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	NRM2022755502
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Accepted - 11/14/2022

NV

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 36.7776375 Longitude -107.7176285
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Howell M 1	Site Type Well Site
Date Release Discovered Historic	API# *(if applicable)* 30-045-09101

Unit Letter	Section	Township	Range	County
N	30	30N	8W	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) Unknown	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
During cleanup of a release a Midstream operator had on the Hilcorp Howell M 1 well site a historic impact was encountered. Because of the location and what appeared to be a liner they notified Hilcorp of their findings.

Form C-141
Page 2

State of New Mexico
Oil Conservation Division

Incident ID	NRM2022755502
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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?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

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: 08/14/2020

email: ccardoza@hilcorp.com Telephone: 505.564.0733

OCD Only

Received by: Ramona Marcus Date: 8/14/2020

District I
1625 N. French Dr., Hobbs, NM 88240
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Revised August 24, 2018
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Incident ID	NRM2022755502
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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?	_____ (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

Form C-141
Page 2

State of New Mexico
Oil Conservation Division

Incident ID	NRM2022755502
District RP	
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Application ID	

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: Env. Specialists

Signature: Katy Kaufman Date: 9/24/21

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

OCD Only

Received by: _____ Date: _____

Form C-141
Page 3

State of New Mexico
Oil Conservation Division

Incident ID	NRM2022755502
District RP	
Facility ID	
Application ID	

Remediation Plan

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

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

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

☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☐ Extents of contamination must be fully delineated.

☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

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

Printed Name: Kathryn H. Kaufman Title: ~~Regulatory~~ Env. Specialist.

Signature: Katy H Kauf Date: 9/24/21

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

OCD Only

Received by: _____ Date: _____

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

Signature: _____ Date: _____

September 27, 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**
Howell M#1
Hilcorp Energy Company
NMOCD Incident Number: NRM2022755502
San Juan County, New Mexico

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 the Howell M#1 production well site (Site). The Site is located on Bureau of Land Management (BLM) surface in San Juan County, New Mexico (Figure 1). WSP has conducted soil-delineation activities to investigate historical petroleum-hydrocarbon impact discovered by a midstream operator at the Site. Specifically, while performing a remedial excavation to address a separate release, the midstream operator encountered what appeared to be an old pit liner and a historical release of petroleum hydrocarbons. Currently, the source and volume of the release is unknown. After discovery of the release, Hilcorp submitted a *Release Notification Form C-141* to the New Mexico Oil Conservation Division (NMOCD) on August 14, 2020. NMOCD has assigned Incident Number NRM2022755502 to the Site.

SITE CHARACTERIZATION

The Howell M#1 natural gas production well is located on BLM surface in Unit N of Section 30, Township 30 North, Range 8 West, San Juan County, New Mexico (Figure 1). The Site is approximately 17 miles east of Aztec, New Mexico, south of New Mexico State Route 511. 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 55 feet below ground surface (bgs). However, an unnamed dry wash is located 60 feet to the west of the Site that is considered a “significant watercourse” as defined in 19.15.17.7 NMAC. Additionally, the San Juan River is located approximately 1,660 feet to the northwest

WSP USA
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DURANGO CO 81301

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of the Site. There are no known springs or fresh-water wells located within 500 feet of the Site. The nearest groundwater well (SJ 04066) is located approximately 1,300 feet southeast of the Site (Figure 2). Depth to water information from this well indicates that groundwater is approximately 200 feet below ground surface (bgs). In addition, the data sheet for a cathodic protection well submitted for the Howell M#1 well site in 1991 indicated that water was encountered at depths of 36, 80, and 120 feet; however, water and/or saturated soils have not been encountered during drilling at the Site up to depths of 55 feet bgs. Based on this information, depth to water is estimated to be between 50 and 100 feet bgs.

The Site is greater than 200 feet from any lakebed, sinkhole, or playa lake, and greater than 300 feet from any wetland (Figure 2). Surface land use surrounding the Site consists primarily of oil and gas development and livestock grazing. No occupied permanent residence or structures, including schools, hospitals, institutions, and/or churches, are located within 300 feet of the Site. The Site is not within the area of a subsurface mine or unstable area and is not within the 100-year floodplain.

SITE CLOSURE CRITERIA

WSP has characterized the Site according to Table 1, Closure Criteria for Soils Impacted by a Release of 19.15.29.12 NMAC. Due to the Site's proximity to a significant watercourse, the following NMOCD Table 1 closure criteria apply: 10 milligrams per kilogram (mg/kg) benzene; 50 mg/kg total benzene, toluene, ethylbenzene, and total xylenes (BTEX); 100 mg/kg total petroleum hydrocarbons (TPH); and 600 mg/kg chloride.

SITE INVESTIGATION ACTIVITIES AND RESULTS

To date, there have been three separate mobilization events to delineate subsurface impacts at the Site: September 16, 2020 to September 22, 2020; May 14, 2021 to May 14, 2021; and September 14, 2021 to September 18, 2021. During each site sampling event, WSP personnel advanced borings to confirm the presence or absence of petroleum hydrocarbon impacts to soil. Groundwater has not been encountered in any of the borings during drilling up to depths of 55 feet bgs.

During drilling, silty sand and sand with occasional gravel and cobbles were generally encountered to depths up to 40 feet bgs. Gravel and cobbles increased with depth and were present in most borings from 35 feet bgs to the terminus. Several borings also encountered claystone/siltstone and sandstone at terminus.

SOIL ASSESSMENT

To date, 18 borings have been advanced at the Site, as shown on Figure 3. Figure 3 also shows the location of the excavation previously performed by a midstream operator to address a leaking pipeline. Soil samples were collected from the borings and submitted for laboratory analysis of BTEX 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. A summary of soil analytical results is presented in Table 1, with laboratory analytical reports attached as Enclosure A.

Borings BH01 through BH10 were initially advanced during the September 2020 sampling event. Soil samples collected from borings BH01, BH02, BH03, BH08, and BH09 contained concentrations of TPH and/or BTEX above the NMOCD Table 1 Closure Criteria. Based on the results, these five borings were completed as soil-vapor extraction (SVE) wells during the September 2020 drilling event for potential future use to remediate the Site. Additionally, analytical results from borings BH02, BH08, and BH09 indicated that soil impacts had migrated off of the well pad to the west/northwest. At that time, Hilcorp proposed additional soil sampling locations in off-pad locations to the BLM. The BLM indicated that a cultural survey would be required for the off-pad locations; however, the cultural survey had to be postponed due to snow cover at the Site. The cultural survey was subsequently performed by La Plata Archaeological Consults in February 2021 and approved by the BLM in May 2021 (included as Enclosure B).

Once BLM access approval was obtained, Hilcorp advanced three additional borings (BH11, BH12, and BH13) at the Site in May 2021. These borings encountered similar lithologies as the previous borings and also met refusal on

cobbles and/or bedrock. Borings BH11 and BH12 did not encounter any field indications of petroleum hydrocarbons and soil sample results indicated that no BTEX or TPH was detected above laboratory reporting limits. Organic vapors measured with a photoionization detector (PID) indicated that petroleum impacts may be present at depths below approximately 42 feet bgs in boring BH13. Subsequent laboratory analysis of sample BH13@40-45' contained a TPH concentration of 21 mg/kg, below the NMOCD Table 1 Closure Criteria, however, deeper soil samples were not collected from this boring due to hollow-stem auger refusal.

In order to vertically delineate potential soil impacts at locations near BH08 and BH13, a sonic drill rig was retained in September 2021 to advance additional borings. Five borings (BH08A, BH13A, BH14, BH15, and BH16) were advanced during this event, including two borings near BH08 and BH13, to delineate soil impacts previously detected at BH08 and BH13. The sonic drill rig was advanced to depths up to 55 feet bgs in all locations. Photographs 1 through 3 (included in the attached Photographic Log) were taken during the September 2021 drilling. Additionally, soil sample results from this event indicated that the vertical and lateral extent of impacts had been delineated at the Site. Figure 4 presents the soil analytical results collected during the Site investigations and the interpreted extent of impact based on TPH concentrations exceeding the NMOCD Closure Standard. In addition, Figures 5, 6, and 7 present cross section locations and cross sections that include the interpreted subsurface lithology, as well as PID and soil analytical results gathered during the sampling events.

SVE WELL CONSTRUCTION

At the completion of drilling, borings BH01, BH02, BH03, and BH08, BH08A, BH09, and BH13A were completed as SVE wells. Table 2 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 across subsurface intervals with TPH impact (based on analytical results and PID readings) and solid casing to the ground surface. 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 hydrated bentonite seal to the ground surface. SVE well locations are depicted on Figure 3, with screen intervals shown on the cross sections presented in Figures 6 and 7. Boring logs with well completion diagrams are included as Enclosure C.

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. Impacted soil appears to be primarily located north to south along the western edge of the well pad. Additionally, soil impacts are present at depths between 18 and 50 feet bgs, with the deepest impact around boring BH08. Based on the analytical data and field-screening measurements, the shallow impacted source of the release appears to have been removed during the previous excavation conducted by a midstream operator. Based on the above conclusions, approximately 8,000 cubic yards of subsurface soil have been impacted by the release. The soil is mostly comprised of silty sand to sand.

REMEDIATION WORK PLAN

Based on the depths of soil impacts and site lithology, WSP recommends 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 is obtained.

WSP recommends using the seven installed SVE wells at the Site to encourage uniform flow throughout the impacted interval (18 feet to 50 feet bgs). SVE well locations, spacing, and depths have been based on observed lithology and soil impacts at the Site. Specifically, SVE wells have been installed so that the screened intervals intersect the impacted depths at each location, with screens varying between 10 and 20 feet in length. Figure 4 shows the location of SVE wells in relation to the impacted areas.

SVE SYSTEM PILOT TEST

Prior to developing the full SVE-system design, WSP recommends conducting a pilot test to evaluate the effectiveness of the remedial technology to achieve site remediation goals. SVE pilot testing will be conducted to evaluate the flow rate and applied vacuum required to influence the subsurface and cause volatilization of the petroleum hydrocarbons entrained in the soil, as well as to determine specific site design radius-of-influence (ROI) and radius-of-effect (ROE). The pilot testing program will be determined based on previously observed geologic conditions, surface conditions, current locations of petroleum hydrocarbon impacts, and other relevant factors.

A vacuum truck will be used to apply a negative pressure to one well at a time (the “extraction” well), with responses measured in the other installed wells at the Site (“observation” wells). A manifold designed and built by WSP will be used to control the vacuum being applied and collect measurements at the extraction well. During each test, the other SVE/observation wells at the Site will be used to collect SVE pilot test monitoring data. The following list summarizes the steps involved in the SVE pilot test:

1. Measure the distances from the extraction well to each observation well.
2. Collect background volatile organic compound (VOC) measurements using a PID at the SVE and observation wells.
3. Connect the vacuum truck to the extraction wells via a flexible hose and manifold. Slowly open the valve and monitor the vacuum and flow.
4. Apply a vacuum ranging from approximately 10 inches of water column (IWC) to 100 IWC at the designated SVE well for each test.
5. Collect at least two rounds of stabilized measurements per vacuum/flow rate. Measure the vacuum and the PID headspace at the observation wells. Collect readings 15 minutes apart.
6. Close the valve to eliminate the vacuum pressure and collect stabilization readings from each observation well.
7. Collect air samples from the SVE wells in laboratory-prepared containers and delivered under chain-of-custody protocol to Hall for analysis of BTEX and total volatile petroleum hydrocarbons (TVPH).

Once completed, WSP will prepare a pilot test report and supplemental remediation plan that includes the SVE system design and operation and maintenance requirements. The pilot test report will include calculations for ROI and ROE, full-scale SVE system design and diagrams, remediation zones (if applicable), and an operation and maintenance plan for the proposed system.

SYSTEM INSTALLATION, STARTUP, AND MONITORING

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 for the first year of operation, to monitor the effective reduction and remediation of soil impacts. Initial and annual air samples will be submitted for analysis of VOCs (including BTEX), TVPH, oxygen, and carbon dioxide. Regular quarterly sampling events will include only analysis of BTEX and TVPH, with the addition of VOCs, oxygen, and carbon dioxide once per year. WSP will submit a summary report of the first six months of operation with analytical results and effective runtime then quarterly reports thereafter. Quarterly reporting will document hydrocarbon mass recovery, system runtime, and air sample analysis.

PROPOSED SCHEDULE

WSP will conduct the pilot test and prepare a pilot test report within 60 days of submittal of this document. Once installed, WSP anticipates that the system will operate at the Site for a total of two to five years. The following timeline is proposed, with day 0 being the day the pilot test report is approved by the NMOCD.

- Months 0 to 3 – Complete construction and installation of the SVE system and system startup, initial collection of air samples at 3 months;
- Months 4, 5, and 6 – Air sample collection monthly, perform system maintenance, and optimize system operation, as necessary;
- Month 9 through Year 2 – Monthly monitoring and quarterly air sample collection to monitor system efficacy and quarterly system monitoring. Quarterly reporting;
- Years 2 through 5 – Assess system performance and collect air sample to assess system efficacy. Once air concentrations of TVPH collected from the system become asymptotic and/or are below 1.0 milligrams per liter (mg/L), performance soil samples will be collected from the Site to determine if confirmation soil samples should be collected. Continue quarterly air sample collection, monitoring, and reporting as necessary;
- Year 5 – Soil confirmation sampling. Request for site closure if soil sample results are below NMOCD Table 1 Closure Criteria.

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

cc: Kate Kaufman, Hilcorp Energy Company

Enclosures:

Figure 1	Site Location Map
Figure 2	Receptor Map
Figure 3	Site Map
Figure 4	Soil Analytical Results
Figure 5	Cross Section Locations
Figure 6	Cross Section A to A’
Figure 7	Cross Section B to B’
Table 1	Soil Analytical Results
Table 2	SVE Well Construction Information
Photographic Log	
Enclosure A	Laboratory Analytical Reports
Enclosure B	Cultural Survey and BLM Approval
Enclosure C	Boring Logs

FIGURES

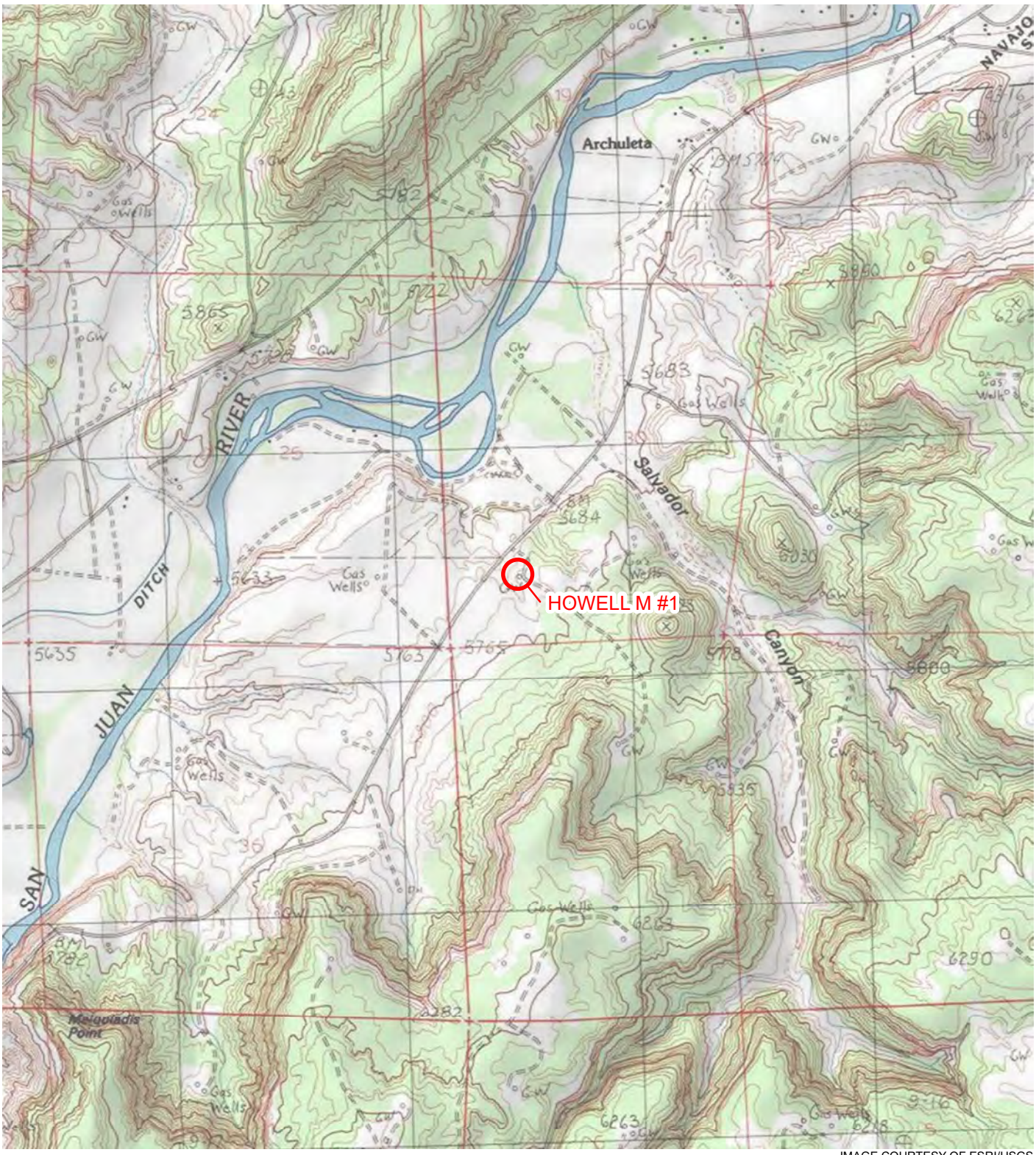

IMAGE COURTESY OF ESRI/USGS

LEGEND

SITE LOCATION

0 2,000 4,000

Feet

N

NEW MEXICO

FIGURE 1
SITE LOCATION MAP
HOWELL M #1
LOT 11 SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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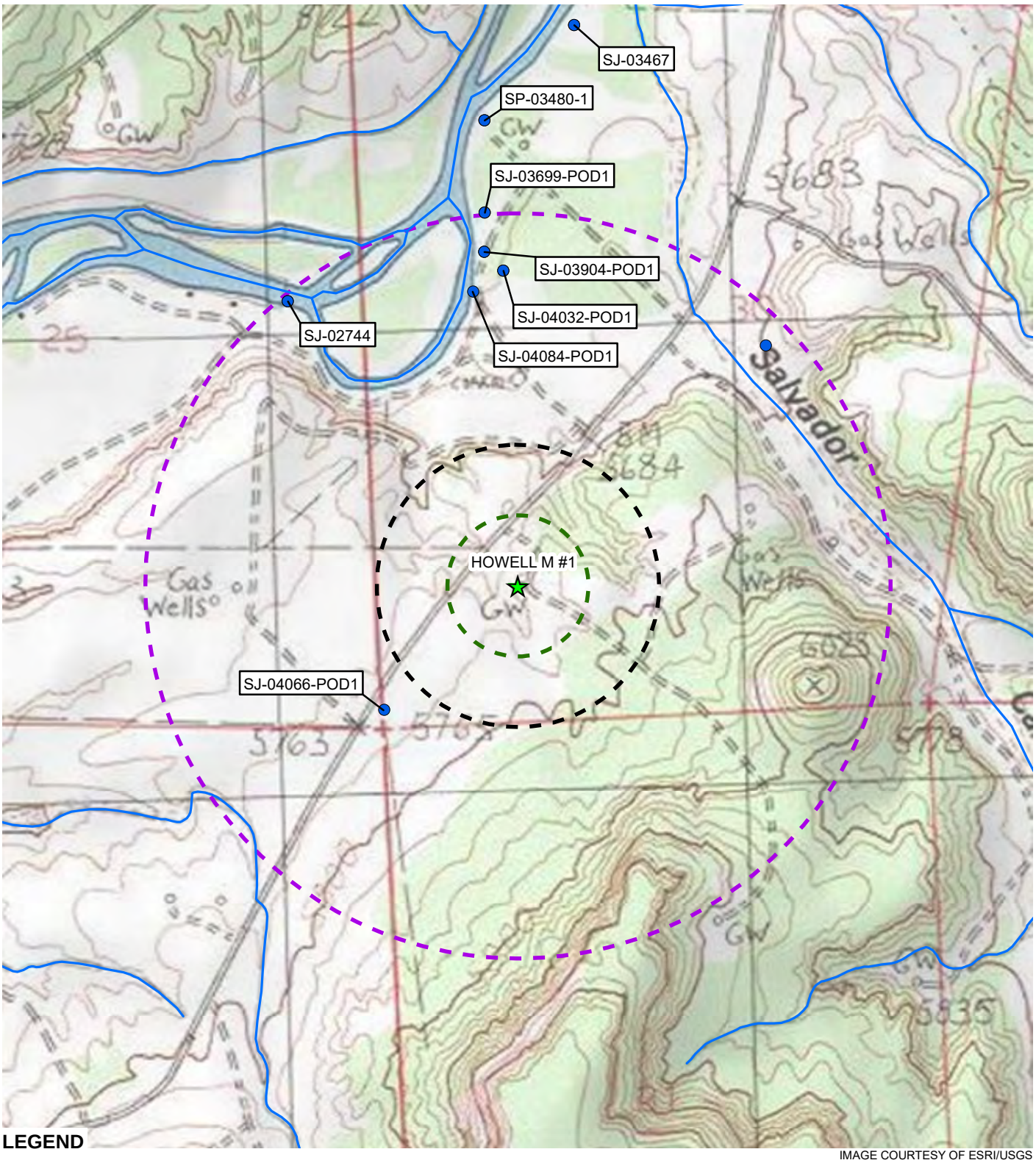

LEGEND

- WATER WELL
- SITE LOCATION
- NATIONAL HYDROGRAPHY DATASET SURFACE WATER FEATURE
- 500-FOOT RADIUS
- 1,000-FOOT RADIUS
- HALF-MILE RADIUS

IMAGE COURTESY OF ESRI/USGS

0 1,000 2,000
Feet

N

FIGURE 2
RECEPTOR MAP
HOWELL M #1
LOT 11 SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

