State of New Mexico
Oil Conservation Division

Incident ID	NRM1935242300
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☒ Description of remediation activities

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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Melodie Sanjari Title: Environmental Professional

Signature: Melodie Sanjari Date: 5/11/2020

email: msanjari@marathonoil.com .Telephone: 575-988-0561

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

May 1, 2020 Vertex Project #: 19E-00614-014

Spill Closure Report: Taylor Deep 12 Federal #009
Unit H, Section 12, Township 18 South, Range 31 East
County: Lea
API: 30-015-39764
Tracking Number: NRM1935242300

Prepared For: Marathon Oil Permian, LLC
4111 S. Tidwell Road
Carlsbad, New Mexico 88220

New Mexico Oil Conservation Division – District 1 – Hobbs
1625 North French Drive
Hobbs, New Mexico 88240

Marathon Oil Permian, LLC (Marathon) retained Vertex Resource Services Inc. (Vertex) to conduct a spill assessment and remediation for an oil release that occurred at Taylor Deep 12 Federal #009, API 30-015-39764 (hereafter referred to as "Taylor Deep"). Marathon provided notification of the spill to New Mexico Oil Conservation Division (NM OCD) District 1 on October 29, 2019, via an initial C-141 Release Notification (Attachment 1). The Bureau of Land Management (BLM), who owns the property, was also notified at that time. The NM OCD tracking number assigned to this incident is NRM1935242300.

This letter provides a description of the spill assessment and remediation activities, and demonstrates that closure criteria established in 19.15.29.12 *New Mexico Administrative Code* (NMAC) have been met and all applicable regulations are being followed. This document is intended to serve as a final report to obtain approval from NM OCD for closure of this release.

Incident Description

On October 19, 2019, a release occurred at Marathon's Taylor Deep site when a dump valve malfunctioned at the heater treater pressure safety valve (PSV). This incident resulted in the release of approximately 2.97 barrels (bbls) of oil into the air as a spray. A small section of the wellpad adjacent the heater treater was affected by the overspray and windy conditions carried the spray off-pad onto undisturbed BLM land. No oil was released into sensitive areas or waterways. Upon discovery of the release, the dump valve was repaired. No free liquids were recovered from the pad or adjacent undisturbed BLM land.

Site Characterization

The release at Taylor Deep occurred on BLM-owned land, N 32.7623863, W 103.816597, approximately 30 miles northeast of Carlsbad, New Mexico. The legal description for the site is Unit H, Section 12, Township 18 South, Range 31 East, Lea County, New Mexico. This location is within the Permian Basin in southeast New Mexico and has

historically been used for oil and gas exploration and production, and farmland. An aerial photograph and site schematic are included in Attachment 2.

Taylor Deep is typical of oil and gas exploration and production sites in the western portion of the Permian Basin, and is currently used for oil and gas production, and storage. The following sections specifically describe the release area on the southern edge of the constructed pad where the heater treaters are located and an adjacent off-pad area.

The surrounding landscape is associated with sandy plains and dunes at elevations of 3,100 to 4,200 feet above sea level. Historically, the plant community was dominated by grasses, which stabilized the potentially erosive sandy soils; however, more recent conditions, resulting from fire suppression and extensive grazing, show increased woody plant abundance. The climate is semi-arid, with average annual precipitation ranging between 10 and 14 inches. The dominant grass species are dropseeds, threeawns and bluestems, and the dominant shrub species are shinnery oak and soapweed yucca. Bare areas are only occasionally present throughout the terrain (United States Department of Agriculture, Natural Resources Conservation Service, 2019). Limited to no vegetation is allowed to grow on the compacted wellpad.

The Geological Map of New Mexico indicates the surface geology at Taylor Deep is comprised primarily of Qep – interlayed eolian sands and piedmont-slope deposits from the Holocene to middle Pleistocene ages (New Mexico Bureau of Geology and Mineral Resources, 2019). The National Resources Conservation Service (NRCS) Web Soil Survey characterizes the soil at the site as Kermit-Berino fine sands, characterized by deep, fine sandy soil. It tends to be excessively well-drained with negligible runoff and low available moisture levels in the soil profile ((United States Department of Agriculture, Natural Resources Conservation Service, 2019). There is low potential for karst geology to be present near Taylor Deep (United States Department of the Interior, Bureau of Land Management, 2019).

There is no surface water located on-site. The nearest significant watercourse, as defined in Subsection P of 19.15.17.7 NMAC, is located approximately 4 miles east of the site (United States Fish and Wildlife Service, 2019). There are no continuously flowing watercourses, lakebeds, sinkholes, playa lakes, or other critical water or community features as outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

The nearest active well to the site is a United States Geologic Survey (USGS)-identified well from 1994, located approximately 1,000 feet to the southwest. Depth to groundwater at this well is 435 feet below ground surface (bgs; United States Department of the Interior – United States Geological Survey, 2019). Documentation pertaining to site characterization and depth to groundwater determination is included in Attachment 3.

Closure Criteria Determination

Using site characterization information, a closure criteria determination worksheet (Attachment 3) was completed to determine if the release was subject to any of the special case scenarios outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

Based on data included in the closure criteria determination worksheet, the release at Taylor Deep is not subject to the requirements of Paragraph (4) of Subsection C of 19.15.29.12 NMAC and the closure criteria for the site are determined to be associated with the following constituent concentration limits.

Table 1. Closure Criteria for Soils Impacted by a Release		
Depth to Groundwater	**Constituent**	**Limit**
> 100 feet	Chloride	20,000 mg/kg
	TPH[1] (GRO + DRO + MRO)	2,500 mg/kg
	GRO + DRO	1,000 mg/kg
	BTEX[2]	50 mg/kg
	Benzene	10 mg/kg

[1]Total petroleum hydrocarbons (TPH) = gasoline range organics (GRO) + diesel range organics (DRO) + motor oil range organics (MRO)
[2]Benzene, toluene, ethylbenzene and xylenes (BTEX)

Initial Remedial Actions

An initial spill inspection, completed on October 20, 2019, identified and mapped the boundaries of the overspray area. The release area was determined to be approximately 94 feet long and 70 feet wide; the total affected area was determined to be 3,291 square feet. The Daily Field Report (DFR) associated with the initial spill inspection is included in Attachment 4.

Following approval from BLM regarding in-situ remediation using a vegetation wash and Microblaze, Vertex was onsite on November 5, 2019, to oversee remediation efforts involving the application of Dawn liquid soap to vegetation affected by the overspray and subsequent high pressure washing to remove hydrocarbons from the plant foliage. After this washing process was completed, Microblaze was applied evenly across the soil surface of the identified area of impact and the site was left for 30 days to allow for the topical treatment to stimulate soil microbial activity and reduce the presence of carbons in the soil.

On December 4, 2019, Vertex provided 48-hour notification of confirmation sampling to NM OCD, as required by Subparagraph (a) of Paragraph (1) of Subsection D 19.15.29.12 NMAC (Attachment 5). On December 7, 2019, Vertex returned to the release area at Taylor Deep and collected 18 confirmatory soil samples, each representative of no more than 200 square feet per the alternate sampling method outlined in Subparagraph (c) of Paragraph (1) of Subsection D 19.15.29.12 NMAC, which does not require prior NM OCD approval. The composite samples were placed into laboratory-provided containers, preserved on ice and submitted to a National Environmental Laboratory Accreditation Program-approved laboratory for chemical analysis.

Laboratory analyses included Method 300.0 for chlorides, Method 8021B for volatile organics, including BTEX, and EPA Method 8015 for TPH, including MRO, DRO and GRO. Confirmatory sample analytical data are summarized in Attachment 6. Laboratory data reports and chain of custody forms are included in Attachment 7.

A GeoExplorer 7000 Series Trimble global positioning system (GPS) unit was used to map the approximate center of each of the five-point composite samples. The confirmatory sample locations are presented on Figure 1 (Attachment 2). Relevant equipment and prominent features/reference points at the site are mapped as well.

Closure Request Denial and Additional Activities

In January 2020, Marathon requested closure for the release at Taylor Deep at Vertex's recommendation, which was unfortunately based on a misinterpretation of the purpose of BLM's 50-foot buffer in relation to restoration and reclamation requiremets. The closure request was subsequently denied by NM OCD and the BLM in March 2020, and Vertex was tasked with re-addressing three sample points which exceeded NM OCD requirements to meet restoration and reclamation standards for releases in undisturbed areas.

Because original remediation involved in-situ treatment with Microblaze, it was understood that the treatment would have continued to work since the original confirmatory sampling activity occurred in December 2019 and, as a result, there was a chance that no hydrocarbons remained in the failed areas. On April 7, 2020, prior to assessing the failed sample areas, Vertex provided 48-hour notification of re-confirmation sampling to NM OCD, as required by Subparagraph (a) of Paragraph (1) of Subsection D 19.15.29.12 NMAC (Attachment 5). On April 9, 2020, Vertex returned to Taylor Deep. Several grab samples from the failed sample locations were collected and field screened using Petroflag to determine if hydrocarbons were still present in the soil. The field screens showed levels below required restoration and reclamation standards, so five-point composite confirmatory samples were re-collected from the failed areas.

The composite samples were placed into laboratory-provided containers, preserved on ice and submitted to a National Environmental Laboratory Accreditation Program-approved laboratory for chemical analysis.

Laboratory analyses included Method 300.0 for chlorides, Method 8021B for volatile organics, including BTEX, and EPA Method 8015 for TPH, including MRO, DRO and GRO. The re-collected confirmatory sample analytical data are summarized in Table 2 (Attachment 6) along with the original confirmatory sample analytical data. Laboratory data reports and chain of custody forms have been added to the original reports in Attachment 7.

Closure Request

Following the re-sampling at Taylor Deep, Vertex does not recommend any additional remediation action to address the release at Taylor Deep. Laboratory analyses of the confirmatory samples show constituent of concern concentration levels below NM OCD Closure Criteria for areas where depth to groundwater is greater than 100 feet bgs as shown in Table 1. There are no anticipated risks to human, ecological or hydrological receptors associated with the release site.

The area of overspray that was treated with Microblaze did not require backfill, and vegetation appeared healthy and stable. Because the Microblaze continued to work on the release, all off-pad confirmatory samples now meet restoration and reclamation requirements per Paragraph (3) of Subsection D 19.15.29.13 NMAC. Vertex requests that restoration and reclamation of all portions of the release off the wellpad be considered complete per 19.15.29.13 NMAC regulations.

Vertex requests that this incident (NRM1935242300) be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. Marathon certifies that all information in this report and the attachments is correct, and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NM OCD requirements to obtain closure on the October 19, 2019, release at Taylor Deep 12 Federal #009.

Should you have any questions or concerns, please do not hesitate to contact me at 505.506.0040 or ngordon@vertex.ca.

Sincerely,

Natalie Gordon
PROJECT MANAGER

Attachments

Attachment 1. NM OCD C-141 Report
Attachment 2. Site Schematic and Confirmatory Sample Locations
Attachment 3. Closure Criteria for Soils Impacted by a Release Research Determination Documentation
Attachment 4. Daily Field Report(s) with Photographs
Attachment 5. Required 48-hr Notifications of Confirmation Sampling to Regulatory Agencies
Attachment 6. Original and New Confirmatory Sample Laboratory Results
Attachment 7. Laboratory Data Reports/COCs

References

Google Earth Pro. (2019). *Measured Distance from the Subject Site to Nearest Waterway.* Retrieved from https://earth.google.com.

