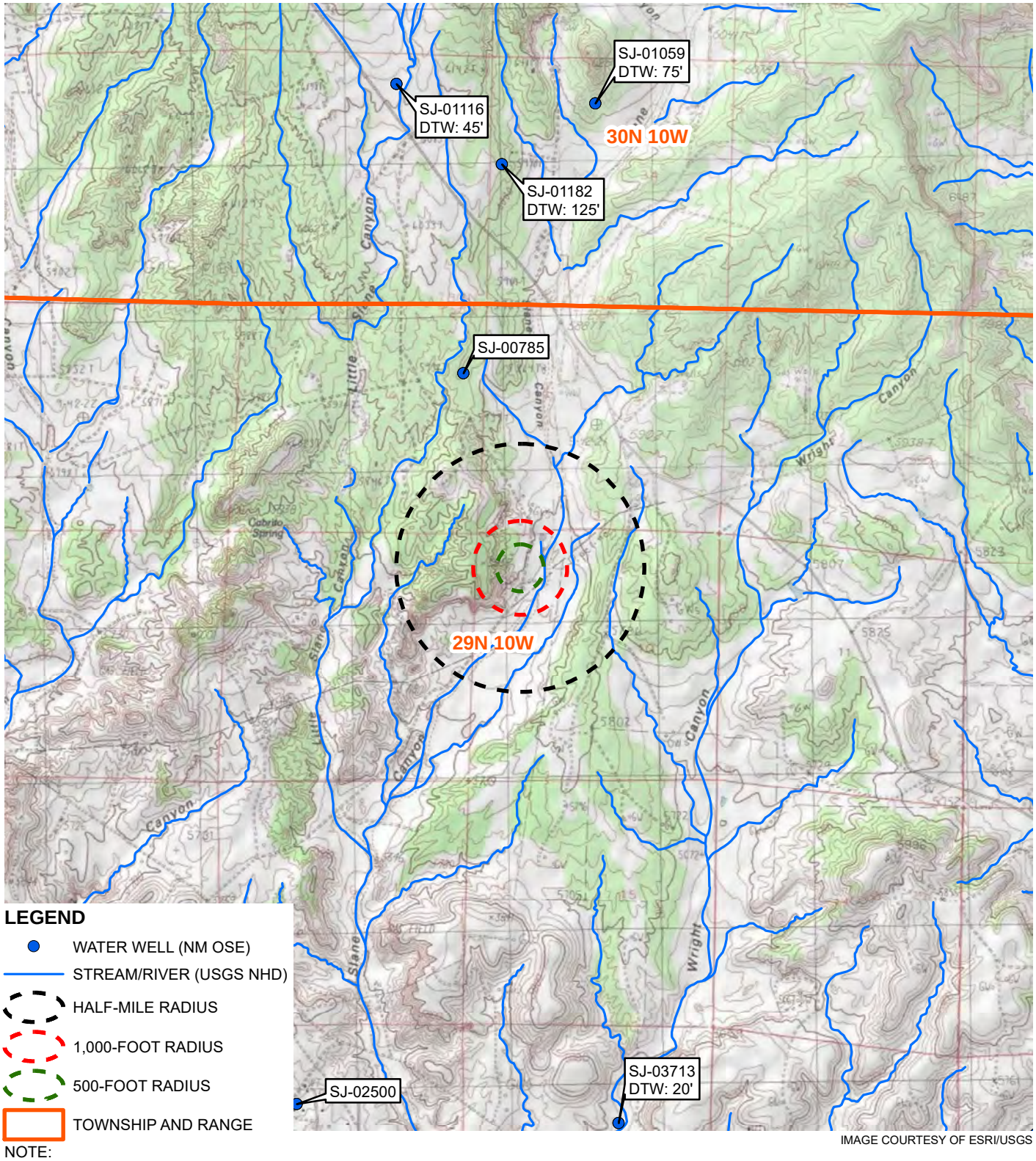


LEGEND

- WATER WELL (NM OSE)
- STREAM/RIVER (USGS NHD)
- HALF-MILE RADIUS
- 1,000-FOOT RADIUS
- 500-FOOT RADIUS
- TOWNSHIP AND RANGE

IMAGE COURTESY OF ESRI/USGS

NOTE:
ACCORDING TO 19.15.2 NMAC, A WELLHEAD PROTECTION AREA CONSISTS OF THE AREA WITHIN 200 HORIZONTAL FEET OF A PRIVATE, DOMESTIC FRESH WATER WELL OR SPRING USED BY <5 HOUSEHOLDS FOR DOMESTIC OR STOCK WATERING PURPOSE, OR WITHIN 1,000 HORIZONTAL FEET OF ANY OTHER FRESH WATER WELL OR SPRING. NO USGS WELLS IN AREA PER NWIS.

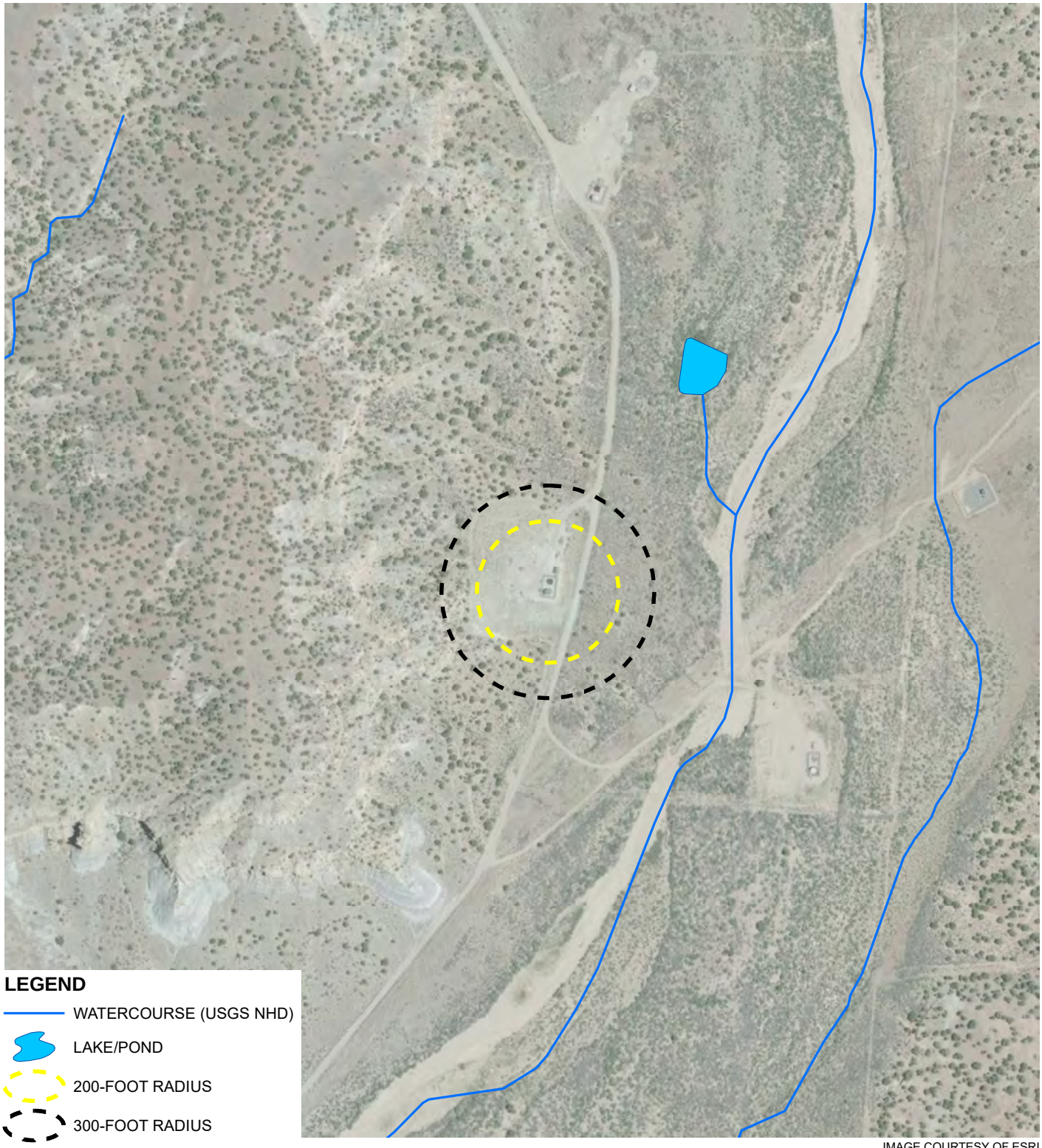
DTW: DEPTH TO WATER
ELEV: APPROXIMATE ELEVATION IN FEET ABOVE MEAN SEA LEVEL
NM OSE: NEW MEXICO OFFICE OF THE STATE ENGINEER
': FEET

0 3,000 6,000
Feet

N

FIGURE 2
SITE RECEPTOR MAP
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017820017_HARE 14M\017820017_FIG02_HARE14M_HYDRO_REC_2020.mxd



LEGEND

- WATERCOURSE (USGS NHD)
- LAKE/POND
- 200-FOOT RADIUS
- 300-FOOT RADIUS

IMAGE COURTESY OF ESRI

NOTE:
ACCORDING TO 19.15.2 NMAC A WATERCOURSE MEANS A RIVER, CREEK, ARROYO, CANYON, DRAW, OR WASH OR OTHER CHANNEL HAVING DEFINITE BANKS AND BED WITH VISIBLE EVIDENCE OF OCCASIONAL FLOW OF WATER.

THERE ARE NO SINKHOLES, LAKEBEDS OR PLAYA LAKES WITHIN THE BOUNDARIES OF THIS MAP USING MAPPED DATA FROM THE USFS NWI AND USGS.

NHD: NATIONAL HYDROGRAPHY DATASET
NMAC: NEW MEXICO ADMINISTRATIVE CODE
NM OSE: NEW MEXICO OFFICE OF THE STATE ENGINEER
USGS: UNITED STATES GEOLOGICAL SURVEY

0 400 800
Feet

N

FIGURE 3
PROXIMITY TO WATERCOURSE, LAKEBED, SINKHOLE, OR PLAYA LAKE
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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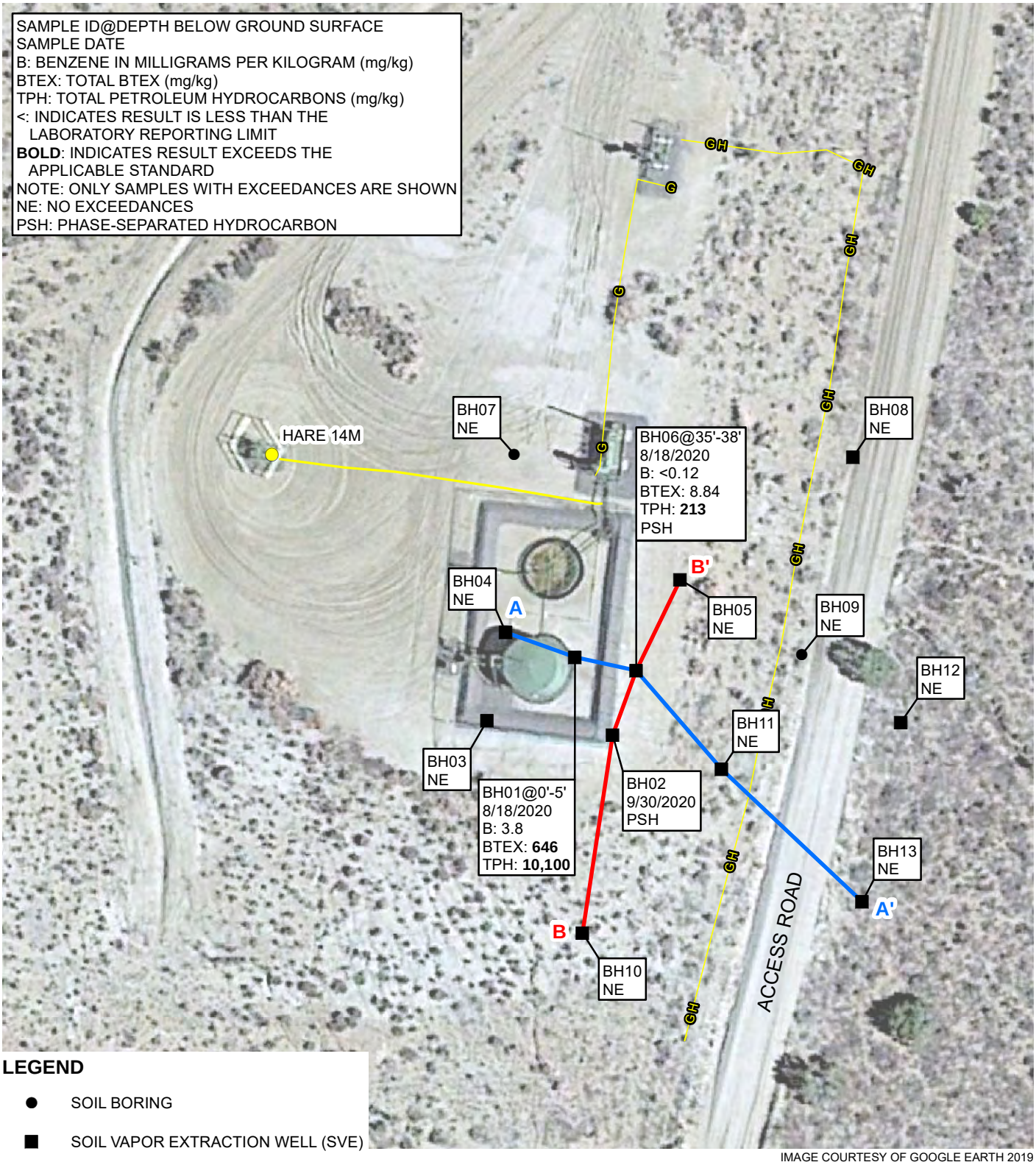

FIGURE 4
SOIL ANALYTICAL RESULTS
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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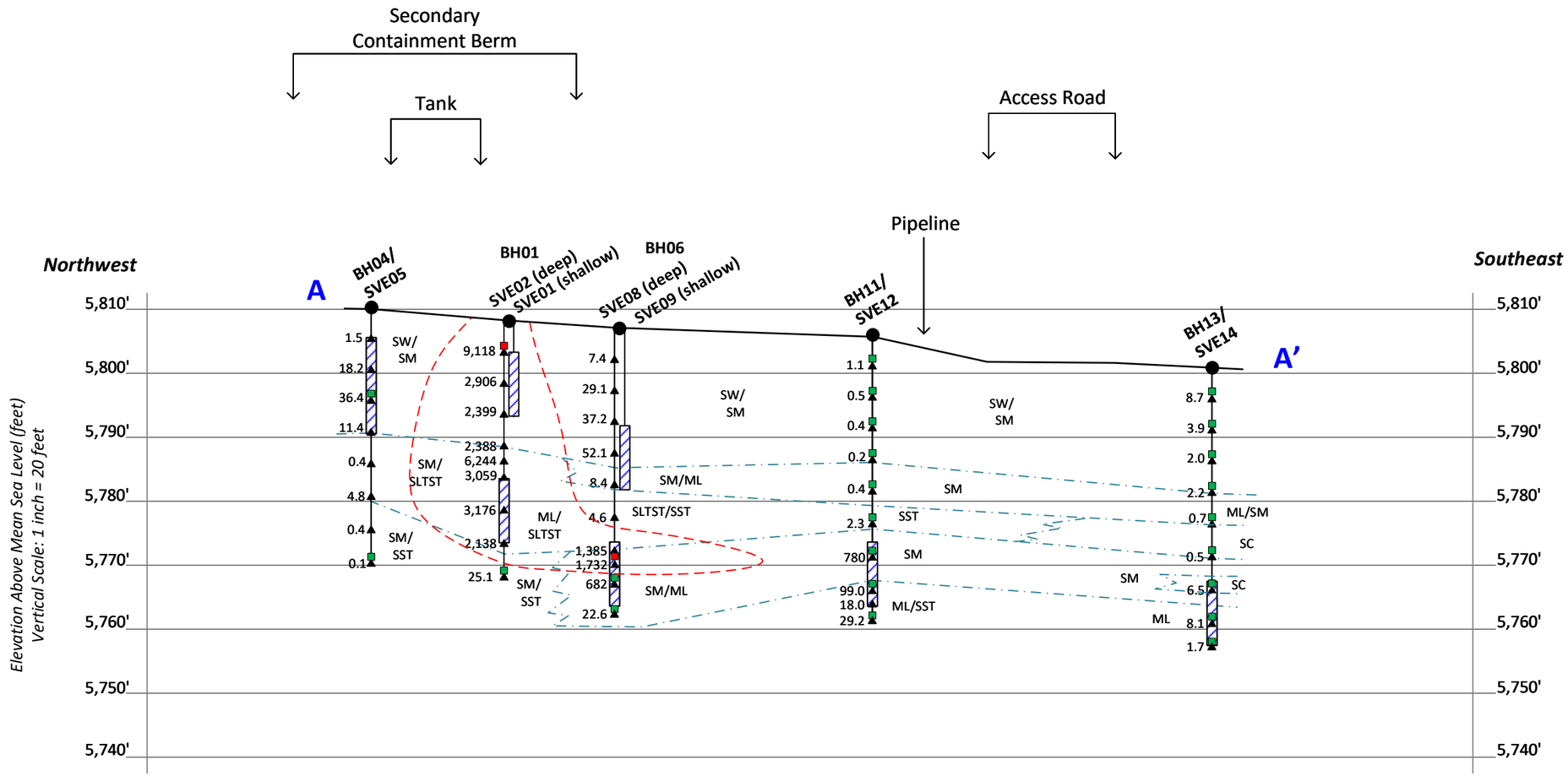


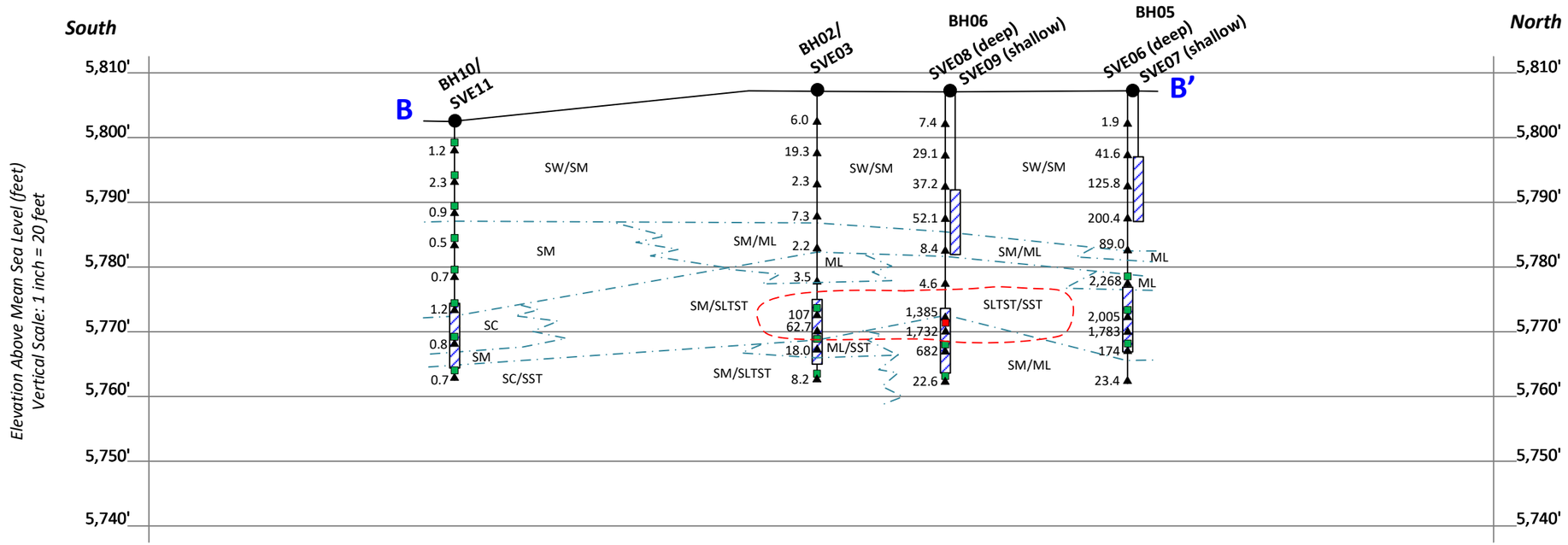
LEGEND

ML	SILT
SC	CLAYEY SAND
SLTST	SILTSTONE
SM	SILTY SAND
SW	POORLY SORTED SAND
SST	SANDSTONE

- APPROXIMATE RELEASE EXTENT
- LITHOLOGIC CONTACT
- SOIL ANALYTICAL RESULTS BELOW NMOCD CLOSURE CRITERIA
- SOIL ANALYTICAL RESULTS EXCEED NMOCD CLOSURE CRITERIA
- PHOTOIONIZATION DETECTOR FIELD-SCREEN MEASUREMENTS, RESULTS LISTED IN PARTS PER MILLION (PPM)
- SVE WELL SCREEN INTERVAL

0 ft. 12 ft. 20 ft. 40 ft.