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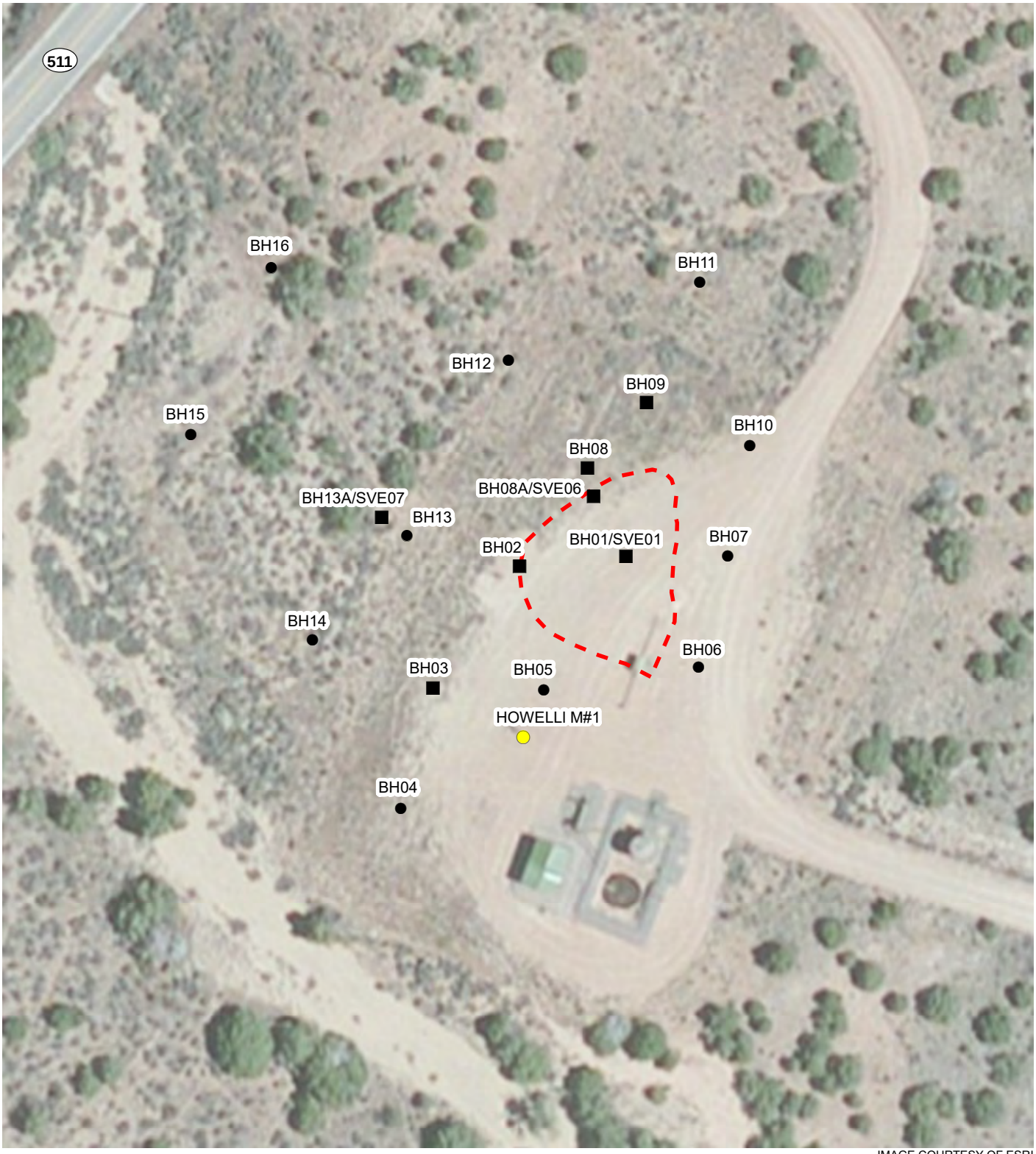


IMAGE COURTESY OF ESRI

LEGEND

- SOIL BORING
- SOIL VAPOR EXTRACTION WELL (SVE)
- WELLHEAD
- EXCAVATION EXTENT

0 60 120

Feet

N

FIGURE 3
SITE MAP
HOWELL M #1
LOT 11 SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017821013_HOWELL_M #1\017821013_FIG03_HOWELL_M #1_SITE_092021.mxd

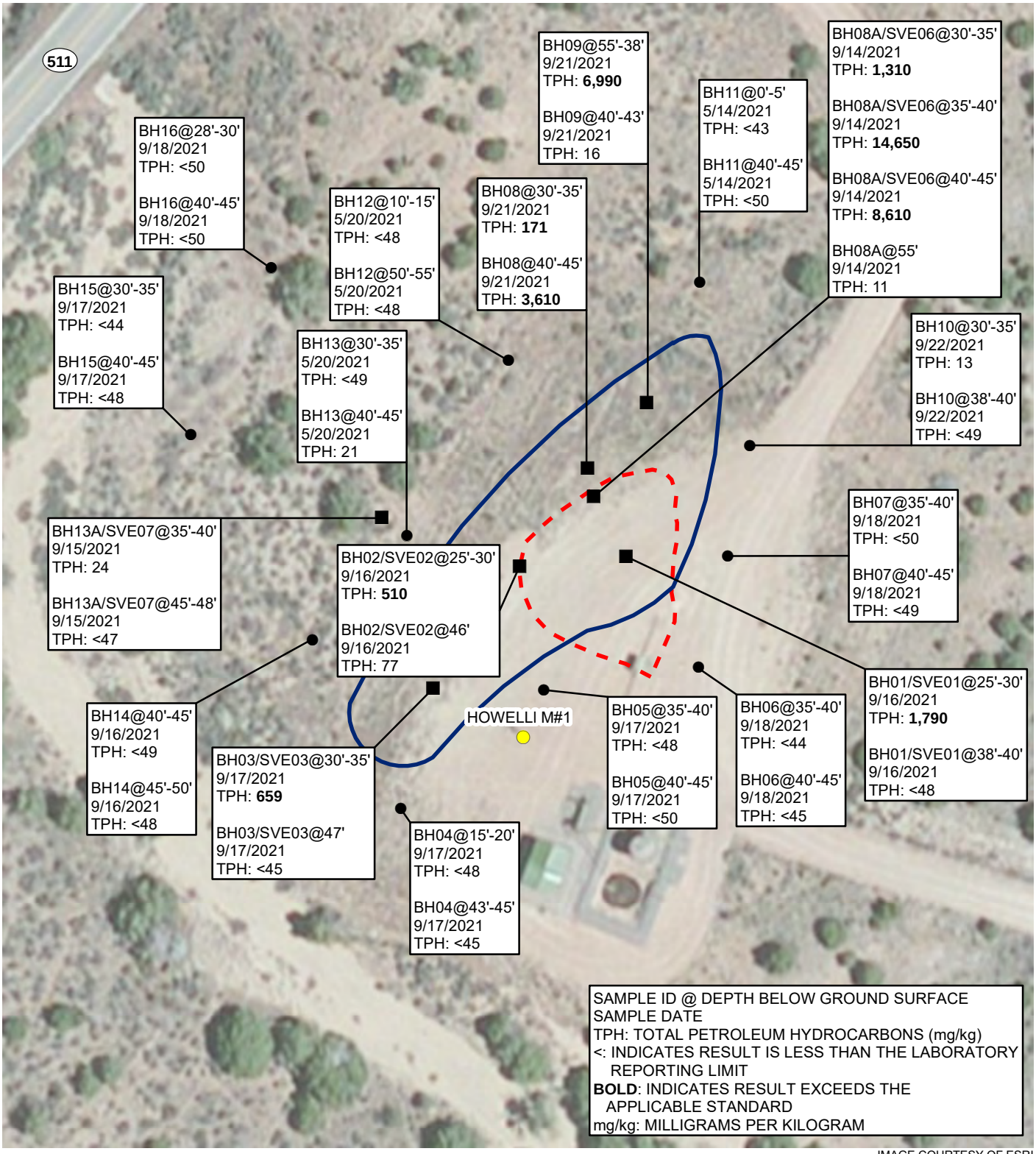


IMAGE COURTESY OF ESRI

LEGEND

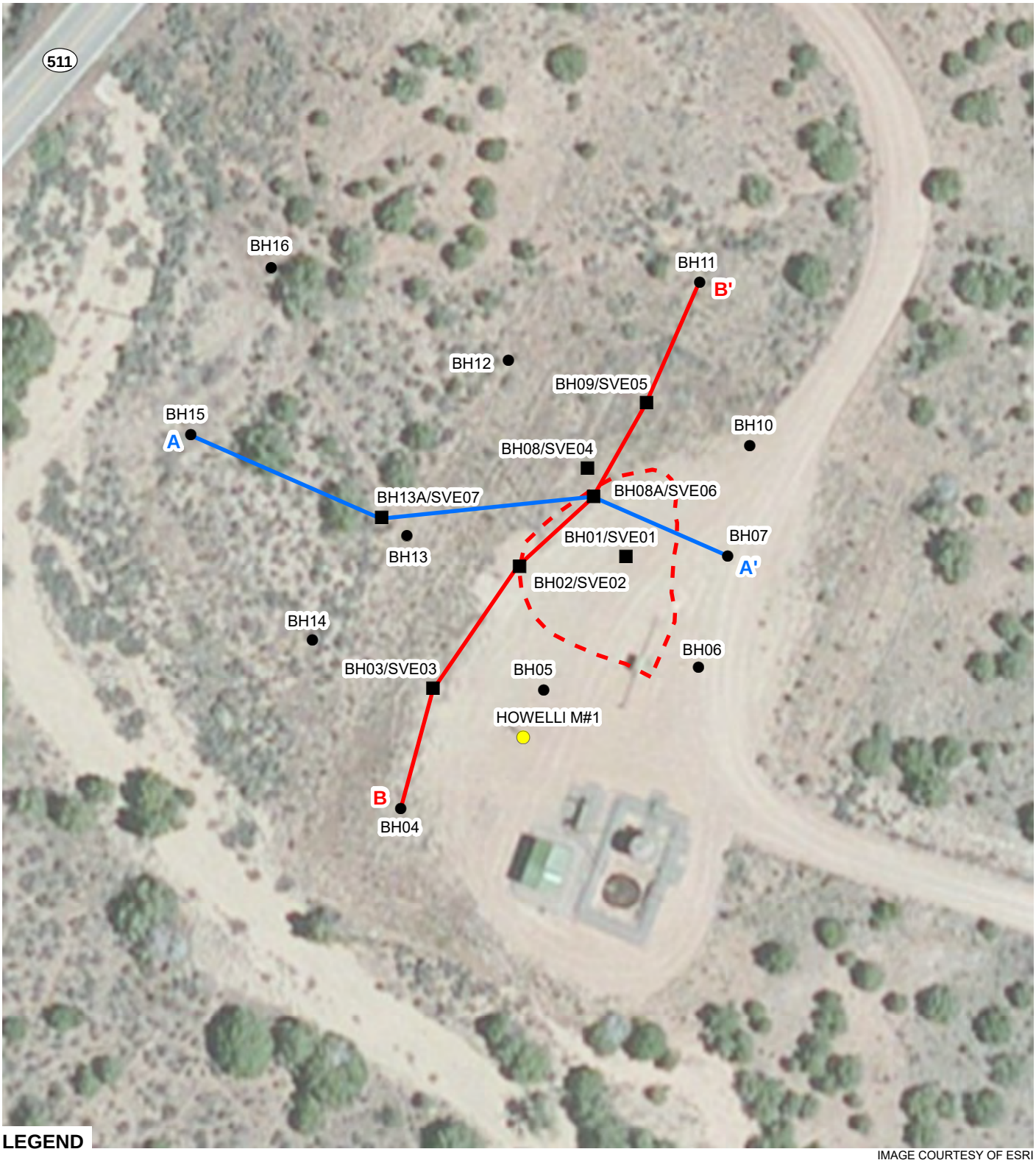
- SOIL BORING
- SOIL VAPOR EXTRACTION WELL (SVE)
- WELLHEAD
- EXTENT OF TPH IMPACT
- EXCAVATION EXTENT

0 60 120
Feet

N

FIGURE 4
SOIL ANALYTICAL RESULTS
HOWELL M #1
LOT 11 SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017821013_HOWELL_M #1\017821013_FIG04_HOWELL_M #1_SOIL_TPH_2021.mxd



LEGEND

- SOIL BORING
- SOIL VAPOR EXTRACTION WELL (SVE)
- WELLHEAD
- CROSS SECTION A - A'
- CROSS SECTION B - B'
- EXCAVATION EXTENT

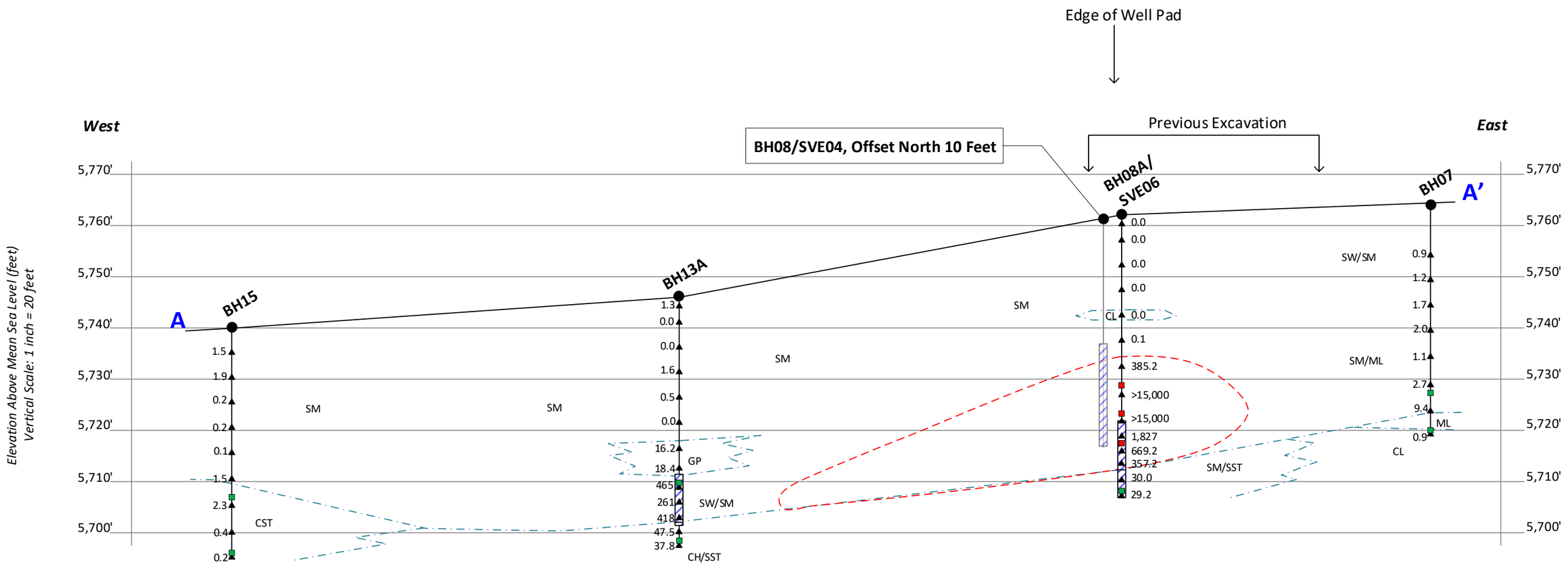
IMAGE COURTESY OF ESRI

0 60 120
Feet

N

FIGURE 5
CROSS SECTION LOCATIONS
HOWELL M #1
LOT 11 SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017821013_HOWELL_M #1\017821013_FIG05_HOWELL_M #1_XSEC_LOC.mxd



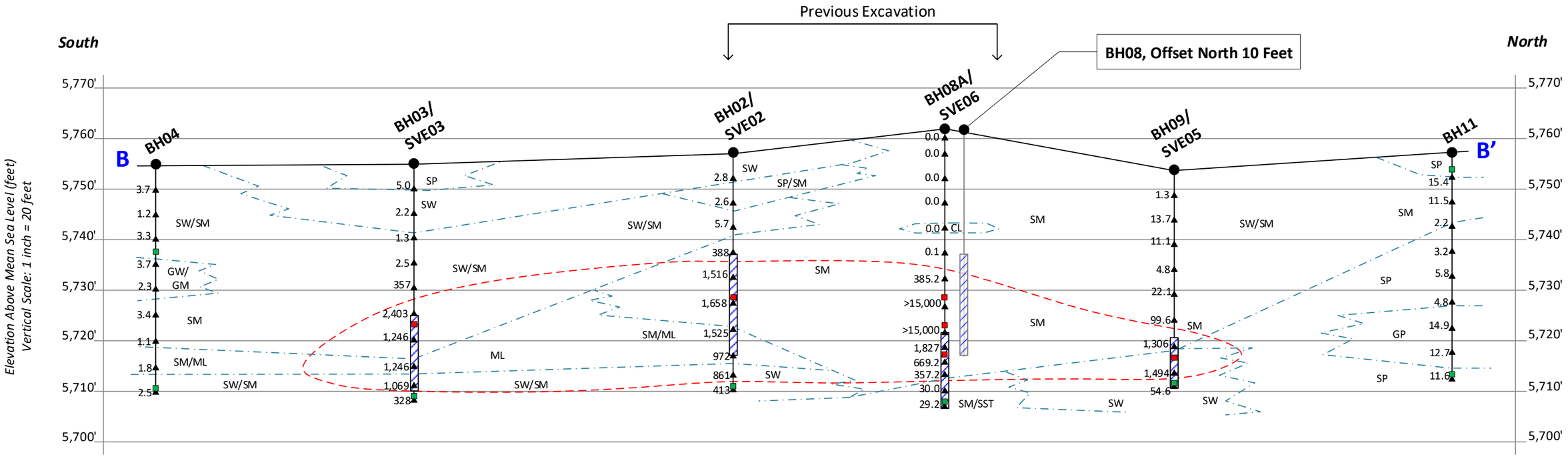
LEGEND

CH	FAT CLAY
CL	LEAN CLAY
CST	CLAYSTONE
GP	WELL SORTED GRAVEL
ML	SILT
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 6
A to A' Cross Section
HOWELL M#1
UNIT N SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



LEGEND

CL	LEAN CLAY
GM	SILTY GRAVEL
GP	WELL SORTED GRAVEL
GW	POORLY SORTED GRAVEL
ML	SILT
SM	SILTY SAND
SP	WELL SORTED 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 7
B to B' Cross Section
HOWELL M#1
UNIT N SEC 30-T30N-R8W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

TABLES

TABLE 1
SOIL ANALYTICAL RESULTS

HOWELL M#1
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 Closure Criteria		NE	**10**	NE	NE	NE	**50**	**600**	NE	NE	NE	**100**
BH01@25'-30'	9/16/2020	1,757	<0.024	12	7.5	85	**105**	<60	1,600	190	<45	**1,790**
BH01@38'-40'	9/16/2020	24.6	0.026	<0.048	<0.048	<0.096	0.026	<60	<4.8	<9.5	<48	<48
BH02@25'-30'	9/16/2020	1,658	<0.082	0.22	<0.16	3.8	4.02	<60	140	370	<46	**510**
BH02@46'	9/16/2020	413.0	0.027	0.32	<0.031	1.2	1.52	<60	56	21	<48	77
BH03@30'-35'	9/17/2020	2,403	<0.12	0.80	0.80	13	14.6	<60	430	140	89	**659**
BH03@47'	9/17/2020	328.0	<0.086	<0.17	<0.17	<0.35	<0.35	84	<17	<9.1	<45	<45
BH04@15'-20'	9/17/2020	3.7	<0.025	<0.049	<0.049	<0.098	<0.098	100	<4.9	<9.6	<48	<48
BH04@43'-45'	9/17/2020	2.5	<0.024	<0.049	<0.049	<0.097	<0.097	<60	<4.9	<9.1	<45	<45
BH05@35'-40'	9/17/2020	14.9	<0.025	<0.050	<0.050	<0.099	<0.099	<60	<5.0	<9.7	<48	<48
BH05@40'-45'	9/17/2020	0.7	<0.024	<0.049	<0.049	<0.097	<0.097	<60	<4.9	<10	<50	<50
BH06@35'-40'	9/18/2020	10.7	0.054	<0.048	<0.048	0.13	0.18	<60	<4.8	<8.8	<44	<44
BH06@40'-45'	9/18/2020	2.9	<0.024	<0.048	<0.048	<0.097	<0.097	<60	<4.8	<9.1	<45	<45
BH07@35'-40'	9/18/2020	9.4	<0.024	<0.049	<0.049	<0.098	<0.098	<60	<4.9	<10	<50	<50
BH07@40'-45'	9/18/2020	0.9	<0.024	<0.048	<0.048	<0.096	<0.096	<60	<4.8	<9.7	<49	<49
BH08@30'-35'	9/21/2020	2,376	<0.12	0.65	0.54	6.7	7.89	<60	140	31	<46	**171**
BH08@40'-45'	9/21/2020	2,194	0.66	26	12	150	**188.7**	<60	3,100	510	<490	**3,610**
BH08A@30'-35'	9/14/2021	>15000	0.16	7.0	3.4	48	**58.6**	<61	1,200	110	<47	**1,310**
BH08A@35'-40'	9/14/2021	>15000	9.3	200	49	560	**818**	97	14,000	650	<460	**14,650**
BH08A@40'-45'	9/14/2021	>15000	7.8	120	22	213	**363**	<60	8,200	410	<490	**8,610**
BH08A@55'	9/15/2021	29.2	<0.083	<0.17	<0.17	<0.33	<0.33	65	<17	11	<48	11
BH09@35'-38'	9/21/2020	1,494	2.9	96	16	260	**375**	<60	6,600	390	<470	**6,990**
BH09@40'-43'	9/21/2020	54.6	<0.023	<0.047	<0.047	<0.094	<0.094	<60	<4.7	16	<44	16
BH10@30'-35'	9/22/2020	17.5	<0.025	0.077	<0.050	0.37	0.45	<60	13	<9.5	<48	13
BH10@38'-40'	9/22/2020	7.1	<0.025	<0.050	<0.050	<0.10	<0.10	<60	<5.0	<9.8	<49	<49
BH11@0-5' (1)	5/14/2021	15.4	<0.023	<0.047	<0.047	<0.094	<0.094	<60	<4.7	<8.5	<43	<43
BH11@40-45' (1)	5/14/2021	11.6	<0.025	<0.049	<0.049	<0.099	<0.099	68	<4.9	<10	<50	<50
BH12@10-15' (1)	5/20/2021	40.5	<0.023	<0.047	<0.047	<0.093	<0.093	110	<4.7	<9.6	<48	<48
BH12@50-55' (1)	5/20/2021	6.7	<0.024	<0.048	<0.048	<0.097	<0.097	<60	<4.8	<9.6	<48	<48
BH13@30-35' (1)	5/20/2021	12.9	<0.024	<0.048	<0.048	<0.096	<0.096	<60	<4.8	<9.8	<49	<49
BH13@40-45' (1)	5/20/2021	371.0	<0.024	<0.047	<0.047	<0.095	<0.095	<61	21	<9.6	<48	21
BH13A@35'-40'	9/15/2021	465	<0.11	0.26	<0.22	0.89	1.15	<61	24	<9.5	<47	24
BH13A@45'-48'	9/15/2021	37.8	0.047	0.050	<0.037	0.079	0.13	<59	<3.7	<9.3	<47	<47

TABLE 1
SOIL ANALYTICAL RESULTS

HOWELL M#1
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 Closure Criteria		NE	**10**	NE	NE	NE	**50**	**600**	NE	NE	NE	**100**
BH14@40'-45'	9/16/2021	7.1	<0.02	<0.041	<0.041	<0.081	<0.081	<60	<4.1	<9.8	<49	<49
BH14@45'-50'	9/16/2021	2.6	<0.021	<0.043	<0.043	<0.085	<0.085	<60	<4.3	<9.5	<48	<48
BH15@30'-35'	9/17/2021	2.3	<0.1	<0.21	<0.21	<0.41	<0.41	<60	<21	<8.7	<44	<44
BH15@40'-45'	9/17/2021	0.2	<0.016	<0.032	<0.032	<0.065	<0.065	<60	<3.2	<9.6	<48	<48
BH16@28'-30'	9/18/2021	20.4	<0.022	<0.043	<0.043	<0.043	<0.043	<60	<4.3	<10	<50	<50
BH16@40'-45'	9/18/2021	11.5	<0.018	<0.036	<0.036	<0.073	<0.073	<60	<3.6	<9.9	<50	<50