New Mexico Bureau of Geology and Mineral Resources. (2019). *Interactive Geologic Map.* Retrieved from http://geoinfo.nmt.edu.

New Mexico Water Rights Reporting System. (2019). *Water Column/Average Depth to Water Report.* Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html.

United States Department of Agriculture, Natural Resources Conservation Service. (2019). *Web Soil Survey*. Retrieved from https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

United States Department of the Interior, Bureau of Land Management. (2019). *New Mexico Cave/Karsts*. Retrieved from https://www.blm.gov/programs/recreation/recreation-programs/caves/new-mexico.

United States Department of the Interior, United States Geological Survey. (2019). *Groundwater for New Mexico: Water Levels*. Retrieved from https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels?.

United States Fish and Wildlife. (2019). National Wetlands Inventory. Retrieved from https://www.fws.gov/wetlands/Data/Mapper.html.

Limitations

This report has been prepared for the sole benefit of Marathon Oil Permian, LLC (Marathon). This document may not be used by any other person or entity, with the exception of the New Mexico Oil Conservation Division, without the express written consent of Vertex Resource Services Inc. (Vertex) and Marathon. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Vertex based on the data collected during the assessment. Due to the nature of the assessment and the data available, Vertex cannot warrant against undiscovered environmental liabilities. Conclusions and recommendations presented in this report should not be considered legal advice.

ATTACHMENT 1

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

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

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

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party Marathon Oil Permian LLC	OGRID 372098
Contact Name Isaac Castro	Contact Telephone 575-988-0561
Contact email icastro@marathonoil.com	Incident # *(assigned by OCD)*
Contact mailing address 4111 S. Tidwell Rd., Carlsbad, NM 8220	

Location of Release Source

Latitude 32.7623863 Longitude -103.816597
(NAD 83 in decimal degrees to 5 decimal places)

Site Name TAYLOR DEEP 12 FEDERAL #009	Site Type Oil and gas drilling facility
Date Release Discovered 10/19/19	API# *(if applicable)* 30-015-39764

Unit Letter	Section	Township	Range	County
H	12	18S	31E	Lea

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) 2.97 bbls	Volume Recovered (bbls) 0 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)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

Operator reported a spill from the heater treater PSV. This was due to a dump valve malfunction. This caused an estimated 2.85 bbls of overspray to go off pad onto BLM land due to windy conditions.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

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: Isaac Castro Title: Environmental Professional

Signature: Isaac Castro Date: 10/29/19

email: icastro@marathonoil.com Telephone: 575-988-0561

OCD Only

Received by: Date:

State of New Mexico
Oil Conservation Division

Incident ID	NRM1935242300
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

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

What is the shallowest depth to groundwater beneath the area affected by the release?	430 (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

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.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	NRM1935242300
District RP	
Facility ID	
Application ID	

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Printed Name: Melodie Sanjari Title: Environmental Professional

Signature: Melodie Sanjari Date: 5/11/2020

email: msanjari@marathonoil.com . Telephone: 575-988-0561 .

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	NRM1935242300
District RP	
Facility ID	
Application ID	

Closure

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Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☒ Description of remediation activities

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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Melodie Sanjari Title: Environmental Professional

Signature: Melodie Sanjari Date: 5/11/2020

email: msanjari@marathonoil.com .Telephone: 575-988-0561

OCD Only

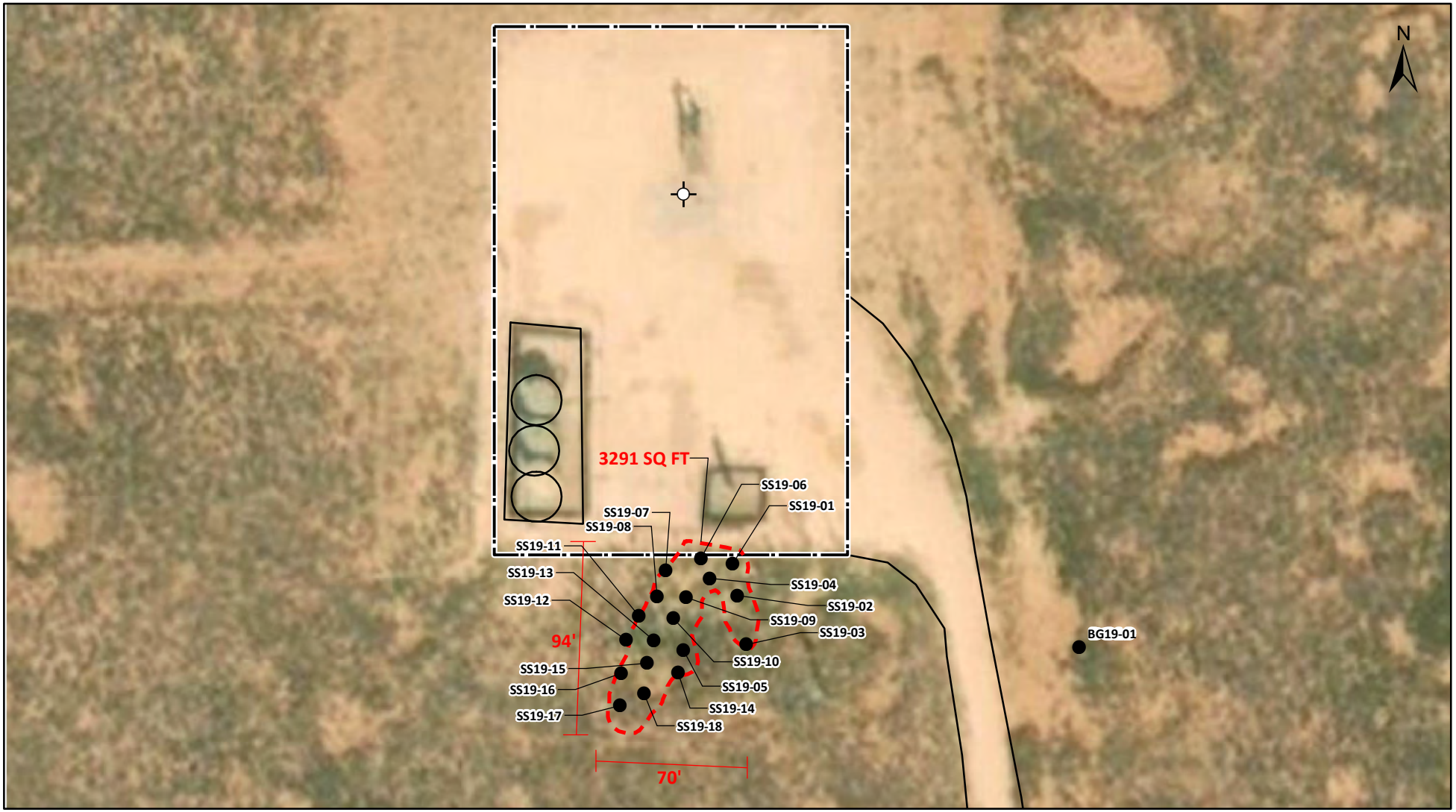
Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

ATTACHMENT 2



LEGEND

- SOIL SAMPLE
- WELLHEAD
- SPILL AREA
- WELLPAD
- ROAD

BG BACKGROUND SAMPLE
SS SOIL SAMPLE

0 25 50 100 ft

SCALE 1:850

Notes: Aerial Image from ESRI Digital Globe 2017

Marathon Oil

Site Schematic and Confirmatory Sample Locations
Taylor Deep 12 009

VERTEX

DRAWN:	NM
APPROVED:	AH
DATE:	DEC 08/19

FIGURE: 1

VERSATILITY. EXPERTISE.

ATTACHMENT 3

Closure Criteria Determination			
Site Name: Taylor Deep 12 Federal 009H			
Spill Coordinates:		X: 32.7623863	Y: -103.816597
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	**430**	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	20,673	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	16,104	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	52,101	feet
5	i) Within 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, **or**	5,709	feet
	ii) Within 1000 feet of any fresh water well or spring	>1000	feet
6	Within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves	No	(Y/N)
7	Within 300 feet of a wetland	38,212	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Low	Critical High Medium Low
10	Within a 100-year Floodplain	>100	year
NMAC 19.15.29.12 E (Table 1) Closure Criteria		>100'	<50' 51-100' >100'

New Mexico Office of the State Engineer

Water Right Summary

get image list

WR File Number: CP 00636 **Subbasin:** CP **Cross Reference:** -

Primary Purpose: PRO 72-12-1 PROSPECTING OR DEVELOPMENT OF NATURAL RESOURCE

Primary Status: PMT PERMIT

Total Acres: **Subfile:** - **Header:** -

Total Diversion: 0 **Cause/Case:** -

Owner: AMOCO PRODUCTION COMPANY

Documents on File

	Trn #	Doc	File/Act	Status 1	Status 2	Transaction Desc.	From/ To	Acres	Diversion	Consumptive
get images	475310	72121	1981-06-04	EXP	EXP	CP 00636	T		3	

Current Points of Diversion

(NAD83 UTM in meters)

POD Number	Well Tag	Source	Q 64	Q16	Q4	Sec	Tws	Rng	X	Y	Other Location Desc
CP 00636				4	4	07	18S	32E	612475	3624947*	

***An (*) after northing value indicates UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q q q 6416	4	Sec	Tws	Rng	X	Y	Distance
CP 00636	CP	PRO	0	AMOCO PRODUCTION COMPANY	LE	CP 00636					4	4	07	18S	32E	612475	3624947*	1741
CP 00672	CP	STK	3	VIRGIL LINAM ESTATE	LE	CP 00672				Shallow	4	4	07	18S	32E	612475	3624947*	1741
CP 00896	CP	STK	3	B.L.M.	LE	CP 00896				Shallow	1	4	4	14	18S	31E	609166	3623398*	2742
CP 00814	CP	PLS	3	KENNETH SMITH	LE	CP 00814 POD1				Shallow	2	2	08	18S	32E	614074	3626168*	3282
CP 00566	CP	DOM	3	B.E. FRIZZELL	LE	CP 00566 POD1				Shallow	4	4	1	04	18S	32E	614960	3627280*	4455
CP 01447	CP	MON	0	PLAINS ALL AMERICAN PIPELINE	ED	CP 01447 POD1					4	3	1	25	18S	31E	609735	3620809	4883

Record Count: 6

UTMNAD83 Radius Search (in meters):

Easting (X): 610847.24 **Northing (Y):** 3625565 **Radius:** 5000

Sorted by: Distance

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer

Wells with Well Log Information

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(in feet)

POD Number	POD Code	Sub-basin	County	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
CP 00672		CP	LE	Shallow	4	4	07	18S	32E	612475	3624947*		1741	07/17/1992	08/07/1992	08/12/1992	524	430	ABBOTT, MURRELL	46
CP 00672 CLW475398	O	CP	LE	Shallow	4	4	07	18S	32E	612475	3624947*		1741	01/22/1985	01/29/1985	02/08/1985	540	460	FELKINS, LARRY	882
CP 00566 POD1		CP	LE	Shallow	4	4	1	04	18S	32E	614960	3627280*	4455	06/01/1977	06/03/1977	06/13/1977	133	65	ABBOTT, MURRELL	46

Record Count: 3

UTMNAD83 Radius Search (in meters):