FIGURE 5A
A TO A' CROSS SECTION
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



LEGEND

ML	SILT
SC	CLAYEY SAND
SLTST	SILTSTONE
SM	SILTY SAND
SW	POORLY SORTED SAND
SST	SANDSTONE

- APPROXIMATE RELEASE EXTENT
- LITHOLOGIC CONTACT
- SOIL ANALYTICAL RESULTS BELOW NMOCD CLOSURE CRITERIA
- SOIL ANALYTICAL RESULTS EXCEED NMOCD CLOSURE CRITERIA
- PHOTOIONIZATION DETECTOR FIELD-SCREEN MEASUREMENTS, RESULTS LISTED IN PARTS PER MILLION (PPM)
- SVE WELL SCREEN INTERVAL

0 ft. 12 ft. 20 ft. 40 ft.

FIGURE 5B
B TO B' CROSS SECTION
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

LEGEND

- SOIL BORING
- SOIL VAPOR EXTRACTION WELL (SVE)
- WELLHEAD
- FLOWLINE
- GAS LINE
- HARVEST MIDSTREAM GAS LINE
- SHALLOW ZONE RADIUS OF EFFECT

IMAGE COURTESY OF GOOGLE EARTH 2019

0 40 80
Feet

N

FIGURE 6A
SHALLOW ZONE RADIUS OF EFFECT
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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IMAGE COURTESY OF GOOGLE EARTH 2019

LEGEND

- SOIL BORING
- SOIL VAPOR EXTRACTION WELL (SVE)
- WELLHEAD
- FLOWLINE
- GAS LINE
- HARVEST MIDSTREAM GAS LINE
- DEEP ZONE RADIUS OF EFFECT

0 40 80
Feet

N

FIGURE 6B
DEEP ZONE RADIUS OF EFFECT
HARE 14M
LOT 4 SEC 10-T29N-R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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TABLES

TABLE 1
SOIL ANALYTICAL RESULTS

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Soil Sample Identification	Sample Date	PID Reading (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
NMOCD Table 1 Closure Criteria		NE	**10**	NE	NE	NE	**50**	**600**	NE	NE	NE	**100**
BH01@0'-5'	8/18/2020	9,118	3.8	120	33	490	**647**	<60	8,600	1,500	<500	**10,100**
BH01@38'-40'	8/18/2020	25.1	<0.025	0.10	<0.050	0.16	0.26	<60	<5.0	<9.7	<49	<49
BH02@30'-35'	8/18/2020	107	<0.019	0.054	<0.039	0.096	0.150	<59	<3.9	<9.0	<45	<45
BH02@38'-40'	8/18/2020	46.1	<0.018	<0.036	<0.036	<0.073	<0.073	<59	<3.6	<9.9	<49	<49
BH02@40'-45'	8/18/2020	8.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH03@5'-10'	8/19/2020	47.3	<0.025	<0.049	<0.049	<0.099	<0.099	<59	<4.9	<9.0	<45	<45
BH03@35'-40'	8/19/2020	0.3	<0.025	<0.050	<0.050	<0.10	<0.10	<60	<5.0	<9.8	<49	<49
BH04@10'-15'	8/19/2020	36.4	<0.025	<0.049	<0.049	<0.099	<0.099	<60	<4.9	<9.4	<47	<47
BH04@35'-40'	8/19/2020	0.1	<0.025	<0.050	<0.050	<0.099	<0.099	<59	<5.0	<9.0	<45	<45
BH05@25'-30'	8/19/2020	2,268	<0.025	0.061	<0.049	0.36	0.421	<60	14	<9.6	<48	14
BH05@38'-40'	8/19/2020	174	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<9.7	<49	<49
BH05@40'-45'	8/19/2020	23.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH06@35'-38'	8/19/2020	1,732	<0.12	0.68	0.56	7.6	8.84	<60	130	83	<44	**213**
BH06@38'-40'	8/19/2020	682	<0.025	0.073	<0.049	0.2	0.273	<60	<4.9	10	<49	10
BH06@40'-45'	8/19/2020	22.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH07@15'-20'	8/20/2020	7.8	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<9.5	<47	<47
BH07@35'-40'	8/20/2020	0.3	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<9.9	<49	<49
BH08@35'-40'	8/20/2020	141.2	<0.024	0.14	<0.049	0.48	0.62	<59	12	<9.3	<47	12
BH08@40'-45'	8/20/2020	38.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH09@30'-35'	8/20/2020	0.0	<0.025	<0.049	<0.049	<0.099	<0.099	<60	<4.9	<9.4	<47	<47
BH09@35'-40'	8/20/2020	0.0	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<9.4	<47	<47
BH10@0'-5'	9/14/2021	1.2	<0.024	<0.049	<0.049	<0.098	<0.098	<59	<4.9	<9.7	<48	<48
BH10@5'-10'	9/14/2021	2.0	<0.024	<0.049	<0.049	<0.097	<0.097	<60	<4.9	<9.7	<48	<48
BH10@10'-15'	9/14/2021	0.9	<0.025	<0.049	<0.049	<0.099	<0.099	72	<4.9	<9.7	<48	<48
BH10@15'-20'	9/14/2021	0.5	<0.025	<0.049	<0.049	<0.098	<0.098	<60	<4.9	<10	<50	<50
BH10@20'-25'	9/14/2021	0.7	<0.025	<0.049	<0.049	<0.098	<0.098	<59	<4.9	<8.5	<42	<42
BH10@25'-30'	9/14/2021	1.2	<0.024	<0.048	<0.048	<0.097	<0.097	<60	<4.8	<9.2	<46	<46
BH10@30'-35'	9/14/2021	0.8	<0.025	<0.049	<0.049	<0.099	<0.099	<61	<4.9	<9.6	<48	<48
BH10@35'-40'	9/14/2021	0.7	<0.00025	<0.00049	<0.00049	<0.00099	<0.00099	<60	<0.049	<9.7	<48	<48

TABLE 1
SOIL ANALYTICAL RESULTS

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Soil Sample Identification	Sample Date	PID Reading (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	MRO (mg/kg)	TPH (mg/kg)
BH11@0'-5'	9/14/2021	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH11@5'-10'	9/14/2021	0.5	<0.025	<0.049	<0.049	<0.098	<0.098	<59	<4.9	<9.6	<48	<48
BH11@10'-15'	9/14/2021	0.4	<0.024	<0.049	<0.049	<0.097	<0.097	88	<4.9	<9.7	<48	<48
BH11@15'-20'	9/14/2021	0.2	<0.024	<0.048	<0.048	<0.096	<0.096	61	<4.8	<9.8	<49	<49
BH11@20'-25'	9/14/2021	0.4	<0.025	<0.050	<0.050	<0.099	<0.099	68	<5.0	<9.6	<48	<48
BH11@25'-30'	9/14/2021	2.3	<0.024	<0.048	<0.048	<0.097	<0.097	73	<4.8	<9.3	<46	<46
BH11@30'-35'	9/14/2021	780.0	0.052	0.750	0.260	3.200	4.262	<60	49	16	<47	65
BH11@35'-40'	9/14/2021	99.0	<0.024	0.078	<0.049	0.270	0.348	<59	<4.9	<9.8	<49	<49
BH11@40'-42'	9/14/2021	18.0	<0.017	<0.034	<0.034	<0.067	<0.067	<60	<3.4	<9.9	<50	<50
BH12@0'-5'	9/15/2021	0.8	<0.023	<0.046	<0.046	<0.092	<0.092	<60	<4.6	<9.4	<47	<47
BH12@5'-10'	9/15/2021	0.0	<0.023	<0.047	<0.047	<0.093	<0.093	<60	<4.7	<9.3	<47	<47
BH12@10'-15'	9/15/2021	0.0	<0.024	<0.047	<0.047	<0.094	<0.094	<60	<4.7	<9.3	<46	<46
BH12@15'-20'	9/15/2021	0.0	<0.024	<0.049	<0.049	<0.097	<0.097	<60	<4.9	<9.6	<48	<48
BH12@20'-25'	9/15/2021	0.0	<0.024	<0.048	<0.048	<0.097	<0.097	<60	<4.8	<9.4	<47	<47
BH12@25'-30'	9/15/2021	0.0	<0.024	<0.048	<0.048	<0.097	<0.097	70	<4.8	<9.7	<48	<48
BH12@30'-35'	9/15/2021	96.0	<0.023	<0.046	<0.046	<0.092	<0.092	<61	<4.6	<9.1	<46	<46
BH12@35'-40'	9/15/2021	109.0	<0.024	<0.048	<0.048	<0.095	<0.095	<60	<4.8	<9.0	<45	<45
BH12@40'-43'	9/15/2021	32.0	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<8.9	<44	<44
BH13@0'-5'	9/15/2021	8.7	<0.024	<0.048	<0.048	<0.097	<0.097	<60	<4.8	<10	<50	<50
BH13@5'-10'	9/15/2021	3.9	<0.023	<0.047	<0.047	<0.093	<0.093	<60	<4.7	<9.5	<48	<48
BH13@10'-15'	9/15/2021	2.0	<0.024	<0.049	<0.049	<0.097	<0.097	64	<4.9	<9.4	<47	<47
BH13@15'-20'	9/15/2021	2.2	<0.024	<0.047	<0.047	<0.095	<0.095	68	<4.7	<9.5	<47	<47
BH13@20'-25'	9/15/2021	0.7	<0.025	<0.050	<0.050	<0.10	<0.10	<60	<5.0	<9.1	<45	<45
BH13@25'-30'	9/15/2021	0.5	<0.025	<0.049	<0.049	<0.099	<0.099	<59	<4.9	<8.8	<44	<44
BH13@30'-35'	9/15/2021	6.5	<0.024	<0.048	<0.048	<0.096	<0.096	<59	<4.8	<9.2	<46	<46
BH13@35'-40'	9/15/2021	8.1	<0.025	<0.050	<0.050	<0.10	<0.10	<60	<5.0	<9.8	<49	<49
BH13@40'-44'	9/15/2021	1.7	<0.025	<0.050	<0.050	<0.10	<0.10	<60	<5.0	<9.8	<49	<49

NOTES:

BTEX - benzene, toluene, ethylbenzene, and total xylenes analyzed by US EPA Method 8021B
DRO - diesel range organics analyzed by US EPA Method 8015D
GRO - gasoline range organics analyzed by US EPA Method 8015D
mg/kg - milligrams per kilogram
MRO - motor oil range organics analyzed by US EPA method 8015D
NA - not analyzed
NE - not established
NMOCD - New Mexico Oil Conservation Division
PID - photo-ionization detector
ppm - parts per million
TPH - total petroleum hydrocarbon (sum of GRO, DRO, and MRO)
< - indicates result is less than the stated laboratory reporting limit
Bold - indicates value exceeds stated NMOCD Closure Criteria

TABLE 2
PSH RECOVERY SUMMARY

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Boring/Well Number	Date	Product Thickness (feet)	Product Recovered (gallons)
BH02 / SVE03	9/30/2020	1.20	3.50
	10/2/2020	1.24	0.25
	7/16/2021	3.35	3.00
	7/30/2021	NM	0.125
	9/2/2021	1.01	1.50
	11/12/2021	0.21	0.50
	11/24/2021	0.17	0.50
	12/8/2021	0.07	0.50
BH06 / SVE08	9/30/2020	7.33	5.00
	10/2/2020	3.06	1.25
	7/16/2021	3.91	4.00
	7/30/2021	NM	1.50
	9/2/2021	1.92	2.30
	11/12/2021	3.13	1.25
	11/24/2021	3.05	1.25
	12/8/2021	1.88	2.00
	Total Recovered (gallons)		**28.425**

Notes:
NM - not measured

TABLE 3
SVE WELL CONSTRUCTION INFORMATION

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Boring/Well Name	Impacted Depth (bgs)	SVE Well Screened Interval (bgs)	Total Well Depth (BTOC)
BH01 / SVE01	0'-38'	5'-15'	17.01'
BH01 / SVE02	0'-38'	25'-35'	37.25'
BH02 / SVE03	30'-40'	30'-40'	42.63'
BH03 / SVE04	ND	7.5'-17.5'	19.30'
BH04 / SVE05	ND	5'-20'	22.05'
BH05 / SVE06	ND	30'-40'	42.22'
BH05 / SVE07	ND	10'-20'	22.33'
BH06 / SVE08	30'-40'	33'-43'	45.30'
BH06 / SVE09	15'-20'	15'-25'	27.25'
BH07	ND	---	---
BH08 / SVE10	ND	35'-40'	42.65'
BH09	ND	---	---
BH10 / SVE11	ND	28' - 38'	40'
BH11 / SVE12	ND	32' - 42'	45'
BH12 / SVE13	ND	32' - 42'	43'
BH13 / SVE14	ND	33' - 43'	44'

NOTES:

bgs - below ground surface
BTOC - below top of casing
ND - impacts above Table 1 Closure Criteria not detected
' - feet

ENCLOSURE A – BORING LOGS

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH01		Project: Hare 14M	
Date: 8-18-20		Project Number: 017820017	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 36'-24', 16'-4'		Seal: Bentonite 24'-22', 18'-16', 4-0'	Grout: Bentonite
Casing Type: Schedule 40 PVC 25'-stickup; 5'-stickup		Diameter: 2" Length: 25+,5+	Hole Diameter: 7" Depth to Liquid:
Screen Type: Schedule 40 PVC 5-15' 25-35' Slot: 0.010"		Diameter: 2" Length: 10'; 10'	Total Depth: 40' 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					SHALLOW DEEP
					1					
				BH01 @ 0'-5'	2					
	SL. Moist.	9,118	Mod. yes	0820	3			SW-SM	Brown. med. - ~~fn-m~~ med. fn. sand w/ silt. well graded. Mod. stain/odor. HC, gassy.	
					4					
					5					
					6					
					7				SAA,	
					8			SW-SM	Brown. fn-med. sand w/ silt. well gr. Mod s/o.	
	Dry	2,906	yes Mod.		9					
					10					
					11					
					12					
					13			SW-SM	SAA. Mod. s/o.	
	Dry	2,399	yes Mod.		14					
					15					

Advancing Opportunity

Boring/Well #	BH01
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	1,395	yes SL.		15–19			SW-SM	SAA. Brown med. sand w/ silt mod. s/o	
	Dry	2,388	NO		20			SM/ML	Gray & maroon mix of sandy silt & silty sand. No slightly dense. Mod. odor. Stain	
	Dry	6,244	NO		21–22			ML	Gray silt stone w/ sand. some lenses fully cemented. Mod. odor. No stain	
									Refusal, trying to continue advancing HSA w/o continuous sampler at bottom of string.	
	Dry	3,059	No.		23–25			ML	Gray w/ maroon sandy silt. fissile, No stain, mod. odor.	
	Dry	3,176	No		26–30			ML	Gray sandy silt. some cemented lenses, other mostly fissile. No stain, mod. odor.	
	Dry	2,138	No		31–35			SM/ML	Gray silty sand and sandy silt lenses interbed some cementation. fissile others. No stain. Mod odor.	
	Dry	121	No.		36–37			ML	SAA. No stain/sl ~~str~~ odor.	

LTE Advancing Opportunity

Boring/Well #	BH01
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38				Dark gray silty sandstone. Mostly cemented. No stain/odor.	
	Dry	25.1	No	BH01 @ 38'-40' 10:40	39			SM/12		
					40					
					41					
					42					
					43					
					44					
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

Advancing Opportunity
848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH02		Project: Hare 14M	
Date: 8-18-20		Project Number: 017820017	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 39'-22'		Seal: Bentonite 22'-20'	Grout: Bentonite 20'-0'
Casing Type: Schedule 40 PVC 23'-S.U.		Diameter: 2" Length: 25'	Hole Diameter: 7" Depth to Liquid: —
Screen Type: Schedule 40 PVC 38'-23' Slot: 0.010"		Diameter: 2" Length: 15'	Total Depth: 45' 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			SW-SM	Brown med sand w/ silt. well gr.	
					2					
					3					
	SL Moist	6.0	No		4				No stain/odor	
					5					
					6					
					7					
	Dry	19.3	No		8			SW-SM	SAA.	
					9				No s/o	
					10					
					11					
					12					
					13			SW-SM	SAA.	
	Dry	2.3	No		14				Brown med sand w/ silt	
					15				No s/o	

Advancing Opportunity

Boring/Well #	BH02
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	7.3	No		15–20			SW-SM	Lt. Brown fn-med sand w/ silt. Well graded. No stain/odor.	
	Dry	2.2	No		21–25			SM + ML	Lt gray + Lt. maroon sandy silt and silty sand mix. slightly dense, but fissile. No stain/odor	
	Dry	3.5	No		26–30			ML	Gray sandy silt. cemented throughout some fissile No stain/odor	
	Dry	107	No	BH02 @ 30'-35' 1230	31–35			SM/ML SM	-Lt. maroon silty stone w/ sand -Lt gray sandy siltstone -gray silty sandstone, v. fn, slight odor, no stain	
	Dry	62.7	No		36–37			ML	Lt. gray sandy silt, silt stone. w/ cement No stain, slt. odor	

Advancing Opportunity

Boring/Well #	BH02
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38					
				BH02 @ 38-40 1300	39			SM/ ML	Gray silty sandstone. cemented. No stain, v. slt. odor	
	Dry	46.1	No		40					backfill/ slough
					41					
					42					
				BH 02 @ 40 -45 1330	43			SM/ ML	Gray & dark gray silty sand, fissile, & sandy siltstone. No stain/odor.	
	Dry	8.2	No		44					
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH03	Project: Hare 14M
Date: 8-18-20	Project Number: 017820017
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,815	Detector: PID
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 18-6.5'	Seal: Bentonite 6.5-4.5'
Grout: Bentonite 4.5-0'	
Casing Type: Schedule 40 PVC 7.5-5.4.	Diameter: 2" Length:
Hole Diameter: 7"	Depth to Liquid:
Screen Type: Schedule 40 PVC 17.5-7.5 Slot: 0.010"	Diameter: 2" Length: 10'
Total Depth: 40'	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					
					2			SW	Brown medium sand w/ silt. well gr. No stain/odor.	
	Dry	3.7	No		3			SM		
					4					
					5					
					6					
				BH 03	7					
	Dry	47.3	No	@ 5-10'	8			SW	Lt. Brown med sand w/ silt No s/o	
				14:40	9			SM		
					10					
					11				Lt. Brown. med-med coarse sand w/ silt. well graded. No s/o	
					12			SW		
	Dry	26.1	No		13			SM		
					14					
					15					