NOTES:

(1) - samples collected on 5/14/2021 and 5/20/2021 were mislabeled on the laboratory analytical reports
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
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
ppm - parts per million

TABLE 2
SVE WELL CONSTRUCTION INFORMATION

HOWELL M#1
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Boring/Well Name	Impacted Depth (bgs)	SVE Well Screened Interval (bgs)	Total Depth (feet)
BH01 / SVE01	22' - 38'	23' - 38'	40.0
BH02 / SVE02	18' - 43'	20' - 40'	46.5
BH03 / SVE03	27' - 45'	30' - 45'	47.0
BH08 / SVE04	25' - 45'+	25' - 45'	45.0
BH08A / SVE06	25' - 50'	40' - 55'	55.0
BH09 / SVE05	30' - 41'	33' - 43'	43.0
BH13A / SVE07	35' - 45'	35' - 45'	48.0

NOTES:

bgs - below ground surface

' - feet

ENCLOSURE A – 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

September 21, 2020

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

RE: Howell M1 OrderNo.: 2009976

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 4 sample(s) on 9/17/2020 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 **2009976**
Date Reported: **9/21/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH01@25'-30'
Project: Howell M1
Collection Date: 9/16/2020 9:45:00 AM
Lab ID: 2009976-001 **Matrix:** SOIL
Received Date: 9/17/2020 8:03:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	190	9.0		mg/Kg	1	9/17/2020 11:15:10 AM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/17/2020 11:15:10 AM
Surr: DNOP	94.9	30.4-154		%Rec	1	9/17/2020 11:15:10 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	1600	480		mg/Kg	100	9/20/2020 12:41:08 PM
Surr: BFB	134	75.3-105	S	%Rec	100	9/20/2020 12:41:08 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	9/19/2020 1:56:46 PM
Toluene	12	4.8		mg/Kg	100	9/20/2020 12:41:08 PM
Ethylbenzene	7.5	4.8		mg/Kg	100	9/20/2020 12:41:08 PM
Xylenes, Total	85	9.6		mg/Kg	100	9/20/2020 12:41:08 PM
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	100	9/20/2020 12:41:08 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/17/2020 5:15:28 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 **2009976**
Date Reported: **9/21/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH01@38'-40'
Project: Howell M1
Collection Date: 9/16/2020 10:30:00 AM
Lab ID: 2009976-002 **Matrix:** SOIL **Received Date:** 9/17/2020 8:03:00 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	9/17/2020 11:39:16 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2020 11:39:16 AM
Surr: DNOP	93.6	30.4-154		%Rec	1	9/17/2020 11:39:16 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/20/2020 1:04:37 PM
Surr: BFB	90.5	75.3-105		%Rec	1	9/20/2020 1:04:37 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	0.026	0.024		mg/Kg	1	9/20/2020 1:04:37 PM
Toluene	ND	0.048		mg/Kg	1	9/20/2020 1:04:37 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/20/2020 1:04:37 PM
Xylenes, Total	ND	0.096		mg/Kg	1	9/20/2020 1:04:37 PM
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	9/20/2020 1:04:37 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/17/2020 5:27:48 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 **2009976**
Date Reported: **9/21/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH02@25'-30'
Project: Howell M1
Collection Date: 9/16/2020 1:00:00 PM
Lab ID: 2009976-003 **Matrix:** SOIL **Received Date:** 9/17/2020 8:03:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**
Diesel Range Organics (DRO)	370	9.1		mg/Kg	1	9/17/2020 10:47:00 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/17/2020 10:47:00 AM
Surr: DNOP	94.9	30.4-154		%Rec	1	9/17/2020 10:47:00 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	140	16		mg/Kg	5	9/17/2020 12:19:40 PM
Surr: BFB	224	75.3-105	S	%Rec	5	9/17/2020 12:19:40 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.082		mg/Kg	5	9/17/2020 12:19:40 PM
Toluene	0.22	0.16		mg/Kg	5	9/17/2020 12:19:40 PM
Ethylbenzene	ND	0.16		mg/Kg	5	9/17/2020 12:19:40 PM
Xylenes, Total	3.8	0.33		mg/Kg	5	9/17/2020 12:19:40 PM
Surr: 4-Bromofluorobenzene	111	80-120		%Rec	5	9/17/2020 12:19:40 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/17/2020 12:31:37 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **2009976**
Date Reported: **9/21/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH02@46'
Project: Howell M1
Collection Date: 9/16/2020 1:30:00 PM
Lab ID: 2009976-004 **Matrix:** SOIL **Received Date:** 9/17/2020 8:03:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**
Diesel Range Organics (DRO)	21	9.5		mg/Kg	1	9/17/2020 11:10:47 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2020 11:10:47 AM
Surr: DNOP	95.1	30.4-154		%Rec	1	9/17/2020 11:10:47 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	56	3.1		mg/Kg	1	9/17/2020 12:43:09 PM
Surr: BFB	311	75.3-105	S	%Rec	1	9/17/2020 12:43:09 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	0.027	0.015		mg/Kg	1	9/17/2020 12:43:09 PM
Toluene	0.32	0.031		mg/Kg	1	9/17/2020 12:43:09 PM
Ethylbenzene	ND	0.031		mg/Kg	1	9/17/2020 12:43:09 PM
Xylenes, Total	1.2	0.061		mg/Kg	1	9/17/2020 12:43:09 PM
Surr: 4-Bromofluorobenzene	109	80-120		%Rec	1	9/17/2020 12:43:09 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/17/2020 1:08:40 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **MB-55233**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **55233**	RunNo: **71928**							
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2518797**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-55233**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **55233**	RunNo: **71928**							
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2518798**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.7	90	110			

Sample ID: **MB-55238**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **55238**	RunNo: **71928**							
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2518827**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-55238**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **55238**	RunNo: **71928**							
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2518828**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.0	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **LCS-55231**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **55231**	RunNo: **71918**
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2517325** 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	89.8	70	130			
Surr: DNOP	4.4		5.000		89.0	30.4	154			

Sample ID: **MB-55231**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **55231**	RunNo: **71918**
Prep Date: **9/17/2020**	Analysis Date: **9/17/2020**	SeqNo: **2517326** 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	9.5		10.00		95.3	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#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **2.5ug gro lcs**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **GS71929**	RunNo: **71929**
Prep Date:	Analysis Date: **9/17/2020**	SeqNo: **2518375** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	87.1	72.5	106			
Surr: BFB	1100		1000		109	75.3	105			S

Sample ID: **mb1**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **GS71929**	RunNo: **71929**
Prep Date:	Analysis Date: **9/17/2020**	SeqNo: **2518399** 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	960		1000		95.9	75.3	105			

Sample ID: **lcs-55219**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **55219**	RunNo: **71963**
Prep Date: **9/16/2020**	Analysis Date: **9/18/2020**	SeqNo: **2519548** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		104	75.3	105			

Sample ID: **mb-55219**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **55219**	RunNo: **71963**
Prep Date: **9/16/2020**	Analysis Date: **9/18/2020**	SeqNo: **2519549** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	950		1000		95.4	75.3	105			

Sample ID: **mb-55234**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520089** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	890		1000		89.3	75.3	105			

Sample ID: **lcs-55234**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520113** 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	100	72.5	106			
Surr: BFB	1000		1000		105	75.3	105			

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#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **mb-55251**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **55251**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/20/2020**	SeqNo: **2520138** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	880		1000		88.0	75.3	105			

Sample ID: **lcs-55251**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **55251**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/20/2020**	SeqNo: **2520139** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	990		1000		99.0	75.3	105			

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#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **100ng btex lcs**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **BS71929**	RunNo: **71929**
Prep Date:	Analysis Date: **9/17/2020**	SeqNo: **2518417** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.88	0.025	1.000	0	87.7	80	120			
Toluene	0.90	0.050	1.000	0	89.6	80	120			
Ethylbenzene	0.90	0.050	1.000	0	89.9	80	120			
Xylenes, Total	2.7	0.10	3.000	0	90.0	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		104	80	120			

Sample ID: **mb1**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **BS71929**	RunNo: **71929**
Prep Date:	Analysis Date: **9/17/2020**	SeqNo: **2518443** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		99.7	80	120			

Sample ID: **mb-55234**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520171** 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		100	80	120			

Sample ID: **LCS-55234**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520172** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.0	80	120			
Toluene	1.0	0.050	1.000	0	101	80	120			
Ethylbenzene	1.0	0.050	1.000	0	101	80	120			
Xylenes, Total	3.1	0.10	3.000	0	103	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2009976**

21-Sep-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **2009976-002ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH01@38'-40'**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520177** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.024	0.9416	0.02586	92.1	76.3	120			
Toluene	0.94	0.047	0.9416	0.01820	98.2	78.5	120			
Ethylbenzene	0.97	0.047	0.9416	0.01791	101	78.1	124			
Xylenes, Total	2.9	0.094	2.825	0.04655	103	79.3	125			
Surr: 4-Bromofluorobenzene	0.96		0.9416		102	80	120			

Sample ID: **2009976-002amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BH01@38'-40'**	Batch ID: **55234**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/19/2020**	SeqNo: **2520178** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.95	0.024	0.9588	0.02586	96.9	76.3	120	6.63	20	
Toluene	1.0	0.048	0.9588	0.01820	103	78.5	120	6.58	20	
Ethylbenzene	1.0	0.048	0.9588	0.01791	107	78.1	124	7.46	20	
Xylenes, Total	3.1	0.096	2.876	0.04655	107	79.3	125	6.26	20	
Surr: 4-Bromofluorobenzene	0.98		0.9588		102	80	120	0	0	

Sample ID: **mb-55251**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **55251**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/20/2020**	SeqNo: **2520197** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.98		1.000		97.6	80	120			

Sample ID: **LCS-55251**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **55251**	RunNo: **71993**
Prep Date: **9/17/2020**	Analysis Date: **9/20/2020**	SeqNo: **2520198** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		99.7	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: 2009976 RcptNo: 1

Received By: **Scott Anderson** 9/17/2020 8:03:00 AM

Completed By: **Juan Rojas** 9/17/2020 8:06:28 AM

Reviewed By: JR 9/17/20

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: DAD 9/17/20

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	5.0	Good				

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) EDF

Turn-Around Time:
☒ Standard ☒ Rush BH01 Same day results for BH02
Project Name: Howell M#1
Project #:
Project Manager: LTE-Danny Burns 701-570-4727
Sampler: D. Burns
On Ice: ☑ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 4.8+0.2=5.0 (°C)

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

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2000976	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)
9-16-20	09:45	Soil	BH01@25'-30'	1-4oz.	Cool	-001	X	X					X			
	10:30		BH01@38'-40'			-002										
	13:00		BH02@25'-30'			-003										
	13:30		BH02@46'			-004										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9-16-20	17:00		SPA Courier		9.17.20	8:03
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
cc: dhencmann@ltenv.com
dburns@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 22, 2020

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

RE: Howell M 1 OrderNo.: 2009A88

Dear Danny Burns:

Hall Environmental Analysis Laboratory received 2 sample(s) on 9/18/2020 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 **2009A88**
Date Reported: **9/22/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH03 @ 30'-35'
Project: Howell M 1
Collection Date: 9/17/2020 11:45:00 AM
Lab ID: 2009A88-001 **Matrix:** SOIL
Received Date: 9/18/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Chloride	ND	60		mg/Kg	20	9/21/2020 2:16:39 PM	55323
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**	
Gasoline Range Organics (GRO)	430	25		mg/Kg	5	9/20/2020 1:58:49 PM	55273
Surr: BFB	112	70-130		%Rec	5	9/20/2020 1:58:49 PM	55273
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**	
Diesel Range Organics (DRO)	140	8.9		mg/Kg	1	9/21/2020 12:14:38 PM	55283
Motor Oil Range Organics (MRO)	89	44		mg/Kg	1	9/21/2020 12:14:38 PM	55283
Surr: DNOP	117	30.4-154		%Rec	1	9/21/2020 12:14:38 PM	55283
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**	
Benzene	ND	0.12		mg/Kg	5	9/20/2020 1:58:49 PM	55273
Toluene	0.80	0.25		mg/Kg	5	9/20/2020 1:58:49 PM	55273
Ethylbenzene	0.80	0.25		mg/Kg	5	9/20/2020 1:58:49 PM	55273
Xylenes, Total	13	0.49		mg/Kg	5	9/20/2020 1:58:49 PM	55273
Surr: 1,2-Dichloroethane-d4	96.3	70-130		%Rec	5	9/20/2020 1:58:49 PM	55273
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	5	9/20/2020 1:58:49 PM	55273
Surr: Dibromofluoromethane	107	70-130		%Rec	5	9/20/2020 1:58:49 PM	55273
Surr: Toluene-d8	98.3	70-130		%Rec	5	9/20/2020 1:58:49 PM	55273

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		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **2009A88**
Date Reported: **9/22/2020**

CLIENT: HILCORP ENERGY
Client Sample ID: BH03 @ 47'
Project: Howell M 1
Collection Date: 9/17/2020 12:15:00 PM
Lab ID: 2009A88-002 **Matrix:** SOIL **Received Date:** 9/18/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	84	60		mg/Kg	20	9/18/2020 12:58:43 PM	55265
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	9/18/2020 10:01:11 AM	55261
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/18/2020 10:01:11 AM	55261
Surr: DNOP	94.7	30.4-154		%Rec	1	9/18/2020 10:01:11 AM	55261
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	ND	17		mg/Kg	5	9/18/2020 12:58:34 PM	55217
Surr: BFB	96.6	75.3-105		%Rec	5	9/18/2020 12:58:34 PM	55217
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	ND	0.086		mg/Kg	5	9/18/2020 12:58:34 PM	55217
Toluene	ND	0.17		mg/Kg	5	9/18/2020 12:58:34 PM	55217
Ethylbenzene	ND	0.17		mg/Kg	5	9/18/2020 12:58:34 PM	55217
Xylenes, Total	ND	0.35		mg/Kg	5	9/18/2020 12:58:34 PM	55217
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	5	9/18/2020 12:58:34 PM	55217

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#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **MB-55265** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55265** RunNo: **71998**
Prep Date: **9/18/2020** Analysis Date: **9/18/2020** SeqNo: **2520645** Units: **mg/Kg**

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

Sample ID: **LCS-55265** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55265** RunNo: **71998**
Prep Date: **9/18/2020** Analysis Date: **9/18/2020** SeqNo: **2520646** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.6	90	110			

Sample ID: **MB-55323** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55323** RunNo: **72032**
Prep Date: **9/21/2020** Analysis Date: **9/21/2020** SeqNo: **2522893** Units: **mg/Kg**

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

Sample ID: **LCS-55323** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55323** RunNo: **72032**
Prep Date: **9/21/2020** Analysis Date: **9/21/2020** SeqNo: **2522895** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	90.1	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#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **MB-55261**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **55261**	RunNo: **71952**							
Prep Date: **9/18/2020**	Analysis Date: **9/18/2020**	SeqNo: **2518515**	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		99.9	30.4	154			

Sample ID: **LCS-55261**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **55261**	RunNo: **71952**							
Prep Date: **9/18/2020**	Analysis Date: **9/18/2020**	SeqNo: **2518516**	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	93.4	70	130			
Surr: DNOP	4.8		5.000		96.6	30.4	154			

Sample ID: **LCS-55283**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **55283**	RunNo: **72031**							
Prep Date: **9/19/2020**	Analysis Date: **9/21/2020**	SeqNo: **2522561**	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	5.4		5.000		108	30.4	154			

Sample ID: **MB-55283**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **55283**	RunNo: **72031**							
Prep Date: **9/19/2020**	Analysis Date: **9/21/2020**	SeqNo: **2522562**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		127	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#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **lcs-55217** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **55217** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519202** 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	72.5	106			
Surr: BFB	1100		1000		108	75.3	105			S

Sample ID: **mb-55217** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **55217** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519203** 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		96.6	75.3	105			

Sample ID: **lcs-55219** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **55219** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519548** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		104	75.3	105			

Sample ID: **mb-55219** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **55219** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519549** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	950		1000		95.4	75.3	105			

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#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **LCS-55217** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS** Batch ID: **55217** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519215** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.025	1.000	0	89.6	80	120			
Toluene	0.94	0.050	1.000	0	93.6	80	120			
Ethylbenzene	0.95	0.050	1.000	0	95.2	80	120			
Xylenes, Total	2.9	0.10	3.000	0	95.4	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		103	80	120			

Sample ID: **mb-55217** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS** Batch ID: **55217** RunNo: **71963**
Prep Date: **9/16/2020** Analysis Date: **9/18/2020** SeqNo: **2519216** 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		101	80	120			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **mb-55273** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519815** 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	0.45		0.5000		90.7	70	130			
Surr: 4-Bromofluorobenzene	0.52		0.5000		104	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		104	70	130			
Surr: Toluene-d8	0.49		0.5000		98.4	70	130			

Sample ID: **lcs-55273** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **55273** RunNo: **71984**
Prep Date: **9/18/2020** Analysis Date: **9/19/2020** SeqNo: **2519816** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	97.8	80	120			
Toluene	1.0	0.050	1.000	0	102	80	120			
Ethylbenzene	1.0	0.050	1.000	0	102	80	120			
Xylenes, Total	3.2	0.10	3.000	0	107	80	120			
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.2	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		102	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		107	70	130			
Surr: Toluene-d8	0.49		0.5000		97.4	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#: **2009A88**
22-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **mb-55273**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **55273**	RunNo: **71984**
Prep Date: **9/18/2020**	Analysis Date: **9/19/2020**	SeqNo: **2519845** 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	510		500.0		103	70	130			

Sample ID: **lcs-55273**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **55273**	RunNo: **71984**
Prep Date: **9/18/2020**	Analysis Date: **9/19/2020**	SeqNo: **2519846** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	88.6	70	130			
Surr: BFB	520		500.0		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

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: **2009A88** RcptNo: **1**

Received By: **Emily Mocho** **9/18/2020 8:00:00 AM**

Completed By: **Emily Mocho** **9/18/2020 8:11:35 AM**

Reviewed By: CMC 9/18/20

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 9/18/20

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	0.6	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp Energy

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:

☐ Standard ☒ Rush Same Day 47' Sample

Project Name: Howell M #1

Project #:

Project Manager: Danny Burns (LTE) 701-570-4787

Sampler: D. Burns

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 0.5+0.1=0.6(°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. 2009A88	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)
9/17	1145	soil	BH03 @ 30'-35'			001	X	X					X			
9/17	1215	soil	BH03 @ 47'			002	X	X					X			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9/17	1500	[signature]	[signature]	courier	9/18/20	8:00
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: same day for ~~the~~ BH03 @ 47'