Easting (X): 610847.24 **Northing (Y):** 3625565 **Radius:** 5000

***UTM location was derived from PLSS - see Help**

U.S. Fish and Wildlife Service
National Wetlands Inventory

Taylor Deep 12 Fed 9H - Riverine 20,673 ft

November 1, 2019

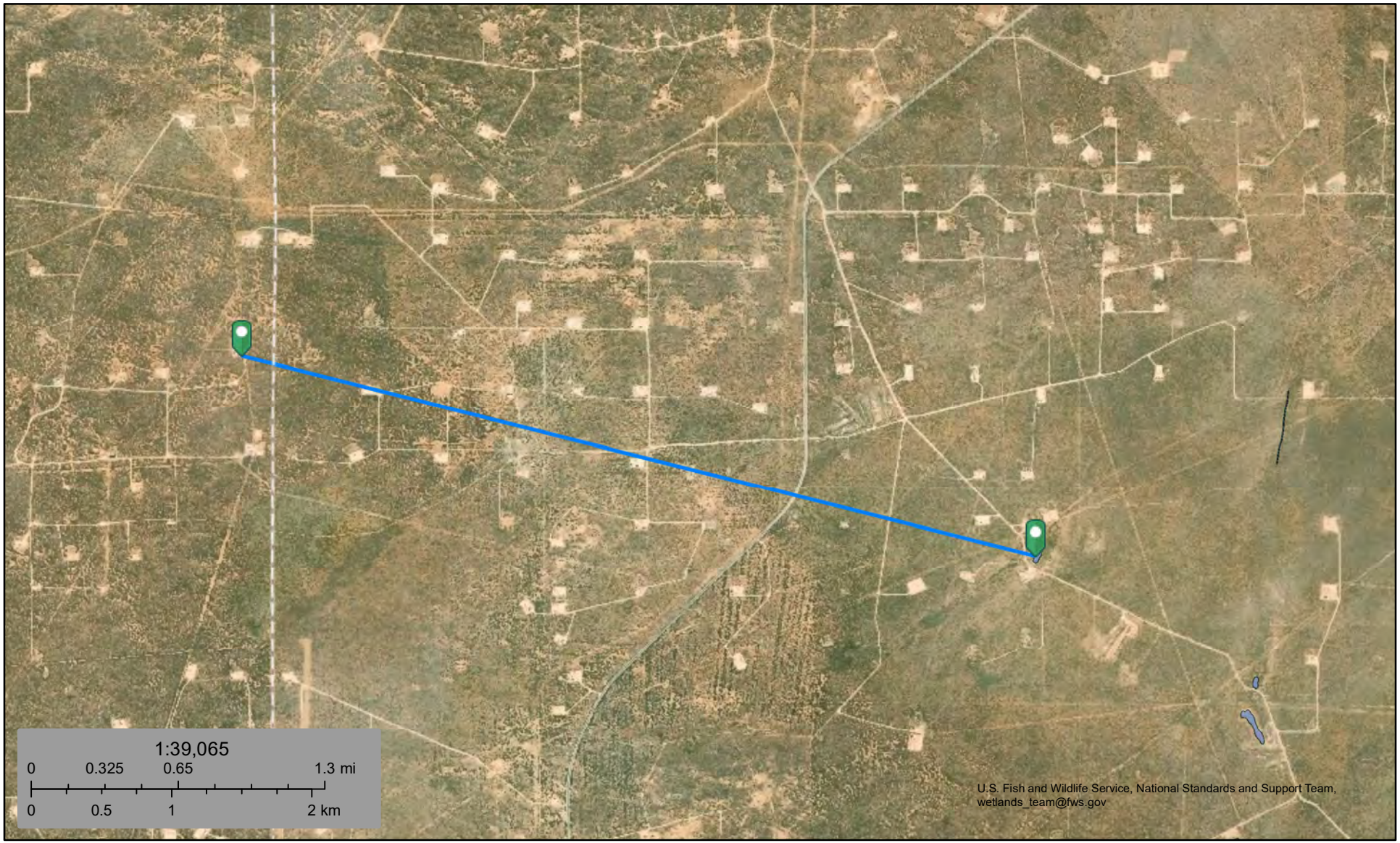
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

Taylor Deep 12 Fed 9H - Pond 16,104 ft



November 1, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

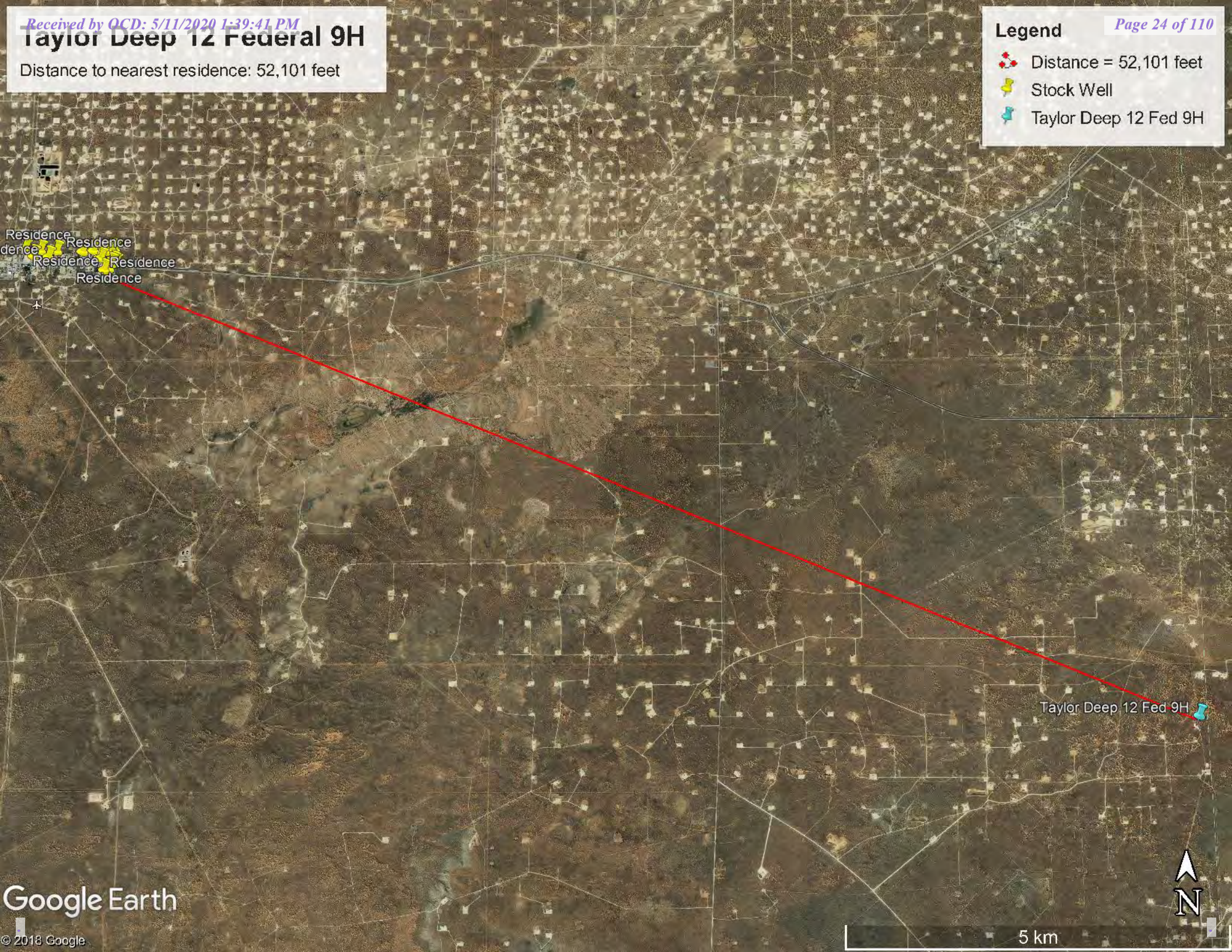
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Taylor Deep 12 Federal 9H

Distance to nearest residence: 52,101 feet

Legend

- Distance = 52,101 feet
- Stock Well
- Taylor Deep 12 Fed 9H



National Water Information System: Web Interface

USGS Water Resources

Data Category: Site Information ▼ Geographic Area: United States ▼ GO

Click to hideNews Bulletins

- Introducing The Next Generation of USGS Water Data for the Nation
- Full News

USGS 324539103490501 18S.31E.12.23144

Available data for this site SUMMARY OF ALL AVAILABLE DATA ▼ GO

Well Site

DESCRIPTION:

Latitude 32°45'39", Longitude 103°49'05" NAD27
Eddy County, New Mexico , Hydrologic Unit 13060011
Well depth: 600 feet
Land surface altitude: 3,775 feet above NAVD88.
Well completed in "Sunrise Formation" (231SNRS) local aquifer

AVAILABLE DATA:

Data Type	Begin Date	End Date	Count
Field groundwater-level measurements	1968-03-07	1994-03-17	7
Revisions	Unavailable (site:0) (timeseries:0)		

OPERATION:

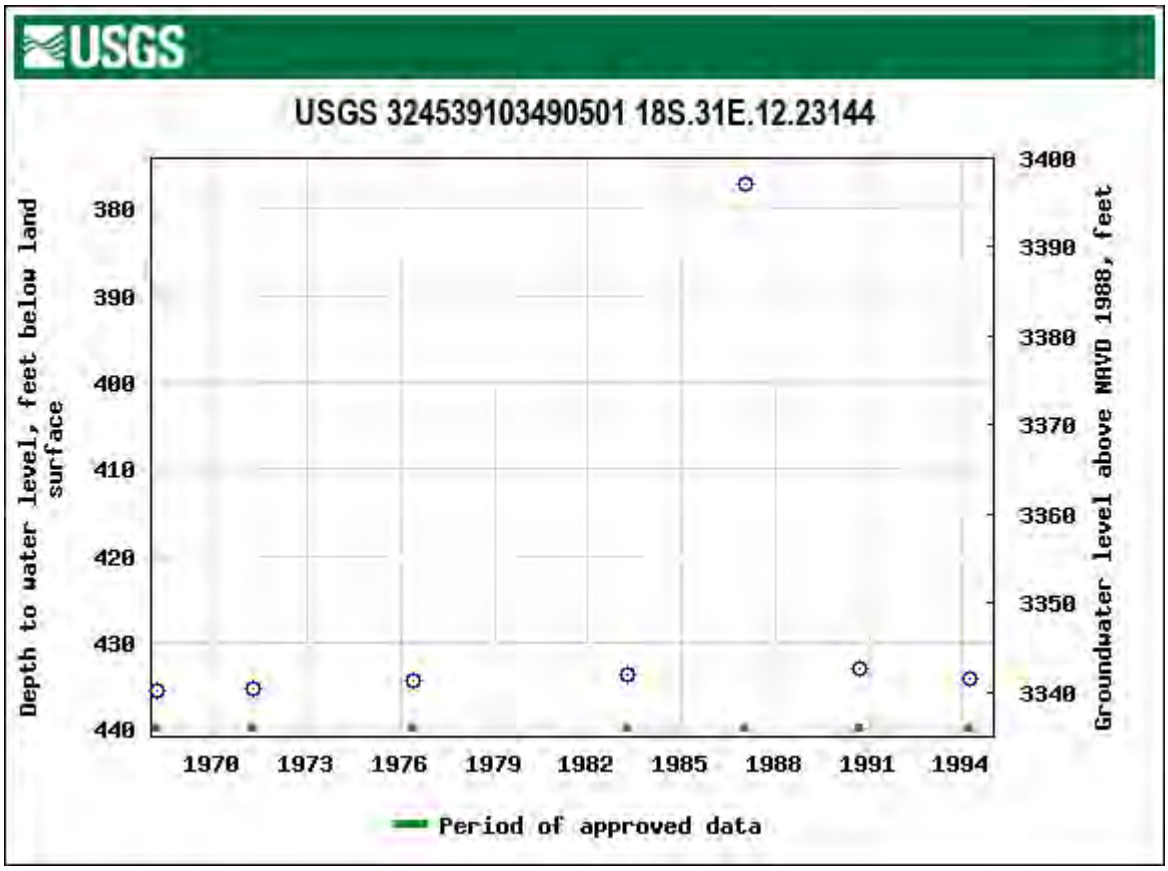
Record for this site is maintained by the USGS New Mexico Water Science Center
Email questions about this site to New Mexico Water Science Center Water-Data Inquiries