Advancing Opportunity

Boring/Well #	BH03
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16			SW SM	SAA. Brown med sand w/ silt. No s/o	
					17					
	Dry	12.2	No		18			SM	Lt. gray to maroon sandy silt. Fissile No s/o	
					19			ML		
					20					backfill w/ cuttings
					21					
					22			SM	Lt. gray dense silty sandstone,	
	Dry	1.8	No		23					
					24			ML	Maroon sandy siltstone, some cementation, but fissile. No stain/odor.	
					25					
					26					
					27				Lt. gray sandy silt	
	Dry	0.9	No		28			ML	& gray silt stone, mostly cemented.	
					29				No stain/odor	
					30					
					31					
					32					
	Dry	0.7	No		33			SM	Gray silty fn-med fn sandstone. Slt. cement. some fissile. No s/o	
					34					
					35					
					36			SM ML	Gray sandy siltstn. No s/o	
	Dry		No		37					

Advancing Opportunity

Boring/Well #	BH03
Project:	Hare 14M
Project #	017820017
Date	8-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.3	No	BH03 @ 35'-40' 15:30	37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59			S/M	Gray silty sandstone + sandy siltstn No s/o.	backfill

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH04		Project: Hare 14M	
Date: 8-19-20		Project Number: 017820017	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 20'-4'		Seal: Bentonite 4'-0'	Grout: Bentonite
Casing Type: Schedule 40 PVC 5'-S.U.		Diameter: 2" Length:	Hole Diameter: 7u Depth to Liquid:
Screen Type: Schedule 40 PVC 20-5' Slot: 0.010"		Diameter: 2" Length: 15'	Total Depth: 40' 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					
					2					
					3			SW	Brown, med sand w/ silt.	
	SL. Moist	8.1	No		4			SM	well graded.	
					5				No stain/odor.	
					6					
					7					
					8					
					9			SW	SAA.	
	SL. Moist	18.2	No		10			-SM	No stain/odor.	
					11					
				BH 04 @	12				SAA	
					13				Brown med sand w/silt.	
	Dry	36.4	No	10'-15'	14			SW-SM	No S/O.	
				0840	15					

Advancing Opportunity

Boring/Well #	BH04
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16			SW-	SAA.	
	Sl. Moist				17			SM	No s/o	
		11.4	No		18					
					19				Gray & maroon silty fn. sand.	
	Dry				20			SM	Dense but fissile. No s/o	
					21				SAA.	
					22			SM	Silty fn sand, some cementation	
					23			/ML	No s/o.	
	Dry	0.4	No		24				Gray, some maroon sandy	
					25				siltstone, dense, cemented. No s/o.	
					26					
					27				Lt. gray & gray	
					28			SM/ML	sandy silt & cemented	
	Dry	4.8	No		29				siltstone w/ v. fn.	
					30				sand. No s/o	
					31				fissile in places.	
					32					
		0.4			33			SM	Gray silty fn. sand	
	Dry		No		34				& sandstone. w/ cement.	
					35				silty fissile. No s/o	
					36			SM	SAA. No s/o	
	Dry		No		37					

backfill w/ cuttings

Advancing Opportunity

Boring/Well #	BH04
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.1	No	BH04 @ 35-40 0920	37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59			SM ML	Gray silty sandstone, & sandy silt. No S/O	Bentonite

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH05	Project: Hare 14M
Date: 8-19-20	Project Number: 017820017
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Elevation: 5,815	Detector: PID
Gravel Pack: 10-20 Silica Sand 40'-29' + 21'-9'	Seal: Bentonite 29'-27' + 23'-21'
Casing Type: Schedule 40 PVC 30'-S.U. 10'-S.U.	Diameter: 2" Length: +9-7'
Screen Type: Schedule 40 PVC 40'-30' & 20'-10' Slot: 0.010"	Diameter: 2" Length: 10'
Grout: Bentonite 7'-0'	Hole Diameter: 7" Depth to Liquid: —
	Total Depth: 45' Depth to Water: —

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks
	Sl. Moist	1.9	NO		0–5			SW SM	Brown, med. sand w/ silt. well graded. No stain/odor
	Dry	41.6	No		8–10			SW -SM	SAA. Lt. Brown fn-med. sand w/ silt. No s/o
	Dry	125.8	No		13–14			SW -SM	SAA. Lt. Brown slight gassy odor, no stain

Deep / Shallow Well Completion

Advancing Opportunity

Boring/Well #	BH05
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17			SW -SM	Lt. Brown medium sand w/ silt. Well graded.	
	Dry	200.4	No		18				No stain, slight gassy odor	
					19					
				1030	20					
					21					
	Dry		No		22			SW -SM	SAA. No s/o silty sand.	
	Dry	89.0			23					
					24			ML	Lt-gray & maroon silt w/sand No s/o	Cuttings
			NO		25					
				BH 05 @ 25'-30'	26			SM/ ML	Gray silty sand, med. well graded. No stain. Mod. odor.	
	Dry		No		27					
		2268			28				Gray-dark gray sand silt Some cementation. Still fissile. No stain. Mod-strong odor	
	Dry		No		29			ML		
				1100	30					
					31					
					32			SM/	Interbedded silty sands/ sandstones	
		2,105			33				and sandy silts/siltstones	
	Dry		No		34			ML	No stain, mod. odor.	
					35					
					36			SM/ M	SAA. No stain, sl-mod odor	
	Dry	1,738	No		37					

Advancing Opportunity

Boring/Well #	BH05
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
		1738	NO		37			SM	SAA	
					38					
	Dry				39			ML	Dark gray sandy siltstn. fissile. No stain, v slt. odor.	
		174	No	1130	40					
					41					
					42			SM	SAA. Interbedded.	
					43			ML	- Dark gray & Lt. gray sandy silts & silty sands.	
	Dry	23.4	NO		44					
				1145	45				- Dense fn. sandy silt. No s/o	
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

backfill slough to 40'

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH06	Project: Hare 14M
Date: 8-19-20	Project Number: 017820017
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Elevation: 5,815	Detector: PID
Gravel Pack: 10-20 Silica Sand 43'-32' & 26'-14'	Seal: Bentonite 32'-26' & 14'-12'
Casing Type: Schedule 40 PVC 33'-stickup & 15'-stickup	Diameter: 2" Length:
Screen Type: Schedule 40 PVC 43'-33' & 25'-15' Slot: 0.010"	Diameter: 2" Length: 10'
Grout: Bentonite 12'-0'	Hole Diameter: 7" Depth to Liquid: —
	Total Depth: 45' 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				~~Logging cuttings only. SVE well install only. Do not sample.~~ DB. Logging per usual	Deep / Shallow
					1			SW-SM		
					2					
					3					
	SL. Moist	7.4	No		4					
					5				Brown medium sand w/ silt. Well graded. No s/o	
					6					
					7					
	Dry	29.1	No		8			SW-SM	SAA. No s/o	
					9					
					10					
					11					
					12					
					13					
	Dry	37.2	No		14				SAA No s/o	
					15					

Advancing Opportunity

Boring/Well #	BH06
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	52.1	No	1330	15–20			SW-SM	Brown fn-med silty sand. No s/o	
	Dry	8.4	No		21–25			SW-SM / SM/ML	SAA Lt. brown to gray fn. silty sand. some cement. Gray + maroon sandy silt. Fissile.	
	Dry	4.6	No		26–30			SM/ML	Lt. gray & gray interbed. sandy silt stn. & v. fn. silty sand stn. cemented, fissile. No s/o	
	Dry	1,385	No		31–34			SM/ML	Gray silty fn. sand & s. stn. cemented yet fissile. Gray sandy silt stn. No stain. mod. odor.	
	Dry	1,732	yes shiny	1350 BH06 @ 35-38'	35–37			ML	Dark Brown v. fn. sandy silt. Dense. Fissile. Shiny HC stain strong HC odor.	

Advancing Opportunity

Boring/Well #	BH06
Project:	Hare 14M
Project #	017820017
Date	8-19-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38			SM/	Dark gray, silty fn sand.	
	Dry	682	No	BH06 @ 38-40' 1415	39			ML	Dense. fissile.	
					40				No stain, sl.-mod odor.	
					41					
					42				SAA. No s/o.	
				BH06 @ 40-45	43			SM	Gray silty fn. sand. Some brown. No s/o	
	Dry	22.6	No		44					
					45			ML	Dense, gray v. fn sandy silt. No s/o	
				1420	46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

Advancing Opportunity
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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH07	Project: Hare 14M
Date: 8-20-20	Project Number: 017820017
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,815	Detector: PID
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Grout: Bentonite	
Casing Type: Schedule 40 PVC	Diameter: 2" Length:
Hole Diameter: 7"	Depth to Liquid: —
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length:
Total Depth: 40'	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					Back fill w/ cuttings
					2				Brown med. sand w/ silt.	
	SL. Moist	3.1	No		3			SW -SM	Well graded.	
					4				No stain/odor	
					5					
					6					
					7					
	SL. Moist	1.7	No		8			SW -SM	SAA.	
					9				No s/o	
					10					
					11					
					12					
					13			SW -SM	SAA.	
	Dry	2.1	No		14				No s/o	
					15					

LTE Advancing Opportunity

Boring/Well #	BH07
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	7.8	No	BH07 @ 15-20' 0910	15–20			SW-SM	Brown med-coarse sand w/ silt. well gr. No s/o	
					20–25			SW-SM	SAA	
	Dry	6.9	No					SM	Lt. brown to gray fn. silty sand. Some cement but fissile. No s/o.	
								ML	Gray silty sand. No s/o	
	Dry	3.1	No		25–30			SM/ML	SAA. Interbedded Gray silty sand stn. + ~~silty fn.~~ fn sandy silt stn. Cement, but fissile. No s/o.	
	Dry	0.7	No		30–35			ML	Dark gray sandy silt + siltstn. Mostly cemented, but friable/fissile. No s/o	
	Dry		No		35–37			ML	SAA Dark Brownish gray sandy silt. No s/o	

Advancing Opportunity

Boring/Well #	BH07
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.3	NO	BH 07 @ 35'-40' 1010	37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59			ML	Dark gray fn. sandy silt. Dense, fissile, No stain/odor. No well set. Backfill w/ cuttings	

Advancing Opportunity

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH08		Project: Hare 14M	
Date: 8-20-20		Project Number: 017820017	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 40'-34'		Seal: Bentonite 34'-32'	Grout: Bentonite 32'-0'
Casing Type: Schedule 40 PVC +3' 35-stickup		Diameter: 2" Length: 40'	Hole Diameter: 7" Depth to Liquid: —
Screen Type: Schedule 40 PVC 40'-35' Slot: 0.010"		Diameter: 2" Length: 5'	Total Depth: 45' 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				Note. Approx 10' lower in elev. than pad.	stickup. Well J plug
					1					
					2					
					3			SW-SM	Brown med. sand w/ silt. Well gr. No s/o	
	Dry	0.0	No		4					
					5					
					6					
					7					
					8					
	Dry	0.1	No		9			SW-SM	SAA. No s/o	
					10					
					11					
					12					
					13			SW-SM	SAA. Lt. Brown fn-med sand w/ silt. No s/o	
	Dry	0.0	No		14					
					15					

Advancing Opportunity

Boring/Well #	BH08
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16			SW	formed Lt. Brown sand w/silt.	
					17			SM		
	Dry	0.0	No		18				Gray and maroon fn silty sand. slightly dense, but fissile.	
					19			SM	No stain/odor	
					20					
					21				lt. gray & brown mixed sandy silts & silty sands. Fissile but some cement.	
					22			SM/ML	No s/o	
	Dry	0.0	No		23					
					24				V. Dense. fn. sandy silt.	
					25			ML	No s/o Gray.	
					26					
					27					
	Dry	0.0	No		28			ML	Gray sandy silt. Dense. some cement.	
					29				No s/o	
					30					
					31					
					32			ML	Dark Brown v. fn sandy silt. Dense. Fissile No s/o	
	Dry	0.3	No		33					
					34			SM	Gray silty fn sand. No s/o.	
					35					
					36			SM/ML	Dark gray fn. sandy silt. & silty sand	
	Dry		No		37					

Advancing Opportunity

Boring/Well #	BH08
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	146.2	No	BH 08 @35-40'	37 38 39 40			SM/ML	Dark gray & gray interbed silty fin sand, dense, & fin. sandy silts. Fossile, lwt slt. cement. No stain, slt. odor.	
	Dry	38.1	No	BH08 @ 40-45	41 42 43 44			ML	Gray & maroon dense sandy silt. No s/o	Slough/ backfill to 40'
				1200	45 46 47 48 49 50 51 52 53 54 55 56 57 58 59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH09		Project: Hare 14M	
Date: 8-20-20		Project Number: 017820017	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand		Seal: Bentonite	Grout: Bentonite
Casing Type: Schedule 40 PVC	Diameter: 2" Length: —	Hole Diameter: 7"	Depth to Liquid: —
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length: —	Total Depth: 40'	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
	Dry	0.3	No		0–5			SW-SM	Lt. Brown fn-med sand w/ silt. Well gr. No s/o.	Back fill w/ Cuttings
	Dry	0.0	No		8–10			SW-SM	SAA. No s/o	
	Dry	0.0	No		13–15			SW-SM	Brown med sand w/ silt. Well Gr. No s/o.	

Advancing Opportunity

Boring/Well #	BH09
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17			SW	Brown med - coarse sand w/ silt. No s/o	
	Dry	0.0	No.		18			-SM		
					19				- More dense.	
					20					
					21				SAA. No s/o	
					22			SW -SM	Lt-gray silty fn-sand. some cement. Fissile. No s/o.	
	Dry	0.0	No		23					
					24			SM ML	Dark brown + gray fn-sandy silt. Dense. No s/o.	
					25					
					26			SW ML	Lt-gray + dark gray fn. sandy silt. Fissile, cemented. No s/o.	
					27					
	Dry	0.0	No		28					
					29			ML	Gray + maroon silt tr. sand. No s/o.	
					30					
					31					
				BH 09 @ 30'-35'	32				Dark brown + gray v. fn. sandy silt.	
	Dry	0.0	No		33			ML	No s/o.	
					34				Gray silt. Tr. sand. No s/o.	
				1300	35					
					36					
	Dry		No		37			ML	SAA. No s/o cont'd ↓	

Advancing Opportunity

Boring/Well #	BH09
Project:	Hare 14M
Project #	017820017
Date	8-20-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	No	BH 09 @ 35'-40' 1315	37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59			ML	Gray fn. sandy silt. No S/O. -No impacts observed, backfill borehole w/ cuttings	

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH 10	Project: Hare 14
Date: 9-14-21	Project Number: 017820017
Logged By: Reece Hanson ~~Danny Burns~~	Drilled By: MO-TE Drilling
Elevation: 5,815	Detector: PID
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 38 - 26.8'	Seal: Bentonite 26.8 - 22'
Grout: Bentonite	
Casing Type: Schedule 40 PVC	Diameter: 2" Length: 30
Hole Diameter: 5-5	Depth to Liquid: —
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length: 10
Total Depth: 40	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					1.9' S.U.
				BH10 @ 0-5'	1			SW-SM	tan - light gray, fine to medium grains in silty matrix, unconsolidated	
					2					
	Dry	1.2			3					
					4					
					5					
					6					
				BH10 @ 5-10'	7			SW-SM	tan, very fine to fine grains in silty matrix	
					8					
	Dry	2.0			9					
					10					
					11					
				BH10 @ 10-15'	12			SW-SM	very fine to medium grained, tan, unconsolidated. some gravel 25% < fines	
					13					
	Dry	0.9			14					
					15					

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Boring/Well #	
Project:	Hare 14
Project #	017820017
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.5	N	BH10 @ 15-20	15–20			SM	intact core with wavy appearance on outside. medium gray, silt to very fine sands w/ white calcareous mineralization well consolidated No S/O	
	Dry	0.7	N	BH10 @ 20-25	20–25			SM	medium gray silt - very fine sand, homogenous. nice intact core, well consolidated No S/O	
	Dry	1.2	N	BH10 @ 25-30	25–30			SM	slightly darker gray/brown to purple silt, laminated, fossile N S/O	
	Dry	0.8	N	BH10 @ 30-35	30–35			SC	medium gray to brown to slightly maroon, waxy appearance fossile, silt & clays moderately consolidated	

Brown - maroon, waxy texture clays & silts, no mod. consolidated

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Boring/Well #	
Project:	Hare 14
Project #	017820017
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.7		BH 10 @ 35-40	37			SM	md. gray, unconsolidated, laminated silt No S/O	
					38					
					39			SC	moderately consolidated, brown to slightly maroon, waxy texture silt to clays No S/O	
					40					
					41				TD @ 40', slough to 38.6' well set @ 38'	
					42					
					43					
					44					
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH 11		Project: Hare 14	
Date: 9-14-21		Project Number: 017820017	
Logged By: Reece Henson ~~Danny Burns~~		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 42-30'		Seal: Bentonite 30'-25'	Grout: Bentonite
Casing Type: Schedule 40 PVC		Diameter: 2" Length: 35	Hole Diameter / Depth to Liquid
Screen Type: Schedule 40 PVC	Slot: 0.010"	Diameter: 2" Length: 10	Total Depth / 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
		1.1	N		0–5			SW-SM	tan, vf-fine w/ ~25% silt well sorted No S/O	
		0.5	N		6–10			SW-SM	tan, med-coarse w/ some gravel 25% > silt	
		0.4	N		11–15			SW-SM	tan, fine-med grained w/ occasional coarse to gravel poorly sorted with ~25% silt No S/O	

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Boring/Well #	
Project:	Hare 14
Project #	017820017
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.2	N		15–20			SW-SM	fsm, med-coarse, mod-sorted 2% > silt No S/O	
	Dry	0.4	N		21–25			SM	md. gray silt - vry fine sand well consolidated, white calcareous inclusions No S/O	
					26				to slt purple light gray, unconsolidated, silt - v fine sands, fissile	
	Dry	2.3	N		27–30			SM	medium gray silt - v fine homogenous, well consolidated wavy texture on outer core	
					31				unconsolidated, medium gray to tan silt, slight odor	
	Dry	780	N		32–35			SM	consolidated silt, medium gray with flecks of carbonaceous material or mica sssy odor, no stain	
	Dry				36					
		99			37					

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Boring/Well #	BH 11
Project	Hare 14
Project #	017820017
Date	9-14-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37				slight odor, unconsolidated silt to V fine sands. no stain	
					38			SM	more consolidated, medium gray silt, no s/o	
	dry	20.5	N		39					
					40					
					41				medium gray silt to V fine sand, moderately consolidated no s/o	
	dry	18.0	N		42			SM		
					43					
		19.2			44					
					45				TD @ 45', slough to 42'	
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH 12		Project: Hare 14	
Date: 9-15-21		Project Number: 017820017	
Logged By: Reece Hansen ~~Danny Burns~~		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 40.6 - 30'		Seal: Bentonite 30 - 24.5	Grout: Bentonite
Casing Type: Schedule 40 PVC		Diameter: 2" Length: 32 ~~40~~ + 5.0.	Hole Diameter: 5.5" / Depth to Liquid: —
Screen Type: Schedule 40 PVC	Slot: 0.010"	Diameter: 2" Length: 10'	Total Depth: 43 / 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
	Dry	0.8	N	BH 12 @ 0-5'	0 1 2 3 4 5			SW-SM	tan, fine-medium grained sands w/ occasional coarse, ~25% fines NO S/O	
	Dry	0.0	N	BH12 @ 5-10'	6 7 8 9 10			SW-SM	tan, V fine-med grained, unconsolidated ~25% fines NO S/O	
	Dry	0.0	N	BH12 @ 10-15'	11 12 13 14 15				tan, medium-coarse grained, ~10% silts, moderately sorted no S/O.	