cc: dhenrin@ltenv.com ecarroll@ltenv.com

seal intact [signature] 9/18/20

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, 2020

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

RE: Howell M 1 OrderNo.: 2009B86

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 8 sample(s) on 9/19/2020 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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH04@ 15'-20'
Project: Howell M 1
Collection Date: 9/17/2020 1:45:00 PM
Lab ID: 2009B86-001 **Matrix:** SOIL
Received Date: 9/19/2020 8:30:00 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	9/23/2020 1:55:13 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/23/2020 1:55:13 PM
Surr: DNOP	78.9	30.4-154		%Rec	1	9/23/2020 1:55:13 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	100	61		mg/Kg	20	9/28/2020 7:01:48 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	9/23/2020 7:52:07 AM
Toluene	ND	0.049		mg/Kg	1	9/23/2020 7:52:07 AM
Ethylbenzene	ND	0.049		mg/Kg	1	9/23/2020 7:52:07 AM
Xylenes, Total	ND	0.098		mg/Kg	1	9/23/2020 7:52:07 AM
Surr: 1,2-Dichloroethane-d4	90.3	70-130		%Rec	1	9/23/2020 7:52:07 AM
Surr: 4-Bromofluorobenzene	100	70-130		%Rec	1	9/23/2020 7:52:07 AM
Surr: Dibromofluoromethane	109	70-130		%Rec	1	9/23/2020 7:52:07 AM
Surr: Toluene-d8	99.5	70-130		%Rec	1	9/23/2020 7:52:07 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/23/2020 7:52:07 AM
Surr: BFB	105	70-130		%Rec	1	9/23/2020 7:52:07 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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH04@ 43'-45'
Project: Howell M 1
Collection Date: 9/17/2020 2:20:00 PM
Lab ID: 2009B86-002 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	9/23/2020 2:05:07 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/23/2020 2:05:07 PM
Surr: DNOP	93.2	30.4-154		%Rec	1	9/23/2020 2:05:07 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 8:03:50 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	9/23/2020 6:27:55 PM
Toluene	ND	0.049		mg/Kg	1	9/23/2020 6:27:55 PM
Ethylbenzene	ND	0.049		mg/Kg	1	9/23/2020 6:27:55 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/23/2020 6:27:55 PM
Surr: 1,2-Dichloroethane-d4	85.8	70-130		%Rec	1	9/23/2020 6:27:55 PM
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	9/23/2020 6:27:55 PM
Surr: Dibromofluoromethane	108	70-130		%Rec	1	9/23/2020 6:27:55 PM
Surr: Toluene-d8	97.1	70-130		%Rec	1	9/23/2020 6:27:55 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/23/2020 6:27:55 PM
Surr: BFB	105	70-130		%Rec	1	9/23/2020 6:27:55 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH05@ 35'-40'
Project: Howell M 1
Collection Date: 9/17/2020 4:20:00 PM
Lab ID: 2009B86-003 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 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	9/23/2020 2:14:59 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/23/2020 2:14:59 PM
Surr: DNOP	89.5	30.4-154		%Rec	1	9/23/2020 2:14:59 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 8:16:15 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	9/23/2020 7:53:25 PM
Toluene	ND	0.050		mg/Kg	1	9/23/2020 7:53:25 PM
Ethylbenzene	ND	0.050		mg/Kg	1	9/23/2020 7:53:25 PM
Xylenes, Total	ND	0.099		mg/Kg	1	9/23/2020 7:53:25 PM
Surr: 1,2-Dichloroethane-d4	90.0	70-130		%Rec	1	9/23/2020 7:53:25 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	9/23/2020 7:53:25 PM
Surr: Dibromofluoromethane	105	70-130		%Rec	1	9/23/2020 7:53:25 PM
Surr: Toluene-d8	92.5	70-130		%Rec	1	9/23/2020 7:53:25 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/23/2020 7:53:25 PM
Surr: BFB	102	70-130		%Rec	1	9/23/2020 7:53:25 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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH05@ 40'-45'
Project: Howell M 1
Collection Date: 9/17/2020 4:30:00 PM
Lab ID: 2009B86-004 **Matrix:** SOIL
Received Date: 9/19/2020 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/23/2020 2:24:52 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/23/2020 2:24:52 PM
Surr: DNOP	80.3	30.4-154		%Rec	1	9/23/2020 2:24:52 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 6:16:13 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	9/23/2020 8:21:52 PM
Toluene	ND	0.049		mg/Kg	1	9/23/2020 8:21:52 PM
Ethylbenzene	ND	0.049		mg/Kg	1	9/23/2020 8:21:52 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/23/2020 8:21:52 PM
Surr: 1,2-Dichloroethane-d4	94.2	70-130		%Rec	1	9/23/2020 8:21:52 PM
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	9/23/2020 8:21:52 PM
Surr: Dibromofluoromethane	108	70-130		%Rec	1	9/23/2020 8:21:52 PM
Surr: Toluene-d8	98.7	70-130		%Rec	1	9/23/2020 8:21:52 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/23/2020 8:21:52 PM
Surr: BFB	106	70-130		%Rec	1	9/23/2020 8:21:52 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH06@ 35'-40'
Project: Howell M 1
Collection Date: 9/18/2020 11:20:00 AM
Lab ID: 2009B86-005 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	8.8		mg/Kg	1	9/23/2020 2:34:44 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	9/23/2020 2:34:44 PM
Surr: DNOP	87.0	30.4-154		%Rec	1	9/23/2020 2:34:44 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 6:53:26 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	0.054	0.024		mg/Kg	1	9/23/2020 8:50:27 PM
Toluene	ND	0.048		mg/Kg	1	9/23/2020 8:50:27 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/23/2020 8:50:27 PM
Xylenes, Total	0.13	0.097		mg/Kg	1	9/23/2020 8:50:27 PM
Surr: 1,2-Dichloroethane-d4	87.9	70-130		%Rec	1	9/23/2020 8:50:27 PM
Surr: 4-Bromofluorobenzene	97.0	70-130		%Rec	1	9/23/2020 8:50:27 PM
Surr: Dibromofluoromethane	102	70-130		%Rec	1	9/23/2020 8:50:27 PM
Surr: Toluene-d8	94.9	70-130		%Rec	1	9/23/2020 8:50:27 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/23/2020 8:50:27 PM
Surr: BFB	104	70-130		%Rec	1	9/23/2020 8:50:27 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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH06@ 40'-45'
Project: Howell M 1
Collection Date: 9/18/2020 11:30:00 AM
Lab ID: 2009B86-006 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	9/23/2020 2:44:36 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	9/23/2020 2:44:36 PM
Surr: DNOP	82.9	30.4-154		%Rec	1	9/23/2020 2:44:36 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 7:05:50 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	9/23/2020 9:19:02 PM
Toluene	ND	0.048		mg/Kg	1	9/23/2020 9:19:02 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/23/2020 9:19:02 PM
Xylenes, Total	ND	0.097		mg/Kg	1	9/23/2020 9:19:02 PM
Surr: 1,2-Dichloroethane-d4	86.6	70-130		%Rec	1	9/23/2020 9:19:02 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	9/23/2020 9:19:02 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	1	9/23/2020 9:19:02 PM
Surr: Toluene-d8	93.2	70-130		%Rec	1	9/23/2020 9:19:02 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/23/2020 9:19:02 PM
Surr: BFB	103	70-130		%Rec	1	9/23/2020 9:19:02 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH07@ 35'40'
Project: Howell M 1
Collection Date: 9/18/2020 1:45:00 PM
Lab ID: 2009B86-007 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/23/2020 2:54:29 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/23/2020 2:54:29 PM
Surr: DNOP	79.4	30.4-154		%Rec	1	9/23/2020 2:54:29 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 7:18:15 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	9/23/2020 9:47:36 PM
Toluene	ND	0.049		mg/Kg	1	9/23/2020 9:47:36 PM
Ethylbenzene	ND	0.049		mg/Kg	1	9/23/2020 9:47:36 PM
Xylenes, Total	ND	0.098		mg/Kg	1	9/23/2020 9:47:36 PM
Surr: 1,2-Dichloroethane-d4	91.4	70-130		%Rec	1	9/23/2020 9:47:36 PM
Surr: 4-Bromofluorobenzene	99.7	70-130		%Rec	1	9/23/2020 9:47:36 PM
Surr: Dibromofluoromethane	107	70-130		%Rec	1	9/23/2020 9:47:36 PM
Surr: Toluene-d8	97.8	70-130		%Rec	1	9/23/2020 9:47:36 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	9/23/2020 9:47:36 PM
Surr: BFB	103	70-130		%Rec	1	9/23/2020 9:47:36 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 **2009B86**
Date Reported: **9/30/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH07@ 40'-45'
Project: Howell M 1
Collection Date: 9/18/2020 2:00:00 PM
Lab ID: 2009B86-008 **Matrix:** SOIL **Received Date:** 9/19/2020 8:30:00 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	9/23/2020 3:04:22 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/23/2020 3:04:22 PM
Surr: DNOP	96.4	30.4-154		%Rec	1	9/23/2020 3:04:22 PM
EPA METHOD 300.0: ANIONS						Analyst: **CAS**
Chloride	ND	60		mg/Kg	20	9/28/2020 7:30:39 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	9/23/2020 10:16:09 PM
Toluene	ND	0.048		mg/Kg	1	9/23/2020 10:16:09 PM
Ethylbenzene	ND	0.048		mg/Kg	1	9/23/2020 10:16:09 PM
Xylenes, Total	ND	0.096		mg/Kg	1	9/23/2020 10:16:09 PM
Surr: 1,2-Dichloroethane-d4	91.1	70-130		%Rec	1	9/23/2020 10:16:09 PM
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	1	9/23/2020 10:16:09 PM
Surr: Dibromofluoromethane	104	70-130		%Rec	1	9/23/2020 10:16:09 PM
Surr: Toluene-d8	96.3	70-130		%Rec	1	9/23/2020 10:16:09 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	9/23/2020 10:16:09 PM
Surr: BFB	105	70-130		%Rec	1	9/23/2020 10:16:09 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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2009B86**
30-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **MB-55495** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55495** RunNo: **72217**
Prep Date: **9/28/2020** Analysis Date: **9/28/2020** SeqNo: **2532335** Units: **mg/Kg**

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

Sample ID: **LCS-55495** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55495** RunNo: **72217**
Prep Date: **9/28/2020** Analysis Date: **9/28/2020** SeqNo: **2532336** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.0	90	110			

Sample ID: **MB-55496** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55496** RunNo: **72226**
Prep Date: **9/28/2020** Analysis Date: **9/28/2020** SeqNo: **2532664** Units: **mg/Kg**

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

Sample ID: **LCS-55496** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55496** RunNo: **72226**
Prep Date: **9/28/2020** Analysis Date: **9/28/2020** SeqNo: **2532665** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.6	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#: **2009B86**
30-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **LCS-55347**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **55347**	RunNo: **72066**
Prep Date: **9/22/2020**	Analysis Date: **9/23/2020**	SeqNo: **2527106** 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	106	70	130			
Surr: DNOP	5.3		5.000		106	30.4	154			

Sample ID: **MB-55347**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **55347**	RunNo: **72066**
Prep Date: **9/22/2020**	Analysis Date: **9/23/2020**	SeqNo: **2527109** 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		113	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#: **2009B86**
30-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **lcs-55331** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **55331** RunNo: **72064**
Prep Date: **9/21/2020** Analysis Date: **9/23/2020** SeqNo: **2524709** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	96.9	80	120			
Toluene	1.0	0.050	1.000	0	102	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	0.42		0.5000		85.0	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.48		0.5000		96.3	70	130			

Sample ID: **mb-55331** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **55331** RunNo: **72064**
Prep Date: **9/21/2020** Analysis Date: **9/23/2020** SeqNo: **2524710** 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	0.43		0.5000		86.1	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.7	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		106	70	130			
Surr: Toluene-d8	0.50		0.5000		99.6	70	130			

Sample ID: **2009b86-001ams** SampType: **MS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BH04@ 15'-20'** Batch ID: **55331** RunNo: **72064**
Prep Date: **9/21/2020** Analysis Date: **9/23/2020** SeqNo: **2524715** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	0.9901	0	107	71.1	115			
Toluene	1.1	0.050	0.9901	0	112	79.6	132			
Ethylbenzene	1.1	0.050	0.9901	0	113	83.8	134			
Xylenes, Total	3.4	0.099	2.970	0	116	82.4	132			
Surr: 1,2-Dichloroethane-d4	0.45		0.4950		90.7	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.4950		100	70	130			
Surr: Dibromofluoromethane	0.53		0.4950		107	70	130			
Surr: Toluene-d8	0.48		0.4950		97.0	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical 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#: **2009B86**
30-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **2009b86-001amsd** SampType: **MSD4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BH04@ 15'-20'** Batch ID: **55331** RunNo: **72064**
Prep Date: **9/21/2020** Analysis Date: **9/23/2020** SeqNo: **2524716** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	0.9852	0	110	71.1	115	2.29	20	
Toluene	1.1	0.049	0.9852	0	114	79.6	132	1.15	20	
Ethylbenzene	1.2	0.049	0.9852	0	118	83.8	134	4.15	20	
Xylenes, Total	3.5	0.099	2.956	0	119	82.4	132	2.71	20	
Surr: 1,2-Dichloroethane-d4	0.45		0.4926		91.3	70	130	0	0	
Surr: 4-Bromofluorobenzene	0.46		0.4926		93.3	70	130	0	0	
Surr: Dibromofluoromethane	0.53		0.4926		107	70	130	0	0	
Surr: Toluene-d8	0.47		0.4926		96.2	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#: **2009B86**
30-Sep-20

Client: HILCORP ENERGY
Project: Howell M 1

Sample ID: **lcs-55331**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **55331**	RunNo: **72064**							
Prep Date: **9/21/2020**	Analysis Date: **9/23/2020**	SeqNo: **2524727**	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	79.6	70	130			
Surr: BFB	510		500.0		102	70	130			

Sample ID: **mb-55331**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**							
Client ID: **PBS**	Batch ID: **55331**	RunNo: **72064**							
Prep Date: **9/21/2020**	Analysis Date: **9/23/2020**	SeqNo: **2524728**	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		105	70	130			

Sample ID: **2009b86-002ams**	SampType: **MS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**							
Client ID: **BH04@ 43'-45'**	Batch ID: **55331**	RunNo: **72117**							
Prep Date: **9/21/2020**	Analysis Date: **9/23/2020**	SeqNo: **2527430**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	4.9	24.70	0	85.4	49.2	122			
Surr: BFB	520		494.1		105	70	130			

Sample ID: **2009b86-002amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D Mod: Gasoline Range**							
Client ID: **BH04@ 43'-45'**	Batch ID: **55331**	RunNo: **72117**							
Prep Date: **9/21/2020**	Analysis Date: **9/23/2020**	SeqNo: **2527431**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	4.8	23.99	0	84.2	49.2	122	4.34	20	
Surr: BFB	490		479.8		102	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: 2009B86 RcptNo: 1

Received By: **Emily Mocho** 9/18/2020 8:30:00 AM

Completed By: **Juan Rojas** 9/21/2020 9:24:54 AM

Reviewed By: JR 9/21/20

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: CM 9/21/20

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	2.7	Good				

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:
☒ Standard ☐ Rush
Project Name: Howell M #1
Project #:
Project Manager: LTE - Danny Burns 701-570-4727
Sampler: D Burns
On Ice: ☑ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 2-8-0.1=2.7 (°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. 2009886	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)
9-17-20	1345	SOIL	BH04@15'-20'	1-4oz	COOL	-001	X	X					X			
	1420		BH04@43'-45'			-002										
	1620		BH05@35'-40'			-003										
	1630		BH05@40'-45'			-004										
9-18-20	1120		BH06@35'-40'			-005										
	1130		BH06@40'-45'			-006										
	1345		BH07@35'-40'			-007										
	1400		BH07@40'-45'			-008										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9-18-20	16:00		EM	courier	9/19/20 EM	
					~~9/18/20~~	8:30
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: cc: dhencmann@ltenv.com
dburns@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

October 02, 2020

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

RE: Howell M1 OrderNo.: 2009D45

Dear Danny Burns:

Hall Environmental Analysis Laboratory received 6 sample(s) on 9/23/2020 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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH08@30'-35'
Project: Howell M1
Collection Date: 9/21/2020 9:00:00 AM
Lab ID: 2009D45-001 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CAS**	
Chloride	ND	60		mg/Kg	20	9/29/2020 2:22:03 PM	55518
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	31	9.1		mg/Kg	1	9/24/2020 3:34:09 PM	55398
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	9/24/2020 3:34:09 PM	55398
Surr: DNOP	118	30.4-154		%Rec	1	9/24/2020 3:34:09 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	140	24		mg/Kg	5	9/26/2020 11:09:25 PM	55383
Surr: BFB	178	75.3-105	S	%Rec	5	9/26/2020 11:09:25 PM	55383
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	ND	0.12		mg/Kg	5	9/26/2020 11:09:25 PM	55383
Toluene	0.65	0.24		mg/Kg	5	9/26/2020 11:09:25 PM	55383
Ethylbenzene	0.54	0.24		mg/Kg	5	9/26/2020 11:09:25 PM	55383
Xylenes, Total	6.7	0.49		mg/Kg	5	9/26/2020 11:09:25 PM	55383
Surr: 4-Bromofluorobenzene	111	80-120		%Rec	5	9/26/2020 11:09:25 PM	55383

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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH08@40'-45'
Project: Howell M1
Collection Date: 9/21/2020 9:30:00 AM
Lab ID: 2009D45-002 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**CAS**
Chloride	ND	60		mg/Kg	20	9/29/2020 5:50:52 PM	55541
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	510	97		mg/Kg	10	9/24/2020 5:36:08 PM	55398
Motor Oil Range Organics (MRO)	ND	490	D	mg/Kg	10	9/24/2020 5:36:08 PM	55398
Surr: DNOP	0	30.4-154	S	%Rec	10	9/24/2020 5:36:08 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	3100	490		mg/Kg	100	9/28/2020 12:50:23 PM	55383
Surr: BFB	181	75.3-105	S	%Rec	100	9/28/2020 12:50:23 PM	55383
EPA METHOD 8021B: VOLATILES						Analyst:	**RAA**
Benzene	0.66	0.12		mg/Kg	5	9/26/2020 11:32:53 PM	55383
Toluene	26	4.9		mg/Kg	100	9/28/2020 12:50:23 PM	55383
Ethylbenzene	12	0.25		mg/Kg	5	9/26/2020 11:32:53 PM	55383
Xylenes, Total	150	9.9		mg/Kg	100	9/28/2020 12:50:23 PM	55383
Surr: 4-Bromofluorobenzene	191	80-120	S	%Rec	5	9/26/2020 11:32:53 PM	55383

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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH09@35'-38'
Project: Howell M1
Collection Date: 9/21/2020 12:00:00 PM
Lab ID: 2009D45-003 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**CAS**
Chloride	ND	60		mg/Kg	20	9/29/2020 6:28:06 PM	55541
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	390	94		mg/Kg	10	9/24/2020 5:46:06 PM	55398
Motor Oil Range Organics (MRO)	ND	470	D	mg/Kg	10	9/24/2020 5:46:06 PM	55398
Surr: DNOP	0	30.4-154	S	%Rec	10	9/24/2020 5:46:06 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	6600	990		mg/Kg	200	9/28/2020 1:13:49 PM	55383
Surr: BFB	155	75.3-105	S	%Rec	200	9/28/2020 1:13:49 PM	55383
EPA METHOD 8021B: VOLATILES						Analyst:	**RAA**
Benzene	2.9	0.12		mg/Kg	5	9/27/2020 1:06:32 AM	55383
Toluene	96	9.9		mg/Kg	200	9/28/2020 1:13:49 PM	55383
Ethylbenzene	16	0.25		mg/Kg	5	9/27/2020 1:06:32 AM	55383
Xylenes, Total	260	20		mg/Kg	200	9/28/2020 1:13:49 PM	55383
Surr: 4-Bromofluorobenzene	213	80-120	S	%Rec	5	9/27/2020 1:06:32 AM	55383

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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH09@40'-43'
Project: Howell M1
Collection Date: 9/21/2020 12:20:00 PM
Lab ID: 2009D45-004 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**CAS**
Chloride	ND	60		mg/Kg	20	9/29/2020 7:05:20 PM	55541
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	16	8.7		mg/Kg	1	9/24/2020 4:03:27 PM	55398
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	9/24/2020 4:03:27 PM	55398
Surr: DNOP	106	30.4-154		%Rec	1	9/24/2020 4:03:27 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**RAA**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/27/2020 1:29:53 AM	55383
Surr: BFB	92.3	75.3-105		%Rec	1	9/27/2020 1:29:53 AM	55383
EPA METHOD 8021B: VOLATILES						Analyst:	**RAA**
Benzene	ND	0.023		mg/Kg	1	9/27/2020 1:29:53 AM	55383
Toluene	ND	0.047		mg/Kg	1	9/27/2020 1:29:53 AM	55383
Ethylbenzene	ND	0.047		mg/Kg	1	9/27/2020 1:29:53 AM	55383
Xylenes, Total	ND	0.094		mg/Kg	1	9/27/2020 1:29:53 AM	55383
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	9/27/2020 1:29:53 AM	55383

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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH010@30'-35'
Project: Howell M1
Collection Date: 9/22/2020 8:30:00 AM
Lab ID: 2009D45-005 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**CAS**
Chloride	ND	60		mg/Kg	20	9/29/2020 7:17:44 PM	55541
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/24/2020 4:13:12 PM	55398
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/24/2020 4:13:12 PM	55398
Surr: DNOP	91.4	30.4-154		%Rec	1	9/24/2020 4:13:12 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**RAA**
Gasoline Range Organics (GRO)	13	5.0		mg/Kg	1	9/27/2020 1:53:21 AM	55383
Surr: BFB	146	75.3-105	S	%Rec	1	9/27/2020 1:53:21 AM	55383
EPA METHOD 8021B: VOLATILES						Analyst:	**RAA**
Benzene	ND	0.025		mg/Kg	1	9/27/2020 1:53:21 AM	55383
Toluene	0.077	0.050		mg/Kg	1	9/27/2020 1:53:21 AM	55383
Ethylbenzene	ND	0.050		mg/Kg	1	9/27/2020 1:53:21 AM	55383
Xylenes, Total	0.37	0.099		mg/Kg	1	9/27/2020 1:53:21 AM	55383
Surr: 4-Bromofluorobenzene	106	80-120		%Rec	1	9/27/2020 1:53:21 AM	55383

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 **2009D45**
Date Reported: **10/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH010@38'-40'
Project: Howell M1
Collection Date: 9/22/2020 10:00:00 AM
Lab ID: 2009D45-006 **Matrix:** SOIL **Received Date:** 9/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**CAS**
Chloride	ND	60		mg/Kg	20	9/29/2020 7:30:08 PM	55541
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/24/2020 4:22:57 PM	55398
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/24/2020 4:22:57 PM	55398
Surr: DNOP	96.0	30.4-154		%Rec	1	9/24/2020 4:22:57 PM	55398
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**RAA**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	9/27/2020 2:16:51 AM	55383
Surr: BFB	89.5	75.3-105		%Rec	1	9/27/2020 2:16:51 AM	55383
EPA METHOD 8021B: VOLATILES						Analyst:	**RAA**
Benzene	ND	0.025		mg/Kg	1	9/27/2020 2:16:51 AM	55383
Toluene	ND	0.050		mg/Kg	1	9/27/2020 2:16:51 AM	55383
Ethylbenzene	ND	0.050		mg/Kg	1	9/27/2020 2:16:51 AM	55383
Xylenes, Total	ND	0.10		mg/Kg	1	9/27/2020 2:16:51 AM	55383
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	1	9/27/2020 2:16:51 AM	55383

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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **MB-55518** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55518** RunNo: **72231**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534523** Units: **mg/Kg**

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

Sample ID: **LCS-55518** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55518** RunNo: **72231**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534524** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.3	90	110			

Sample ID: **MB-55518** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55518** RunNo: **72232**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534647** Units: **mg/Kg**

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

Sample ID: **LCS-55518** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55518** RunNo: **72232**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534648** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.0	90	110			

Sample ID: **MB-55541** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **55541** RunNo: **72232**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534669** Units: **mg/Kg**

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

Sample ID: **LCS-55541** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **55541** RunNo: **72232**
Prep Date: **9/29/2020** Analysis Date: **9/29/2020** SeqNo: **2534670** 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#: **2009D45**
02-Oct-20

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **2009D05-001AMS**	SampType: **ms**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **55541**	RunNo: **72232**
Prep Date: **9/29/2020**	Analysis Date: **9/29/2020**	SeqNo: **2534672** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24	7.5	15.00	11.08	83.0	47.2	156			

Sample ID: **2009D05-001AMSD**	SampType: **msd**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **55541**	RunNo: **72232**
Prep Date: **9/29/2020**	Analysis Date: **9/29/2020**	SeqNo: **2534673** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	23	7.5	15.00	11.08	81.2	47.2	156	1.16	20	

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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **2009C39-001AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **BatchQC** Batch ID: **55398** RunNo: **72109**

Prep Date: **9/23/2020** Analysis Date: **9/24/2020** SeqNo: **2527693** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	41	9.5	47.39	0	86.5	15	184			
Surr: DNOP	4.0		4.739		84.0	30.4	154			

Sample ID: **2009C39-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **BatchQC** Batch ID: **55398** RunNo: **72109**

Prep Date: **9/23/2020** Analysis Date: **9/24/2020** SeqNo: **2527694** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	9.7	48.64	0	82.1	15	184	2.65	23.9	
Surr: DNOP	3.7		4.864		75.2	30.4	154	0	0	

Sample ID: **LCS-55398** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **55398** RunNo: **72109**

Prep Date: **9/23/2020** Analysis Date: **9/24/2020** SeqNo: **2527717** 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	114	70	130			
Surr: DNOP	5.3		5.000		106	30.4	154			

Sample ID: **MB-55398** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **PBS** Batch ID: **55398** RunNo: **72109**

Prep Date: **9/23/2020** Analysis Date: **9/24/2020** SeqNo: **2527718** 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		111	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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **lcs-55362**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2529247**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		103	75.3	105			

Sample ID: **mb-55362**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2529249**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	880		1000		87.8	75.3	105			

Sample ID: **2009c45-013ams**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2530042**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	9500		4726		202	75.3	105			S

Sample ID: **2009c45-013amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2530043**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	9600		4836		198	75.3	105	0	0	S

Sample ID: **mb-55383**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530060**	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	910		1000		91.2	75.3	105			

Sample ID: **lcs-55383**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530061**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	5.0	25.00	0	85.3	72.5	106			
Surr: BFB	1000		1000		102	75.3	105			

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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **2009d42-001ams**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530063**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	4.9	24.51	0	93.6	61.3	114			
Surr: BFB	990		980.4		101	75.3	105			

Sample ID: **2009d42-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530064**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	4.9	24.27	0	84.4	61.3	114	11.3	20	
Surr: BFB	920		970.9		94.4	75.3	105	0	0	

Sample ID: **2.5ug gro lcs**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **G72180**	RunNo: **72180**							
Prep Date:	Analysis Date: **9/26/2020**	SeqNo: **2530540**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		101	75.3	105			

Sample ID: **2009g46-001ams**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **G72180**	RunNo: **72180**							
Prep Date:	Analysis Date: **9/26/2020**	SeqNo: **2530559**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	770		796.8		96.9	75.3	105			

Sample ID: **2009g46-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BatchQC**	Batch ID: **G72180**	RunNo: **72180**							
Prep Date:	Analysis Date: **9/26/2020**	SeqNo: **2530560**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	810		796.8		102	75.3	105	0	0	

Sample ID: **mb1**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **G72180**	RunNo: **72180**							
Prep Date:	Analysis Date: **9/26/2020**	SeqNo: **2530568**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	950		1000		95.4	75.3	105			

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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **LCS-55362**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **LCSS**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2529256**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Sample ID: **mb-55362**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **PBS**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2529258**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Sample ID: **2009c45-014ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **BatchQC**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2530072**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		0.9551		107	80	120			

Sample ID: **2009c45-014amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **BatchQC**	Batch ID: **55362**	RunNo: **72151**							
Prep Date: **9/22/2020**	Analysis Date: **9/25/2020**	SeqNo: **2530073**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		0.9921		104	80	120	0	0	

Sample ID: **mb-55383**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **PBS**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530090**	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		103	80	120			

Sample ID: **LCS-55383**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**							
Client ID: **LCSS**	Batch ID: **55383**	RunNo: **72151**							
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530091**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	96.9	80	120			

Qualifiers:

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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#: **2009D45**

02-Oct-20

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **LCS-55383**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **55383**	RunNo: **72151**
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530091** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	1.0	0.050	1.000	0	101	80	120			
Ethylbenzene	1.0	0.050	1.000	0	101	80	120			
Xylenes, Total	3.1	0.10	3.000	0	102	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		106	80	120			

Sample ID: **2009d42-002ams**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BatchQC**	Batch ID: **55383**	RunNo: **72151**
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530094** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.85	0.024	0.9542	0	89.6	76.3	120			
Toluene	0.93	0.048	0.9542	0.01215	95.9	78.5	120			
Ethylbenzene	0.95	0.048	0.9542	0	99.9	78.1	124			
Xylenes, Total	2.9	0.095	2.863	0	99.8	79.3	125			
Surr: 4-Bromofluorobenzene	0.95		0.9542		99.8	80	120			

Sample ID: **2009d42-002amsd**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BatchQC**	Batch ID: **55383**	RunNo: **72151**
Prep Date: **9/23/2020**	Analysis Date: **9/26/2020**	SeqNo: **2530095** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.86	0.023	0.9302	0	92.1	76.3	120	0.209	20	
Toluene	0.92	0.047	0.9302	0.01215	97.3	78.5	120	1.13	20	
Ethylbenzene	0.94	0.047	0.9302	0	101	78.1	124	1.86	20	
Xylenes, Total	2.8	0.093	2.791	0	101	79.3	125	1.35	20	
Surr: 4-Bromofluorobenzene	0.94		0.9302		101	80	120	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: **2009D45** RcptNo: 1

Received By: **Cheyenne Cason** **9/23/2020 8:00:00 AM**

Completed By: **Isaiah Ortiz** **9/23/2020 9:08:49 AM** I.O.