---

Questions about sites/data?
Feedback on this web site
Automated retrievals
Help
Data Tips
Explanation of terms
Subscribe for system changes
News

U.S. Department of the Interior | U.S. Geological Survey
Title: NWIS Site Information for USA: Site Inventory
URL: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=324539103490501

Page Contact Information: New Mexico Water Data Support Team
Page Last Modified: 2020-01-07 12:24:39 EST
0.31 0.29 caww01

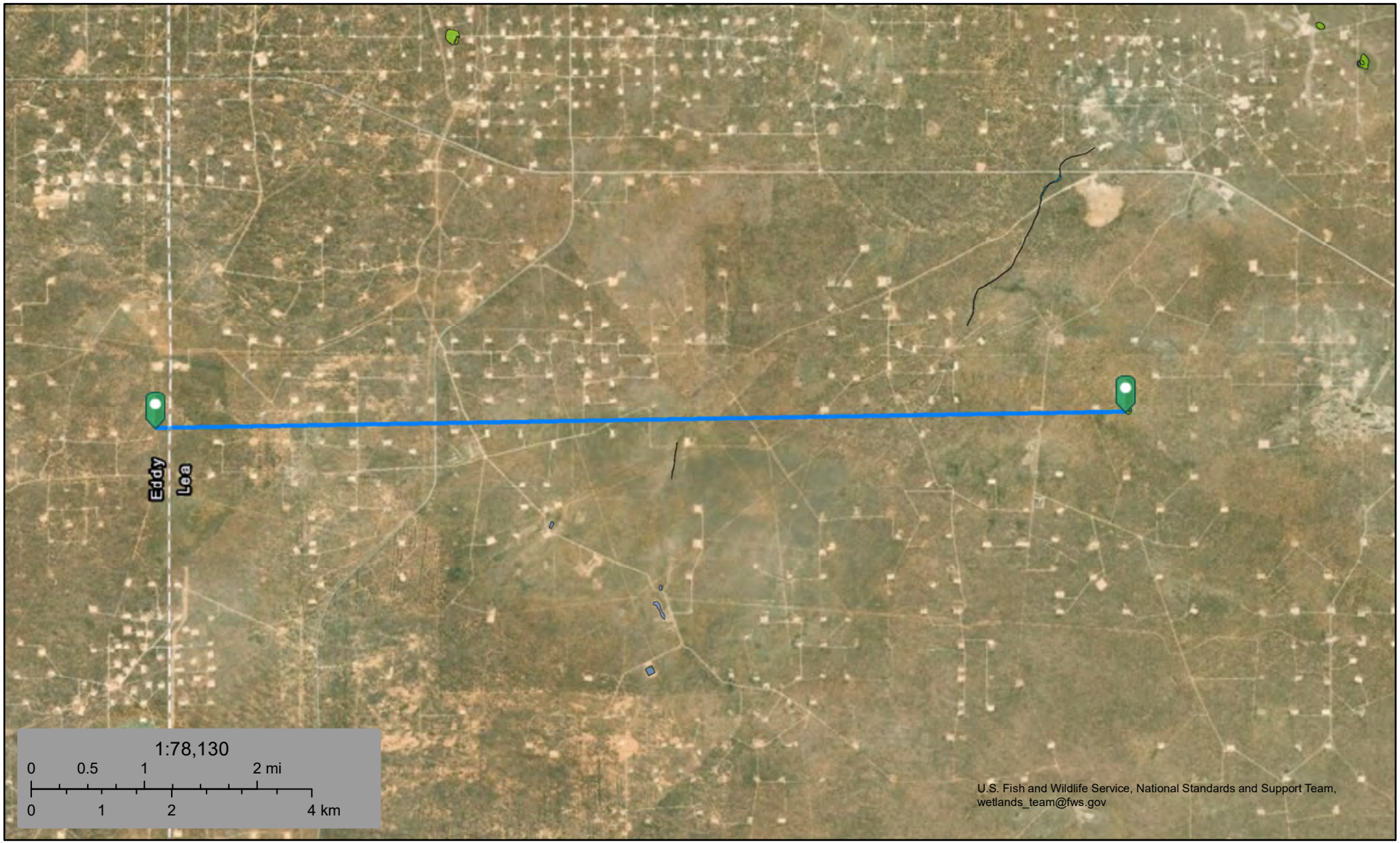

USGS
USGS 324539103490501 18S.31E.12.23144
Depth to water level, feet below land surface
380
390
400
410
420
430
440
Groundwater level above NAVD 1988, feet
3400
3390
3380
3370
3360
3350
3340
1970
1973
1976
1979
1982
1985
1988
1991
1994
Period of approved data

Taylor Deep 12 Federal 9H

Distance to nearest well: 5,709 feet

U.S. Fish and Wildlife Service
National Wetlands Inventory

Taylor Deep 12 Fed 9H - Wetland 38,212 f



November 1, 2019

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
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- Lake
- Other
- Riverine

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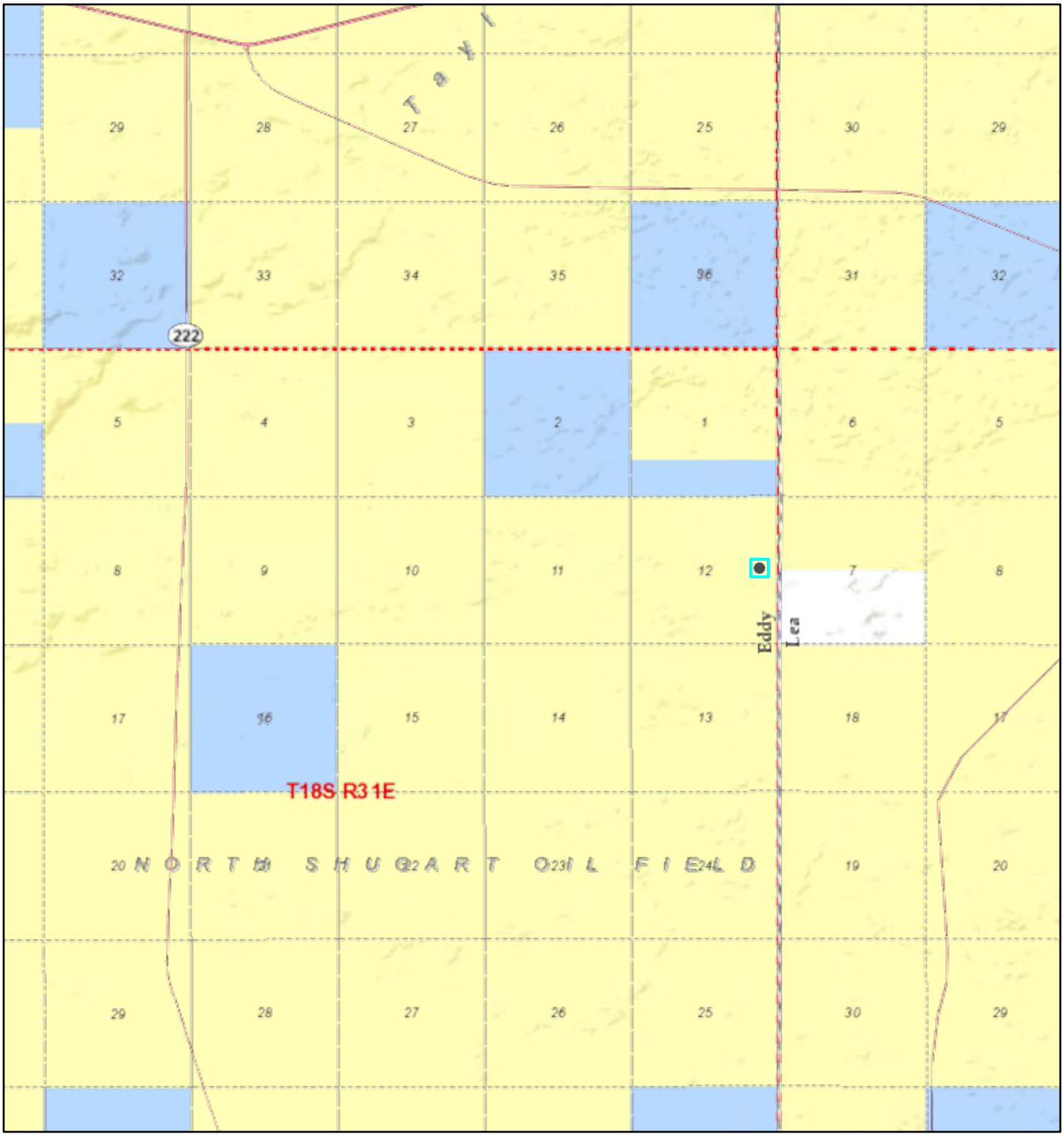
Active Mines near Taylor Deep 12 Federal 9H