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Boring/Well #	
Project	Hare 14
Project #	017820017
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
				BH12 @ 15-20	16					
					17					
	Dry	0.0	N		18			SW-SM	unconsolidated, tan, med-coarse 10% > fines, mod. sorted	
					19					
					20			SM	tan-lt brown, moderately consolidated fine-md, ~25% fines	
					21					
				BH12 22-25	22			SM	tan-lt brown, unconsol., fine-md grained, ~25% fines	
	Dry	0.0	N		23			SW-SM	off wht-lt gray, mod-consol. med grained in silty matrix, mica flecks visible No S/O	
					24					
					25					
					26				Same as above ↑ med-gray to maroon, laminated silt, clays + v fine sands	
				BH12 25-30	27			SM	No S/O	
	Dry	0.0	N		28				outside of core has waxy texture, mod to well consol.	
					29					
					30					
				BH12 30-35	31					
					32				unconsolidated, med-dark gray silt to clay	
	Silt moist	96	N		33					
					34			SL	well consolidated, waxy smooth ↑ texture on core. med gray silt to clay No S/O	
					35					
					36					
					37					

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Boring/Well #	BH 12
Project	Hare 14
Project #	017820017
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
				BH 12 35-40	37				mod consol, med gray to mottled maroon, wavy texture, silt + clays	
	slt				38			SC		
	moist	109	N		39				No stain, slight localized odor	
					40					
				BH 12 40-43	41				med. gray V fine - silt w/ clays. unconsol. No S/O	
	slt				42			SM		
	moist	32	N		43				TD @ 43', well set @ 42'	
					44					
					45					
					46					
					47					
					48					
					49					
					50					
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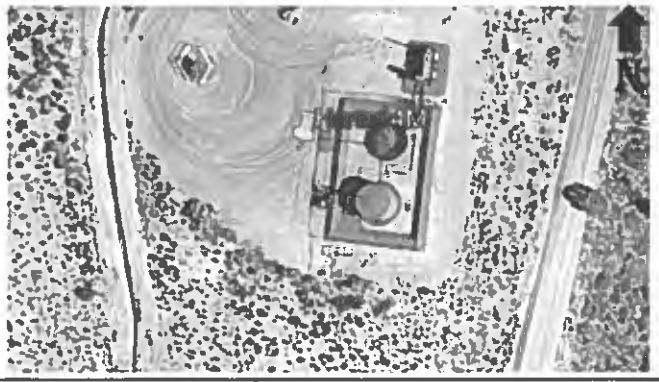
					59					



WSP USA INC

848 East 2nd Avenue
Durango, CO 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH 13		Project: Hare 14	
Date: 9-15-21		Project Number: 017820017	
Logged By: Reece Hansen ~~Danny Burns~~		Drilled By: MO-TE Drilling	
Elevation: 5,815	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 41-30		Seal: Bentonite 30-24'	Grout: Bentonite
Casing Type: Schedule 40 PVC		Diameter: 2" Length: 33+5.0'	Hole Diameter: 5.6" / Depth to Liquid:
Screen Type: Schedule 40 PVC	Slot: 0.010"	Diameter: 2" Length: 10	Total Depth: 44' / 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 (3' S.O.)
					0					
				BH13 @ 0-5	1					
					2			SW-SM	fgn, V fine to medium w/ ~25% silt, No S/O	
	dry	8.7	N		3			SM		
					4					
					5		X			
				BH13 5-10	6					
					7			SW-SM		
		3.9	N		8			SM	fgn, fine to coarse, unconsol. 25% > silt NO S/O	
					9					
					10		X			
					11					
				BH 13 10-15	12					
					13			SW-SM	fgn, fine to coarse w/ occ. gravel ~10% silt NO S/O	
	dry	2.0	N		14		X			
					15					

WSP USA INC
848 East 2nd Avenue
Durango, CO 81301

Boring/Well #	BH 13
Project:	Hare 14
Project #	017820017
Date	9-15-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	2.2	N	BH 13 15-20	15 16 17 18 19 20			SW-SM SM SM	tan, fine-coarse grained w ~25% silt, unconsolidated. N S/O transitions to more consolidated, gray to brown silt, no S/O	
	Dry	0.7	N	BH 13 20-25	21 22 23 24 25				unconsolidated, gray/green, laminated silt to v fine sand, no S/O consolidated core with waxy outer texture. silt + clays to medium sand. light gray. gets grained finer down section no S/O	
	Dry	0.5	N	BH 13 25-30	26 27 28 29 30			SC	unconsolidated silt + clays consolidated core with waxy texture dark gray to purplish. silts + clays no S/O some mica flecks visible	
	silt moist	6.5	N	BH 13 30-35	31 32 33 34 35			SM SC	unconsolidate off-white to lt gray, laminated sandy silt no S/O consolidated waxy core. md gray homogenous silt + clays	
					36 37					

WSP USA INC
848 East 2nd Avenue
Durango, CO 81301

Boring/Well #	BH 13
Project	Hare 14
Project #	017820017
Date	9-15-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37				unconsolidated lt gray silt to v fine sand N S/O	
				BH13 35-40	38			SM		
					39			SC	consolidated core w/ waxy texture medium gray mottled with maroon silt & clays N S/O	
	silt moist	8.1	N		40					
					41				mod consol. mottled med. gray + maroon silt & clay N S/O	
				BH13 40-44	42			SC		
	silt moist	1.7	N		43					
					44				TD @ 44' @ 1345	
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

ENCLOSURE B – LABORATORY ANALYTICAL REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

August 26, 2020

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

RE: Hare 14M OrderNo.: 2008986

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 5 sample(s) on 8/19/2020 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2008986**
Date Reported: **8/26/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH01@ 0'-5'
Project: Hare 14M
Collection Date: 8/18/2020 8:20:00 AM
Lab ID: 2008986-001 **Matrix:** SOIL **Received Date:** 8/19/2020 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	1500	99		mg/Kg	10	8/21/2020 3:47:49 PM
Motor Oil Range Organics (MRO)	ND	500	D	mg/Kg	10	8/21/2020 3:47:49 PM
Surr: DNOP	0	30.4-154	S	%Rec	10	8/21/2020 3:47:49 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	8/26/2020 1:06:47 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	3.8	1.2		mg/Kg	50	8/21/2020 12:31:51 PM
Toluene	120	2.4		mg/Kg	50	8/21/2020 12:31:51 PM
Ethylbenzene	33	2.4		mg/Kg	50	8/21/2020 12:31:51 PM
Xylenes, Total	490	4.8		mg/Kg	50	8/21/2020 12:31:51 PM
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	50	8/21/2020 12:31:51 PM
Surr: 4-Bromofluorobenzene	98.8	70-130		%Rec	50	8/21/2020 12:31:51 PM
Surr: Dibromofluoromethane	113	70-130		%Rec	50	8/21/2020 12:31:51 PM
Surr: Toluene-d8	94.4	70-130		%Rec	50	8/21/2020 12:31:51 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	8600	240		mg/Kg	50	8/21/2020 12:31:51 PM
Surr: BFB	110	70-130		%Rec	50	8/21/2020 12:31:51 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2008986**
Date Reported: **8/26/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH01@ 38'-40'
Project: Hare 14M
Collection Date: 8/18/2020 10:40:00 AM
Lab ID: 2008986-002 **Matrix:** SOIL **Received Date:** 8/19/2020 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	8/20/2020 3:49:14 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/20/2020 3:49:14 PM
Surr: DNOP	154	30.4-154	S	%Rec	1	8/20/2020 3:49:14 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	8/26/2020 1:44:02 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	8/21/2020 1:00:27 PM
Toluene	0.10	0.050		mg/Kg	1	8/21/2020 1:00:27 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/21/2020 1:00:27 PM
Xylenes, Total	0.16	0.099		mg/Kg	1	8/21/2020 1:00:27 PM
Surr: 1,2-Dichloroethane-d4	99.5	70-130		%Rec	1	8/21/2020 1:00:27 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	8/21/2020 1:00:27 PM
Surr: Dibromofluoromethane	106	70-130		%Rec	1	8/21/2020 1:00:27 PM
Surr: Toluene-d8	104	70-130		%Rec	1	8/21/2020 1:00:27 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/21/2020 1:00:27 PM
Surr: BFB	107	70-130		%Rec	1	8/21/2020 1:00:27 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2008986**
Date Reported: **8/26/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH02@ 30'-35'
Project: Hare 14M **Collection Date:** 8/18/2020 12:30:00 PM
Lab ID: 2008986-003 **Matrix:** MEOH (SOIL) **Received Date:** 8/19/2020 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	8/20/2020 1:40:00 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	8/20/2020 1:40:00 PM
Surr: DNOP	117	30.4-154		%Rec	1	8/20/2020 1:40:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	59		mg/Kg	20	8/26/2020 1:56:26 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.019		mg/Kg	1	8/20/2020 9:54:48 AM
Toluene	0.054	0.039		mg/Kg	1	8/20/2020 9:54:48 AM
Ethylbenzene	ND	0.039		mg/Kg	1	8/20/2020 9:54:48 AM
Xylenes, Total	0.096	0.078		mg/Kg	1	8/20/2020 9:54:48 AM
Surr: 1,2-Dichloroethane-d4	99.4	70-130		%Rec	1	8/20/2020 9:54:48 AM
Surr: 4-Bromofluorobenzene	99.2	70-130		%Rec	1	8/20/2020 9:54:48 AM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	8/20/2020 9:54:48 AM
Surr: Toluene-d8	102	70-130		%Rec	1	8/20/2020 9:54:48 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	3.9		mg/Kg	1	8/20/2020 9:54:48 AM
Surr: BFB	106	70-130		%Rec	1	8/20/2020 9:54:48 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008986**
Date Reported: **8/26/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH02@ 38'-40'
Project: Hare 14M **Collection Date:** 8/18/2020 1:00:00 PM
Lab ID: 2008986-004 **Matrix:** MEOH (SOIL) **Received Date:** 8/19/2020 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	8/20/2020 2:04:20 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/20/2020 2:04:20 PM
Surr: DNOP	117	30.4-154		%Rec	1	8/20/2020 2:04:20 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	59		mg/Kg	20	8/26/2020 2:08:50 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.018		mg/Kg	1	8/20/2020 10:23:25 AM
Toluene	ND	0.036		mg/Kg	1	8/20/2020 10:23:25 AM
Ethylbenzene	ND	0.036		mg/Kg	1	8/20/2020 10:23:25 AM
Xylenes, Total	ND	0.073		mg/Kg	1	8/20/2020 10:23:25 AM
Surr: 1,2-Dichloroethane-d4	98.6	70-130		%Rec	1	8/20/2020 10:23:25 AM
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	8/20/2020 10:23:25 AM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	8/20/2020 10:23:25 AM
Surr: Toluene-d8	103	70-130		%Rec	1	8/20/2020 10:23:25 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	3.6		mg/Kg	1	8/20/2020 10:23:25 AM
Surr: BFB	105	70-130		%Rec	1	8/20/2020 10:23:25 AM

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008986**
26-Aug-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **MB-54676** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **54676** RunNo: **71336**
Prep Date: **8/25/2020** Analysis Date: **8/25/2020** SeqNo: **2490791** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008986**
26-Aug-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **LCS-54554** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **54554** RunNo: **71215**
Prep Date: **8/19/2020** Analysis Date: **8/20/2020** SeqNo: **2484367** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	57	10	50.00	0	115	70	130			
Surr: DNOP	6.1		5.000		122	30.4	154			

Sample ID: **MB-54554** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **54554** RunNo: **71215**
Prep Date: **8/19/2020** Analysis Date: **8/20/2020** SeqNo: **2484369** 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	12		10.00		125	30.4	154			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008986**
26-Aug-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **lcs-54452** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **54452** RunNo: **71205**
Prep Date: **8/16/2020** Analysis Date: **8/19/2020** SeqNo: **2484058** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.025	1.000	0	94.0	80	120			
Toluene	1.0	0.050	1.000	0	103	80	120			
Ethylbenzene	1.0	0.050	1.000	0	101	80	120			
Xylenes, Total	3.1	0.10	3.000	0	104	80	120			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.8	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		101	70	130			
Surr: Dibromofluoromethane	0.55		0.5000		110	70	130			
Surr: Toluene-d8	0.51		0.5000		102	70	130			

Sample ID: **mb-54452** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **54452** RunNo: **71205**
Prep Date: **8/16/2020** Analysis Date: **8/19/2020** SeqNo: **2484061** 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: 1,2-Dichloroethane-d4	0.51		0.5000		103	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		103	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		111	70	130			
Surr: Toluene-d8	0.53		0.5000		105	70	130			

Sample ID: **mb-54551** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **54551** RunNo: **71232**
Prep Date: **8/19/2020** Analysis Date: **8/20/2020** SeqNo: **2485082** 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: 1,2-Dichloroethane-d4	0.51		0.5000		102	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		101	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		109	70	130			
Surr: Toluene-d8	0.52		0.5000		103	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008986**
26-Aug-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **lcs-54551** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **54551** RunNo: **71232**
Prep Date: **8/19/2020** Analysis Date: **8/20/2020** SeqNo: **2485083** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	90.8	80	120			
Toluene	1.0	0.050	1.000	0	99.9	80	120			
Ethylbenzene	0.95	0.050	1.000	0	94.6	80	120			
Xylenes, Total	3.1	0.10	3.000	0	103	80	120			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.4	70	130			
Surr: 4-Bromofluorobenzene	0.53		0.5000		107	70	130			
Surr: Dibromofluoromethane	0.56		0.5000		113	70	130			
Surr: Toluene-d8	0.50		0.5000		101	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008986**

26-Aug-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **lcs-54452**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **54452**	RunNo: **71205**
Prep Date: **8/16/2020**	Analysis Date: **8/19/2020**	SeqNo: **2484164** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	92.5	70	130			
Surr: BFB	520		500.0		103	70	130			

Sample ID: **mb-54452**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **54452**	RunNo: **71205**
Prep Date: **8/16/2020**	Analysis Date: **8/19/2020**	SeqNo: **2484167** 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	520		500.0		104	70	130			

Sample ID: **mb-54551**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **54551**	RunNo: **71232**
Prep Date: **8/19/2020**	Analysis Date: **8/20/2020**	SeqNo: **2485108** 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	520		500.0		103	70	130			

Sample ID: **lcs-54551**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **54551**	RunNo: **71232**
Prep Date: **8/19/2020**	Analysis Date: **8/20/2020**	SeqNo: **2485109** 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	94.3	70	130			
Surr: BFB	530		500.0		106	70	130			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2008986 RcptNo: 1

Received By: Cheyenne Cason 8/19/2020 7:55:00 AM

Completed By: Isaiah Ortiz 8/19/2020 8:15:23 AM I-OK

Reviewed By: JR 8/19/20

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
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 ☐	Checked by: EM 8/19/20

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	3.7	Good	Not Present			

Chain-of-Custody Record

Client: Hilcorp Energy Company
Attn: Clara Cardoza
Mailing Address:
Phone #:
email or Fax#: ccardoza@hilcorp.com
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☒ EDD (Type) PDF

Turn-Around Time: 48 hr TAT on BH02 @ 30'-35' BH02 @ 38'-40'
☒ Standard ☒ Rush
Project Name: Hare 14M
Project #:
Project Manager: LTE - Danny Burns 701-570-4727
Sampler: D. Burns
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 3.7+0=3.7c

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 7008986	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals 350.0	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
8-18-20	0820	Soil	BH01@0'-5'	1-4oz	cool	001	X	X					X			
	1040		BH01@38'-40'			002										
	1230		BH02@30'-35'			003										
	1300		BH02@38'-40'			004										
	1330		BH02@40'-45'			005										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
8-18-20	2:30				8/18/20	2:30
8/18/20	325				8/18/2020	1525

Remarks: cc: dhencmann@ltenv.com dburns@ltenv.com
Hold BH02@40-45 until verbal on BH02@38'-40'

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

8/18/2020 1811

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 01, 2020

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

RE: Hare 14M OrderNo.: 2008B74

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 10 sample(s) on 8/21/2020 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH03@ 5'-10'
Project: Hare 14M
Collection Date: 8/18/2020 2:40:00 PM
Lab ID: 2008B74-001 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	8/25/2020 8:25:35 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	8/25/2020 8:25:35 PM
Surr: DNOP	155	30.4-154	S	%Rec	1	8/25/2020 8:25:35 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/24/2020 9:38:34 PM
Surr: BFB	98.8	75.3-105		%Rec	1	8/24/2020 9:38:34 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/24/2020 9:38:34 PM
Toluene	ND	0.049		mg/Kg	1	8/24/2020 9:38:34 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/24/2020 9:38:34 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/24/2020 9:38:34 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	8/24/2020 9:38:34 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	8/29/2020 1:53:36 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH03@ 35'-40'
Project: Hare 14M
Collection Date: 8/18/2020 3:30:00 PM
Lab ID: 2008B74-002 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	8/25/2020 8:35:29 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/25/2020 8:35:29 PM
Surr: DNOP	77.0	30.4-154		%Rec	1	8/25/2020 8:35:29 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/24/2020 11:12:10 PM
Surr: BFB	98.6	75.3-105		%Rec	1	8/24/2020 11:12:10 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/24/2020 11:12:10 PM
Toluene	ND	0.050		mg/Kg	1	8/24/2020 11:12:10 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/24/2020 11:12:10 PM
Xylenes, Total	ND	0.10		mg/Kg	1	8/24/2020 11:12:10 PM
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	8/24/2020 11:12:10 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 2:06:00 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH04@ 10'-15'
Project: Hare 14M
Collection Date: 8/19/2020 8:40:00 AM
Lab ID: 2008B74-003 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	8/25/2020 8:45:24 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/25/2020 8:45:24 PM
Surr: DNOP	87.7	30.4-154		%Rec	1	8/25/2020 8:45:24 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/24/2020 11:35:36 PM
Surr: BFB	97.7	75.3-105		%Rec	1	8/24/2020 11:35:36 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/24/2020 11:35:36 PM
Toluene	ND	0.049		mg/Kg	1	8/24/2020 11:35:36 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/24/2020 11:35:36 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/24/2020 11:35:36 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	8/24/2020 11:35:36 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 2:18:25 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH04@ 35'-40'
Project: Hare 14M
Collection Date: 8/19/2020 9:20:00 AM
Lab ID: 2008B74-004 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	8/25/2020 8:55:20 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	8/25/2020 8:55:20 PM
Surr: DNOP	83.5	30.4-154		%Rec	1	8/25/2020 8:55:20 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/24/2020 11:58:58 PM
Surr: BFB	97.2	75.3-105		%Rec	1	8/24/2020 11:58:58 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/24/2020 11:58:58 PM
Toluene	ND	0.050		mg/Kg	1	8/24/2020 11:58:58 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/24/2020 11:58:58 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/24/2020 11:58:58 PM
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	8/24/2020 11:58:58 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	8/29/2020 2:30:49 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH05@ 25'-30'
Project: Hare 14M
Collection Date: 8/19/2020 11:00:00 AM
Lab ID: 2008B74-005 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	8/25/2020 9:05:19 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	8/25/2020 9:05:19 PM
Surr: DNOP	87.2	30.4-154		%Rec	1	8/25/2020 9:05:19 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	14	4.9		mg/Kg	1	8/25/2020 11:24:19 AM
Surr: BFB	143	75.3-105	S	%Rec	1	8/25/2020 11:24:19 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/25/2020 11:24:19 AM
Toluene	0.061	0.049		mg/Kg	1	8/25/2020 11:24:19 AM
Ethylbenzene	ND	0.049		mg/Kg	1	8/25/2020 11:24:19 AM
Xylenes, Total	0.36	0.098		mg/Kg	1	8/25/2020 11:24:19 AM
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	1	8/25/2020 11:24:19 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 2:43:14 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH05@ 38'-40'
Project: Hare 14M
Collection Date: 8/19/2020 11:30:00 AM
Lab ID: 2008B74-006 **Matrix:** SOIL
Received Date: 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	8/25/2020 9:15:16 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/25/2020 9:15:16 PM
Surr: DNOP	84.5	30.4-154		%Rec	1	8/25/2020 9:15:16 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/25/2020 12:45:50 AM
Surr: BFB	97.7	75.3-105		%Rec	1	8/25/2020 12:45:50 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/25/2020 12:45:50 AM
Toluene	ND	0.050		mg/Kg	1	8/25/2020 12:45:50 AM
Ethylbenzene	ND	0.050		mg/Kg	1	8/25/2020 12:45:50 AM
Xylenes, Total	ND	0.099		mg/Kg	1	8/25/2020 12:45:50 AM
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	1	8/25/2020 12:45:50 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 3:20:29 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH06@ 35'-38'
Project: Hare 14M
Collection Date: 8/19/2020 1:50:00 PM
Lab ID: 2008B74-008 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	83	8.8		mg/Kg	1	8/25/2020 9:25:16 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	8/25/2020 9:25:16 PM
Surr: DNOP	81.4	30.4-154		%Rec	1	8/25/2020 9:25:16 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	130	25		mg/Kg	5	8/25/2020 1:09:16 AM
Surr: BFB	218	75.3-105	S	%Rec	5	8/25/2020 1:09:16 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.12		mg/Kg	5	8/25/2020 1:09:16 AM
Toluene	0.68	0.25		mg/Kg	5	8/25/2020 1:09:16 AM
Ethylbenzene	0.56	0.25		mg/Kg	5	8/25/2020 1:09:16 AM
Xylenes, Total	7.6	0.50		mg/Kg	5	8/25/2020 1:09:16 AM
Surr: 4-Bromofluorobenzene	111	80-120		%Rec	5	8/25/2020 1:09:16 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 3:32:54 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B74**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH06@ 38'-40'
Project: Hare 14M
Collection Date: 8/19/2020 2:15:00 PM
Lab ID: 2008B74-009 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	10	9.7		mg/Kg	1	8/25/2020 9:35:14 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/25/2020 9:35:14 PM
Surr: DNOP	87.1	30.4-154		%Rec	1	8/25/2020 9:35:14 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/25/2020 1:32:43 AM
Surr: BFB	99.4	75.3-105		%Rec	1	8/25/2020 1:32:43 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/25/2020 1:32:43 AM
Toluene	0.073	0.049		mg/Kg	1	8/25/2020 1:32:43 AM
Ethylbenzene	ND	0.049		mg/Kg	1	8/25/2020 1:32:43 AM
Xylenes, Total	0.20	0.099		mg/Kg	1	8/25/2020 1:32:43 AM
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	8/25/2020 1:32:43 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 3:45:19 AM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B74**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **MB-54761**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **54761**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/29/2020**	SeqNo: **2495220**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54761**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **54761**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/29/2020**	SeqNo: **2495221**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.5	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B74**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **LCS-54627**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **54627**	RunNo: **71330**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490676** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	70	130			
Surr: DNOP	4.7		5.000		94.4	30.4	154			