Reviewed By: CM 9/23/20

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 9.23.20

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	5.2	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)

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: Howell M#1
Project #:
Project Manager: LTE - Danny Burns
Sampler: D Burns
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 5.3 - 0.1 = 5.2 (°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. 2009D45	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)
9-21	0900	Soil	BH08 @ 30'-35'	1-4oz	cool	001	X	X					X			
↓	0930	↓	BH08 @ 40'-45'	↓	↓	002	↓	↓					↓			
↓	1200	↓	BH09 @ 35'-38'	↓	↓	003	↓	↓					↓			
↓	1220	↓	BH09 @ 40'-43'	↓	↓	004	↓	↓					↓			
9-22	0830	↓	BH10 @ 30'-35'	↓	↓	005	↓	↓					↓			
↓	1000	↓	BH10 @ 38'-40'	↓	↓	006	↓	↓					↓			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
9-22-20	14:30	D Burns	Chris Ward		9/22/2020	1430
9/22/2020	1810	Chris Ward	[illegible]		9/23/20	0800

Remarks: cc: dhencmann@ltenv.com
dburns@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

May 28, 2021

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

RE: Howell 1M OrderNo.: 2105888

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 2 sample(s) on 5/20/2021 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 **2105888**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 0-5'
Project: Howell 1M
Collection Date: 5/14/2021 11:00:00 AM
Lab ID: 2105888-001 **Matrix:** SOIL **Received Date:** 5/20/2021 7:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	8.5		mg/Kg	1	5/22/2021 6:59:05 PM
Motor Oil Range Organics (MRO)	ND	43		mg/Kg	1	5/22/2021 6:59:05 PM
Surr: DNOP	103	70-130		%Rec	1	5/22/2021 6:59:05 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	5/22/2021 11:59:15 AM
Surr: BFB	90.2	70-130		%Rec	1	5/22/2021 11:59:15 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	5/22/2021 11:59:15 AM
Toluene	ND	0.047		mg/Kg	1	5/22/2021 11:59:15 AM
Ethylbenzene	ND	0.047		mg/Kg	1	5/22/2021 11:59:15 AM
Xylenes, Total	ND	0.094		mg/Kg	1	5/22/2021 11:59:15 AM
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	1	5/22/2021 11:59:15 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	5/24/2021 4:16:53 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 **2105888**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH10 40-45'
Project: Howell 1M
Collection Date: 5/14/2021 12:30:00 PM
Lab ID: 2105888-002 **Matrix:** SOIL **Received Date:** 5/20/2021 7:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **mb**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	5/22/2021 11:15:07 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	5/22/2021 11:15:07 AM
Surr: DNOP	140	70-130	S	%Rec	1	5/22/2021 11:15:07 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	5/22/2021 12:22:39 PM
Surr: BFB	89.7	70-130		%Rec	1	5/22/2021 12:22:39 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	5/22/2021 12:22:39 PM
Toluene	ND	0.049		mg/Kg	1	5/22/2021 12:22:39 PM
Ethylbenzene	ND	0.049		mg/Kg	1	5/22/2021 12:22:39 PM
Xylenes, Total	ND	0.099		mg/Kg	1	5/22/2021 12:22:39 PM
Surr: 4-Bromofluorobenzene	100	70-130		%Rec	1	5/22/2021 12:22:39 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	68	60		mg/Kg	20	5/24/2021 4:29:17 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2105888**

28-May-21

Client: HILCORP ENERGY

Project: Howell 1M

Sample ID: **MB-60211**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **60211**	RunNo: **77619**							
Prep Date: **5/24/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755203**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-60211**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **60211**	RunNo: **77619**							
Prep Date: **5/24/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755204**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.7	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#: **2105888**

28-May-21

Client: HILCORP ENERGY

Project: Howell 1M

Sample ID: **MB-60165** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **60165** RunNo: **77563**
Prep Date: **5/20/2021** Analysis Date: **5/21/2021** SeqNo: **2753501** 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	14		10.00		138	70	130			S

Sample ID: **MB-60191** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **60191** RunNo: **77590**
Prep Date: **5/21/2021** Analysis Date: **5/22/2021** SeqNo: **2753997** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		128	70	130			

Sample ID: **LCS-60191** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **60191** RunNo: **77590**
Prep Date: **5/21/2021** Analysis Date: **5/22/2021** SeqNo: **2754004** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	64	10	50.00	0	127	68.9	141			
Surr: DNOP	7.2		5.000		145	70	130			S

Sample ID: **2105888-002AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH10 40-45'** Batch ID: **60191** RunNo: **77590**
Prep Date: **5/21/2021** Analysis Date: **5/22/2021** SeqNo: **2754008** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	9.4	47.13	0	107	15	184			
Surr: DNOP	5.2		4.713		111	70	130			

Sample ID: **2105888-002AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH10 40-45'** Batch ID: **60191** RunNo: **77590**
Prep Date: **5/21/2021** Analysis Date: **5/22/2021** SeqNo: **2754011** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	63	10	50.15	0	126	15	184	23.1	23.9	
Surr: DNOP	6.5		5.015		129	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#: **2105888**
28-May-21

Client: HILCORP ENERGY
Project: Howell 1M

Sample ID: **LCS-60165** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **60165** RunNo: **77604**
Prep Date: **5/20/2021** Analysis Date: **5/22/2021** SeqNo: **2754505** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	59	10	50.00	0	118	68.9	141			
Surr: DNOP	5.9		5.000		118	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#: **2105888**

28-May-21

Client: HILCORP ENERGY

Project: Howell 1M

Sample ID: **mb-60161** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **PBS** Batch ID: **60161** RunNo: **77587**

Prep Date: **5/20/2021** Analysis Date: **5/22/2021** SeqNo: **2753650** 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		88.7	70	130			

Sample ID: **lcs-60161** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **LCSS** Batch ID: **60161** RunNo: **77587**

Prep Date: **5/20/2021** Analysis Date: **5/22/2021** SeqNo: **2753651** 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	92.4	78.6	131			
Surr: BFB	970		1000		97.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical 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#: **2105888**

28-May-21

Client: HILCORP ENERGY

Project: Howell 1M

Sample ID: **mb-60161**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **60161**	RunNo: **77587**
Prep Date: **5/20/2021**	Analysis Date: **5/22/2021**	SeqNo: **2753713** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.99		1.000		99.5	70	130			

Sample ID: **LCS-60161**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **60161**	RunNo: **77587**
Prep Date: **5/20/2021**	Analysis Date: **5/22/2021**	SeqNo: **2753714** 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	94.1	80	120			
Toluene	0.98	0.050	1.000	0	98.2	80	120			
Ethylbenzene	0.97	0.050	1.000	0	97.3	80	120			
Xylenes, Total	2.9	0.10	3.000	0	97.7	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		100	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: 2105888 RcptNo: 1

Received By: Juan Rojas 5/20/2021 7:20:00 AM

Completed By: Sean Livingston 5/20/2021 9:29:51 AM

Reviewed By: JR 5/20/21

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 ☑

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

    Adjusted?
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 ☐

    Checked by:

IO 5.20.21

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	0.5	Good				

Chain-of-Custody Record

Client: Hilcorp Energy
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)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Howell 1M

Project #:

Project Manager: Stuart Hyde - WSP

Sampler: Eric Carroll

On Ice: ☒ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 0.4+0.1=0.5 (°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. 2105887	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)	Chloride
5/14	1100	Soil	BH16 0-5'	1 4oz	Cool	001	X	X									X
5/14	1730	Soil	BH16 40-45'	1 4oz	Cool	002	X	✓									✓

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
5/19	1710	Eric Carroll	Chris Ward		5/19/21	1718
5/19/21	1830	Chris Walters		courier	5/20/21	7:20

Remarks:
Please cc: Stuart.Hyde@wsp.com
Eric.Carroll@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.

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

May 28, 2021

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

RE: Howell M1 OrderNo.: 2105A14

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 4 sample(s) on 5/22/2021 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 **2105A14**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 10-15'
Project: Howell M1
Collection Date: 5/20/2021 1:30:00 PM
Lab ID: 2105A14-001 **Matrix:** SOIL **Received Date:** 5/22/2021 8:45:00 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	5/24/2021 2:42:02 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	5/24/2021 2:42:02 PM
Surr: DNOP	91.8	70-130		%Rec	1	5/24/2021 2:42:02 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	110	60		mg/Kg	20	5/25/2021 12:30:50 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.023		mg/Kg	1	5/25/2021 2:29:19 AM
Toluene	ND	0.047		mg/Kg	1	5/25/2021 2:29:19 AM
Ethylbenzene	ND	0.047		mg/Kg	1	5/25/2021 2:29:19 AM
Xylenes, Total	ND	0.093		mg/Kg	1	5/25/2021 2:29:19 AM
Surr: 1,2-Dichloroethane-d4	94.0	70-130		%Rec	1	5/25/2021 2:29:19 AM
Surr: 4-Bromofluorobenzene	97.4	70-130		%Rec	1	5/25/2021 2:29:19 AM
Surr: Dibromofluoromethane	112	70-130		%Rec	1	5/25/2021 2:29:19 AM
Surr: Toluene-d8	102	70-130		%Rec	1	5/25/2021 2:29:19 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	5/25/2021 2:29:19 AM
Surr: BFB	105	70-130		%Rec	1	5/25/2021 2:29:19 AM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **2105A14**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH11 50-55'
Project: Howell M1
Collection Date: 5/20/2021 3:30:00 PM
Lab ID: 2105A14-002 **Matrix:** SOIL **Received Date:** 5/22/2021 8:45:00 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	5/24/2021 2:51:50 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	5/24/2021 2:51:50 PM
Surr: DNOP	123	70-130		%Rec	1	5/24/2021 2:51:50 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	5/25/2021 1:32:52 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	5/25/2021 5:43:15 PM
Toluene	ND	0.048		mg/Kg	1	5/25/2021 5:43:15 PM
Ethylbenzene	ND	0.048		mg/Kg	1	5/25/2021 5:43:15 PM
Xylenes, Total	ND	0.097		mg/Kg	1	5/25/2021 5:43:15 PM
Surr: 1,2-Dichloroethane-d4	88.5	70-130		%Rec	1	5/25/2021 5:43:15 PM
Surr: 4-Bromofluorobenzene	98.3	70-130		%Rec	1	5/25/2021 5:43:15 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	1	5/25/2021 5:43:15 PM
Surr: Toluene-d8	101	70-130		%Rec	1	5/25/2021 5:43:15 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	5/25/2021 5:43:15 PM
Surr: BFB	106	70-130		%Rec	1	5/25/2021 5:43:15 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 **2105A14**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 30-35'
Project: Howell M1
Collection Date: 5/21/2021 10:00:00 AM
Lab ID: 2105A14-003 **Matrix:** SOIL **Received Date:** 5/22/2021 8:45:00 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	5/24/2021 3:01:38 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	5/24/2021 3:01:38 PM
Surr: DNOP	95.4	70-130		%Rec	1	5/24/2021 3:01:38 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	5/25/2021 1:45:16 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	5/25/2021 3:26:18 AM
Toluene	ND	0.048		mg/Kg	1	5/25/2021 3:26:18 AM
Ethylbenzene	ND	0.048		mg/Kg	1	5/25/2021 3:26:18 AM
Xylenes, Total	ND	0.096		mg/Kg	1	5/25/2021 3:26:18 AM
Surr: 1,2-Dichloroethane-d4	90.6	70-130		%Rec	1	5/25/2021 3:26:18 AM
Surr: 4-Bromofluorobenzene	98.9	70-130		%Rec	1	5/25/2021 3:26:18 AM
Surr: Dibromofluoromethane	110	70-130		%Rec	1	5/25/2021 3:26:18 AM
Surr: Toluene-d8	100	70-130		%Rec	1	5/25/2021 3:26:18 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	5/25/2021 3:26:18 AM
Surr: BFB	103	70-130		%Rec	1	5/25/2021 3:26:18 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 **2105A14**
Date Reported: **5/28/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY
Client Sample ID: BH12 40-45'
Project: Howell M1
Collection Date: 5/21/2021 11:00:00 AM
Lab ID: 2105A14-004 **Matrix:** SOIL **Received Date:** 5/22/2021 8:45:00 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	5/24/2021 3:11:28 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	5/24/2021 3:11:28 PM
Surr: DNOP	104	70-130		%Rec	1	5/24/2021 3:11:28 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	61		mg/Kg	20	5/25/2021 1:57:41 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	5/25/2021 6:11:51 PM
Toluene	ND	0.047		mg/Kg	1	5/25/2021 6:11:51 PM
Ethylbenzene	ND	0.047		mg/Kg	1	5/25/2021 6:11:51 PM
Xylenes, Total	ND	0.095		mg/Kg	1	5/25/2021 6:11:51 PM
Surr: 1,2-Dichloroethane-d4	95.1	70-130		%Rec	1	5/25/2021 6:11:51 PM
Surr: 4-Bromofluorobenzene	96.6	70-130		%Rec	1	5/25/2021 6:11:51 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	1	5/25/2021 6:11:51 PM
Surr: Toluene-d8	98.1	70-130		%Rec	1	5/25/2021 6:11:51 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	21	4.7		mg/Kg	1	5/25/2021 6:11:51 PM
Surr: BFB	109	70-130		%Rec	1	5/25/2021 6:11:51 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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#: **2105A14**
28-May-21

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **MB-60237**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **60237**	RunNo: **77623**							
Prep Date: **5/25/2021**	Analysis Date: **5/25/2021**	SeqNo: **2756623**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-60237**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **60237**	RunNo: **77623**							
Prep Date: **5/25/2021**	Analysis Date: **5/25/2021**	SeqNo: **2756624**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.6	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#: **2105A14**
28-May-21

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **MB-60204**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **60204**	RunNo: **77605**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2754540** 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		108	70	130			

Sample ID: **LCS-60204**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **60204**	RunNo: **77600**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2754936** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	10	50.00	0	80.2	68.9	141			
Surr: DNOP	5.1		5.000		102	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#: **2105A14**
28-May-21

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **lcs-60202**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **60202**	RunNo: **77632**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755757** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	108	70	130			
Toluene	1.0	0.050	1.000	0	104	70	130			
Surr: 1,2-Dichloroethane-d4	0.45		0.5000		90.8	70	130			
Surr: 4-Bromofluorobenzene	0.46		0.5000		92.2	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		106	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Sample ID: **mb-60202**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **60202**	RunNo: **77632**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755758** 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	0.48		0.5000		96.2	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		101	70	130			
Surr: Dibromofluoromethane	0.54		0.5000		107	70	130			
Surr: Toluene-d8	0.49		0.5000		98.0	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical 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#: **2105A14**

28-May-21

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **lcs-60202**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **60202**	RunNo: **77632**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755770** 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	97.4	70	130			
Surr: BFB	520		500.0		104	70	130			

Sample ID: **mb-60202**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **60202**	RunNo: **77632**
Prep Date: **5/22/2021**	Analysis Date: **5/24/2021**	SeqNo: **2755771** 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			

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: 2105A14 RcptNo: 1

Received By: Desiree Dominguez 5/22/2021 8:45:00 AM DD

Completed By: Desiree Dominguez 5/22/2021 10:08:08 AM DD

Reviewed By: DAD 5/22/21

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# 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: DAD 5/22/21

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.4	Good	Yes			

Chain-of-Custody Record

Client: HilCorp Energy
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)

Turn-Around Time:
☑ Standard ☐ Rush
Project Name: HOwell M1
Project #:
Project Manager: Stuart Hyde - WSP
Sampler: Eric Carroll
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 3.3+0.1=3.4 (°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. 2105A14	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)	Chloride
5/20	1330	Soil	BH11 10-15'	1 4oz	Cool	-001	X	X									X
5/20	1530	↓	BH11 50-55'	↓	↓	-002	X	X									X
5/20	1000	↓	BH12 30-35'	↓	↓	-003	X	X									X
5/21	1100	↓	BH12 40-45'	↓	↓	-004	X	X									X

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
5/21	1250	Eric Carroll	Christine Walters		5/21/20	1250
5/21/21	1810	Christine Walters		Courier	5.22.21	8:45

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 22, 2021

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

RE: Howell M1 OrderNo.: 2109891

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 4 sample(s) on 9/17/2021 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 **2109891**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH08A@30-35'
Project: Howell M1 **Collection Date:** 9/14/2021 4:15:00 PM
Lab ID: 2109891-001 **Matrix:** MEOH (SOIL) **Received Date:** 9/17/2021 7:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**
Diesel Range Organics (DRO)	110	9.4		mg/Kg	1	9/17/2021 10:04:28 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/17/2021 10:04:28 AM
Surr: DNOP	94.6	70-130		%Rec	1	9/17/2021 10:04:28 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	1200	34		mg/Kg	10	9/17/2021 12:58:23 PM
Surr: BFB	583	70-130	S	%Rec	10	9/17/2021 12:58:23 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	0.16	0.14		mg/Kg	10	9/17/2021 12:58:23 PM
Toluene	7.0	0.34		mg/Kg	10	9/17/2021 12:58:23 PM
Ethylbenzene	3.4	0.34		mg/Kg	10	9/17/2021 12:58:23 PM
Xylenes, Total	48	0.69		mg/Kg	10	9/17/2021 12:58:23 PM
Surr: 4-Bromofluorobenzene	111	70-130		%Rec	10	9/17/2021 12:58:23 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	61		mg/Kg	20	9/17/2021 10:45:42 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 **2109891**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH08A@35-40'
Project: Howell M1 **Collection Date:** 9/14/2021 4:32:00 PM
Lab ID: 2109891-002 **Matrix:** MEOH (SOIL) **Received Date:** 9/17/2021 7:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**
Diesel Range Organics (DRO)	650	92		mg/Kg	10	9/17/2021 10:44:45 AM
Motor Oil Range Organics (MRO)	ND	460		mg/Kg	10	9/17/2021 10:44:45 AM
Surr: DNOP	0	70-130	S	%Rec	10	9/17/2021 10:44:45 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	14000	1800		mg/Kg	500	9/17/2021 1:22:06 PM
Surr: BFB	155	70-130	S	%Rec	500	9/17/2021 1:22:06 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	9.3	0.89		mg/Kg	50	9/17/2021 10:13:17 AM
Toluene	200	18		mg/Kg	500	9/17/2021 1:22:06 PM
Ethylbenzene	49	1.8		mg/Kg	50	9/17/2021 10:13:17 AM
Xylenes, Total	560	35		mg/Kg	500	9/17/2021 1:22:06 PM
Surr: 4-Bromofluorobenzene	122	70-130		%Rec	50	9/17/2021 10:13:17 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	97	60		mg/Kg	20	9/17/2021 10:58:07 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 **2109891**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH08A@40-45'
Project: Howell M1 **Collection Date:** 9/14/2021 4:52:00 PM
Lab ID: 2109891-003 **Matrix:** MEOH (SOIL) **Received Date:** 9/17/2021 7:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**
Diesel Range Organics (DRO)	410	98		mg/Kg	10	9/17/2021 10:54:33 AM
Motor Oil Range Organics (MRO)	ND	490		mg/Kg	10	9/17/2021 10:54:33 AM
Surr: DNOP	0	70-130	S	%Rec	10	9/17/2021 10:54:33 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	8200	360		mg/Kg	100	9/17/2021 2:09:37 PM
Surr: BFB	219	70-130	S	%Rec	100	9/17/2021 2:09:37 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	7.8	0.091		mg/Kg	5	9/17/2021 10:36:50 AM
Toluene	120	3.6		mg/Kg	100	9/17/2021 2:09:37 PM
Ethylbenzene	22	3.6		mg/Kg	100	9/17/2021 2:09:37 PM
Xylenes, Total	270	7.3		mg/Kg	100	9/17/2021 2:09:37 PM
Surr: 4-Bromofluorobenzene	213	70-130	S	%Rec	5	9/17/2021 10:36:50 AM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/17/2021 11:10:32 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 **2109891**
Date Reported: **9/22/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH08A@55'
Project: Howell M1 **Collection Date:** 9/15/2021 9:55:00 AM
Lab ID: 2109891-004 **Matrix:** MEOH (SOIL) **Received Date:** 9/17/2021 7:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **JME**
Diesel Range Organics (DRO)	11	9.7		mg/Kg	1	9/17/2021 10:34:57 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/17/2021 10:34:57 AM
Surr: DNOP	96.1	70-130		%Rec	1	9/17/2021 10:34:57 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	17		mg/Kg	5	9/17/2021 12:34:47 PM
Surr: BFB	111	70-130		%Rec	5	9/17/2021 12:34:47 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.083		mg/Kg	5	9/17/2021 12:34:47 PM
Toluene	ND	0.17		mg/Kg	5	9/17/2021 12:34:47 PM
Ethylbenzene	ND	0.17		mg/Kg	5	9/17/2021 12:34:47 PM
Xylenes, Total	ND	0.33		mg/Kg	5	9/17/2021 12:34:47 PM
Surr: 4-Bromofluorobenzene	93.5	70-130		%Rec	5	9/17/2021 12:34:47 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	65	60		mg/Kg	20	9/17/2021 11:22:56 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		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2109891**
22-Sep-21