11/1/2019, 4:04:43 PM

1:72,224

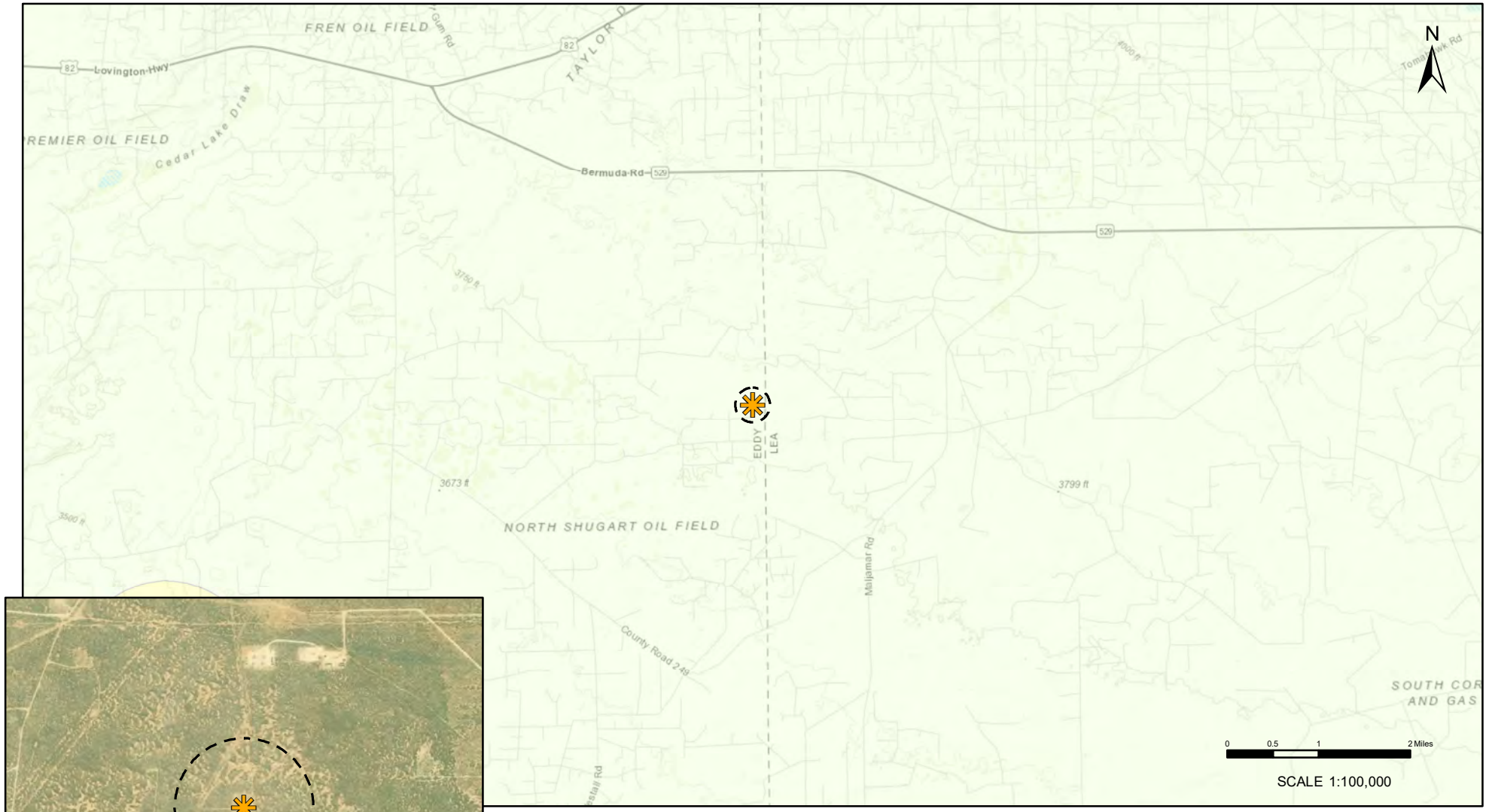
0 0.5 1 2 mi

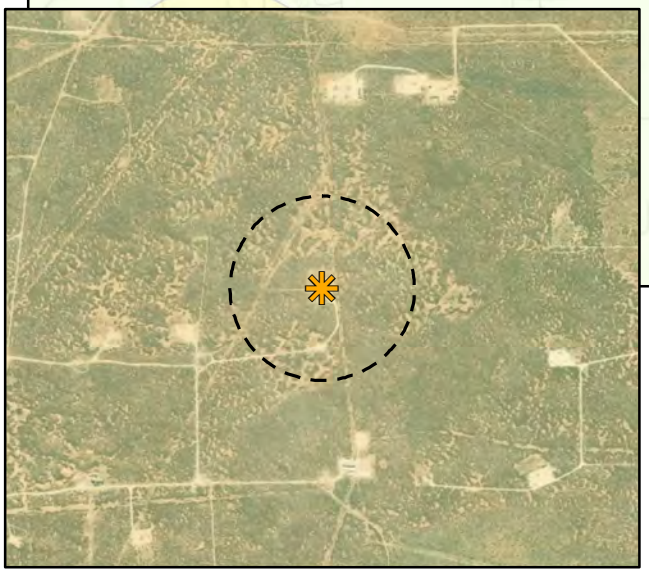
0 0.75 1.5 3 km

Registered Mines

- Aggregate, Stone etc.
- Aggregate, Stone etc.

U.S. Bureau of Land Management - New Mexico State Office, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS





LEGEND

SITE

1000FT BUFFER

KARST POTENTIAL

CRITICAL

HIGH

MEDIUM

LOW

Notes: Aerial Image from ESRI Digital Globe 2018

MarathonOil

Karst Potential
Taylor Deep 12
Federal 9H

VERTEX

DRAWN:	NM
APPROVED:	SH
DATE:	NOV 03/19

FIGURE: 1

VERSATILITY. EXPERTISE.

National Flood Hazard Layer FIRMette

FEMA

32°45'59.72"N

103°49'18.48"W

103°48'41.02"W

32°45'29.46"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

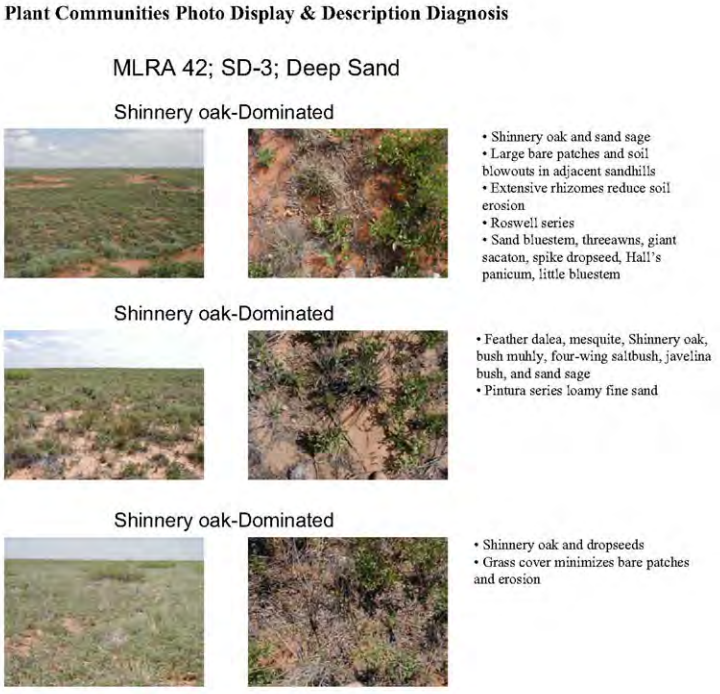
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/1/2019 at 6:09:57 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

R042XC005NM — Deep Sand: Historic Climax Plant Community

Plant Community Photos



Historic Climax Plant Community

Plant Community Description

State Containing Historic Plant Community

Grassland: The historic plant community is dominated by giant dropseed, other dropseeds, threeawns, and bluestems. Dominant woody plants include shinnery oak and soapweed yucca. Forb abundance and distribution varies and is dependent on annual rainfall. The Deep Sand site typically exists in sandy plains and dunes (Sosebee 1983). Grass dominance stabilizes the potentially erosive sandy soils. Historical fire suppression, however, may have contributed to increased woody plant abundance, which has reduced grass species. Further, drought conditions compounded with excessive grazing likely has driven most grass species out of competition with shrubs which has resulted in a shinnery oak dominated state with sand sage and mesquite (Young et al. 1948).

Diagnosis: Grassland dominated by dropseeds, threeawns, and bluestems. Small shrubs, such as shinnery oak and soapweed yucca, and subshrubs are dispersed throughout the grassland.

Other grasses that could appear on this site would include: flatsedge, almejita signalgrass, big bluestem, Indiangrass, fall witchgrass, hairy grama and red lovegrass

Other shrubs include: fourwing saltbush, mesquite, ephedra and broom snakeweed.

Other forbs include: wooly and scarlet gaura, wooly dalea, phlox heliotrope, scorpionweed, deerstongue, fleabane, nama, hoffmanseggia, lemon beebalm and stickleaf.

Plant Community Tables

Plant Type	Low	Representative Value	High
Grass/Grasslike	396	858	1,320
Forb	96	208	320
Shrub/Vine	108	234	360
Totals	**600**	**1,300**	**2,000**

Grass/Grasslike				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
1: Warm Season			450	585
	spike dropseed	Sporobolus contractus	450	585
	sand dropseed	Sporobolus cryptandrus	450	585
	mesa dropseed	Sporobolus flexuosus	450	585
	giant dropseed	Sporobolus giganteus	450	585
2: Warm Season			65	104
	sand bluestem	Andropogon hallii	65	104
	little bluestem	Schizachyrium scoparium	65	104
3: Warm Season			39	91
	perennial threeawn spp.	Aristida	39	91
4: Warm Season			13	39
	sand paspalum	Paspalum setaceum	13	39
5: Warm Season			13	39
	black grama	Bouteloua eriopoda	13	39
6: Warm Season			13	39
	field sandbur	Cenchrus longispinus	13	39
7: Warm Season			13	39
	havard's panicum	Panicum havardii	13	39
8: Warm Season			13	65
	plains bristlegrass	Setaria vulpiseta	13	65
9: Other Annual Grasses			13	65

Forb				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
15: Forb			39	91
	croton spp.	Croton	39	91
	rosering gaillardia	Gaillardia pulchella	39	91
16: Forb			39	91
	aster	Aster	39	91
	halfshrub sundrop	Oenothera albicaulis	39	91
	penstemon spp. (beard tongue)	Penstemon	39	91

Forb				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
17: Forb			39	91
	spectacle pod	Dimorphocarpa wislizeni	39	91
	wild buckwheat	Eriogonum	39	91
	sunflower	Helianthus	39	91
	spiny false fiddleleaf	Hydrolea spinosa	39	91
	threadleaf groundsel	Senecio flaccidus var. flaccidus	39	91
18: Other Forbs			13	65

Shrub/Vine				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
10: Shrub			65	130
	shinnery oak (havard)	Quercus havardii	65	130
11: Shrub			13	39
	sand sagebrush	Artemisia filifolia	13	39
12: Shrub			65	130
	yucca spp.	Yucca	65	130
13: Shrub			13	39
	rabbitbrush	Chrysothamnus	13	39
14: Other Shrubs			13	39

Growth Curve Name
HCPC

Growth Curve Description
SD-3 Deep Sand - Warm season plant community

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0%	0%	3%	5%	10%	10%	25%	30%	12%	5%	0%	0%

Vegetative Cover Type	Minimum	Maximum
Grass/grasslike	15.000%	20.000%
Forb	—	—
Shrub/vine/liana	—	—
Tree	—	—
Non-vascular plants	—	—
Biological crust	—	—
Non-Vegetative Cover Type	**Minimum**	**Maximum**
Litter	35.000%	40.000%
Surface fragments > 0.25" and <= 3"	—	—
Surface fragments > 3"	—	—
Bedrock	—	—
Water	—	—
Bare ground	35.000%	40.000%
Down wood, fine-small	—	—
Down wood, fine-medium	—	—
Down wood, fine-large	—	—
Down wood, coarse-small	—	—
Down wood, coarse-large	—	—
Tree snags	—	—
Hard snags	—	—
Soft snags	—	—

Eddy Area, New Mexico

KM—Kermit-Berino fine sands, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1w4q
Elevation: 3,100 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 60 to 64 degrees F
Frost-free period: 190 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Kermit and similar soils: 50 percent
Berino and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kermit

Setting

Landform: Plains, alluvial fans
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or eolian sands

Typical profile

H1 - 0 to 7 inches: fine sand
H2 - 7 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Deep Sand (R042XC005NM)
Hydric soil rating: No

Description of Berino

Setting

Landform: Fan piedmonts, plains
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed alluvium and/or eolian sands

Typical profile

H1 - 0 to 17 inches: fine sand
H2 - 17 to 50 inches: fine sandy loam
H3 - 50 to 58 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Minor Components

Active dune land

Percent of map unit: 15 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Eddy Area, New Mexico
Survey Area Data: Version 15, Sep 15, 2019

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 16, Sep 15, 2019

ATTACHMENT 4

Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	10/20/2019
Site Location Name:	Taylor Deep 12 Federal #009	Report Run Date:	10/24/2019 2:24 PM
Project Owner:		File (Project) #:	19E-00614
Project Manager:		API #:	30-015-39764
Client Contact Name:	Isaac Castro	Reference	Pop off spray
Client Contact Phone #:	(575) 988-0561		

Summary of Times

Left Office	10/20/2019 8:00 AM
Arrived at Site	10/20/2019 9:20 AM
Departed Site	10/20/2019 9:44 AM
Returned to Office	10/20/2019 12:15 PM

Summary of Daily Operations

9:38 Mobilize to site
Fill out arrival and safety forms
Map spill area
Take pictures
Fill out DFR
Demobilize

Next Steps & Recommendations

1

Daily Site Visit Report

Site Photos

Viewing Direction: West

Spill area

Viewing Direction: Southwest

Spill area

Viewing Direction: South

Spill area

Viewing Direction: South

Spill area

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: North
	
Spill area	Spill area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Jason Crabtree

Signature: 

Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	11/5/2019
Site Location Name:	Taylor Deep 12 Federal #009	Report Run Date:	11/6/2019 2:50 AM
Project Owner:		File (Project) #:	19E-00614
Project Manager:		API #:	30-015-39764
Client Contact Name:	Isaac Castro	Reference	Pop off spray
Client Contact Phone #:	(575) 988-0561		

Summary of Times

Left Office	11/5/2019 7:00 AM
Arrived at Site	11/5/2019 8:21 AM
Departed Site	11/5/2019 6:32 PM
Returned to Office	11/5/2019 7:46 PM

Summary of Daily Operations

8:21 Oversight of microblaze and dawn application for remediation.