Sample ID: **MB-54627**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **54627**	RunNo: **71330**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490679** 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	8.4		10.00		84.2	30.4	154			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B74**
01-Sep-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **mb-54607**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **54607**	RunNo: **71310**							
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488533**	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	1000		1000		102	75.3	105			

Sample ID: **lcs-54607**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **54607**	RunNo: **71310**							
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488534**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	5.0	25.00	0	79.4	72.5	106			
Surr: BFB	1100		1000		111	75.3	105			S

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B74**
01-Sep-20

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **mb-54607**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **PBS**	Batch ID: **54607**	RunNo: **71310**							
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488571**	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	1.1		1.000		106	80	120			

Sample ID: **LCS-54607**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **LCSS**	Batch ID: **54607**	RunNo: **71310**							
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488572**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	90.8	80	120			
Toluene	0.92	0.050	1.000	0	92.4	80	120			
Ethylbenzene	0.93	0.050	1.000	0	92.8	80	120			
Xylenes, Total	2.8	0.10	3.000	0	93.6	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY** Work Order Number: **2008B74** RcptNo: **1**

Received By: **Cheyenne Cason** **8/21/2020 8:00:00 AM**

Completed By: **Isaiah Ortiz** **8/21/2020 10:30:18 AM** I-OK

Reviewed By: JR 8/21/20

Chain of Custody

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

Log In

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

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

Adjusted?

Checked by: SPA 8.21.20

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	0.4	Good	Not Present			

Chain-of-Custody Record

Client: Hilcorp Energy Company
Attn: Clara Cardoza
Mailing Address:
Phone #:
email or Fax#:
QA/QC Package: ☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other
☒ EDD (Type) PDF

Turn-Around Time: ☒ Standard ☐ Rush
Project Name: Hare 14 M
Project #:
Project Manager: LTE - Danny Burns, Approved member of the LTE 701-570-4727
Sampler: D Burns
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp (including CF): 0.5 - 0.1 = 0.4

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2008B74	BTEX / MTBE / TMB's (8021)	TPH:8015D (GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO3, NO2, PO4, SO4 (by 300.0)	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)						
8-18-20	1440	Soil	BH03 @ 5'-10'	1-4oz	cool	001	X	X					X									
↓	1530	↓	BH03 @ 35'-40'	↓	↓	002	↓	↓					↓									
8-19-20	0840	↓	BH04 @ 10'-15'	↓	↓	003	↓	↓					↓									
↓	0920	↓	BH04 @ 35'-40'	↓	↓	004	↓	↓					↓									
↓	1100	↓	BH05 @ 25'-30'	↓	↓	005	↓	↓					↓									
↓	1130	↓	BH05 @ 38'-40'	↓	↓	006	↓	↓					↓									
↓	1145	↓	BH05 @ 40'-45' ☆	↓	↓	007	↓	↓					↓									
↓	1330	↓	BH06 @ 35'-38'	↓	↓	008	↓	↓					↓									
↓	1415	↓	BH06 @ 38'-40'	↓	↓	009	↓	↓					↓									
↓	1420	↓	BH06 @ 40'-45' ☆	↓	↓	010	↓	↓					↓									

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
8-20-20	1432	[signature]	[signature]		8/20/2020	1432
8/20/2020	1921	[signature]	[signature]	Courier	8/21/20	0800

Remarks: ☆ - HOLD BH05 @ 40'-45' + BH06 @ 40'-45'
cc: dhenemann@ltenv.com

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 01, 2020

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

RE: Hare 14M OrderNo.: 2008B67

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 6 sample(s) on 8/21/2020 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2008B67**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH07@ 15'-20'
Project: Hare 14M
Collection Date: 8/20/2020 9:10:00 AM
Lab ID: 2008B67-001 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	8/25/2020 7:36:00 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/25/2020 7:36:00 PM
Surr: DNOP	89.6	30.4-154		%Rec	1	8/25/2020 7:36:00 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/23/2020 10:13:09 PM
Surr: BFB	96.4	75.3-105		%Rec	1	8/23/2020 10:13:09 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/23/2020 10:13:09 PM
Toluene	ND	0.050		mg/Kg	1	8/23/2020 10:13:09 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/23/2020 10:13:09 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/23/2020 10:13:09 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	8/23/2020 10:13:09 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/28/2020 11:37:04 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2008B67**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH07@ 35'-40'
Project: Hare 14M
Collection Date: 8/20/2020 10:10:00 AM
Lab ID: 2008B67-002 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	8/25/2020 7:45:59 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/25/2020 7:45:59 PM
Surr: DNOP	91.9	30.4-154		%Rec	1	8/25/2020 7:45:59 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/23/2020 10:36:38 PM
Surr: BFB	98.1	75.3-105		%Rec	1	8/23/2020 10:36:38 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/23/2020 10:36:38 PM
Toluene	ND	0.050		mg/Kg	1	8/23/2020 10:36:38 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/23/2020 10:36:38 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/23/2020 10:36:38 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	8/23/2020 10:36:38 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/28/2020 11:49:29 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2008B67**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH08@ 35'-40'
Project: Hare 14M
Collection Date: 8/20/2020 11:45:00 AM
Lab ID: 2008B67-003 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	8/25/2020 7:55:54 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/25/2020 7:55:54 PM
Surr: DNOP	82.6	30.4-154		%Rec	1	8/25/2020 7:55:54 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	12	4.9		mg/Kg	1	8/23/2020 11:00:08 PM
Surr: BFB	112	75.3-105	S	%Rec	1	8/23/2020 11:00:08 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	8/23/2020 11:00:08 PM
Toluene	0.14	0.049		mg/Kg	1	8/23/2020 11:00:08 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/23/2020 11:00:08 PM
Xylenes, Total	0.48	0.098		mg/Kg	1	8/23/2020 11:00:08 PM
Surr: 4-Bromofluorobenzene	104	80-120		%Rec	1	8/23/2020 11:00:08 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	8/29/2020 12:51:31 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B67**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH09@ 30'-35'
Project: Hare 14M
Collection Date: 8/20/2020 1:00:00 PM
Lab ID: 2008B67-005 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	8/25/2020 8:05:50 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/25/2020 8:05:50 PM
Surr: DNOP	82.5	30.4-154		%Rec	1	8/25/2020 8:05:50 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/23/2020 11:23:31 PM
Surr: BFB	98.7	75.3-105		%Rec	1	8/23/2020 11:23:31 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/23/2020 11:23:31 PM
Toluene	ND	0.049		mg/Kg	1	8/23/2020 11:23:31 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/23/2020 11:23:31 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/23/2020 11:23:31 PM
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	8/23/2020 11:23:31 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 1:28:46 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2008B67**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH09@ 35'-40'
Project: Hare 14M
Collection Date: 8/20/2020 1:15:00 PM
Lab ID: 2008B67-006 **Matrix:** SOIL **Received Date:** 8/21/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	8/25/2020 8:15:43 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	8/25/2020 8:15:43 PM
Surr: DNOP	80.2	30.4-154		%Rec	1	8/25/2020 8:15:43 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	8/24/2020 9:15:08 PM
Surr: BFB	99.9	75.3-105		%Rec	1	8/24/2020 9:15:08 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	8/24/2020 9:15:08 PM
Toluene	ND	0.050		mg/Kg	1	8/24/2020 9:15:08 PM
Ethylbenzene	ND	0.050		mg/Kg	1	8/24/2020 9:15:08 PM
Xylenes, Total	ND	0.099		mg/Kg	1	8/24/2020 9:15:08 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	8/24/2020 9:15:08 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/29/2020 1:41:11 AM

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B67**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **MB-54760**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **54760**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/28/2020**	SeqNo: **2495190**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54760**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **54760**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/28/2020**	SeqNo: **2495191**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.7	90	110			

Sample ID: **MB-54761**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **54761**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/29/2020**	SeqNo: **2495220**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54761**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **54761**	RunNo: **71445**							
Prep Date: **8/28/2020**	Analysis Date: **8/29/2020**	SeqNo: **2495221**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.5	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B67**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **LCS-54627**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **54627**	RunNo: **71330**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490676** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	70	130			
Surr: DNOP	4.7		5.000		94.4	30.4	154			

Sample ID: **MB-54627**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **54627**	RunNo: **71330**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490679** 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	8.4		10.00		84.2	30.4	154			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B67**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **mb-54605**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **54605**	RunNo: **71272**
Prep Date: **8/21/2020**	Analysis Date: **8/23/2020**	SeqNo: **2486990** 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	1000		1000		102	75.3	105			

Sample ID: **lcs-54605**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **54605**	RunNo: **71272**
Prep Date: **8/21/2020**	Analysis Date: **8/23/2020**	SeqNo: **2486991** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	5.0	25.00	0	79.4	72.5	106			
Surr: BFB	1100		1000		105	75.3	105			S

Sample ID: **mb-54607**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **54607**	RunNo: **71310**
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488533** 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	1000		1000		102	75.3	105			

Sample ID: **lcs-54607**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **54607**	RunNo: **71310**
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488534** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	5.0	25.00	0	79.4	72.5	106			
Surr: BFB	1100		1000		111	75.3	105			S

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008B67**

01-Sep-20

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **mb-54605**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **54605**	RunNo: **71272**
Prep Date: **8/21/2020**	Analysis Date: **8/23/2020**	SeqNo: **2487087** 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		104	80	120			

Sample ID: **LCS-54605**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **54605**	RunNo: **71272**
Prep Date: **8/21/2020**	Analysis Date: **8/23/2020**	SeqNo: **2487088** 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	92.2	80	120			
Toluene	0.94	0.050	1.000	0	94.1	80	120			
Ethylbenzene	0.95	0.050	1.000	0	94.7	80	120			
Xylenes, Total	2.8	0.10	3.000	0	94.8	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		108	80	120			

Sample ID: **mb-54607**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **54607**	RunNo: **71310**
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488571** 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	1.1		1.000		106	80	120			

Sample ID: **LCS-54607**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **54607**	RunNo: **71310**
Prep Date: **8/21/2020**	Analysis Date: **8/24/2020**	SeqNo: **2488572** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	90.8	80	120			
Toluene	0.92	0.050	1.000	0	92.4	80	120			
Ethylbenzene	0.93	0.050	1.000	0	92.8	80	120			
Xylenes, Total	2.8	0.10	3.000	0	93.6	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY** Work Order Number: **2008B67** RcptNo: **1**

Received By: **Cheyenne Cason** **8/21/2020 8:00:00 AM**

Completed By: **Isaiah Ortiz** **8/21/2020 9:11:52 AM** I-OK

Reviewed By: JR 8/21/20

Chain of Custody

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

Log In

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

# of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by: SPA 8.21.20

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	0.4	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp Energy Company
Attn: Clara Cardoza
Mailing Address:

Phone #:
email or Fax#:
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☒ EDD (Type) PDF

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: Hare 14M
Project #:
Project Manager: LTE-Danny Burns
Sampler: D. Burns
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp (including CF): 0.5-0.1=0.4°C

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2008B67	BTEX / MTBE / TMB's (8021)	TPH:8015D (GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO3, NO2, PO4, SO4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)						
8-20-20	0910	Soil	BH07@15'-20'	1-4oz	cool	001	X	X					X									
↓	1010	↓	BH07@35'-40'	↓	↓	002	↓	↓					↓									
↓	1145	↓	BH08@35'-40'	↓	↓	003	↓	↓					↓									
↓	1200	↓	BH08@40'-45' ☆	↓	↓	004	↓	↓					↓									
↓	1300	↓	BH09@30'-35'	↓	↓	005	↓	↓					↓									
↓	1315	↓	BH09@35'-40'	↓	↓	006	↓	↓					↓									

Date	Time	Relinquished by	Received by	Via	Date	Time
8/20/20	1432	[signature]	[signature]		8/20/2020	1432
8/20/2020	1921	Christ Walker	[signature]	Courier	8/21/20	0800

Remarks: Hold BH08@40'-45'
cc: dhenomann@ltenv.com

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 27, 2021

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

RE: Hare 14M OrderNo.: 2109727

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 17 sample(s) on 9/15/2021 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 5-10
Project: Hare 14M
Collection Date: 9/14/2021 11:45:00 AM
Lab ID: 2109727-002 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	59		mg/Kg	20	9/21/2021 4:24:26 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	9/17/2021 3:54:38 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 3:54:38 PM	62620
Surr: DNOP	94.8	70-130		%Rec	1	9/17/2021 3:54:38 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/16/2021 10:16:00 PM	62603
Surr: BFB	98.0	70-130		%Rec	1	9/16/2021 10:16:00 PM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/16/2021 10:16:00 PM	62603
Toluene	ND	0.049		mg/Kg	1	9/16/2021 10:16:00 PM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/16/2021 10:16:00 PM	62603
Xylenes, Total	ND	0.098		mg/Kg	1	9/16/2021 10:16:00 PM	62603
Surr: 4-Bromofluorobenzene	82.4	70-130		%Rec	1	9/16/2021 10:16:00 PM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 10-15
Project: Hare 14M
Collection Date: 9/14/2021 11:51:00 AM
Lab ID: 2109727-003 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	88	60		mg/Kg	20	9/21/2021 4:36:51 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/17/2021 4:04:31 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 4:04:31 PM	62620
Surr: DNOP	99.7	70-130		%Rec	1	9/17/2021 4:04:31 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/16/2021 11:15:00 PM	62603
Surr: BFB	93.7	70-130		%Rec	1	9/16/2021 11:15:00 PM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/16/2021 11:15:00 PM	62603
Toluene	ND	0.049		mg/Kg	1	9/16/2021 11:15:00 PM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/16/2021 11:15:00 PM	62603
Xylenes, Total	ND	0.097		mg/Kg	1	9/16/2021 11:15:00 PM	62603
Surr: 4-Bromofluorobenzene	82.2	70-130		%Rec	1	9/16/2021 11:15:00 PM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 15-20
Project: Hare 14M
Collection Date: 9/14/2021 11:56:00 AM
Lab ID: 2109727-004 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	61	60		mg/Kg	20	9/21/2021 4:49:16 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/17/2021 4:14:24 PM	62620
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/17/2021 4:14:24 PM	62620
Surr: DNOP	93.1	70-130		%Rec	1	9/17/2021 4:14:24 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/16/2021 11:35:00 PM	62603
Surr: BFB	97.6	70-130		%Rec	1	9/16/2021 11:35:00 PM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/16/2021 11:35:00 PM	62603
Toluene	ND	0.048		mg/Kg	1	9/16/2021 11:35:00 PM	62603
Ethylbenzene	ND	0.048		mg/Kg	1	9/16/2021 11:35:00 PM	62603
Xylenes, Total	ND	0.096		mg/Kg	1	9/16/2021 11:35:00 PM	62603
Surr: 4-Bromofluorobenzene	83.4	70-130		%Rec	1	9/16/2021 11:35:00 PM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 20-25
Project: Hare 14M
Collection Date: 9/14/2021 12:03:00 PM
Lab ID: 2109727-005 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	68	60		mg/Kg	20	9/21/2021 5:01:41 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	9/17/2021 4:24:14 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 4:24:14 PM	62620
Surr: DNOP	94.4	70-130		%Rec	1	9/17/2021 4:24:14 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/16/2021 11:54:00 PM	62603
Surr: BFB	98.9	70-130		%Rec	1	9/16/2021 11:54:00 PM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/16/2021 11:54:00 PM	62603
Toluene	ND	0.050		mg/Kg	1	9/16/2021 11:54:00 PM	62603
Ethylbenzene	ND	0.050		mg/Kg	1	9/16/2021 11:54:00 PM	62603
Xylenes, Total	ND	0.099		mg/Kg	1	9/16/2021 11:54:00 PM	62603
Surr: 4-Bromofluorobenzene	85.5	70-130		%Rec	1	9/16/2021 11:54:00 PM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 25-30
Project: Hare 14M
Collection Date: 9/14/2021 12:52:00 PM
Lab ID: 2109727-006 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	73	60		mg/Kg	20	9/21/2021 5:14:06 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	9/17/2021 4:34:04 PM	62620
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/17/2021 4:34:04 PM	62620
Surr: DNOP	95.6	70-130		%Rec	1	9/17/2021 4:34:04 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/17/2021 12:14:00 AM	62603
Surr: BFB	97.1	70-130		%Rec	1	9/17/2021 12:14:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/17/2021 12:14:00 AM	62603
Toluene	ND	0.048		mg/Kg	1	9/17/2021 12:14:00 AM	62603
Ethylbenzene	ND	0.048		mg/Kg	1	9/17/2021 12:14:00 AM	62603
Xylenes, Total	ND	0.097		mg/Kg	1	9/17/2021 12:14:00 AM	62603
Surr: 4-Bromofluorobenzene	84.6	70-130		%Rec	1	9/17/2021 12:14:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 30-35
Project: Hare 14M
Collection Date: 9/14/2021 1:05:00 PM
Lab ID: 2109727-007 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/21/2021 8:58:14 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	16	9.4		mg/Kg	1	9/17/2021 4:43:53 PM	62620
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/17/2021 4:43:53 PM	62620
Surr: DNOP	95.8	70-130		%Rec	1	9/17/2021 4:43:53 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	49	4.9		mg/Kg	1	9/17/2021 12:34:00 AM	62603
Surr: BFB	253	70-130	S	%Rec	1	9/17/2021 12:34:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	0.052	0.024		mg/Kg	1	9/17/2021 12:34:00 AM	62603
Toluene	0.75	0.049		mg/Kg	1	9/17/2021 12:34:00 AM	62603
Ethylbenzene	0.26	0.049		mg/Kg	1	9/17/2021 12:34:00 AM	62603
Xylenes, Total	3.2	0.097		mg/Kg	1	9/17/2021 12:34:00 AM	62603
Surr: 4-Bromofluorobenzene	111	70-130		%Rec	1	9/17/2021 12:34:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 35-40
Project: Hare 14M
Collection Date: 9/14/2021 1:24:00 PM
Lab ID: 2109727-008 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	59		mg/Kg	20	9/21/2021 9:10:39 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/17/2021 4:53:40 PM	62620
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/17/2021 4:53:40 PM	62620
Surr: DNOP	97.7	70-130		%Rec	1	9/17/2021 4:53:40 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 1:33:00 AM	62603
Surr: BFB	104	70-130		%Rec	1	9/17/2021 1:33:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/17/2021 1:33:00 AM	62603
Toluene	0.078	0.049		mg/Kg	1	9/17/2021 1:33:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 1:33:00 AM	62603
Xylenes, Total	0.27	0.098		mg/Kg	1	9/17/2021 1:33:00 AM	62603
Surr: 4-Bromofluorobenzene	84.4	70-130		%Rec	1	9/17/2021 1:33:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 40-42
Project: Hare 14M
Collection Date: 9/14/2021 1:45:00 PM
Lab ID: 2109727-009 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/15/2021 10:46:23 AM	62591
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	9/15/2021 10:41:46 AM	62590
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/15/2021 10:41:46 AM	62590
Surr: DNOP	104	70-130		%Rec	1	9/15/2021 10:41:46 AM	62590
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	3.4		mg/Kg	1	9/15/2021 9:15:00 AM	GS8127
Surr: BFB	99.8	70-130		%Rec	1	9/15/2021 9:15:00 AM	GS8127
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.017		mg/Kg	1	9/15/2021 9:15:00 AM	BS8127
Toluene	ND	0.034		mg/Kg	1	9/15/2021 9:15:00 AM	BS8127
Ethylbenzene	ND	0.034		mg/Kg	1	9/15/2021 9:15:00 AM	BS8127
Xylenes, Total	ND	0.067		mg/Kg	1	9/15/2021 9:15:00 AM	BS8127
Surr: 4-Bromofluorobenzene	82.9	70-130		%Rec	1	9/15/2021 9:15:00 AM	BS8127