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **MB-62652**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **62652**	RunNo: **81356**							
Prep Date: **9/17/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874173**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-62652**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **62652**	RunNo: **81356**							
Prep Date: **9/17/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874174**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.9	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#: **2109891**

22-Sep-21

Client: HILCORP ENERGY

Project: Howell M1

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: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	11		10.00		106	70	130			

Sample ID: **MB-62646**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **62646**	RunNo: **81352**
Prep Date: **9/17/2021**	Analysis Date: **9/17/2021**	SeqNo: **2873418** 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		100	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: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.7		5.000		114	70	130			

Sample ID: **LCS-62646**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **62646**	RunNo: **81352**
Prep Date: **9/17/2021**	Analysis Date: **9/17/2021**	SeqNo: **2873421** 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	99.1	68.9	135			
Surr: DNOP	5.6		5.000		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#: **2109891**
22-Sep-21

Client: HILCORP ENERGY
Project: Howell M1

Sample ID: **mb-62641**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **62641**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2873982** 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		111	70	130			

Sample ID: **lcs-62641**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **62641**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2873985** 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	120	78.6	131			
Surr: BFB	1100		1000		115	70	130			

Sample ID: **mb-62628**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **62628**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/18/2021**	SeqNo: **2874049** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		107	70	130			

Sample ID: **lcs-62628**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **62628**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874050** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1200		1000		115	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#: **2109891**

22-Sep-21

Client: HILCORP ENERGY

Project: Howell M1

Sample ID: **mb-62641**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **62641**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874122** 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	0.96		1.000		95.6	70	130			

Sample ID: **LCS-62641**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **62641**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874123** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	99.9	80	120			
Toluene	1.0	0.050	1.000	0	101	80	120			
Ethylbenzene	1.0	0.050	1.000	0	99.8	80	120			
Xylenes, Total	2.9	0.10	3.000	0	98.2	80	120			
Surr: 4-Bromofluorobenzene	0.89		1.000		89.2	70	130			

Sample ID: **mb-62628**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **62628**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/18/2021**	SeqNo: **2874132** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.93		1.000		93.4	70	130			

Sample ID: **LCS-62628**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **62628**	RunNo: **81363**
Prep Date: **9/16/2021**	Analysis Date: **9/17/2021**	SeqNo: **2874133** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.93		1.000		92.8	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: **2109891** RcptNo: **1**

Received By: **Cheyenne Cason** **9/17/2021 7:30:00 AM** Chel

Completed By: **Sean Livingston** **9/17/2021 8:19:41 AM** Sean Livingston

Reviewed By: JR 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: KPG 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: Hilcorp Energy Company
Mitch Killough
Mailing Address: PO Box 4700
Farmington, NM 87499
Phone #: 713-575-5247
email or Fax#:
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☒ EDD (Type) PDF

Turn-Around Time: Same Day
☐ Standard ☒ Rush ASAP
Project Name: Howell M1
Project #: TE017821013
Project Manager: Stuart Hyde
Sampler: Josh Adams
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. 2109891	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	1615	soil	BH08A @ 30-35'	(1) 4oz	cool	001	X	X					X			
	1632		BH08A @ 35-40'			002	X	X					X			
	~~1658~~ 1652		BH08A @ 40-45'			003	X	X					X			
9-15-21	0955		BH08A @ 55'			004	X	X					X			

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

Remarks: cc: stuart.hyde@wsp.com
josh.adams@wsp.com
KKaufman@hilcorp.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.

Analytical Report
Lab Order **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH13A 35-40
Project: Howell M1 **Collection Date:** 9/16/2021 10:50:00 AM
Lab ID: 2109993-003 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/18/2021 1:18:47 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/18/2021 1:18:47 PM
Surr: DNOP	97.9	70-130		%Rec	1	9/18/2021 1:18:47 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	24	22		mg/Kg	5	9/20/2021 9:16:09 AM
Surr: BFB	118	70-130		%Rec	5	9/20/2021 9:16:09 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.11		mg/Kg	5	9/20/2021 9:16:09 AM
Toluene	0.26	0.22		mg/Kg	5	9/20/2021 9:16:09 AM
Ethylbenzene	ND	0.22		mg/Kg	5	9/20/2021 9:16:09 AM
Xylenes, Total	0.89	0.44		mg/Kg	5	9/20/2021 9:16:09 AM
Surr: 4-Bromofluorobenzene	93.0	70-130		%Rec	5	9/20/2021 9:16:09 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	61		mg/Kg	20	9/18/2021 3:00:44 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 **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH13A 45-48
Project: Howell M1 **Collection Date:** 9/16/2021 4:40:00 PM
Lab ID: 2109993-005 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	9/18/2021 2:31:34 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	9/18/2021 2:31:34 PM
Surr: DNOP	99.5	70-130		%Rec	1	9/18/2021 2:31:34 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	3.7		mg/Kg	1	9/20/2021 9:39:56 AM
Surr: BFB	111	70-130		%Rec	1	9/20/2021 9:39:56 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	0.047	0.018		mg/Kg	1	9/20/2021 9:39:56 AM
Toluene	0.050	0.037		mg/Kg	1	9/20/2021 9:39:56 AM
Ethylbenzene	ND	0.037		mg/Kg	1	9/20/2021 9:39:56 AM
Xylenes, Total	0.079	0.074		mg/Kg	1	9/20/2021 9:39:56 AM
Surr: 4-Bromofluorobenzene	94.1	70-130		%Rec	1	9/20/2021 9:39:56 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	9/18/2021 3:13:05 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 **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH14@ 40-45
Project: Howell M1 **Collection Date:** 9/17/2021 10:35:00 AM
Lab ID: 2109993-006 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	9/18/2021 2:55:49 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/18/2021 2:55:49 PM
Surr: DNOP	101	70-130		%Rec	1	9/18/2021 2:55:49 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.1		mg/Kg	1	9/20/2021 10:03:40 AM
Surr: BFB	106	70-130		%Rec	1	9/20/2021 10:03:40 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.020		mg/Kg	1	9/20/2021 10:03:40 AM
Toluene	ND	0.041		mg/Kg	1	9/20/2021 10:03:40 AM
Ethylbenzene	ND	0.041		mg/Kg	1	9/20/2021 10:03:40 AM
Xylenes, Total	ND	0.081		mg/Kg	1	9/20/2021 10:03:40 AM
Surr: 4-Bromofluorobenzene	91.9	70-130		%Rec	1	9/20/2021 10:03:40 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	9/18/2021 3:25:26 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 **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH14@ 45-50
Project: Howell M1 **Collection Date:** 9/17/2021 11:00:00 AM
Lab ID: 2109993-007 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	9/18/2021 3:20:06 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/18/2021 3:20:06 PM
Surr: DNOP	98.7	70-130		%Rec	1	9/18/2021 3:20:06 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.3		mg/Kg	1	9/20/2021 10:27:26 AM
Surr: BFB	105	70-130		%Rec	1	9/20/2021 10:27:26 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.021		mg/Kg	1	9/20/2021 10:27:26 AM
Toluene	ND	0.043		mg/Kg	1	9/20/2021 10:27:26 AM
Ethylbenzene	ND	0.043		mg/Kg	1	9/20/2021 10:27:26 AM
Xylenes, Total	ND	0.085		mg/Kg	1	9/20/2021 10:27:26 AM
Surr: 4-Bromofluorobenzene	90.6	70-130		%Rec	1	9/20/2021 10:27:26 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	9/18/2021 3:37:46 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 **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH15@ 30-35
Project: Howell M1 **Collection Date:** 9/17/2021 1:30:00 PM
Lab ID: 2109993-008 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	8.7		mg/Kg	1	9/18/2021 3:44:20 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	9/18/2021 3:44:20 PM
Surr: DNOP	99.2	70-130		%Rec	1	9/18/2021 3:44:20 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	21		mg/Kg	5	9/20/2021 10:51:16 AM
Surr: BFB	105	70-130		%Rec	5	9/20/2021 10:51:16 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.10		mg/Kg	5	9/20/2021 10:51:16 AM
Toluene	ND	0.21		mg/Kg	5	9/20/2021 10:51:16 AM
Ethylbenzene	ND	0.21		mg/Kg	5	9/20/2021 10:51:16 AM
Xylenes, Total	ND	0.41		mg/Kg	5	9/20/2021 10:51:16 AM
Surr: 4-Bromofluorobenzene	89.8	70-130		%Rec	5	9/20/2021 10:51:16 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	9/18/2021 4:14:49 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 **2109993**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH15@ 40-45
Project: Howell M1 **Collection Date:** 9/17/2021 1:50:00 PM
Lab ID: 2109993-009 **Matrix:** MEOH (SOIL) **Received Date:** 9/18/2021 9:00:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	9/18/2021 4:08:45 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	9/18/2021 4:08:45 PM
Surr: DNOP	103	70-130		%Rec	1	9/18/2021 4:08:45 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	3.2		mg/Kg	1	9/20/2021 11:14:57 AM
Surr: BFB	104	70-130		%Rec	1	9/20/2021 11:14:57 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.016		mg/Kg	1	9/20/2021 11:14:57 AM
Toluene	ND	0.032		mg/Kg	1	9/20/2021 11:14:57 AM
Ethylbenzene	ND	0.032		mg/Kg	1	9/20/2021 11:14:57 AM
Xylenes, Total	ND	0.065		mg/Kg	1	9/20/2021 11:14:57 AM
Surr: 4-Bromofluorobenzene	90.4	70-130		%Rec	1	9/20/2021 11:14:57 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	9/18/2021 4:27:10 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 **2109A37**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH16 @ 28-30'
Project: Howell M 1 **Collection Date:** 9/18/2021 9:40:00 AM
Lab ID: 2109A37-001 **Matrix:** MEOH (SOIL) **Received Date:** 9/19/2021 9:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/20/2021 11:05:16 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/20/2021 11:05:16 AM
Surr: DNOP	88.6	70-130		%Rec	1	9/20/2021 11:05:16 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.3		mg/Kg	1	9/20/2021 12:25:41 PM
Surr: BFB	107	70-130		%Rec	1	9/20/2021 12:25:41 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.022		mg/Kg	1	9/20/2021 12:25:41 PM
Toluene	ND	0.043		mg/Kg	1	9/20/2021 12:25:41 PM
Ethylbenzene	ND	0.043		mg/Kg	1	9/20/2021 12:25:41 PM
Xylenes, Total	ND	0.087		mg/Kg	1	9/20/2021 12:25:41 PM
Surr: 4-Bromofluorobenzene	92.7	70-130		%Rec	1	9/20/2021 12:25:41 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/20/2021 10:30:00 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 **2109A37**
Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY **Client Sample ID:** BH16 @ 40-45'
Project: Howell M 1 **Collection Date:** 9/18/2021 10:00:00 AM
Lab ID: 2109A37-002 **Matrix:** MEOH (SOIL) **Received Date:** 9/19/2021 9:50:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **SB**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	9/20/2021 11:17:45 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/20/2021 11:17:45 AM
Surr: DNOP	90.8	70-130		%Rec	1	9/20/2021 11:17:45 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	3.6		mg/Kg	1	9/20/2021 12:49:20 PM
Surr: BFB	105	70-130		%Rec	1	9/20/2021 12:49:20 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.018		mg/Kg	1	9/20/2021 12:49:20 PM
Toluene	ND	0.036		mg/Kg	1	9/20/2021 12:49:20 PM
Ethylbenzene	ND	0.036		mg/Kg	1	9/20/2021 12:49:20 PM
Xylenes, Total	ND	0.073		mg/Kg	1	9/20/2021 12:49:20 PM
Surr: 4-Bromofluorobenzene	91.2	70-130		%Rec	1	9/20/2021 12:49:20 PM
EPA METHOD 300.0: ANIONS						Analyst: **VP**
Chloride	ND	60		mg/Kg	20	9/20/2021 10:30:00 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		

ENCLOSURE B – CULTURAL SURVEY AND BLM APPROVAL

From: AFMSS <blm-afmss-notifications@blm.gov>
Sent: Friday, May 14, 2021 9:31 AM
To: Kandis Roland <kroland@hilcorp.com>
Subject: [EXTERNAL] Well Name: HOWELL M, Well Number: 1, Notification of Sundry Approval

The Bureau of Land Management

Notice of Notice Of Intent Approval

- Operator Name: **HILCORP ENERGY COMPANY**
- Well Name: **HOWELL M**
- Well Number: **1**
- US Well Number: **3004509101**
- Sundry ID: **2159207**

The BLM received your Notice Of Intent, Other on 04/29/2021. This is to notify you that we are Approving your Notice Of Intent Other. Please login to your account in AFMSS II to see the final documents.

If this Notice Of Intent prompted the BLM to create another work task, it will generate in your worklist.

You may contact the field office if you have any questions.

This notification is automatically generated. Please do not reply to this message as this account is not monitored.

CLIENT VERSION
Site Details withheld at BLM's request
NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

1. NMCRIS Activity No.: 147506	2a. Lead (Sponsoring) Agency: BLM Farmington Field Office	2b. Other Permitting Agency(ies):	3. Lead Agency Report No.:

4. Title of Report: Cultural Resource Survey of Hilcorp Energy Company's Proposed Howell M1 Historic Spill Delineation and Assessment Project, San Juan County, New Mexico.
Author(s): Leslie Sesler

5. Type of Report: ☐ Negative ☒ Positive

6. Investigation Type:
☐ Research Design ☒ Survey/Inventory ☐ Test Excavation ☐ Excavation ☐ Collections/Non-Field Study
☐ Overview/Lit Review ☐ Monitoring ☐ Ethnographic study ☐ Site specific visit ☐ Other:

7. Description of Undertaking (what does the project entail?):
The project proposed by Hilcorp Energy is related to the process of delineating an historic spill that was found on the Howell M1 well pad by a midstream company. Full horizontal and vertical delineation of the extent of the spill was not reached on the well pad itself. Additional boring is needed just off the north-northwest edge of the well pad to complete delineation of the spill so that a remediation plan can be completed. Hilcorp proposes to complete as many as four more bore holes, located just outside the fill of the pad on the downslope(northwest) side. Including a 100 ft buffer zone, a 4.079 acre polygon was surveyed for cultural resources, encompassing the area of the proposed bore holes plus at least 100 ft outside of the area of expected disturbance. The survey encompassed the well pad and all previous construction disturbance, and extended from a wide sandy wash southwest of the pad, to the northeast side of the well access road, and the southeast edge of NM Highway 511. Two previously recorded sites are just inside the area of the survey, and both were updated. See Figures 1 and 2 for project location, and Figure 4 for the survey area detail.

8. Dates of Investigation: February 25-26, 2021

9. Report Date: March 2, 2021

10. Performing Agency/Consultant: La Plata Archaeological Consultants
Principal Investigator: Steven Fuller
Field Supervisor: Leslie Sesler
Field Personnel Names:

11. Performing Agency/Consultant Report No.:
LAC Report 2020-1b

12. Applicable Cultural Resource Permit No(s):
NM Cultural Resource Use Permit 19-2920-20-EE

13. Customer Name: Hilcorp Energy Company
Responsible Individual: Clara Cardoza
Address: 382 Road 3100, Aztec, NM 87410
Phone: (505) 564-0733

14. Client/Customer Project No.:

15. Land Ownership Status ***(Must be indicated on project map):***

Land Owner	Acres Surveyed	Acres in APE
BLM, Farmington Field Office	4.079	ca. 0.50
TOTALS	4.079	ca 0.50

16. Records Search(es):

Date(s) of ARMS File Review: 12/16/20	**Name of Reviewer(s):** S. Fuller	
Date(s) of NR/SR File Review:	**Name of Reviewer(s):**	
Date(s) of Other Agency File Review: 12/16/20	**Name of Reviewer(s):**G. Haymes	**Agency:** BLM, Farmington

There are three previously recorded sites within 1/4 mile of the proposed project (See Figure 3, Appendix A). Two of these sites are just slightly within the project area buffer zone; the boundary of site LA170933 extends inside the northeast corner of the 100 ft buffer survey and the boundary of site LA78852 is barely within the edge of the 100 ft buffer survey near the northwest corner. The other known site, LA163096, is about one-quarter mile to the east. The GLO records show a homestead dating to 1881 located some distance to the north of the project area.

17. Survey Data:

a. Source Graphics ☐ NAD 27 ☒ NAD 83

☒ USGS 7.5' (1:24,000) topo map ☐ Other topo map, Scale:

☒ GPS Unit ☐ Accuracy <1.0m ☐1-10m ☒ 10-100m ☐ >100m

b. USGS 7.5' Topographic Map Name | **USGS Quad Code**

Archuleta, NM	36107-G6

c. County(ies): San Juan

d. Nearest City or Town: Archuleta, NM

e. Legal Description:

Township (N/S)	Range (E/W)	Section	¼	¼	¼
30N	8W	30		SW	SW

Projected legal description? Yes [ ] No [X] Unplatted [ ]

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.): The Existing Howell M1 well pad where the historic spill delineation will occur is located in the southwest quarter of the southwest quarter of Section 30, T30N, R8W. See Figure 4 for the location of the well and extent of the survey area.

18. Survey Field Methods:

Intensity: ☒ 100% coverage ☐ <100% coverage

Configuration: ☒ block survey units ☐ linear survey units (l x w): ☐ other survey units (specify)::

Scope: ☒ non-selective (all sites recorded) ☐ selective/thematic (selected sites recorded)

Coverage Method: ☒ systematic pedestrian coverage ☐ other method (describe)

Survey Interval (m): 15 m **Crew Size:** 1 **Fieldwork Dates:** February 25-26, 2021

Survey Person Hours: 6 **Recording Person Hours:** 4 **Total Hours:** 10

Additional Narrative: Pedestrian transects spaced no greater than 15 m apart were used to examine a four-plus acre polygon around the existing Howell M1 well, with the location of the four proposed bore holes located in the approximate center of the area. The survey area includes at least a 100 ft buffer zone beyond the proposed area that will be disturbed during the delineation process. The spill delineation and presumed remediation is located on BLM land.

19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.): The existing Howell M1 well pad is located on a bench above the San Juan river, a little over a mile south-southwest of the community of Archuleta, New Mexico. The bench slopes to the north and northwest toward the river, and is eroded and dissected by numerous ephemeral drainages. Quaternary river cobbles occur in sporadic concentrations where the overlying eolian sediment is thin or missing. Most of the bench with deeper sediment is open sagebrush with some areas having been cleared for farming or grazing, but the portion of the bench where the well is located has thinner soils and is partly wooded. There is considerable evidence of a wildfire in this area; numerous burned-off juniper stumps were noted within the area surveyed, associated with some broken and oxidized alluvial cobbles within the quaternary gravel concentrations.

20. a. Percent Ground Visibility: 50-75 **b. Condition of Survey Area (grazed, bladed, undisturbed, etc.):** The Howell M1 well pad and construction-related disturbance, the associated access road, the right-of-way of NM Highway 511, and a wide, flat-bottomed sandy wash, have disturbed a majority of the 4.079 acres included in the cultural resource survey. Probably no more than an acre of land is undisturbed by construction or major erosion, and this area has evidence of wildfire.

21. CULTURAL RESOURCE FINDINGS: ☒ Yes, See Page 3 ☐ No, Discuss Why:

22. Required Attachments (check all appropriate boxes):	23. Other Attachments:
☒USGS 7.5 (1:24,000) Topographic map with sites, isolates, and survey area clearly drawn ☒Copy of BLM/ARMS Map Check ☐ LA Site Forms - new sites (*with sketch map & topographic map*) ☒ LA Site Forms (update) - previously recorded & un-relocated sites (*first 2 pages minimum*) *(see Attachment D)* ☐ Historic Cultural Property Inventory Forms ☐ List and Description of isolates, if applicable ☐ List and Description of Collections, if applicable	☐ Photographs and Log ☐ Other Attachments *(Describe)*:

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Responsible Archaeologist: Steven Fuller, PI **Title (if Not PI)**

Signature: _____ **Date** March 2, 2021

25. Reviewing Agency:	26. SHPO
Reviewer's Name/Date _____	Reviewer's Names/Date: _____
Accepted ( ) Rejected ( )	HPD Log #: _____
Tribal Consultation (if applicable): ☐Yes ☐No	SHPO File Location: _____ Date sent to ARMS: _____

CULTURAL RESOURCE FINDINGS

[fill in appropriate section(s)]

1. NMCRIS Activity No.: 147506	2. Lead (Sponsoring) Agency BLM, Farmington Field Office	3. Lead Agency Report No.:

SURVEY RESULTS:
Sites discovered and registered:0
Sites discovered and NOT registered: 0
Previously recorded sites revisited *(site update form required)*: 2
Previously recorded sites not relocated *(site update form required)*: 0
TOTAL SITES VISITED: 2
Total isolates recorded: 0 **Non-selective isolate recording?** ☒
Total structures recorded *(new and previously recorded, including acequias)*:

MANAGEMENT SUMMARY: Cultural clearance for the project is recommended as no significant cultural properties will be affected by the proposed development.

IF REPORT IS NEGATIVE YOU ARE DONE AT THIS POINT.