Next Steps & Recommendations

1 Wait 30 days and collect confirmation samples.

Daily Site Visit Report

Site Photos

Viewing Direction: South

Spill area.

Viewing Direction: West

Site.

Viewing Direction: Northwest

Flagging on eastern side of spray area.

Viewing Direction: West

Spray area from heater treater south fence. All flagging not visible through vegetation.

Daily Site Visit Report

Viewing Direction: Southeast

Watering down vegetation after Dawn application.

Viewing Direction: East

Pressure-washing vegetation.

Viewing Direction: Southeast

Microblaze application.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Sharlene Harvester

Signature: 

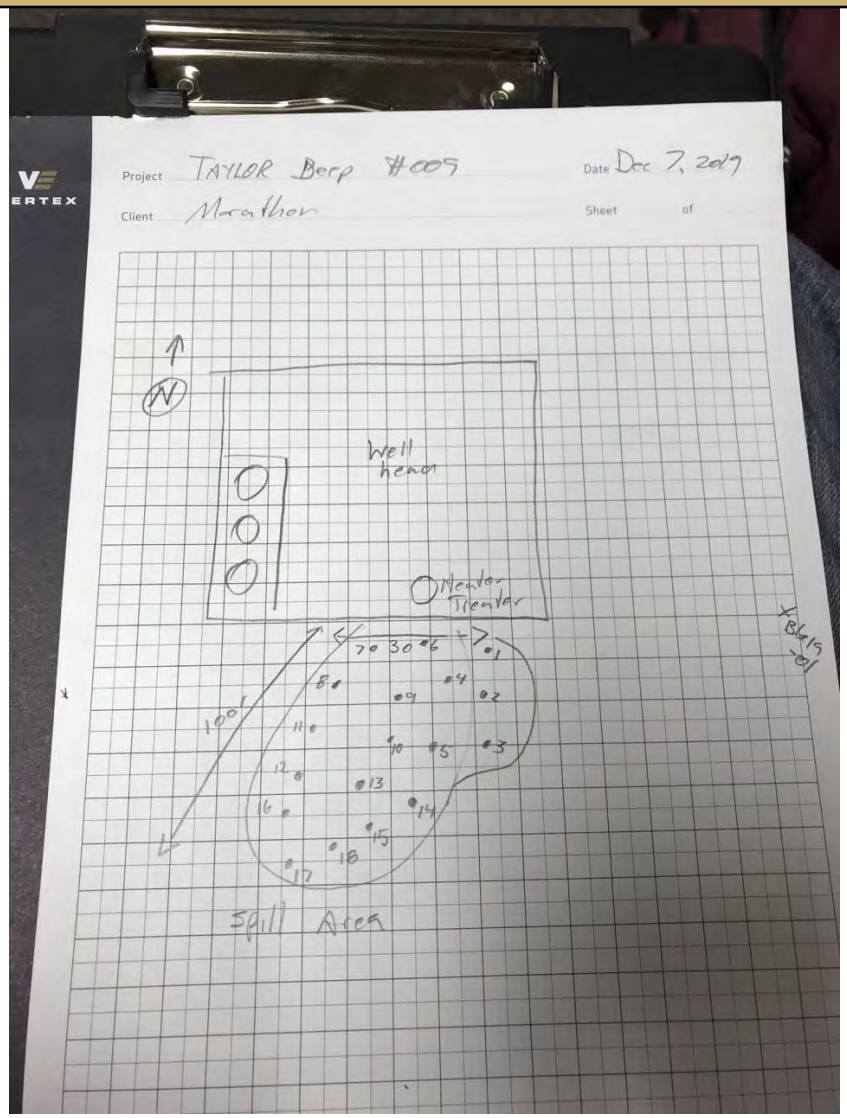
Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	12/7/2019
Site Location Name:	Taylor Deep 12 Federal #009	Report Run Date:	12/8/2019 2:55 AM
Project Owner:		File (Project) #:	19E-00614
Project Manager:		API #:	30-015-39764
Client Contact Name:	Isaac Castro	Reference	Pop off spray
Client Contact Phone #:	(575) 988-0561		

Summary of Times	
Left Office	12/7/2019 10:05 AM
Arrived at Site	12/7/2019 12:05 PM
Departed Site	12/7/2019 4:42 PM
Returned to Office	12/7/2019 6:30 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

12:06 Arrive on site.
Complete safety paperwork.
Field screen and obtain confirmatory samples of Microblaze area.
Complete DFR.
Return to office.

Next Steps & Recommendations

1 Send samples to lab

2 Confirm site area criteria are met

3 Close job

Sampling

Background19-01

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	77 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76181312, -103.81596460	Yes
1 ft.	0 ppm	6 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76181312, -103.81596460	Yes

Background19-01

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	24 ppm	Low (30-600 ppm)		BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76193176, -103.81652084	Yes

Daily Site Visit Report

SS19-02

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.1 ppm	59 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76188866, -103.81651302	Yes

SS19-03

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.2 ppm	40 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76182179, -103.81649934	Yes

SS19-04

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.1 ppm	23 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76191258, -103.81655782	Yes

SS19-05

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.1 ppm	26 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76181539, -103.81660154	Yes

Daily Site Visit Report

SS19-06

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	209 ppm	Low (30-600 ppm)	250 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76193981, -103.81657093	Yes

SS19-07

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	67 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76192394, -103.81662827	Yes

SS19-08

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.5 ppm	403 ppm	Low (30-600 ppm)	435 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76188875, -103.81664260	Yes

SS19-09

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	129 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76188694, -103.81659590	Yes

Daily Site Visit Report

SS19-10

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	161 ppm	Low (30-600 ppm)	138 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76185819, -103.81661710	Yes

SS19-11

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	453 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76186217, -103.81667203	Yes

SS19-12

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	56 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76183024, -103.81669349	Yes

SS19-13

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	95 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76182913, -103.81664833	Yes

Daily Site Visit Report

SS19-14

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	46 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76178445, -103.81661014	Yes

SS19-15

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	100 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76179765, -103.81666011	Yes

SS19-16

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	52 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76178439, -103.81670167	Yes

SS19-17

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	81 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76174025, -103.81670449	Yes

Daily Site Visit Report

SS19-18

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0 ppm	55 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.76175650, -103.81666489	Yes

Daily Site Visit Report

Site Photos

Viewing Direction: Southwest

Spray area

Viewing Direction: West

Spray area

Viewing Direction: South

Spray area

Viewing Direction: Northeast

Spray area

Daily Site Visit Report

Depth Sample Photos

Sample Point ID: Background19-01

Depth: 0 ft.

Sample Point ID: Background19-01

Depth: 0 ft.

Sample Point ID: Background19-01

Depth: 1 ft.

Sample Point ID: SS19-02

Depth: 0 ft.

Daily Site Visit Report

Sample Point ID: SS19-03

Depth: 0 ft.

Sample Point ID: SS19-04

Depth: 0 ft.

Sample Point ID: SS19-05

Depth: 0 ft.

Sample Point ID: SS19-06

Depth: 0 ft.

Daily Site Visit Report

Sample Point ID: SS19-07	**Sample Point ID**: SS19-08
	
Depth: 0 ft.	**Depth:** 0 ft.
Sample Point ID: SS19-09	**Sample Point ID**: SS19-10
	
Depth: 0 ft.	**Depth:** 0 ft.

Daily Site Visit Report

Sample Point ID: SS19-11

Depth: 0 ft.

Sample Point ID: SS19-12

Depth: 0 ft.

Sample Point ID: SS19-13

Depth: 0 ft.

Sample Point ID: SS19-14

Depth: 0 ft.

Daily Site Visit Report

Sample Point ID: SS19-15

Depth: 0 ft.

Sample Point ID: SS19-16

Depth: 0 ft.

Sample Point ID: SS19-17

Depth: 0 ft.

Sample Point ID: SS19-18

Depth: 0 ft.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 

ATTACHMENT 5

Natalie Gordon

From: Natalie Gordon
Sent: Wednesday, December 4, 2019 6:32 PM
To: emnrd-ocd-district1spills@state.nm.us; blm_nm_cfo_spill@blm.gov; Mike Bratcher (mike.bratcher@state.nm.us)
Cc: Dennis Williams (DWilliams@vertex.ca); Isaac Castro (icastro@marathonoil.com)
Subject: Taylor Deep 12 Federal #009 48-hr Sampling Notification - Marathon Oil

All:

Please accept this email as 48-hr notification that Vertex Resource Services Inc. has scheduled confirmation sampling to be conducted at Taylor Deep 12 Federal #009 for an oil release that occurred on 10/19/2019. An initial C-141 was submitted but no Incident RP number has been assigned at this time.

On December 8, 2019 beginning at 10:00 a.m., Vertex personnel will be onsite to complete remediation and collect confirmation samples for closure of the above referenced incident.

If you need assistance with directions to the site, or have any questions or concerns, please do not hesitate to contact me.