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 0-5
Project: Hare 14M
Collection Date: 9/14/2021 9:30:00 AM
Lab ID: 2109727-010 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	59		mg/Kg	20	9/21/2021 9:23:03 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/17/2021 5:03:26 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 5:03:26 PM	62620
Surr: DNOP	110	70-130		%Rec	1	9/17/2021 5:03:26 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 1:52:00 AM	62603
Surr: BFB	97.0	70-130		%Rec	1	9/17/2021 1:52:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/17/2021 1:52:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 1:52:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 1:52:00 AM	62603
Xylenes, Total	ND	0.098		mg/Kg	1	9/17/2021 1:52:00 AM	62603
Surr: 4-Bromofluorobenzene	82.5	70-130		%Rec	1	9/17/2021 1:52:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 5-10
Project: Hare 14M
Collection Date: 9/14/2021 9:40:00 AM
Lab ID: 2109727-011 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/21/2021 9:35:28 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	49	9.7		mg/Kg	1	9/17/2021 5:13:12 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 5:13:12 PM	62620
Surr: DNOP	114	70-130		%Rec	1	9/17/2021 5:13:12 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 2:12:00 AM	62603
Surr: BFB	96.2	70-130		%Rec	1	9/17/2021 2:12:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/17/2021 2:12:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 2:12:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 2:12:00 AM	62603
Xylenes, Total	ND	0.097		mg/Kg	1	9/17/2021 2:12:00 AM	62603
Surr: 4-Bromofluorobenzene	83.7	70-130		%Rec	1	9/17/2021 2:12:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 10-15
Project: Hare 14M
Collection Date: 9/14/2021 9:52:00 AM
Lab ID: 2109727-012 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	72	60		mg/Kg	20	9/21/2021 9:47:53 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/17/2021 5:22:58 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 5:22:58 PM	62620
Surr: DNOP	98.0	70-130		%Rec	1	9/17/2021 5:22:58 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 2:31:00 AM	62603
Surr: BFB	99.5	70-130		%Rec	1	9/17/2021 2:31:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/17/2021 2:31:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 2:31:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 2:31:00 AM	62603
Xylenes, Total	ND	0.099		mg/Kg	1	9/17/2021 2:31:00 AM	62603
Surr: 4-Bromofluorobenzene	85.5	70-130		%Rec	1	9/17/2021 2:31:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 15-20
Project: Hare 14M
Collection Date: 9/14/2021 10:08:00 AM
Lab ID: 2109727-013 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/21/2021 10:00:19 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/17/2021 5:32:43 PM	62620
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/17/2021 5:32:43 PM	62620
Surr: DNOP	112	70-130		%Rec	1	9/17/2021 5:32:43 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 2:51:00 AM	62603
Surr: BFB	96.7	70-130		%Rec	1	9/17/2021 2:51:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/17/2021 2:51:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 2:51:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 2:51:00 AM	62603
Xylenes, Total	ND	0.098		mg/Kg	1	9/17/2021 2:51:00 AM	62603
Surr: 4-Bromofluorobenzene	84.1	70-130		%Rec	1	9/17/2021 2:51:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 20-25
Project: Hare 14M
Collection Date: 9/14/2021 10:18:00 AM
Lab ID: 2109727-014 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	59		mg/Kg	20	9/21/2021 10:37:31 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	8.5		mg/Kg	1	9/17/2021 5:42:29 PM	62620
Motor Oil Range Organics (MRO)	ND	42		mg/Kg	1	9/17/2021 5:42:29 PM	62620
Surr: DNOP	100	70-130		%Rec	1	9/17/2021 5:42:29 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 3:11:00 AM	62603
Surr: BFB	97.9	70-130		%Rec	1	9/17/2021 3:11:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/17/2021 3:11:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 3:11:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 3:11:00 AM	62603
Xylenes, Total	ND	0.098		mg/Kg	1	9/17/2021 3:11:00 AM	62603
Surr: 4-Bromofluorobenzene	85.5	70-130		%Rec	1	9/17/2021 3:11:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 25-30
Project: Hare 14M
Collection Date: 9/14/2021 10:23:00 AM
Lab ID: 2109727-015 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/21/2021 10:49:55 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	9/17/2021 5:52:17 PM	62620
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/17/2021 5:52:17 PM	62620
Surr: DNOP	94.1	70-130		%Rec	1	9/17/2021 5:52:17 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/17/2021 3:31:00 AM	62603
Surr: BFB	106	70-130		%Rec	1	9/17/2021 3:31:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.024		mg/Kg	1	9/17/2021 3:31:00 AM	62603
Toluene	ND	0.048		mg/Kg	1	9/17/2021 3:31:00 AM	62603
Ethylbenzene	ND	0.048		mg/Kg	1	9/17/2021 3:31:00 AM	62603
Xylenes, Total	ND	0.097		mg/Kg	1	9/17/2021 3:31:00 AM	62603
Surr: 4-Bromofluorobenzene	86.9	70-130		%Rec	1	9/17/2021 3:31:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 30-35
Project: Hare 14M
Collection Date: 9/14/2021 10:30:00 AM
Lab ID: 2109727-016 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	61		mg/Kg	20	9/21/2021 11:02:20 AM	62691
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	9/17/2021 6:02:05 PM	62620
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 6:02:05 PM	62620
Surr: DNOP	95.8	70-130		%Rec	1	9/17/2021 6:02:05 PM	62620
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/17/2021 3:50:00 AM	62603
Surr: BFB	101	70-130		%Rec	1	9/17/2021 3:50:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.025		mg/Kg	1	9/17/2021 3:50:00 AM	62603
Toluene	ND	0.049		mg/Kg	1	9/17/2021 3:50:00 AM	62603
Ethylbenzene	ND	0.049		mg/Kg	1	9/17/2021 3:50:00 AM	62603
Xylenes, Total	ND	0.099		mg/Kg	1	9/17/2021 3:50:00 AM	62603
Surr: 4-Bromofluorobenzene	87.4	70-130		%Rec	1	9/17/2021 3:50:00 AM	62603

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

Qualifiers:

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

Analytical Report
Lab Order **2109727**
Date Reported: **9/27/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 35-40
Project: Hare 14M
Collection Date: 9/14/2021 10:40:00 AM
Lab ID: 2109727-017 **Matrix:** SOIL **Received Date:** 9/15/2021 7:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **VP**	
Chloride	ND	60		mg/Kg	20	9/21/2021 12:29:12 PM	62706
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/17/2021 6:11:53 PM	62629
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 6:11:53 PM	62629
Surr: DNOP	99.0	70-130		%Rec	1	9/17/2021 6:11:53 PM	62629
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**	
Gasoline Range Organics (GRO)	ND	0.049		mg/Kg	1	9/17/2021 4:10:00 AM	62603
Surr: BFB	101	70-130		%Rec	1	9/17/2021 4:10:00 AM	62603
EPA METHOD 8021B: VOLATILES						Analyst: **mb**	
Benzene	ND	0.00025		mg/Kg	1	9/17/2021 4:10:00 AM	62603
Toluene	ND	0.00049		mg/Kg	1	9/17/2021 4:10:00 AM	62603
Ethylbenzene	ND	0.00049		mg/Kg	1	9/17/2021 4:10:00 AM	62603
Xylenes, Total	ND	0.00099		mg/Kg	1	9/17/2021 4:10:00 AM	62603
Surr: 4-Bromofluorobenzene	85.6	70-130		%Rec	1	9/17/2021 4:10:00 AM	62603

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**
27-Sep-21

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **MB-62591** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **62591** RunNo: **81279**
Prep Date: **9/15/2021** Analysis Date: **9/15/2021** SeqNo: **2871570** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62591** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **62591** RunNo: **81279**
Prep Date: **9/15/2021** Analysis Date: **9/15/2021** SeqNo: **2871571** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	99.5	90	110			

Sample ID: **MB-62706** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **62706** RunNo: **81415**
Prep Date: **9/21/2021** Analysis Date: **9/21/2021** SeqNo: **2877535** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62706** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **62706** RunNo: **81415**
Prep Date: **9/21/2021** Analysis Date: **9/21/2021** SeqNo: **2877536** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	97.6	90	110			

Sample ID: **MB-62691** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **62691** RunNo: **81415**
Prep Date: **9/20/2021** Analysis Date: **9/22/2021** SeqNo: **2877599** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62691** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **62691** RunNo: **81415**
Prep Date: **9/20/2021** Analysis Date: **9/22/2021** SeqNo: **2877600** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.7	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**

27-Sep-21

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **LCS-62590**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **62590**	RunNo: **81280**
Prep Date: **9/15/2021**	Analysis Date: **9/15/2021**	SeqNo: **2870379** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	50.00	0	94.2	68.9	135			
Surr: DNOP	5.6		5.000		112	70	130			

Sample ID: **MB-62590**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **62590**	RunNo: **81280**
Prep Date: **9/15/2021**	Analysis Date: **9/15/2021**	SeqNo: **2870380** 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		101	70	130			

Sample ID: **2109727-009AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH11 40-42**	Batch ID: **62590**	RunNo: **81280**
Prep Date: **9/15/2021**	Analysis Date: **9/15/2021**	SeqNo: **2870565** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	9.9	49.41	7.476	89.2	39.3	155			
Surr: DNOP	5.7		4.941		115	70	130			

Sample ID: **2109727-009AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH11 40-42**	Batch ID: **62590**	RunNo: **81280**
Prep Date: **9/15/2021**	Analysis Date: **9/15/2021**	SeqNo: **2870566** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.15	7.476	85.9	39.3	155	1.98	23.4	
Surr: DNOP	5.7		5.015		114	70	130	0	0	

Sample ID: **MB-62620**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **62620**	RunNo: **81352**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2873416** 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		97.5	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**
27-Sep-21

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **MB-62629** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **62629** RunNo: **81352**
Prep Date: **9/16/2021** Analysis Date: **9/17/2021** SeqNo: **2873417** 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		106	70	130			

Sample ID: **LCS-62620** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **62620** RunNo: **81352**
Prep Date: **9/16/2021** Analysis Date: **9/17/2021** SeqNo: **2873419** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	10	50.00	0	91.0	68.9	135			
Surr: DNOP	5.5		5.000		110	70	130			

Sample ID: **LCS-62629** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **62629** RunNo: **81352**
Prep Date: **9/16/2021** Analysis Date: **9/17/2021** SeqNo: **2873420** 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	99.6	68.9	135			
Surr: DNOP	5.7		5.000		114	70	130			

Sample ID: **2109727-017AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH10 35-40** Batch ID: **62629** RunNo: **81352**
Prep Date: **9/16/2021** Analysis Date: **9/17/2021** SeqNo: **2873879** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	9.8	49.12	5.877	83.0	39.3	155			
Surr: DNOP	5.5		4.912		112	70	130			

Sample ID: **2109727-017AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH10 35-40** Batch ID: **62629** RunNo: **81352**
Prep Date: **9/16/2021** Analysis Date: **9/17/2021** SeqNo: **2873880** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	9.5	47.57	5.877	88.4	39.3	155	2.74	23.4	
Surr: DNOP	5.2		4.757		110	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**

27-Sep-21

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **GS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871045** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		105	70	130			

Sample ID: **2.5ug lcs gro**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **GS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871046** 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	101	78.6	131			
Surr: BFB	1200		1000		122	70	130			

Sample ID: **mb-62603**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872750** 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	970		1000		96.9	70	130			

Sample ID: **lcs-62603**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872752** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	30	5.0	25.00	0	119	78.6	131			
Surr: BFB	1100		1000		113	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**
27-Sep-21

Client: HILCORP ENERGY
Project: Hare 14M

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **BS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871047** 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	0.90		1.000		89.6	70	130			

Sample ID: **100ng btex lcs**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **BS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871048** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.83	0.025	1.000	0	82.6	80	120			
Toluene	0.85	0.050	1.000	0	85.4	80	120			
Ethylbenzene	0.88	0.050	1.000	0	88.5	80	120			
Xylenes, Total	2.7	0.10	3.000	0	89.5	80	120			
Surr: 4-Bromofluorobenzene	0.89		1.000		89.0	70	130			

Sample ID: **2109727-009ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH11 40-42**	Batch ID: **BS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871049** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.56	0.017	0.6748	0	83.0	80	120			
Toluene	0.57	0.034	0.6748	0	84.5	80	120			
Ethylbenzene	0.59	0.034	0.6748	0	86.7	80	120			
Xylenes, Total	1.8	0.067	2.024	0	87.0	80	120			
Surr: 4-Bromofluorobenzene	0.57		0.6748		83.8	70	130			

Sample ID: **2109727-009amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH11 40-42**	Batch ID: **BS81278**	RunNo: **81278**
Prep Date:	Analysis Date: **9/15/2021**	SeqNo: **2871050** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.54	0.017	0.6748	0	80.7	80	120	2.77	20	
Toluene	0.55	0.034	0.6748	0	81.4	80	120	3.69	20	
Ethylbenzene	0.56	0.034	0.6748	0	83.7	80	120	3.62	20	
Xylenes, Total	1.7	0.067	2.024	0	83.6	80	120	4.03	20	
Surr: 4-Bromofluorobenzene	0.55		0.6748		81.5	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109727**

27-Sep-21

Client: HILCORP ENERGY

Project: Hare 14M

Sample ID: **mb-62603**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872754** 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	0.85		1.000		85.0	70	130			

Sample ID: **lcs-62603**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872756** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.025	1.000	0	92.6	80	120			
Toluene	0.92	0.050	1.000	0	92.2	80	120			
Ethylbenzene	0.93	0.050	1.000	0	92.6	80	120			
Xylenes, Total	2.8	0.10	3.000	0	92.9	80	120			
Surr: 4-Bromofluorobenzene	0.88		1.000		87.7	70	130			

Sample ID: **2109727-002ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH11 5-10**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872801** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	0.9872	0	96.3	80	120			
Toluene	0.96	0.049	0.9872	0	97.1	80	120			
Ethylbenzene	0.97	0.049	0.9872	0	98.4	80	120			
Xylenes, Total	2.9	0.099	2.962	0	98.8	80	120			
Surr: 4-Bromofluorobenzene	0.81		0.9872		82.2	70	130			

Sample ID: **2109727-002amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH11 5-10**	Batch ID: **62603**	RunNo: **81344**
Prep Date: **9/15/2021**	Analysis Date: **9/16/2021**	SeqNo: **2872803** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.025	1.000	0	95.1	80	120	0.0218	20	
Toluene	0.96	0.050	1.000	0	95.6	80	120	0.229	20	
Ethylbenzene	0.96	0.050	1.000	0	96.3	80	120	0.902	20	
Xylenes, Total	2.9	0.10	3.000	0	96.1	80	120	1.48	20	
Surr: 4-Bromofluorobenzene	0.84		1.000		83.6	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Hilcorp Energy** Work Order Number: **2109727** RcptNo: 1

Received By: **Cheyenne Cason** 9/15/2021 7:05:00 AM

Completed By: **Cheyenne Cason** 9/15/2021 8:17:25 AM

Reviewed By: DAD 9/15/21

Chain of Custody

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

Log In

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

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

Adjusted?