SURVEY LA NUMBER LOG
Sites Discovered:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

Previously recorded revisited sites:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)
LA78852	NM-01-37450	Eligible (d) official determination
LA170933	NM-210-48250	Eligible (d) official determination

MONITORING LA NUMBER LOG (site form required):

Sites Discovered (*site form required*): LA No.	Field/Agency No.	Previously recorded sites *(Site update form required)*: LA No.	Field/Agency No

Areas outside known nearby site boundaries monitored? Yes ☐ No ☐ If no explain why:

TESTING & EXCAVATION LA NUMBER LOG (site form required)

Tested LA Number(s)	Excavated LA Number(s)

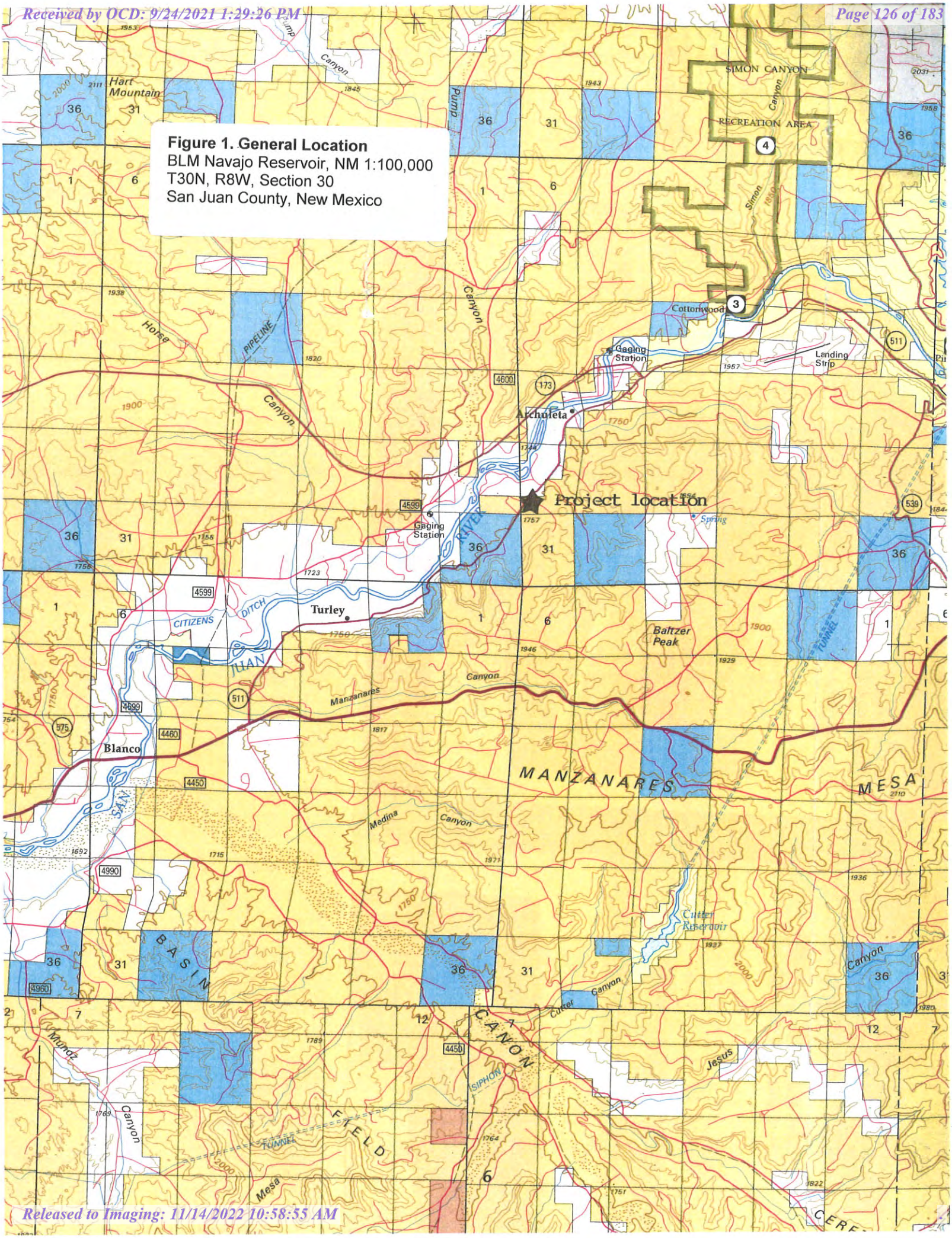

Figure 1. General Location
BLM Navajo Reservoir, NM 1:100,000
T30N, R8W, Section 30
San Juan County, New Mexico

Figure 4. Survey Detail
Scale: 1" = 2500 ft

ENCLOSURE C – BORING LOGS

LTE Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring Well Number: BH01		Project: Howel M#1	
Date: 9-16-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 38'-22'		Seal: Bentonite 22'-20'	Grout: Bentonite 20'-0'
Casing Type: Schedule 40 PVC 23'-0'(+)SU		Diameter: 2" Length:	Hole Diameter: 7" Depth to Liquid:
Screen Type: Schedule 40 PVC Slot 38'-23' 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
	Dry	0.0	No		0–5			SM	Lt. Brown silty fn. sand w/ gravel, some cobble. Backfill material, loose, unconsolidated. No stain/odor.	
	Dry	0.0	No		5–10			SM	SAA, backfill material No s/o.	
	Dry	0.0	No		10–15				SAA. Backfill No s/o	

Advancing Opportunity

Boring/Well #	BH01
Project:	Howell M#1
Project #	017820016
Date	9-16-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17			SM	~Backfill, mixing into Native.	
					18					
					19			SP -SM	Lt. Brown & gray fn-med sand w/ silt. Poorly graded. No stain. Slt. odor.	
	Dry.	44.6	No		20					
					21					
					22					
					23					
	Dry	1,450	Yes. Slt.		24			SP	Lt. Brown & Lt. gray Medium sand. Tr. silt. Slt. stain, Mod. odor	
					25					
					26					
					27					
				BH01 @	28					
	Dry	1,757	Yes. Mod.	25-30'	29			SP	Lt. gray med-med. coarse sand. Tr. silt. Mod. stain/odor.	
				09:45	30					
					31			SM	Dark gray silty fn. sand. Mod s/o.	
	Dry	1,648	Yes Mod		32			SP	Lt. gray coarse sand, dense. slt. cement. No stain. Refusal w/ continuous sampler. Mod odor.	
					33				Put in plug, drilled to 35', tried continuous sampler again. Successful.	
					34					
					35					
					36			SM/ ML	Dark gray fn silty sand. Mod stain/odor.	
	Dry	1,026	yes		37					

Advancing Opportunity

Boring Well #	BH01
Project	Howell M#1
Project #	017820016
Date	9-16-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38					
				BH01 @ 38'-40' 10:30	39					
	Dry	24.6	No		40			ML	Lt. gray silt. w/ fn. sand. Dense but fissile. No stain/odor.	
					41					
					42					
					43					
	Dry		Yes		44			SW	~~Gray well grd.~~ DB, meant for BH02	
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

LTE Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring Well Number: BH02		Project: Howel M#1	
Date: 9-16-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 40'-19'		Seal: Bentonite 19'-17'	Grout: Bentonite 17'-0'
Casing Type: Schedule 40 PVC 20'-0' + SU.		Diameter: 2" Length: 30'	Hole Diameter: 7" Depth to Liquid: —
Screen Type: Schedule 40 PVC Slot: 40'-20' 0.010"		Diameter: 2" Length: 20'	Total Depth: 46.5' Depth to Water: —

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	2.8	No		0–5			SW	Brown well gr. med-med coarse sand. Tr. gravel. No stain/odor.	
	Dry	2.6	No		8–10			SP-SM	Brown uniform fn-med fn. sand w/ silt. No s/o.	
	Dry	5.7	No		13–15			SW SM	Lt. Brown. well gr. med fn to med sand w/ silt. No s/o.	

LTE Advancing Opportunity

Boring/Well #	BH02
Project:	Howell M#1
Project #	017820016
Date	9-16-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	388	No		15–20			SM	Lt. Brown med. - fn silty sand. No stain. Slight gassy HC odor.	
	Dry	1,516	No		21–25			SM	SAA. No stain. Mod. gassy odor.	
	Dry	1,658	No	BH 02 @ 25'-30' 13:00	26–30			SM	SAA. Lt Brown med silty sand. No stain. Mod gassy odor.	
	Dry	1,525	No		31–34			SM	SAA. No stain, mod HC gas odor	
					35			SM/ML	Brown, fn. silty sand. No stain slt. odor.	
					36–37					

Advancing Opportunity

Boring Well #	BH02
Project:	Howell M#1
Project #	017820016
Date	9-16-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38					
					39			SM/ML	Brown fn. silty sand. No stain., slt-mod HC odor. Degraded, gassy.	
	Dry	972	No		40					
					41					
					42					
					43					
			yes		44			SW	Gray, well gr. med-coarse sand w/ gravel, Tr. cobbles. tslt. Mod s/o.	
	Dry	861	SL-Mod		45					
	SL.Mod Dry	413	SL. NO	BH02 @46' 1330	46			SW	SAA-Med sand w/ gravel/cobbles Mod s/o -Lt gray med. sand stn. Cemented. No stain, slt. odor. Refusal w/ HSA rig due to cobbles & sand stn.	
					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: Howel M#1	
Date: 9-17-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 45'-29'		Seal: Bentonite 29'-27'	Grout: Bentonite 27'-0'
Casing Type: Schedule 40 PVC 30'-0' (+SU)		Diameter: 2" Length: 30'	Hole Diameter: 7" / Depth to Liquid: —
Screen Type: Schedule 40 PVC 45'-30' Slot: 0.010"		Diameter: 2" Length: 15'	Total Depth: 47' / 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	5.0	No		0–5			SP	Tan med. sand. uniform, loose. pad, fill No stain/odor.	
	Dry	2.2	No		5–10			SW	Lt. Brown & Tan med. – med coarse sand. Well gr. No s/o	
	Dry	1.3	No		10–15			SW	SAA. Lt. Brown coarse sand No s/o.	
					15			SW-SM	Brown med sand w/ silt. No s/o	

Advancing Opportunity

Boring/Well #	BH03
Project:	Howell M#1
Project #	017820016
Date	9-17-20

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. well gr.	
	Dry	2.5	No		18			-SM	sand w/ silt.	
					19				No s/o.	
					20					
					21					
					22			SW	SAA. med. fn. - med.	
	Dry	1.3	No		23			-SM	sand w/ silt.	
					24				No s/o	
					25					
					26					
					27			SM	Brown fn. silty sand.	
			No		28				No s/o.	
	Dry	357			29			SW-SM	Lt. gray med. sand w/ silt.	
			yes SLT.		30				SLT stain + odor. Degrd. HC.	
					31					
				BH 03 @ 30'-35'	32			SW	Gray med fn - med sand	
	Dry	2,403	yes		33			-SM	w/ silt.	
					34				Mod stain + odor.	
				11:45	35					
					36			SW	SAA Mod s/o	
	Dry	1,246	yes		37			-SM		

Advancing Opportunity

Boring Well #	BH03
Project:	Howell M#1
Project #	017820016
Date	9-17-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
			yes		37			SW-SM	SAA	
					38			SM/ML		
	Dry	1,246	No		39			ML	Brown sandy silt. Slightly dense No stain, mod gassy odor	
					40					
					41					
	Dry		No		42			SW -SM	Brown fn.-med sand w/ silt. No stain, mod gassy odor.	
	SL. MOIST	1,069	yes SLT.		43				Gray med. sand w/ gravel/cobble Mod. s/o.	
					44					
	Dry				45			SW -SM	SAA. Cobble, silty sand	
				BH 03 @ 47' 12:15	46					
	Dry	328	No		47			SW -SM	Gray med sand w/ silt. Slt. odor. Refusal w/ HSA due to cobbles.	
					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: BH04		Project: Howel M#1	
Date: 9-17-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	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: 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
	Dry	3.7	No		0–5			SW SM	Lt. Brown med fn. sand w/ silt. Fill material on pad No s/o.	No well set.
	Dry	12	No		8–10			SW -SM	SAA. No s/o.	
	Dry	3.3	No		13–15			SW -SM	SAA. No s/o	

Advancing Opportunity

Boring/Well #	BH04
Project:	Howell M#1
Project #	017820016
Date	9-17-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16				Lt. Brown / tan Med. med coarse sand.	
				BH 04 @	17			SW -SM	w/ silt. No s/o	
	Dry	3.7	No	15'-20'	18					
					19					
				13:45	20			GW -GM	Tan coarse sand & gravel w/ silt., cobbles. No s/o	
					21					
					22					
					23					
	Dry	2.3	No		24			GW -GM	SAA. No s/o	
					25					
					26					
					27					
					28				Lt. Brown fn-med fr	
	Dry	3.4	No		29			SM	silty sand. No s/o.	
					30					
					31					
					32					
					33					
	Dry	1.1	No		34			SM	SAA. No s/o	
					35					
					36					
					37					

Advancing Opportunity

Boring Well #	BH04
Project:	Howell M#1
Project #	017820016
Date	9-17-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38			SM	SAA Lt. Brown fn silty sand. No s/o	
	Dry	1.8	No		39				fn sandy silt. No s/o	
					40			ML		
					41					
					42					
					43					
	Dry	2.5	No	BH04 @ 43-45' 14:20	44			SW -SM	Tan & Lt. gray med-coarse sand & gravel w/ silt & cobble. No s/o.	
					45				Refusal @ 45' w/ HSA. No well set.	
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

LT Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring Well Number: BH05		Project: Howel M#1	
Date: 9-17-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	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: 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
	Dry	1.4	No		0–5			SW-SM	Lt Brown med. sand w/ silt. No s/o	No well set
	Dry	1.3	No		5–10			GW-GM	Lt brown sandy gravel w/ silt. No s/o	
	Dry	0.0	No		10–15			SW-SM	Brown med. med coarse sand w/ silt. some gravel No s/o	

Advancing Opportunity

Boring/Well #	BH05
Project:	Howell M#1
Project #	017820016
Date	9-17-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17					
					18			SW	Brown med sand w/	
	Dry	0.9	No		19			-SM	silt & Tr. gravel.	
					20				Well Gr. No s/o.	
					21					
					22					
					23			SW	Brown-dark brown med.	
	Dry	0.3	No		24			-SM	to med-coarse sand	
					25				w/ silt. No s/o	
	Dry	0.0	No		26		X		LT gray coarse sand SILT cement. No s/o Refusal w/ continuous sampler.	
					27				put in plug, drill to	
					28				30' and put continuous	
	No	Recovery			29				sampler back on	
					30					
					31					
					32			SM/	Lt. gray alternating	
	Dry	0.4	No		33			ML	sandy silt and silty	
					34				sand. Some V. Dense.	
					35				No s/o.	
					36			SM/		
	Dry		No		37			ML	SAA No s/o	

Advancing Opportunity

Boring Well #	BH05
Project:	Howell M#1
Project #	017820016
Date	9-17-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	14.9	No	BH 05 @ 35-40' 16:20	37 38 39 40			ML	Gray silt w/ sand. Dense. No s/o.	
	Dry	0.7	No	BH05 @ 40' -45' 16.30	41 42 43 44 45			ML	Gray v. fn sandy silt. V. Dense. No s/o.	
					46 47 48 49 50 51 52 53 54 55 56 57 58 59				Refusal @45', clean hole. w/ HSA No wellset.	

LTE Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH06	Project: Howel M#1
Date: 9-18-20	Project Number: 017820016
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,760	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: 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					No Well Set
					1					
					2			SM	Brown med fn. silty sand. Pad fill. No s/o	
					3					
					4					
	Dry	1.2	No		5			ML	Gray sand silt Dense. No s/o	
					6					
					7				SAA. Lt. gray sandy silt. No s/o	
					8			ML		
	Dry	1.4	No		9				Maroon & Lt. gray banded silt. w/ sand. No s/o Dense. but fossile.	
					10					
					11					
					12					
					13					
	Dry	0.0	No		14			ML	SAA. Lt. gray, mottled w/ maroon, & banding silt w/ fn. sand. No s/o	
					15					

LTE Advancing Opportunity

Boring/Well #	BH06
Project:	Howell M#1
Project #	017820016
Date	9-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16				Alternating Lt. gray w/	
					17			SM	maroon sandy silt.	
	Dry	0.2	No		18				& fn. silty sands.	
					19			ML	silty Dense, but fissile	
					20				No s/o.	
					21					
					22			SM -ML	SAA. No s/o	
	Dry	1.0	No		23					
					24					
					25			ML	Gray dense v. fn sandy silt. No s/o	
					26					
					27				Gray & maroon silt	
					28			ML	w/ sand. Dense but	
	Dry	1.5	No		29				fissile. No s/o	
					30					
					31					
					32				Gray v. fn. sandy	
	Dry	3.7	No		33			ML	silt. No s/o	
					34			ML CL	Gray, shiny, Dense, silty clay	
					35				No s/o	
					36					
	Dry		No		37				SAA No s/o	

Advancing Opportunity

Boring Well #	BH06
Project:	Howell M#1
Project #	017820016
Date	9-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	10.7	No	BH 06 @ 35'-40' 1120	37 38 39 40			ML/CL	Lt. & dark gray silty clay, w/ v. fn sand. Sandy clay. Dense. No s/o	
	Dry	2.9	No	BH06 @ 40'-45' 1130	41 42 43 44 45			ML/CL	SAA. Dense, shiny silty clay, Tr. sand. No s/o.	
					46 47 48 49 50 51 52 53 54 55 56 57 58 59				Lt. bluish gray siltstone. Cemented No s/o. Refusal @ 45' No well set.	

Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH07	Project: Howel M#1
Date: 9-18-20	Project Number: 017820016
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,760	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: 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
	—	—	—		0–5				Cobble blocked sampler. No Recovery.	No well set
	Dry	0.9	No		6–10			SW-SM	Brown med sand w/ silt. Well gr. some gravel. No s/o.	
	Dry	1.2	No		11–15			SW-SM	SAA. No s/o. Lt gray silty fn-med sand. No s/e	

Advancing Opportunity

Boring/Well #	BH07
Project:	Howell M#1
Project #	017820016
Date	9-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16			SM	Lt. gray, some maroon. fn. silty sand + ~~silty~~	
	Dry	1.7	No		17					
					18			ML	sandy silt. No s/o.	
					19				SH. Dense.	
					20					
					21					
					22			SM	Interbedded gray +	
	Dry	2.0	No		23				maroon silty fn sand	
					24			ML	+ sandy silt. Dense.	
					25				No s/o	
					26					
					27			SM		
					28				SAA. No s/o.	
	Dry	1.1	No		29			ML		
					30					
					31				Lt. gray + tan silty	
					32			SM	fn sand	
	Dry	2.7	No		33					
					34			ML	gray + maroon sandy	
					35				silt. No s/o	
					36					
	Dry		No		37				SAA No s/o	

Advancing Opportunity

Boring Well #	BH07
Project:	Howell M#1
Project #	017820016
Date	9-18-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
				BH07 @ 35-40 1345	38			SM/ML	Lt. gray + tan silty fn sand + sandy silt. No s/o	
	Dry	9.4	No		39					
					40			ML	Gray v. fn sandy silt. No s/o	
				BH07 @ 40-45'	41					
					42					
					43			ML/CL	Lt. + dark gray silty clay, tr. sand.	
	Dry	0.9	No		44					
				1400	45				- gray, bluish gray siltstn. refusal @ 45' No. s/o No well set.	
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

LTE Advancing Opportunity

848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH08	Project: Howell M#1
Date: 9-21-20	Project Number: 017820016
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,760	Detector: PID
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 45'-24'	Seal: Bentonite 24'-22'
Grout: Bentonite 22'-0'	
Casing Type: Schedule 40 PVC 25'-0 +SU	Diameter: 2" Length: ~~30~~ 30'
Hole Diameter: 7"	Depth to Liquid:
Screen Type: Schedule 40 PVC 45'-25' Slot: 0.010"	Diameter: 2" Length: 20'
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
	Dry	1.5	No		0–5			SW-SM	Lt. Brown fn. sand w/ SIH. Fill material. No s/o	
	Dry	0.8	No		5–10			SW-SM	SAA. No s/o	
	Dry	3.7	No		10–15			SW-SM	SAA. No s/o. Tan, med sand, No s/o.	

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Boring/Well #	BH08
Project:	Howell M#1
Project #	017820016
Date	9-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	1.3	No		15–20			SP	Tan med sand. No s/o	
	SL. Moist	2.4	No		21–25			SW-SM	Lt. Brown well gr. med coarse & fn sand w/ silt. & ~~cobbles.~~ gravel. No s/o.	
	Dry	1,363	No		26–30			SW-SW	Lt. Brown Well grd. Med coase & fn. sand w/ silt. No stain, slight sweet gassy degrad. HC odor.	
	Dry	2,376	No	BH 08 @ 30-35'	31–35			SW-SM	SAA. No stain, Mod sweet gassy odor.	
	SL. Moist		yes. SL.	0900	36–37			SM/ ML	Lt. gray fn. silty sand & sandy silt.	

LT Advancing Opportunity

Boring Well #	BH08
Project:	Howell M#1
Project #	017820016
Date	9-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
	SL Moist	1,838	Yes		38			SM/ ML	Lt. gray sandy silt. & fn-med fn silty sand. Slt. stain & odor.	
					39					
	Dry				40				cobbles w/sand & silt.	
					41					
					42					
			SL.		43			SW	Lt. gray well grad. med-med coarse sand w/ gravel & cobbles. Slight stain & odor.	
	Dry	2,194	yes		44					
					45				Refusal @ 45', cobbles	
					46				well set 45'-25'	
					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: BH09		Project: Howel M#1	
Date: 9-21-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	Detector: PID	Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand 43'-32'		Seal: Bentonite 32'-30'	Grout: Bentonite 30'-0'
Casing Type: Schedule 40 PVC 33'-0+S.M.		Diameter: 2" Length:	Hole Diameter: 7" Depth to Liquid: —
Screen Type: Schedule 40 PVC 43'-33' 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	1.3	No		0–5			SW-SM	Lt. Brown fn-med fn. silty sand Fill material. No s/o.	
					6–7				SAA. No s/o	
	Dry	13.7	No		8–10			SW-SM	Brown fn-med sand w/ silt. Some organics	
					11–12			SW SM	SAA. No s/o	
	Dry	11.1	No		13–15			SW-SM	Lt. brown med fn. No s/o silty sand trace w/ silt.	