Thank you,
Natalie

ATTACHMENT 6

Client Name: Marathon Oil Permian, LLC
Site Name: Taylor Deep 12 Federal #009
NM OCD Tracking #: NRM1935242300
Project #: 19E-00614-014
Lab Report: 1912462; 2004518

Table 2. Confirmatory Sample Results

Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
						Volatile		Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro Flag)	Inorganics (Quantab - High/Low)	Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	GRO + DRO	Total Petroleum Hydrocarbons (TPH)	Chloride
			(ppm)	(ppm)	(+/-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BG 19-01	0	12/3/2019	0.0	77	-	<0.024	<0.22	<4.9	<9.6	<48	<14.5	<62.5	<60
BG 19-01	1	12/3/2019	0.0	6	-	<0.023	<0.21	<4.7	<9.4	<47	<14.1	<61.1	<60
SS 19-01	0	12/4/2019	0.0	24	-	<0.024	<0.212	<4.7	<8.8	<44	<13.5	<57.5	290
SS 19-02	0	12/4/2019	0.1	59	-	<0.023	<0.21	<4.7	<9.8	<49	<14.5	<63.5	110
SS 19-03	0	12/3/2019	0.2	40	-	<0.024	<0.22	<4.9	<9.1	<45	<14	<59	<60
SS 19-04	0	12/4/2019	0.1	23	-	<0.025	<0.224	<5.0	<9.3	<47	<14.3	<61.3	<60
SS 19-05	0	12/4/2019	0.1	26	-	<0.025	<0.224	<5.0	<9.1	<46	<14.1	<60.1	<61
SS 19-06	0	12/3/2019	0.0	209	-	<0.023	<0.211	<4.7	50	54	50	**104**	170
SS 20-06	0	4/9/2020	-	-	-	<0.025	<0.221	<4.9	<9.9	<49	<14.8	<63.8	<60
SS 19-07	0	12/4/2019	0.0	67	-	<0.024	<0.219	<4.9	<9.4	<47	<14.3	<61.3	<60
SS 19-08	0	12/4/2019	0.5	403	-	<0.024	<0.219	<4.9	<9.0	<45	<13.9	<58.9	<61
SS 19-09	0	12/3/2019	0.0	129	-	<0.025	<0.22	<4.9	27	<46	27	27	400
SS 19-10	0	12/4/2019	0.0	161	-	<0.025	<0.222	<4.9	<9.9	<49	<14.8	<63.8	<60
SS 19-11	0	12/4/2019	0.0	453	-	<0.024	<0.22	<4.9	180	170	180	**350**	<60
SS 20-11	0	4/9/2020	-	-	-	<0.024	<0.219	<4.9	<9.4	<47	<14.3	<61.3	<60
SS 19-12	0	12/4/2019	0.0	56	-	<0.024	<0.22	<4.9	<7.9	<40	<12.8	<52.8	<60
SS 19-13	0	12/3/2019	0.0	95	-	<0.023	<0.211	<4.7	14	<48	14	14	<60
SS 19-14	0	12/3/2019	0.0	46	-	<0.024	<0.22	<4.9	<9.8	<49	<14.7	<63.7	<60
SS 19-15	0	12/4/2019	0.0	100	-	<0.024	<0.216	<4.8	24	<43	24	24	<60
SS 19-16	0	12/3/2019	0.0	52	-	<0.024	<0.215	<4.8	<8.8	<44	<13.6	<57.6	<60
SS 19-17	0	12/4/2019	0.0	81	-	<0.024	<0.216	<4.8	46	59	46	**105**	<60
SS 20-17	0	4/9/2020	-	-	-	<0.025	<0.225	<5.0	<9.5	<47	<14.5	<61.5	<60
SS 19-18	0	12/3/2019	0.0	55	-	<0.024	<0.213	<4.7	<9.5	<48	<14.2	<62.2	<60

"-" indicates not analyzed/assessed

Bold and shaded indicates exceedance outside of applied action

ATTACHMENT 7

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

December 17, 2019

Dennis Williams

Vertex Resource Group Ltd.
213 S. Mesa St
Carlsbad, NM 88220
TEL:
FAX

RE: Taylor Deep 12 Fed 009 OrderNo.: 1912462

Dear Dennis Williams:

Hall Environmental Analysis Laboratory received 20 sample(s) on 12/10/2019 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BG19-01 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:00:00 PM
Lab ID: 1912462-001 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/12/2019 12:45:20 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/12/2019 12:45:20 AM
Surr: DNOP	96.3	70-130		%Rec	1	12/12/2019 12:45:20 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/11/2019 2:36:16 PM
Surr: BFB	80.0	66.6-105		%Rec	1	12/11/2019 2:36:16 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/11/2019 2:36:16 PM
Toluene	ND	0.049		mg/Kg	1	12/11/2019 2:36:16 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/11/2019 2:36:16 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/11/2019 2:36:16 PM
Surr: 4-Bromofluorobenzene	94.8	80-120		%Rec	1	12/11/2019 2:36:16 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	60		mg/Kg	20	12/12/2019 2:46:04 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BG19-01 1.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:05:00 PM
Lab ID: 1912462-002 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	12/12/2019 1:50:48 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/12/2019 1:50:48 AM
Surr: DNOP	93.9	70-130		%Rec	1	12/12/2019 1:50:48 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/11/2019 2:58:59 PM
Surr: BFB	82.7	66.6-105		%Rec	1	12/11/2019 2:58:59 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	12/11/2019 2:58:59 PM
Toluene	ND	0.047		mg/Kg	1	12/11/2019 2:58:59 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/11/2019 2:58:59 PM
Xylenes, Total	ND	0.093		mg/Kg	1	12/11/2019 2:58:59 PM
Surr: 4-Bromofluorobenzene	98.9	80-120		%Rec	1	12/11/2019 2:58:59 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	60		mg/Kg	20	12/12/2019 2:58:24 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-01 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:10:00 PM
Lab ID: 1912462-003 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	8.8		mg/Kg	1	12/12/2019 2:12:48 AM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	12/12/2019 2:12:48 AM
Surr: DNOP	98.3	70-130		%Rec	1	12/12/2019 2:12:48 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/11/2019 3:21:48 PM
Surr: BFB	83.0	66.6-105		%Rec	1	12/11/2019 3:21:48 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/11/2019 3:21:48 PM
Toluene	ND	0.047		mg/Kg	1	12/11/2019 3:21:48 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/11/2019 3:21:48 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/11/2019 3:21:48 PM
Surr: 4-Bromofluorobenzene	98.4	80-120		%Rec	1	12/11/2019 3:21:48 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	290	60		mg/Kg	20	12/12/2019 3:10:45 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: SS19-02 0.0'
Project: Taylor Deep 12 Fed 009
Collection Date: 12/7/2019 2:15:00 PM
Lab ID: 1912462-004 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	12/12/2019 2:34:41 AM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/12/2019 2:34:41 AM
Surr: DNOP	95.9	70-130		%Rec	1	12/12/2019 2:34:41 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/11/2019 3:44:42 PM
Surr: BFB	85.1	66.6-105		%Rec	1	12/11/2019 3:44:42 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	12/11/2019 3:44:42 PM
Toluene	ND	0.047		mg/Kg	1	12/11/2019 3:44:42 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/11/2019 3:44:42 PM
Xylenes, Total	ND	0.093		mg/Kg	1	12/11/2019 3:44:42 PM
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	12/11/2019 3:44:42 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	110	60		mg/Kg	20	12/12/2019 3:23:06 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-03 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:20:00 PM
Lab ID: 1912462-005 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	12/12/2019 2:56:23 AM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	12/12/2019 2:56:23 AM
Surr: DNOP	96.3	70-130		%Rec	1	12/12/2019 2:56:23 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/11/2019 4:07:35 PM
Surr: BFB	81.4	66.6-105		%Rec	1	12/11/2019 4:07:35 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/11/2019 4:07:35 PM
Toluene	ND	0.049		mg/Kg	1	12/11/2019 4:07:35 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/11/2019 4:07:35 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/11/2019 4:07:35 PM
Surr: 4-Bromofluorobenzene	95.5	80-120		%Rec	1	12/11/2019 4:07:35 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	60		mg/Kg	20	12/12/2019 3:35:26 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-04 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:25:00 PM
Lab ID: 1912462-006 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/12/2019 3:18:12 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/12/2019 3:18:12 AM
Surr: DNOP	94.6	70-130		%Rec	1	12/12/2019 3:18:12 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/11/2019 4:30:32 PM
Surr: BFB	83.8	66.6-105		%Rec	1	12/11/2019 4:30:32 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	12/11/2019 4:30:32 PM
Toluene	ND	0.050		mg/Kg	1	12/11/2019 4:30:32 PM
Ethylbenzene	ND	0.050		mg/Kg	1	12/11/2019 4:30:32 PM
Xylenes, Total	ND	0.099		mg/Kg	1	12/11/2019 4:30:32 PM
Surr: 4-Bromofluorobenzene	98.7	80-120		%Rec	1	12/11/2019 4:30:32 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	60		mg/Kg	20	12/12/2019 4:12:31 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-05 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:30:00 PM
Lab ID: 1912462-007 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	12/12/2019 3:39:57 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/12/2019 3:39:57 AM
Surr: DNOP	96.7	70-130		%Rec	1	12/12/2019 3:39:57 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/11/2019 4:53:26 PM
Surr: BFB	80.3	66.6-105		%Rec	1	12/11/2019 4:53:26 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	12/11/2019 4:53:26 PM
Toluene	ND	0.050		mg/Kg	1	12/11/2019 4:53:26 PM
Ethylbenzene	ND	0.050		mg/Kg	1	12/11/2019 4:53:26 PM
Xylenes, Total	ND	0.099		mg/Kg	1	12/11/2019 4:53:26 PM
Surr: 4-Bromofluorobenzene	93.9	80-120		%Rec	1	12/11/2019 4:53:26 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	61		mg/Kg	20	12/12/2019 4:24:51 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-06 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:35:00 PM
Lab ID: 1912462-008 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	50	9.0		mg/Kg	1	12/13/2019 9:52:10 AM
Motor Oil Range Organics (MRO)	54	45		mg/Kg	1	12/13/2019 9:52:10 AM
Surr: DNOP	103	70-130		%Rec	1	12/13/2019 9:52:10 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/11/2019 5:16:12 PM
Surr: BFB	86.3	66.6-105		%Rec	1	12/11/2019 5:16:12 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	12/11/2019 5:16:12 PM
Toluene	ND	0.047		mg/Kg	1	12/11/2019 5:16:12 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/11/2019 5:16:12 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/11/2019 5:16:12 PM
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	12/11/2019 5:16:12 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	170	60		mg/Kg	20	12/12/2019 4:37:12 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-07 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:40:00 PM
Lab ID: 1912462-009 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	12/13/2019 10:01:13 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/13/2019 10:01:13 AM
Surr: DNOP	94.7	70-130		%Rec	1	12/13/2019 10:01:13 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/11/2019 6:47:41 PM
Surr: BFB	84.9	66.6-105		%Rec	1	12/11/2019 6:47:41 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/11/2019 6:47:41 PM
Toluene	ND	0.049		mg/Kg	1	12/11/2019 6:47:41 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/11/2019 6:47:41 PM
Xylenes, Total	ND	0.097		mg/Kg	1	12/11/2019 6:47:41 PM
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	1	12/11/2019 6:47:41 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	60		mg/Kg	20	12/12/2019 4:49:32 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-08 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:45:00 PM
Lab ID: 1912462-010 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	12/12/2019 1:20:34 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	12/12/2019 1:20:34 PM
Surr: DNOP	136	70-130	S	%Rec	1	12/12/2019 1:20:34 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 9:38:49 AM
Surr: BFB	81.9	66.6-105		%Rec	1	12/12/2019 9:38:49 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/12/2019 9:38:49 AM
Toluene	ND	0.049		mg/Kg	1	12/12/2019 9:38:49 AM
Ethylbenzene	ND	0.049		mg/Kg	1	12/12/2019 9:38:49 AM
Xylenes, Total	ND	0.097		mg/Kg	1	12/12/2019 9:38:49 AM
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	12/12/2019 9:38:49 AM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	ND	61		mg/Kg	20	12/12/2019 5:01:53 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-09 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:50:00 PM
Lab ID: 1912462-011 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	27	9.2		mg/Kg	1	12/16/2019 3:43:16 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/16/2019 3:43:16 PM
Surr: DNOP	92.7	70-130		%Rec	1	12/16/2019 3:43:16 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 10:49:34 AM
Surr: BFB	77.6	66.6-105		%Rec	1	12/12/2019 10:49:34 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	12/12/2019 10:49:34 AM
Toluene	ND	0.049		mg/Kg	1	12/12/2019 10:49:34 AM
Ethylbenzene	ND	0.049		mg/Kg	1	12/12/2019 10:49:34 AM
Xylenes, Total	ND	0.098		mg/Kg	1	12/12/2019 10:49:34 AM
Surr: 4-Bromofluorobenzene	93.9	80-120		%Rec	1	12/12/2019 10:49:34 AM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	400	61		mg/Kg	20	12/12/2019 5:14:15 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-10 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 2:55:00 PM
Lab ID: 1912462-012 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	12/12/2019 1:57:11 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/12/2019 1:57:11 PM
Surr: DNOP	103	70-130		%Rec	1	12/12/2019 1:57:11 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 2:45:26 PM
Surr: BFB	79.2	66.6-105		%Rec	1	12/12/2019 2:45:26 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	12/12/2019 2:45:26 PM
Toluene	ND	0.049		mg/Kg	1	12/12/2019 2:45:26 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/12/2019 2:45:26 PM
Xylenes, Total	ND	0.099		mg/Kg	1	12/12/2019 2:45:26 PM
Surr: 4-Bromofluorobenzene	94.4	80-120		%Rec	1	12/12/2019 2:45:26 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 2:54:12 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-11 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:10:00 PM
Lab ID: 1912462-013 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	180	20		mg/Kg	2	12/16/2019 3:52:25 PM
Motor Oil Range Organics (MRO)	170	99		mg/Kg	2	12/16/2019 3:52:25 PM
Surr: DNOP	132	70-130	S	%Rec	2	12/16/2019 3:52:25 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 4:19:59 PM
Surr: BFB	78.4	66.6-105		%Rec	1	12/12/2019 4:19:59 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 12:26:41 PM
Toluene	ND	0.049		mg/Kg	1	12/13/2019 12:26:41 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/13/2019 12:26:41 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/13/2019 12:26:41 PM
Surr: 4-Bromofluorobenzene	95.9	80-120		%Rec	1	12/13/2019 12:26:41 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 3:06:33 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-12 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:05:00 PM
Lab ID: 1912462-014 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	7.9		mg/Kg	1	12/12/2019 2:41:03 PM
Motor Oil Range Organics (MRO)	ND	40		mg/Kg	1	12/12/2019 2:41:03 PM
Surr: DNOP	132	70-130	S	%Rec	1	12/12/2019 2:41:03 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 4:43:33 PM
Surr: BFB	79.7	66.6-105		%Rec	1	12/12/2019 4:43:33 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 12:50:20 PM
Toluene	ND	0.049		mg/Kg	1	12/13/2019 12:50:20 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/13/2019 12:50:20 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/13/2019 12:50:20 PM
Surr: 4-Bromofluorobenzene	95.4	80-120		%Rec	1	12/13/2019 12:50:20 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 3:18:53 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-13 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:10:00 PM
Lab ID: 1912462-015 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	14	9.7		mg/Kg	1	12/16/2019 4:01:32 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/16/2019 4:01:32 PM
Surr: DNOP	91.5	70-130		%Rec	1	12/16/2019 4:01:32 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/12/2019 5:07:03 PM
Surr: BFB	78.3	66.6-105		%Rec	1	12/12/2019 5:07:03 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	12/13/2019 1:13:59 PM
Toluene	ND	0.047		mg/Kg	1	12/13/2019 1:13:59 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/13/2019 1:13:59 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/13/2019 1:13:59 PM
Surr: 4-Bromofluorobenzene	96.4	80-120		%Rec	1	12/13/2019 1:13:59 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 3:55:57 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-14 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:15:00 PM
Lab ID: 1912462-016 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	12/12/2019 2:59:14 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	12/12/2019 2:59:14 PM
Surr: DNOP	107	70-130		%Rec	1	12/12/2019 2:59:14 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/12/2019 5:30:28 PM
Surr: BFB	76.9	66.6-105		%Rec	1	12/12/2019 5:30:28 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 4:21:40 PM
Toluene	ND	0.049		mg/Kg	1	12/13/2019 4:21:40 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/13/2019 4:21:40 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/13/2019 4:21:40 PM
Surr: 4-Bromofluorobenzene	96.0	80-120		%Rec	1	12/13/2019 4:21:40 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 4:08:17 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-15 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:20:00 PM
Lab ID: 1912462-017 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	24	8.5		mg/Kg	1	12/12/2019 3:08:24 PM
Motor Oil Range Organics (MRO)	ND	43		mg/Kg	1	12/12/2019 3:08:24 PM
Surr: DNOP	130	70-130		%Rec	1	12/12/2019 3:08:24 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/12/2019 5:53:49 PM
Surr: BFB	77.6	66.6-105		%Rec	1	12/12/2019 5:53:49 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 4:45:05 PM
Toluene	ND	0.048		mg/Kg	1	12/13/2019 4:45:05 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/13/2019 4:45:05 PM
Xylenes, Total	ND	0.096		mg/Kg	1	12/13/2019 4:45:05 PM
Surr: 4-Bromofluorobenzene	94.5	80-120		%Rec	1	12/13/2019 4:45:05 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 4:20:38 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-16 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:25:00 PM
Lab ID: 1912462-018 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	8.8		mg/Kg	1	12/12/2019 3:17:33 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	12/12/2019 3:17:33 PM
Surr: DNOP	95.2	70-130		%Rec	1	12/12/2019 3:17:33 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/12/2019 6:17:25 PM
Surr: BFB	78.8	66.6-105		%Rec	1	12/12/2019 6:17:25 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 5:08:21 PM
Toluene	ND	0.048		mg/Kg	1	12/13/2019 5:08:21 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/13/2019 5:08:21 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/13/2019 5:08:21 PM
Surr: 4-Bromofluorobenzene	94.1	80-120		%Rec	1	12/13/2019 5:08:21 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 4:32:59 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 **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-17 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:30:00 PM
Lab ID: 1912462-019 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	46	9.3		mg/Kg	1	12/16/2019 4:10:38 PM
Motor Oil Range Organics (MRO)	59	47		mg/Kg	1	12/16/2019 4:10:38 PM
Surr: DNOP	101	70-130		%Rec	1	12/16/2019 4:10:38 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/12/2019 6:41:00 PM
Surr: BFB	79.3	66.6-105		%Rec	1	12/12/2019 6:41:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 5:31:37 PM
Toluene	ND	0.048		mg/Kg	1	12/13/2019 5:31:37 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/13/2019 5:31:37 PM
Xylenes, Total	ND	0.096		mg/Kg	1	12/13/2019 5:31:37 PM
Surr: 4-Bromofluorobenzene	96.6	80-120		%Rec	1	12/13/2019 5:31:37 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 2:52:55 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1912462**
Date Reported: **12/17/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS19-18 0.0'
Project: Taylor Deep 12 Fed 009 **Collection Date:** 12/7/2019 3:35:00 PM
Lab ID: 1912462-020 **Matrix:** SOIL **Received Date:** 12/10/2019 10:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	12/12/2019 3:35:54 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/12/2019 3:35:54 PM
Surr: DNOP	83.8	70-130		%Rec	1	12/12/2019 3:35:54 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/12/2019 7:04:28 PM
Surr: BFB	77.0	66.6-105		%Rec	1	12/12/2019 7:04:28 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	12/13/2019 5:54:58 PM
Toluene	ND	0.047		mg/Kg	1	12/13/2019 5:54:58 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/13/2019 5:54:58 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/13/2019 5:54:58 PM
Surr: 4-Bromofluorobenzene	96.4	80-120		%Rec	1	12/13/2019 5:54:58 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	ND	60		mg/Kg	20	12/13/2019 3:05:20 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#: **1912462**