Checked by: SPA 9.15.21

Same day cmc 9/15/21 checked SPA 9.15.21

Special Handling (if applicable)

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

Person Notified: Date:

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

Regarding:

Client Instructions:

16. Additional remarks: (*) Disregard the information on the "Sticker Label" (client) For samples 10A, 11A, 14A, 15A, 16A, 17A. SPA 9.15.21

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.8	Good				

(*) Sample cool Not Present. SPA 9.15.21

Chain-of-Custody Record

Client: IHEC

attn: Mitch Killough

Mailing Address:

Phone #:

email or Fax#: See Remarks

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☑ Rush Same Day for BH 11 40-42 only
all others

Project Name: HARE 14M

Project #: 01732017

Project Manager: Danny Burns / Stuart Hyde

Sampler: Reece Hanson

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 3.9 - 0.1 = 5.8 (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2109727	(BTEX) MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
9-14-21	~~1140~~	Soil	~~BH 11 0-5~~	1-4oz	Cool	001 (time 9/15/21)	✓	✓					✓			
	1145		BH 11 5-10			002										
	1151		BH 11 10-15			003										
	1156		BH 11 15-20			004										
	1203		BH 11 20-25			005										
	1252		BH 11 25-30			006										
	1305		BH 11 30-35			007										
	1324		BH 11 35-40			008										
	1345		& BH 11 40-42			009										
			~~BH 11 40-42 RH~~													
	930		BH 10 0-5			010										
	940		BH 10 5-10			011										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9/14/21	1616		Stuart Hyde		9/14/21	1616
9/14/21	1747	Stuart Hyde	Courier		9/15/21	0705

Remarks: Same day rush on 40-42' sample (BH 11 40-42) Standard on all others
cc - stuart.hyde@wsp.com
Danny.burns@wsp.com

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

Chain-of-Custody Record

Client: HEC

Mailing Address:

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: HARE 14M

Project #: 01782017

Project Manager: Danny Burns/ Stuart Hyde

Sampler: RH

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 5.9-0.1=5.8 (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2109727	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
9-14-21	952	Soil	BH 10 10-15	(1) 4oz Jar	Cool	012										
	1008		BH 10 15-20			013										
	1018		BH 10 20-25			014										
	1023		BH 10 25-30			015										
	1030		BH 10 30-35			016										
	1040		BH 10 35-40			017										

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9/14/21	1614				9/15/21	1616
9/14/21	1747			Courier	9/15/21	0705

Remarks:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

September 30, 2021

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

RE: HARE 14M OrderNo.: 2109899

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 18 sample(s) on 9/16/2021 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 0-5
Project: HARE 14M
Collection Date: 9/15/2021 9:15:00 AM
Lab ID: 2109899-001 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	9/22/2021 2:36:56 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/22/2021 2:36:56 PM
Surr: DNOP	81.5	70-130		%Rec	1	9/22/2021 2:36:56 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/22/2021 9:11:00 AM
Surr: BFB	102	70-130		%Rec	1	9/22/2021 9:11:00 AM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.023		mg/Kg	1	9/22/2021 9:11:00 AM
Toluene	ND	0.046		mg/Kg	1	9/22/2021 9:11:00 AM
Ethylbenzene	ND	0.046		mg/Kg	1	9/22/2021 9:11:00 AM
Xylenes, Total	ND	0.092		mg/Kg	1	9/22/2021 9:11:00 AM
Surr: 4-Bromofluorobenzene	90.5	70-130		%Rec	1	9/22/2021 9:11:00 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 8:11:40 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 5-10
Project: HARE 14M
Collection Date: 9/15/2021 9:19:00 AM
Lab ID: 2109899-002 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	9/22/2021 3:15:08 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/22/2021 3:15:08 PM
Surr: DNOP	85.8	70-130		%Rec	1	9/22/2021 3:15:08 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/22/2021 10:11:00 AM
Surr: BFB	92.5	70-130		%Rec	1	9/22/2021 10:11:00 AM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.023		mg/Kg	1	9/22/2021 10:11:00 AM
Toluene	ND	0.047		mg/Kg	1	9/22/2021 10:11:00 AM
Ethylbenzene	ND	0.047		mg/Kg	1	9/22/2021 10:11:00 AM
Xylenes, Total	ND	0.093		mg/Kg	1	9/22/2021 10:11:00 AM
Surr: 4-Bromofluorobenzene	81.1	70-130		%Rec	1	9/22/2021 10:11:00 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 8:48:55 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 10-15
Project: HARE 14M
Collection Date: 9/15/2021 9:26:00 AM
Lab ID: 2109899-003 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	9/22/2021 3:27:54 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/22/2021 3:27:54 PM
Surr: DNOP	89.5	70-130		%Rec	1	9/22/2021 3:27:54 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/22/2021 11:09:00 AM
Surr: BFB	91.0	70-130		%Rec	1	9/22/2021 11:09:00 AM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 11:09:00 AM
Toluene	ND	0.047		mg/Kg	1	9/22/2021 11:09:00 AM
Ethylbenzene	ND	0.047		mg/Kg	1	9/22/2021 11:09:00 AM
Xylenes, Total	ND	0.094		mg/Kg	1	9/22/2021 11:09:00 AM
Surr: 4-Bromofluorobenzene	77.4	70-130		%Rec	1	9/22/2021 11:09:00 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 9:01:19 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 15-20
Project: HARE 14M
Collection Date: 9/15/2021 9:32:00 AM
Lab ID: 2109899-004 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	9/22/2021 3:40:29 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/22/2021 3:40:29 PM
Surr: DNOP	102	70-130		%Rec	1	9/22/2021 3:40:29 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/22/2021 11:29:00 AM
Surr: BFB	98.6	70-130		%Rec	1	9/22/2021 11:29:00 AM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 11:29:00 AM
Toluene	ND	0.049		mg/Kg	1	9/22/2021 11:29:00 AM
Ethylbenzene	ND	0.049		mg/Kg	1	9/22/2021 11:29:00 AM
Xylenes, Total	ND	0.097		mg/Kg	1	9/22/2021 11:29:00 AM
Surr: 4-Bromofluorobenzene	85.0	70-130		%Rec	1	9/22/2021 11:29:00 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 9:13:44 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 20-25
Project: HARE 14M
Collection Date: 9/15/2021 9:43:00 AM
Lab ID: 2109899-005 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	9/22/2021 3:53:12 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/22/2021 3:53:12 PM
Surr: DNOP	108	70-130		%Rec	1	9/22/2021 3:53:12 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/22/2021 11:49:00 AM
Surr: BFB	99.7	70-130		%Rec	1	9/22/2021 11:49:00 AM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 11:49:00 AM
Toluene	ND	0.048		mg/Kg	1	9/22/2021 11:49:00 AM
Ethylbenzene	ND	0.048		mg/Kg	1	9/22/2021 11:49:00 AM
Xylenes, Total	ND	0.097		mg/Kg	1	9/22/2021 11:49:00 AM
Surr: 4-Bromofluorobenzene	86.2	70-130		%Rec	1	9/22/2021 11:49:00 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 9:50:58 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 25-30
Project: HARE 14M
Collection Date: 9/15/2021 9:56:00 AM
Lab ID: 2109899-006 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/22/2021 4:05:46 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/22/2021 4:05:46 PM
Surr: DNOP	95.5	70-130		%Rec	1	9/22/2021 4:05:46 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/22/2021 12:08:00 PM
Surr: BFB	89.0	70-130		%Rec	1	9/22/2021 12:08:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 12:08:00 PM
Toluene	ND	0.048		mg/Kg	1	9/22/2021 12:08:00 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/22/2021 12:08:00 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/22/2021 12:08:00 PM
Surr: 4-Bromofluorobenzene	79.2	70-130		%Rec	1	9/22/2021 12:08:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	70	60		mg/Kg	20	9/22/2021 10:03:22 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 30-35
Project: HARE 14M
Collection Date: 9/15/2021 10:06:00 AM
Lab ID: 2109899-007 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	9/22/2021 4:18:28 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/22/2021 4:18:28 PM
Surr: DNOP	101	70-130		%Rec	1	9/22/2021 4:18:28 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/22/2021 12:28:00 PM
Surr: BFB	92.5	70-130		%Rec	1	9/22/2021 12:28:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.023		mg/Kg	1	9/22/2021 12:28:00 PM
Toluene	ND	0.046		mg/Kg	1	9/22/2021 12:28:00 PM
Ethylbenzene	ND	0.046		mg/Kg	1	9/22/2021 12:28:00 PM
Xylenes, Total	ND	0.092		mg/Kg	1	9/22/2021 12:28:00 PM
Surr: 4-Bromofluorobenzene	79.4	70-130		%Rec	1	9/22/2021 12:28:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	61		mg/Kg	20	9/22/2021 10:15:47 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 35-40
Project: HARE 14M
Collection Date: 9/15/2021 10:20:00 AM
Lab ID: 2109899-008 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	9/22/2021 4:31:06 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/22/2021 4:31:06 PM
Surr: DNOP	110	70-130		%Rec	1	9/22/2021 4:31:06 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/22/2021 12:48:00 PM
Surr: BFB	87.9	70-130		%Rec	1	9/22/2021 12:48:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 12:48:00 PM
Toluene	ND	0.048		mg/Kg	1	9/22/2021 12:48:00 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/22/2021 12:48:00 PM
Xylenes, Total	ND	0.095		mg/Kg	1	9/22/2021 12:48:00 PM
Surr: 4-Bromofluorobenzene	77.7	70-130		%Rec	1	9/22/2021 12:48:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 10:28:12 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 40-43
Project: HARE 14M
Collection Date: 9/15/2021 10:52:00 AM
Lab ID: 2109899-009 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	8.9		mg/Kg	1	9/22/2021 4:43:46 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	9/22/2021 4:43:46 PM
Surr: DNOP	98.9	70-130		%Rec	1	9/22/2021 4:43:46 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/22/2021 1:07:00 PM
Surr: BFB	96.1	70-130		%Rec	1	9/22/2021 1:07:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.025		mg/Kg	1	9/22/2021 1:07:00 PM
Toluene	ND	0.050		mg/Kg	1	9/22/2021 1:07:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	9/22/2021 1:07:00 PM
Xylenes, Total	ND	0.099		mg/Kg	1	9/22/2021 1:07:00 PM
Surr: 4-Bromofluorobenzene	85.6	70-130		%Rec	1	9/22/2021 1:07:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 10:40:37 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 0-5
Project: HARE 14M
Collection Date: 9/15/2021 12:32:00 PM
Lab ID: 2109899-010 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/22/2021 4:56:25 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/22/2021 4:56:25 PM
Surr: DNOP	85.9	70-130		%Rec	1	9/22/2021 4:56:25 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/22/2021 1:27:00 PM
Surr: BFB	92.3	70-130		%Rec	1	9/22/2021 1:27:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 1:27:00 PM
Toluene	ND	0.048		mg/Kg	1	9/22/2021 1:27:00 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/22/2021 1:27:00 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/22/2021 1:27:00 PM
Surr: 4-Bromofluorobenzene	80.2	70-130		%Rec	1	9/22/2021 1:27:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 10:53:02 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 5-10
Project: HARE 14M
Collection Date: 9/15/2021 12:37:00 PM
Lab ID: 2109899-011 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/28/2021 1:13:57 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/28/2021 1:13:57 PM
Surr: DNOP	82.2	70-130		%Rec	1	9/28/2021 1:13:57 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/22/2021 2:26:00 PM
Surr: BFB	89.4	70-130		%Rec	1	9/22/2021 2:26:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.023		mg/Kg	1	9/22/2021 2:26:00 PM
Toluene	ND	0.047		mg/Kg	1	9/22/2021 2:26:00 PM
Ethylbenzene	ND	0.047		mg/Kg	1	9/22/2021 2:26:00 PM
Xylenes, Total	ND	0.093		mg/Kg	1	9/22/2021 2:26:00 PM
Surr: 4-Bromofluorobenzene	78.6	70-130		%Rec	1	9/22/2021 2:26:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 11:05:27 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 10-15
Project: HARE 14M
Collection Date: 9/15/2021 12:41:00 PM
Lab ID: 2109899-012 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	9/22/2021 5:21:52 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/22/2021 5:21:52 PM
Surr: DNOP	105	70-130		%Rec	1	9/22/2021 5:21:52 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/22/2021 2:45:00 PM
Surr: BFB	88.6	70-130		%Rec	1	9/22/2021 2:45:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 2:45:00 PM
Toluene	ND	0.049		mg/Kg	1	9/22/2021 2:45:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	9/22/2021 2:45:00 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/22/2021 2:45:00 PM
Surr: 4-Bromofluorobenzene	77.2	70-130		%Rec	1	9/22/2021 2:45:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	64	60		mg/Kg	20	9/22/2021 11:17:52 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 15-20
Project: HARE 14M
Collection Date: 9/15/2021 12:50:00 PM
Lab ID: 2109899-013 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/22/2021 5:34:32 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/22/2021 5:34:32 PM
Surr: DNOP	97.0	70-130		%Rec	1	9/22/2021 5:34:32 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/22/2021 3:05:00 PM
Surr: BFB	100	70-130		%Rec	1	9/22/2021 3:05:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 3:05:00 PM
Toluene	ND	0.047		mg/Kg	1	9/22/2021 3:05:00 PM
Ethylbenzene	ND	0.047		mg/Kg	1	9/22/2021 3:05:00 PM
Xylenes, Total	ND	0.095		mg/Kg	1	9/22/2021 3:05:00 PM
Surr: 4-Bromofluorobenzene	87.0	70-130		%Rec	1	9/22/2021 3:05:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	68	60		mg/Kg	20	9/22/2021 11:30:17 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 20-25
Project: HARE 14M
Collection Date: 9/15/2021 12:58:00 PM
Lab ID: 2109899-014 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	9/22/2021 5:47:18 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/22/2021 5:47:18 PM
Surr: DNOP	87.6	70-130		%Rec	1	9/22/2021 5:47:18 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/22/2021 3:24:00 PM
Surr: BFB	88.8	70-130		%Rec	1	9/22/2021 3:24:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.025		mg/Kg	1	9/22/2021 3:24:00 PM
Toluene	ND	0.050		mg/Kg	1	9/22/2021 3:24:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	9/22/2021 3:24:00 PM
Xylenes, Total	ND	0.10		mg/Kg	1	9/22/2021 3:24:00 PM
Surr: 4-Bromofluorobenzene	77.9	70-130		%Rec	1	9/22/2021 3:24:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/22/2021 11:42:42 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 25-30
Project: HARE 14M
Collection Date: 9/15/2021 1:09:00 PM
Lab ID: 2109899-015 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	8.8		mg/Kg	1	9/22/2021 6:00:11 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	9/22/2021 6:00:11 PM
Surr: DNOP	96.4	70-130		%Rec	1	9/22/2021 6:00:11 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/22/2021 3:44:00 PM
Surr: BFB	90.6	70-130		%Rec	1	9/22/2021 3:44:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.025		mg/Kg	1	9/22/2021 3:44:00 PM
Toluene	ND	0.049		mg/Kg	1	9/22/2021 3:44:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	9/22/2021 3:44:00 PM
Xylenes, Total	ND	0.099		mg/Kg	1	9/22/2021 3:44:00 PM
Surr: 4-Bromofluorobenzene	78.7	70-130		%Rec	1	9/22/2021 3:44:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	59		mg/Kg	20	9/23/2021 12:19:56 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 30-35
Project: HARE 14M
Collection Date: 9/15/2021 1:19:00 PM
Lab ID: 2109899-016 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	9/22/2021 6:12:54 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/22/2021 6:12:54 PM
Surr: DNOP	89.4	70-130		%Rec	1	9/22/2021 6:12:54 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/22/2021 4:04:00 PM
Surr: BFB	93.5	70-130		%Rec	1	9/22/2021 4:04:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.024		mg/Kg	1	9/22/2021 4:04:00 PM
Toluene	ND	0.048		mg/Kg	1	9/22/2021 4:04:00 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/22/2021 4:04:00 PM
Xylenes, Total	ND	0.096		mg/Kg	1	9/22/2021 4:04:00 PM
Surr: 4-Bromofluorobenzene	78.5	70-130		%Rec	1	9/22/2021 4:04:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	59		mg/Kg	20	9/23/2021 12:32:21 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 35-40
Project: HARE 14M
Collection Date: 9/15/2021 1:30:00 PM
Lab ID: 2109899-017 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/22/2021 6:25:41 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/22/2021 6:25:41 PM
Surr: DNOP	88.2	70-130		%Rec	1	9/22/2021 6:25:41 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/22/2021 4:23:00 PM
Surr: BFB	99.3	70-130		%Rec	1	9/22/2021 4:23:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.025		mg/Kg	1	9/22/2021 4:23:00 PM
Toluene	ND	0.050		mg/Kg	1	9/22/2021 4:23:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	9/22/2021 4:23:00 PM
Xylenes, Total	ND	0.10		mg/Kg	1	9/22/2021 4:23:00 PM
Surr: 4-Bromofluorobenzene	85.8	70-130		%Rec	1	9/22/2021 4:23:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/23/2021 12:44:45 AM

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

Qualifiers:

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

Analytical Report
Lab Order **2109899**
Date Reported: **9/30/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH13 40-44
Project: HARE 14M
Collection Date: 9/15/2021 1:59:00 PM
Lab ID: 2109899-018 **Matrix:** SOIL **Received Date:** 9/16/2021 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/22/2021 6:38:29 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/22/2021 6:38:29 PM
Surr: DNOP	83.0	70-130		%Rec	1	9/22/2021 6:38:29 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **mb**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/22/2021 4:43:00 PM
Surr: BFB	104	70-130		%Rec	1	9/22/2021 4:43:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **mb**
Benzene	ND	0.025		mg/Kg	1	9/22/2021 4:43:00 PM
Toluene	ND	0.050		mg/Kg	1	9/22/2021 4:43:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	9/22/2021 4:43:00 PM
Xylenes, Total	ND	0.10		mg/Kg	1	9/22/2021 4:43:00 PM
Surr: 4-Bromofluorobenzene	88.6	70-130		%Rec	1	9/22/2021 4:43:00 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/22/2021 4:37:16 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 Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109899**

30-Sep-21

Client: HILCORP ENERGY

Project: HARE 14M

Sample ID: **MB-62751** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**

Client ID: **PBS** Batch ID: **62751** RunNo: **81465**

Prep Date: **9/22/2021** Analysis Date: **9/22/2021** SeqNo: **2879331** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62751** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**

Client ID: **LCSS** Batch ID: **62751** RunNo: **81465**

Prep Date: **9/22/2021** Analysis Date: **9/22/2021** SeqNo: **2879332** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.2	90	110			

Sample ID: **MB-62759** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**

Client ID: **PBS** Batch ID: **62759** RunNo: **81505**

Prep Date: **9/22/2021** Analysis Date: **9/22/2021** SeqNo: **2879452** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62759** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**

Client ID: **LCSS** Batch ID: **62759** RunNo: **81505**

Prep Date: **9/22/2021** Analysis Date: **9/22/2021** SeqNo: **2879453** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.8	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109899**

30-Sep-21

Client: HILCORP ENERGY

Project: HARE 14M

Sample ID: **LCS-62736**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **62736**	RunNo: **81472**							
Prep Date: **9/22/2021**	Analysis Date: **9/22/2021**	SeqNo: **2878395**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.4		5.000		88.9	70	130			

Sample ID: **MB-62736**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **62736**	RunNo: **81472**							
Prep Date: **9/22/2021**	Analysis Date: **9/22/2021**	SeqNo: **2878420**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.2		10.00		91.8	70	130			

Sample ID: **MB-62716**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **62716**	RunNo: **81472**							
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879823**	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		96.6	70	130			

Sample ID: **LCS-62716**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **62716**	RunNo: **81472**							
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879824**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	105	68.9	135			
Surr: DNOP	5.2		5.000		103	70	130			

Sample ID: **2109899-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **BH12 0-5**	Batch ID: **62716**	RunNo: **81472**							
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879826**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	9.8	49.07	0	91.2	39.3	155			
Surr: DNOP	4.3		4.907		87.5	70	130			

Sample ID: **2109899-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **BH12 0-5**	Batch ID: **62716**	RunNo: **81472**							
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879827**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	41	9.4	47.13	0	87.4	39.3	155	8.29	23.4	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2109899**
30-Sep-21

Client: HILCORP ENERGY
Project: HARE 14M

Sample ID: **2109899-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH12 0-5** Batch ID: **62716** RunNo: **81472**
Prep Date: **9/21/2021** Analysis Date: **9/22/2021** SeqNo: **2879827** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.0		4.713		85.1	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109899**

30-Sep-21

Client: HILCORP ENERGY

Project: HARE 14M

Sample ID: **mb-62708** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **PBS** Batch ID: **62708** RunNo: **81496**

Prep Date: **9/21/2021** Analysis Date: **9/22/2021** SeqNo: **2878961** 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		89.2	70	130			

Sample ID: **lcs-62708** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **LCSS** Batch ID: **62708** RunNo: **81496**

Prep Date: **9/21/2021** Analysis Date: **9/22/2021** SeqNo: **2878963** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	29	5.0	25.00	0	115	78.6	131			
Surr: BFB	1000		1000		103	70	130			

Sample ID: **2109899-001ams** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **BH12 0-5** Batch ID: **62708** RunNo: **81496**

Prep Date: **9/21/2021** Analysis Date: **9/22/2021** SeqNo: **2878965** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.9	24.63	0	114	61.3	114			
Surr: BFB	1200		985.2		119	70	130			

Sample ID: **2109899-001amsd** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **BH12 0-5** Batch ID: **62708** RunNo: **81496**

Prep Date: **9/21/2021** Analysis Date: **9/22/2021** SeqNo: **2878967** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.8	23.92	0	116	61.3	114	1.07	20	S
Surr: BFB	1200		956.9		123	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2109899**

30-Sep-21

Client: HILCORP ENERGY

Project: HARE 14M

Sample ID: **mb-62708**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **62708**	RunNo: **81496**
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879014** 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	0.81		1.000		80.8	70	130			

Sample ID: **lcs-62708**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **62708**	RunNo: **81496**
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879016** 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	92.0	80	120			
Toluene	0.92	0.050	1.000	0	92.3	80	120			
Ethylbenzene	0.93	0.050	1.000	0	92.7	80	120			
Xylenes, Total	2.8	0.10	3.000	0	92.8	80	120			
Surr: 4-Bromofluorobenzene	0.81		1.000		80.9	70	130			

Sample ID: **2109899-002ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH12 5-10**	Batch ID: **62708**	RunNo: **81496**
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879018** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.024	0.9579	0	100	80	120			
Toluene	0.98	0.048	0.9579	0	103	80	120			
Ethylbenzene	1.0	0.048	0.9579	0	104	80	120			
Xylenes, Total	3.0	0.096	2.874	0	105	80	120			
Surr: 4-Bromofluorobenzene	0.77		0.9579		80.7	70	130			