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Boring/Well #	BH09
Project:	Howell M#1
Project #	017820016
Date	9-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	4.8	No		15–20			SP SM	Lt. Brown med fn. sand w/ silt. Some organics carbonaceous lenses. No s/o	
	Dry	22.1	No		21–25			SW -SM	Lt. Brown med fn. sand w/ silt. Tr. gravel No s/o.	
	Dry	99.6	No		26–30			SW -SM	SAA. Lt Brown / tan med – med fn. sand w/ silt. Some gravel. No stain, v. slt. sweet odor.	
	Dry	~~1,685~~ DB 1,306	No		31–35			SM	Lt. Brown silty fn. – med fn. sand. No stain. slt. gassy sweet HC odor.	
	Dry		No		36–37			SW -SM	Lt. Brown med sand w/ silt + gravel	

Advancing Opportunity

Boring Well #	BH09
Project:	Howell M#1
Project #	01 7820016
Date	9-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
				BH 09 @ 35'-38' [redacted] 1200	38				Lt. Brown med sand w/ silt + gravel. No stain, slt. gassy odor. Refusal due to cobble @38', using plug to get to 40'	
	Dry	1,494	No		39					
					40					
					41					
				BH 09 @ 40'-43' [redacted] 1220	42			SW	Lt. grayish tan med-coarse sand w/ gravel/cobbles.	
	Dry	546	No		43				Lt. grayish white, dense med S. sth. Refusal @ [redacted] 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: BH10		Project: Howel M#1	
Date: 9-21-20		Project Number: 017820016	
Logged By: Danny Burns		Drilled By: MO-TE Drilling	
Elevation: 5,760	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	16.5	No		0–5			SW-SM	Lt. Brown med. sand w/ silt. Some oganics No s/o	No well set
	Dry	12.3	No		5–10			SM	Lt. Brown fn. silty sand. w/ white mottling. No s/o.	
	Dry	10.7	No		10–15			SM	SAA No s/o	

Advancing Opportunity

Boring/Well #	BH 10
Project:	Howell M#1
Project #	017820016
Date	7-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	Dry	6.5	No		16			SW -SM	Lt. Brown med to fn. sand w/ silt & gravel/cobbles. No s/o	
					17				Refusal, - cobbles	
					18				put in plug, drill to 20'	
					19					
					20					
					21					
					22				Limited recovery in continuous sampler.	
					23					
	Dry	7.4	No		24			SW -SM	Lt. grayish brown fn sand w/ silt. No s/o	
					25					
					26					
					27					
					28					
					29					
	Dry	10.7	No		30			SM/ML	Lt. grayish tan sandy silt & fn/silty sand. No s/o	
				BH 10 @ 30'-35'	31					
					32					
					33					
					34					
	Dry	17.5	No	0830	35			SM/ML	SAA. No s/o	
					36					
					37					

Advancing Opportunity

Boring Well #	BH10
Project:	Howell M#1
Project #	017820016
Date	9-21-20

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37				No Recovery	
				BH10 @ 38'-40' 1000	38					No well set
	Dry	7.1	No		39		X	SM/ ML	Lt. grayish tan, fn. sandy silt. + silt stn. No S/O	
					40				Refusal @ 40', broke auger + auger teeth on drill bit.	
					41					
					42					
					43					
					44					
					45					
					46					
					47					
					48					
					49					
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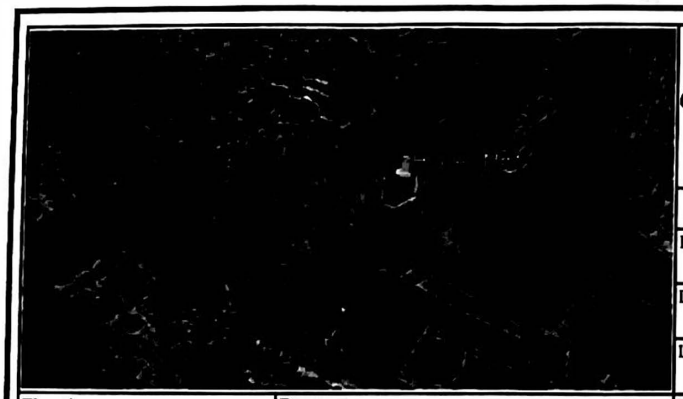
					56					
					57					
					58					
					59					



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH11	Project: Howell M#1
Date: 5/14/21	Project Number: 017820016
Logged By: Eric Carroll	Drilled By: MO-TE Drilling
Elevation: 5,760	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: NA
Hole Diameter:	Depth to Liquid: NA
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length: NA
Total Depth: 45'	Depth to Water: NA

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	15.4	N		0		80	SP	100se, dry, red brown, sand some gravel no stain/odor	NO well Installed
					1					
					2					
					3					
					4					
	Dry	11.5	N		5		100	SM	medium dense, dry, fine sand and silt	
					6					
					7				NO Stain/Odor	
					8					
					9					
					10					
					11					
	Dry	2.2	N		12		100	SM	SAA no stain/odor	
					13					
					14					
					15					

Advancing Opportunity

Boring/Well #	BH11
Project:	Howell M#1
Project #	017820016
Date	5/14/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	Dry	3.2	N		16		100	SP	Dense, dry, fine sand, few gravel no stain/odor	
					17					
					18					
					19					
					20					
	DRY	5.8	N		21		100	SP	Dense, dry silty sand, little gravel no stain/odor	
					22					
					23					
					24					
					25					
					26					
	Dry	4.6	N		27			SP	SAA no stain/odor	
					28					
					29					
					30					
	Dry	14.9	N		31		0	GP	Sample cuttings due to cobbles/boulders Dry sandy gravel	
					32					
					33					
					34					
					35					
	Dry	12.7	N		36		0	GP	Gravel no recovery in cont. nous	
					37					

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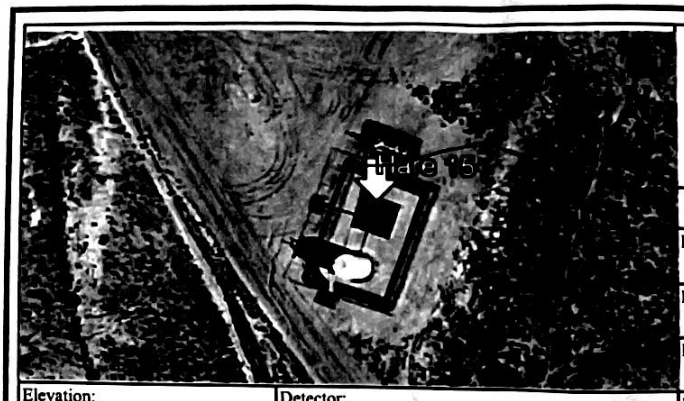
Boring/Well #	BH11
Project:	Howell M#1
Project #	017820016
Date	5/14/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry		N		37			GP	SAA gravel no stain/odor	
					38					
					39					
					40					
					41					
	Dry	11.6	N		42			SP	Dry, loose, Sandy gravel no stain/odor	
					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: BH12	Project: Howell NE ~~Hare 15~~
Date: 5/20/21	Project Number: 017820018
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Elevation: 5,830 / 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: NA / Hole Diameter: / Depth to Liquid: NA
Screen Type: Schedule 40 PVC Slot: 0.010"	Diameter: 2" Length: NA / Total Depth: 55' / Depth to Water: NA

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	DRY	8.4	N		0–2			SM	Dry, loose, sand, some fines and gravel no silo	NO well Installed
	DRY	2.5	N		6–7			SP	Dry, loose, coarse sand, some gravel, few fines	
	DRY	40.1	N		12–13			SP	DRY, med dense, coarse sand and gravel	

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Boring/Well #	BH12
Project:	Howell ~~Hare 15~~
Project #	017820018
Date	5/20/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
	DRY	10.2	N		17			SP	Dry, med dense, coarse sand some gravel NO S/O	
					18					
					19					
					20					
					21					
	DRY	6.3	N		22					
					23					
					24			SP	Dry, dense, fine - med grain Sand, little fines	
					25					
					26					
					27					
	DRY	6.4	N		28			SP	Loose, dry, gravel and coarse Sand	
					29					
					30					
					31					
	DRY	4.8	N		32			GP	SAA NO S/G	
					33					
					34					
					35					
					36			GP	NO Recovery Cobbles/gravel	
					37					

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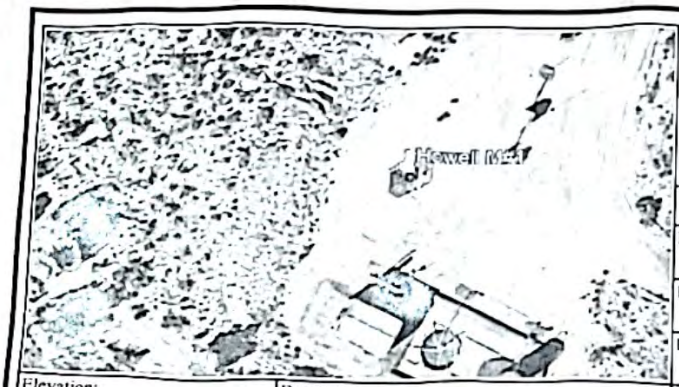
Boring/Well #	BH12
Project:	Hawell ~~Hare 19~~
Project #	017820018
Date	5/20/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38					
					39					
					40					
	DRY	6.0	N		41			GP	Dry, loose, ~~coarse~~ cobbles gravel, some sand	
					42					
					43					
					44					
					45					
					46					
	DRY	20.1	N		47			SP	Dry, Dense, ~~tuff Cemented~~ coarse sand and gravel very hard	
					48					
					49					
					50					
					51					
	moist	6.7	N		52			SP	Moist, very dense, gray, ~~to~~ Sand and gravel very hard	
					53					
					54					
					55					
					56					
					57					
					58					
					59					



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH13	Project: Howell M#1
Date: 5/21/21	Project Number: 017820016
Logged By: Danny Burns	Drilled By: MO-TE Drilling
Drilling Method: Hollow Stem/Air Rotary	Sampling Method: Continuous
Seal: Bentonite	Grout: Bentonite
Elevation: 5,760 / Detector: PID	
Gravel Pack: 10-20 Silica Sand	
Casing Type: Schedule 40 PVC — Diameter: 2" — Length:	Hole Diameter: / Depth to Liquid:
Screen Type: Schedule 40 PVC — Slot: 0.010" — Diameter: 2" — Length:	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
	DRY	1.1	N		0–2			SP	Loose dry, lt brown sand and gravel, no s/c	NO well Installed
	DRY	3.1	N		8–9			SP	med dense, lt. brown, coarse sand, some gravel	
	DRY	0.8	N		13–14			SP	Dry, med dense, coarse sand some gravel	

Advancing Opportunity

BH13

Boring/Well #	
Project:	Howell M#1
Project #	017820016
Date	5/21/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	Dry	0.4	N		16			SP	Dry med dense coarse sand few gravel	
					17					
					18					
					19					
					20					
					21					
					22					
	DRY	1.0	N		23					
					24				moist, fine sand some silt no S/O	
					25			SM		
					26					
					27					
	moist	2.9	N		28			SP	moist, dark brown, gravel and sand no S/O	
					29					
					30					
					31					
					32					
	moist	2.3	N		33			SP	SAA no S/O	
					34					
					35				Gravel & cobbles	
					36			GP	no recovery	
					37					

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Boring/Well #	BH13
Project:	Howell M#1
Project #	017820016
Date	5/21/21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	moist	14.2	N		37–38			GP	gravel & cobbles	
	moist	371	Y		43–59			SP	moist, dense hard, gray, coarse sand, HC stain, slight odor	

total #s sand = 7 bags
bentonite = 10 bags

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[ ] = 10/20 sand || = blank
[ ] = ~~bentonite~~
[ ] = grout bentonite
[ ] = screen

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH08A / SVE06		Project: Howell M1	
Date: 9-14-21 – 9-15-21		Project Number: TE017821013	
Logged By: Josh Adams		Drilled By: Environmental Works	
Elevation: 5,815	Detector: PID	Drilling Method: Sonic	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand		Seal: Bentonite	Grout: slurry
Casing Type: Schedule 40 PVC	Diameter: 2" Length: 40'	Hole Diameter: 6"	Depth to Liquid: ND
Screen Type: Schedule 40 PVC Slot: 0.010" (55-40')	Diameter: 2" Length: 15'	Total Depth: 55	Depth to Water: ND

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.0	No		0–2				dark yellowish brown silty sand, no stain / odor low plas/cohesion 10YR 4/6	stick up
				BH08 @ 0-5' @ 1457	3–4	0-5		SM		
	Dry	0.0	NO	BH08 5-10' @1500	5–8	5-9		SM	SAA	
	Dry	0.0	NO		9–11	9-11		SM	SAA	
					12–13	11-16		NR		
	Dry	0.0	No	BH08A 10-15' @153[illegible]	14–15			SM	SAA	

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Boring/Well #	BH08A/SVE06
Project:	[redacted] Hauch M1
Project #	[redacted]
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
	Dry	0.0	NO		15	11-16		SM	S AA	
					16					
					17	16-20			SAA, slightly more sand	
	Dry	0.0	NO	BH08A 15-20' @ 1545	18			SM		
					19					
	Moist	0.0	NO		20			CL	dark brown. sandy lean clay medium plas/cohesion	
					21			SM	brown silty sand	
	Dry	0.1	NO	BH08A 20-25 @ 1600	22					
					23					
					24					
					25	20-32				
					26					
	Dry	385.2	NO	BH08A 25-30 @ 1602	27			SM	SAA, slight HC odor	
					28					
					29					
					30					
					31			SM	SM, SAA strong HC odor	
	Moist	>15,000 ppm	NO	BH08A @ 30-35' 1615	32	30-35				
					33					
					34					
					35	35-40				
	Moist	>15,000	Yes black	BH08A @ 35-40'	36				SAA, strong HC odor black stain	
					37					

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Boring/Well #	BH08A/SVE06
Project:	Howell
Project #	[illegible]
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
	M	>15000	Yes black	BH08A @ 35-40' 1632	37–40	35-40		SM	SAA, strong HC odor black stain w/ cobbles	
	M	>15,000	Yes Black	BH08A @ 40-45 1652	40–44	40-44		SM	SAA strong HC odor black stain w/ cobbles	
	M	1827	Yes black		44–46	44-46		SM	SAA	
	M	669.2	Yes gray	BH08A @ 45-50' 0835	46–49	46-49		SM	SAA, cobbles last 2' of run staining is lighter, grey	
	M	357.2	Yes slight grey	→	49–50	49-50		SM SP-SM	intermixed SM, with Sandstone,	
	M	30.0	NO	BH08A @ 50-55' 0945	50–53	50-53		SM SP-SM	SAA, no HC odor	
	M	29.2	NO	BH08A @ 55' 0955	53–55	53-55			SAA	
					55–59				TD @ 55'	

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH13A / SVE07		Project: Howell M1	
Date: 9-15-21 - 9-16-21		Project Number: TE017821013	
Logged By: Josh Adams / Reece Hargis		Drilled By: Environmental Works	
Elevation: 5,815	Detector: PID	Drilling Method: Sonic	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand		Seal: Bentonite	Grout: slurry
Casing Type: Schedule 40 PVC 35 - 0 ft		Diameter: 2" Length: 35 ft	Hole Diameter: 6" Depth to Liquid: ND
Screen Type: Schedule 40 PVC 45 - 35 Slot: 0.010"		Diameter: 2" Length: 10'	Total Depth: Depth to Water: ND

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	1.3	NO		0 1	0-2		SM	silty sand, low cohesion, low plast, 7.5 YR 4/6, no odor	
				BH13A a 0-5' 1407	2 3					
	Dry	0.0	NO		4 5					
					6	2-10		SM	SAA	
				BH13A c 5-10' 1410	7 8			SM	SAA, some gravel	
	Dry	0.0	NO		9 10					
					11	10-14		SM	SAA	
	Dry	1.6	NO		12					
				BH13A c 10-15' 1420	13 14 15				SAA	

Totals: SAND: 7 bags
Bentonite 12 bags

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Boring/Well #	BH13A/SVE06
Project:	~~[illegible]~~ Howell M1
Project #	01[illegible]
Date	9-15-21 – 9-16-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15				SAA, some sandstone chips	
					16	14-20		SM		
	Dry	0.5	NO	BH13A @ 15-20' 1445	17–19			SM	SAA	
					20					
					21	20-25				
	Dry	0.0	NO	BH13A @ 20-25' 1500	22–24			SM	SAA	
					25				9-16-21, resume drilling @ 0815	
					26	25-30			fines – very f sand, medium plasticity, brown w/ silts & clay No S/O	
	Dry	16.2	N	BH13A @ 25-30 0915	27–28			SM		
					29–30			GP	transitions to fine – md. grained with large gravel, tan to lt brown No S/O	
					31	30-35			Fine – coarse sands with cobbles (rounded) up to ~4" unconsolidated No S/O	
	Dry	18.4	N	BH13A @ 30-35 0950	32–34			GP		
					35					
	moist	465	grey	BH13A 35-40 1050	36–37	35-37		SW-SM	fine – medium sand, md. gray silt matrix, moderate HC odor, some dark gray stain	

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Boring/Well #	BH 13A
Project:	[redacted] Ifowell NM
Project #	01782001?
Date	9-16-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
				BH13A @ 35-40 1050	37	37-40		SM	silt - v fine some clays dark gray stain & mod. odor	
	silt moist	261	dark gray		38					
					39			SW-SM	fine to med. sands dark gray to less staining & odor	
					40					
	silt moist	418	d gray -black	BH13A 40-45 1345	41	40-43			laminated v fine to med ss silts & clays. dark gray to black	
					42				dark gray to black staining	
					43				run casing to prevent hole collapse	
	silt moist	47.5	N		44	43-46		SW	red gray to blush gray well sorted fine-medium ss w/ silt matrix	
					45			SM	no stain, ✓ slight odor	
				BH13A 45-48 1640	46	46-48			gray silty clay, NO s/o	
	moist	37.8	N		47					
					48				fine-med. snd in silt No s/o	
					49				TD 48' @ 1630	
					50				well set @ 45'	
					51				screen	
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH14	Project: Howell M1
Date: 9-17-2021	Project Number: TE017821013
Logged By: Josh Adams	Drilled By: Environmental Works
Elevation: 5,815	Detector: PID
Drilling Method: Sonic	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Grout: NA	
Casing Type: Schedule 40 PVC	Diameter: 2" Length:
Hole Diameter: 6"	Depth to Liquid: NA
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length:
Total Depth: 50	Depth to Water: NA

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	1.2	NO		0 1 2 3 4	0-3		ML	brown sandy silt, low coh/plas no stain/odor 7.5YR 5/6	
	Dry	0.0	No		5 6 7	3-7		ML	SAA	No well
	Dry	0.0	NO		8 9 10 11 12 13 14 15	7-10 10-14		SM SM	brown silty sand low plas/coh no stain/odor 7.5YR 5/6 SAA	

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Boring/Well #	BH14
Project:	[redacted] Howell M1
Project #	[redacted]
Date	9-17-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15	14-17		SM	SAA	
	Dry	1.2	NO		16					
					17					
	Dry	1.9	NO		18	17-20		SM	SAA	
					19					
					20					
					21					
	Dry	1.7	NO		22			SM	SAA	
					23	20-25				NO well
					24					
					25					
					26					
	Dry	0.0	NO		27			SM	SAA, some cobbles	
					28	25-30				
					29					
					30					
					31					
	Dry	0.2	NO		32	30-34		SM	SAA, many cobbles	
					33					
					34					
	Dry	0.0	NO		35	34-37		SM	SAA, many large cobbles	
					36					
					37					

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Boring/Well #	BH14
Project:	~~Hagan~~ Howell
Project #	~~0172220017~~
Date	9-17-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37					
					38			SM	SAA, cobbles	
	Dry	1.2	NO		39	37-40				
					40					
					41				grey ~~ca~~ claystone high plas/cohesive	
				BH14 @ 40-45' 1035	42	40-44		CH		
	M	7.1	NO		43				Grey1 6/2	NO Well
					44					
					45	44-47		CH	SAA	
	m	2.3	NO	BH14 @ 45-50' 1100	46					
					47	47-50		CH		
	m	26	NO		48				SAA	
					49			CH		
					50					
					51				TD @ 50'	
					52				no observed impacts	
					53					
					54					
					55					
					56					
					57					
					58					
					59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH15	Project: Howell M1
Date: 9-17-21	Project Number: TE017821013
Logged By: Josh Adams	Drilled By: Environmental Works
Elevation: 5,815	Detector: PID
Drilling Method: Sonic	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Grout:	
Casing Type: Schedule 40 PVC	Diameter: 2" Length:
Hole Diameter: 6"	Depth to Liquid:
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length:
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
	Dry	1.5	NO		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	0-5		SM	Yellowish brown silty sand low plas/cohe w/some cobbles no stain/odor 10YR 6/6	
	Dry	1.9	NO			5-8		SM	SAA, cobbles	NO Well
	Dry	1.5	NO			8-10		SM	SAA	
	Dry	0.2	NO			10-15		SM	SAA	

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Boring/Well #	BH15
Project:	Howell
Project #	[illegible]
Date	9-17-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
	Dry	0.2	NO		15–20	15-20		SM	SAA	
	Dry	0.1	NO		20–25	20-25		SM	SAA, mainly large cobbles	NO Well
	Dry	1.5	NO		25–28	25-28		SM	light grey/brown SAA, mainly large cobbles 2YR 6/1	
	Dry	1.0	NO		28–30	28-30		SM	SAA	
					30–31				SAA	
	M	2.3	NO	BH15 @ 30-35' 1330	31–35	30-35		CH	grey claystone, high plas/cohesion no stain/odor 2.5YR5/1	
	M		NO		35–37	35-40		CH	SAA	

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Boring/Well #	BH15
Project:	[redacted]
Project #	01[redacted] Howell MI
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
	M	0.4	NO		37–39	35-40		CH	SAA	
	M	0.2	NO	BH15 40-45' @ 1350	40–45	40-45		CH	SAA	
					45				TD @ 45, no impacts observed clay stone	NO WELL
					46–59					

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH16	Project: Howell M1
Date: 9-17-21	Project Number: TE017821013
Logged By: Josh Adams	Drilled By: Environmental Works
Elevation: 5,815	Detector: PID
Drilling Method: Sonic	Sampling Method: Continuous
Gravel Pack: 10-20 Silica Sand	Seal: Bentonite
Grout:	
Casing Type: Schedule 40 PVC	Diameter: 2" Length:
Hole Diameter: 6"	Depth to Liquid: NA
Screen Type: Schedule 40 PVC	Slot: 0.010" Diameter: 2" Length:
Total Depth:	Depth to Water: ND

Penetration Resistance	Moisture Content	Vapor (ppm)	HC Staining?	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				brown silty sand, low plast/ coh.	
					1			SM	7.5YR 5/6 no stain/ odor	
					2					
	Dry	0.7	NO		3	0-5				
					4					No well
					5					
					6					
					7			SM		
	Dry	3.6	NO		8	5-10			SAA, some sandstone chunks	
					9					
					10					
					11					
					12	10-15		SM	SAA	
	Dry	2.8	NO		13					
					14					
					15					

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Boring/Well #	BH16
Project:	[redacted] Howell M(
Project #	[redacted]
Date	9-17-21

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
					16					
					17	15-20		SM	SAA, some smaller cobbles	
	Dry	0.8	No		18					
					19					
					20					
					21					
					22			SM	light grey/brown, SAA many large cobbles	
	Dry	1.3	No		23	20-25				
					24				2YR 6/1	
					25					
					26					
	Moist	7.0	No		27	25-28'			SAA, Gobbles to 5 inches, rounded	
					28					
				BH16 COC 28-30' 0940	29				29-32 Grey, claystone	
		20.4	No			28-30'				
	Dry				30			CH	high plast./cohesive grey 1 6/0 No odor or staining	
					31	30-35				
		13.8			32					
					33				32-41 Sandy clay/claystone, slightly cohesive No odor or staining	
	Dry				34					
					35			LH		
					36	35-40			SAA	
		17.2			37					

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Boring/Well #	BH16
Project:	Howell #1 Hare 14
Project #	017820017
Date	9/15/2021

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					37				continued	
					38	35-40'			SAA, more cohesive @ 37'	
					39			CH		
					40					
					41					
	Moist				42				Gray, sandy silt + clay, moist, no odor or staining	
	~~11.5~~	11.5	none	BH16 @40-45' 1000	43	40-45'		CH		
					44					
					45				EOB @ 45'	
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					

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

CONDITIONS

Action 51756

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 51756
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 63058 for most updated status.	11/14/2022