Sample ID: **2109899-002amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH12 5-10**	Batch ID: **62708**	RunNo: **81496**
Prep Date: **9/21/2021**	Analysis Date: **9/22/2021**	SeqNo: **2879020** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.023	0.9191	0	102	80	120	2.47	20	
Toluene	0.96	0.046	0.9191	0	105	80	120	1.93	20	
Ethylbenzene	0.98	0.046	0.9191	0	107	80	120	1.27	20	
Xylenes, Total	3.0	0.092	2.757	0	108	80	120	1.59	20	
Surr: 4-Bromofluorobenzene	0.74		0.9191		80.0	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 Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY** Work Order Number: **2109899** RcptNo: 1

Received By: **Cheyenne Cason** **9/16/2021 10:55:00 AM** Chl

Completed By: **Sean Livingston** **9/17/2021 9:26:58 AM** Sean Livingston

Reviewed By: DAD 9/17/21

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
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 ☐	Checked by: TMC 9.17.21

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.3	Good				
2	4.0	Good				

Chain-of-Custody Record

Client: HEC

attn: Mitch Killough

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: HARE 14M

Project #: 617620017

Project Manager: Stuart Hyde, Danny Burns
stuart.hyde@wsp.com
Danny.Burns@wsp.com

Sampler: Reece Hanson

On Ice: ☒ Yes ☐ No

# of Coolers: 1 2.3-0=2.3

Cooler Temp(including CF): 4.0-0=4.0 (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2109899	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
9-15-21	915	Soil	BH 12 0-5	1-4oz	Cool	001										
	919		BH 12 5-10			002										
	926		BH 12 10-15			003										
	932		BH 12 15-20			004										
	943		BH 12 20-25			005										
	956		BH 12 25-30			006										
	1006		BH 12 30-35			007 ~~007~~										
	1020		BH 12 35-40			008										
	1052		BH 12 40-43			009										
	1232		BH 13 0-5			010										
	1237		BH 13 5-10			011										
	1241		BH 13 10-15			012										

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9-15-21	1745				9-15-21	1745
9-16-21	1055				9/16/21	1055
9/16/21	1900			Courier	9/17/21	0730

Remarks:

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

Chain-of-Custody Record

Client: HEC

attn: Mitch Killough

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance ☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☑ Standard ☐ Rush

Project Name: HARE 14M

Project #: 01782 0017

Project Manager:

Sampler: RH

On Ice: ☒ Yes ☐ No

# of Coolers: 2 2.3-0=2.3

Cooler Temp(including CF): 4.0-0=4.0 (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
9-13-21	1250	Soil	BH13 15-20	1-4oz	Cool	013										
	1258		BH 13 20-25			014										
	1309		BH 13 25-30			015										
	1319		BH 13 30-35			016										
	1330		BH 13 35-40			017										
↓	1359	↓	BH 13 40-44	↓	↓	018	↓	↓					↓			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
9-15-21	1745				9-15-21	1745
9-16-21	1055				9/16/21	1055
9/16/21	1900				9/17/21	0730

Remarks:

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

ENCLOSURE C – PILOT TEST DATA

SOIL VAPOR EXTRACTION SYSTEM PILOT TEST DATA

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Date : 12/8/2021 SVE well dia - 2"

Extraction Test Well

SVE01/BH01

Pilot Test Extraction Well											
Time	Wellhead Vacuum (in. wc)	Well Velocity (fpm)	Well Flow (cfm)	PID at Stack (ppm)	**SVE02**	**SVE05**	**SVE07**	**SVE09**	**SVE05**	**SVE07**	**SVE09**
					0	**21**	**38**	**15**	**21**	**38**	**15**
					Vacuum (in. wc)				PID Measurement (ppm)		
9:30	0.0	0.0	0.0	548	0.0	0.0	0.0	0.0	86	832	1215
10:10	19.3	<1,000	5	1,195	0.0	0.0	0.0	0.0	NM	NM	NM
10:15	19.7	1,000	6	1,190	0.0	0.0	0.0	0.0	NM	NM	NM
10:25	19.6	1,000	6	1,176	0.0	0.0	0.0	0.0	NM	NM	NM
10:35	41.6	1,200	10	1,201	0.0	0.0	0.0	0.0	NM	NM	NM
10:48	42	1,200	10	1,205	0.1	0.0	0.0	0.0	NM	NM	NM
10:53	77.1	2,200	17	869	0.1	0.0	0.0	0.0	NM	NM	NM
10:58	77.4	2,200	17	8,511	0.1	0.0	0.0	0.0	NM	NM	NM
11:08	136.1	5,600	46	NM	0.1	0.0	0.0	0.1	NM	NM	NM
11:30	163.3	>6,000	50	NM	0.1	0.0	0.0	0.1	NM	NM	NM
12:15	190.5	>6,000	>60	NM	0.1	0.0	0.0	0.2	NM	NM	NM

Date : 12/8/2021 SVE well dia - 2"

Notes:
ND - not detected
in. wc - inches of water column
ppm - parts per million
PID - photoionization detector
fpm - feet per minute
acfm - actual cubic feet per minute
NM - not measured

WSP

RADIUS OF EFFECT CALCULATIONS

HARE 14M
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Site Specific Information		
Test Well	SVE01	
SVE Screen Length (H)	10	ft
Soil Type	sand and silty sand	
Porosity (n)	30%	percent
Test Specific Information		
Radius of Influence (ROI)	20	feet - 0.3 IWC observed in at a distance of 39 feet
Flow Rate (1)	46	SCFM
Wellhead Vacuum (1)	136	IWC
Calculations (Flowrate - 60 SCFM)		
Total Volume (ft^3)	12,566	= PI * ROI * ROI * H
Volume Pore Space (ft^3)	3,770	= Total Volume * n
Pore Volume Exchange Rate	0.06	days
Annual Pore Volume Exchanges	6,413	>500 Required
Velocity at ROI (ft/min)	0.122	= Flowrate/(2*PI * ROI * H * n)
Velocity at ROI (ft/day)	176	> 3 ft/day recommended

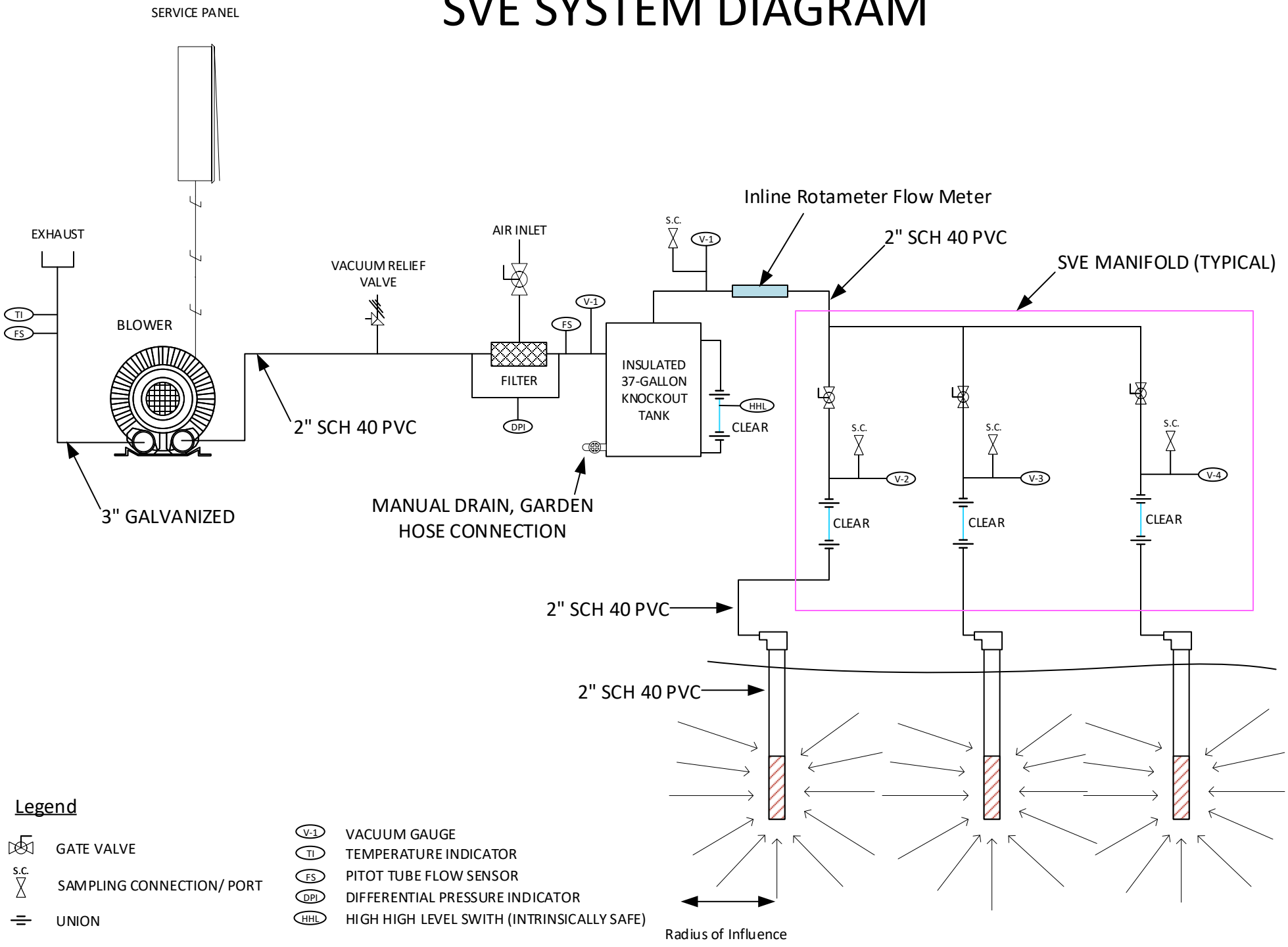
Conclusions

Acceptable annual pore volume exchanges >500 and acceptable pore space velocity.

Notes:
ft - feet
ROI - radius of influence
IWC - inches water column
min - minute
s - second
SCFM - standard cubic feet per minute

ENCLOSURE D – SVE SYSTEM DIAGRAM

SVE SYSTEM DIAGRAM



ENCLOSURE E – SVE O&M FORMS AND OPERATIONS AND MAINTENANCE MANUAL

SVE SYSTEM
BIWEEKLY O&M FORM

DATE: _____ O&M PERSONNEL: _____

TIME ONSITE: _____ TIME OFFSITE: _____

SVE SYSTEM

SVE STATUS: _____ SVE BLOWER HOURS: _____

GENERATOR HOURS: _____

SVE ALARMS: (check if applicable)		
		HIGH/LOW VACUUM
		KO TANK HIGH LEVEL
		HIGH EXHAUST TEMPERATURE

MANIFOLD INLET VACUUM: _____ KO TANK DRAIN: _____

AFTER FILTER VACUUM: _____ BYPASS STATUS: _____

EXHAUST TEMPERATURE: _____ BLOWER GREASE: _____

EXHAUST PRESSURE: _____ GENERATOR GREASE: _____

EXHAUST FLOW: _____ INLINE FILTER CLEAN: _____

SVE SYSTEM

EXHAUST PID: _____ AIR SAMPLE COLLECTION: _____

MANIFOLD	VACUUM (IWC)	PID HEADSPACE (PPM)	FLOW (CFM)	ADJUSTMENTS
INLET				

COMMENTS/OTHER MAINTENANCE:

OPERATIONS AND MAINTENANCE MANUAL

SAN JUAN BASIN, NEW MEXICO SVE SYSTEMS

OCTOBER 2021

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SECTION 1.0

INTRODUCTION

1.0 INTRODUCTION

This Operations and Maintenance (O&M) Manual has been prepared for the Hilcorp Energy Company (Hilcorp) for the purpose of successfully operating the soil vapor extraction (SVE) systems remediating subsurface hydrocarbon impacts in the San Juan Basin, New Mexico. The O&M manual is the base guide for all O&M personnel to follow at sites throughout the basin. This O&M manual is intended to serve as a guide to assist in the routine day-to-day operation and maintenance of the remediation systems. This manual also outlines the remediation system monitoring schedules to comply with regulatory agencies and to document the effectiveness of the systems. Successful operation of the systems will ensure that the environment is protected, the public welfare is promoted, and that federal/state and local laws/regulations are met.

1.2 SVE Process Equipment

A vacuum is applied to the wells and subsurface piping using a regenerative blower system electrified either by solar panels and batteries or directly connected to the power grid. Each system includes a manifold to control flow from each well or group of wells, and the SVE blower system. The manifold includes control valves, sample ports, and a tap plug for obtaining air velocity measurements in the individual lines. The initial flow and applied vacuum settings will be determined during pilot testing, system startup, and initial O&M procedures. As subsurface conditions change, adjustment of the flow rates and applied vacuum to each SVE well may be required. Typically, adjustments will be required to balance the air flowing from the various wells.

Starting from the manifold, the SVE skid generally contains:

- a control valve;
- a vacuum indicator;
- a sample port;
- an air/water separator with storage tank, fluid sight tube and fluid level switch;
- an additional vacuum indicator;
- a dilution air valve;
- a particulate filter;
- a vacuum relief valve;
- a regenerative blower driven by an electric motor;

- a high temperature switch;
- a temperature indicator;
- a pressure indicator;
- a SVE stack drain/sampling valve; and
- a flow indicator.

An SVE system diagram is attached.

SECTION 2.0

SYSTEM OPERATION

Operational procedures are summarized below. These procedures describe the adjustments needed for full system operation. Manufacturer's information for the specific system components shall be examined when seeking information regarding a particular system component. The equipment supplier provided O&M Manuals should also be consulted during operation and maintenance procedures.

2.1 ROUTINE O&M SITE VISITS

O&M site visits will occur as needed to achieve near continuous operation of the systems. Typically, system operation checks will be performed every other weekly (twice monthly). Site visits which shall include more involved tasks will be performed monthly, quarterly, semi-annually, annually, and on an as-needed basis. Specific O&M tasks have been determined for each of the above frequencies, and these tasks should be used as a reference guide for determining what actions are necessary for proper system operation. The O&M tasks are summarized on the site specific Monitoring Schedules. The monitoring schedule indicates the frequency required for each of the O&M tasks. The monitoring schedule also shows the monitoring required at individual wells.

Records kept during the O&M procedures shall be recorded in a field book and scanned onto the WSP server each day after returning to the office. WSP will review the site data and log book prior to each site visit to determine what O&M actions occurred during the last site visit and identify any special equipment or maintenance actions required for the planned site visit.

Semi-Monthly System Check

A typical system check during the weekly O&M site visit will consist of the following tasks, in sequential order beginning with arrival on site:

1. Note if the systems are running.
2. Inspect the control panel to determine if any alarms have occurred (if applicable).
3. Record any alarm conditions and the hour meter values for applicable remediation equipment onsite.
4. Note the inlet vacuum for the SVE blower.
5. Record all gauge and flow indicator values for the SVE system.
6. Record vacuum or pressure readings on the manifold assembly and perform minor valve adjustments as needed to optimize system operation.
7. Check air/water separation tank levels and transfer fluid as needed.

8. Lubricate the appropriate generators and blowers, check and add oil/grease as required.
9. Examine/check operation of building heaters and exhaust fans (if applicable).
10. Perform simple adjustments to correct any system operational problems.
11. Perform general housekeeping inside and outside of the equipment area, such as picking up trash or debris surrounding the site. Note any damage or vandalism requiring attention.
12. Collect influent samples per quarterly and annual requirements.

Monthly System Checks

Monthly site visits shall include the following additional efforts:

1. Collect any required air samples.
2. Monitor the SVE inlet air and exhaust using a photoionization detector (PID).
3. Following the recording of measurements, adjustments of system operation may be made based on the measurements.
4. Perform any required equipment maintenance (See O&M Manual for specific maintenance requirements).
5. Check and clean filters.

Quarterly Site Checks

Quarterly site visits shall include:

1. Measure and record vacuum in each SVE line.
2. Measure and adjust vacuum and measure vapor concentrations using a PID at the SVE wellheads.
3. Clean and replace filters as required by manufacturer's O&M manual or as needed through visual inspection, and perform all required maintenance items, as required.
4. Clean all fluid level switches.
5. Change and check oil and oil filters, where applicable.

Semi-annual System Checks

Semi-annual site visits shall include:

1. Change generator and SVE blower oil. Replace with oil recommended by the equipment manufacturer or equivalent.

2. Tighten all wire terminals and check connections.

Annual

Annual requirements include:

1. Replace SVE blower air inlet filter elements.

Periodic

The following items will need to be conducted as remediation progresses. The timing of these activities is site dependent and cannot be predicted. These activities shall be performed as soon as possible following discovery of conditions affecting or limiting system performance.

1. Drain the SVE air/water separation or knockout (KO) tank fluid.

2. Clean sludge from the SVE air/water separation tanks.

2.2 SVE SYSTEM PERFORMANCE ADJUSTMENTS

On a routine basis, WSP will evaluate site monitoring data and may complete performance adjustments to the remediation system operation. It may be beneficial to adjust the remediation system's operation over time, and as specific areas of a site require less effort than other areas. Remediation efforts will be characterized by system monitoring information.

For example, as the concentration of contaminants in SVE wells decreases to asymptotic conditions, flow and vacuum in these areas may be adjusted in attempts to increase volatilization and contaminant removal. Additionally, as contaminant concentrations decrease to below 1 milligram per liter (mg/L), flow in individual SVE wells may be decreased and/or shut off to induce higher flow in other wells and target specific areas of the site.

2.2.1 SVE Flow Adjustment

Proper operation of the SVE systems entails applying an optimum vacuum at the screened interval of the SVE well such that the maximum air flow rate through the well is achieved. The SVE systems are designed to run at a specific vacuum and air flow rate, however, due to variable subsurface conditions, the air flow through the subsurface may need to be reduced by opening the blower inlet bypass valve and/or restricting flow from certain wells.

The air flow rate may be measured at the flow lines using a portable air velocity device, such as a thermal anemometer. The air flow rate and applied vacuum can be adjusted by opening/closing ball valves on the individual lines. Typically, these adjustments will be made quarterly. Ideal operation of the SVE system entails balancing flow rates from each well. To balance flow from all SVE wells, minor calculations may be required for sites with different sizes of SVE lines.

To balance the SVE system, follow the following procedure:

1. Measure the air velocity in each line using the thermal anemometer.

2. Calculate the total flow from the SVE wells using the equation Flowrate = Cross Sectional Area X Velocity. Area for the SVE pipes is calculated using the formula Area = π * Diameter^2 / 4.

3. Divide the total flow by the number of wells to be balanced. This number equals the average flow rate.

4. Back calculate the air velocity required to achieve the average flowrate for each pipe size using the equation: Velocity = Average Flowrate / Area.

5. Starting at the well yielding the highest flowrate, use the control valve for each line to reduce the flowrate to the average flowrate by lowering the air velocity measured with the thermal anemometer to the velocity calculated in Step #4.

6. Check lower flow wells to ensure an increase in airflow.

Note that the thermal anemometer yields a rough field estimate, and there may be a large inaccuracy inherent to the instrument. It is therefore only necessary to achieve a balance within 25% of the average flowrate. The system will also change flows as the higher flow wells are reduced and system vacuum is increased. This is another reason why it is not necessary to balance the SVE wells to closer than 25% of the calculated average flow. Also note that most SVE systems have the same sized pipes for all SVE lines, which allows for fewer calculations when balancing the SVE system.

For sites with the same size SVE lines, the average flowrate calculation and velocity back calculations are not necessary. Rather, measure the velocity from each well, calculate the average velocity, and attempt to achieve the average velocity from each well by reducing flow/velocity from the higher flow wells. As with the flowrate calculation method, velocities within 25% of the average velocity do not need adjustment.

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
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Santa Fe, NM 87505

CONDITIONS

Action 68678

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 68678
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Please see Conditions of Approval Letter within attached application file.	11/7/2022