17-Dec-19

Client: Vertex Resource Group Ltd.

Project: Taylor Deep 12 Fed 009

Sample ID: **MB-49307** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **49307** RunNo: **65161**
Prep Date: **12/12/2019** Analysis Date: **12/12/2019** SeqNo: **2236251** Units: **mg/Kg**

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

Sample ID: **LCS-49307** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **49307** RunNo: **65161**
Prep Date: **12/12/2019** Analysis Date: **12/12/2019** SeqNo: **2236252** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.5	90	110			

Sample ID: **MB-49328** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **49328** RunNo: **65173**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237320** Units: **mg/Kg**

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

Sample ID: **LCS-49328** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **49328** RunNo: **65173**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237321** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.5	90	110			

Sample ID: **1912462-018AMS** SampType: **ms** TestCode: **EPA Method 300.0: Anions**
Client ID: **SS19-16 0.0'** Batch ID: **49328** RunNo: **65173**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237348** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	59	30.00	0	0	54.2	146			S

Sample ID: **1912462-018AMSD** SampType: **msd** TestCode: **EPA Method 300.0: Anions**
Client ID: **SS19-16 0.0'** Batch ID: **49328** RunNo: **65173**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237349** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	60	30.00	0	0	54.2	146	0	20	S

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **MB-49329** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **49329** RunNo: **65171**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237722** Units: **mg/Kg**

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

Sample ID: **LCS-49329** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **49329** RunNo: **65171**
Prep Date: **12/13/2019** Analysis Date: **12/13/2019** SeqNo: **2237723** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	98.4	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#: **1912462**

17-Dec-19

Client: Vertex Resource Group Ltd.

Project: Taylor Deep 12 Fed 009

Sample ID: **LCS-49275** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **49275** RunNo: **65091**
Prep Date: **12/11/2019** Analysis Date: **12/11/2019** SeqNo: **2233456** 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	93.6	63.9	124			
Surr: DNOP	4.2		5.000		84.0	70	130			

Sample ID: **MB-49275** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **49275** RunNo: **65091**
Prep Date: **12/11/2019** Analysis Date: **12/11/2019** SeqNo: **2233457** 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	9.2		10.00		91.7	70	130			

Sample ID: **1912462-001AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BG19-01 0.0'** Batch ID: **49275** RunNo: **65091**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2234562** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	46	9.3	46.30	0	98.8	57	142			
Surr: DNOP	4.4		4.630		95.6	70	130			

Sample ID: **1912462-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BG19-01 0.0'** Batch ID: **49275** RunNo: **65091**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2234563** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	9.0	44.92	0	97.3	57	142	4.45	20	
Surr: DNOP	4.2		4.492		93.7	70	130	0	0	

Sample ID: **1912462-010AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **SS19-08 0.0'** Batch ID: **49284** RunNo: **65148**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235622** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	65	9.5	47.66	5.921	125	57	142			
Surr: DNOP	7.1		4.766		149	70	130			S

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **1912462-010AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **SS19-08 0.0'** Batch ID: **49284** RunNo: **65148**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235623** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	56	9.9	49.36	5.921	102	57	142	15.2	20	
Surr: DNOP	5.2		4.936		105	70	130	0	0	

Sample ID: **LCS-49284** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **49284** RunNo: **65148**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235644** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.00	0	109	63.9	124			
Surr: DNOP	4.6		5.000		91.4	70	130			

Sample ID: **MB-49284** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **49284** RunNo: **65148**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235645** 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	9.6		10.00		96.0	70	130			

Sample ID: **LCS-49351** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **49351** RunNo: **65199**
Prep Date: **12/16/2019** Analysis Date: **12/16/2019** SeqNo: **2238107** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	46	10	50.00	0	91.9	63.9	124			
Surr: DNOP	4.0		5.000		79.3	70	130			

Sample ID: **MB-49351** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **49351** RunNo: **65199**
Prep Date: **12/16/2019** Analysis Date: **12/16/2019** SeqNo: **2238108** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.2		10.00		82.1	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#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **mb-49264** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **49264** RunNo: **65101**
Prep Date: **12/10/2019** Analysis Date: **12/11/2019** SeqNo: **2234122** 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	820		1000		81.9	66.6	105			

Sample ID: **lcs-49264** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **49264** RunNo: **65101**
Prep Date: **12/10/2019** Analysis Date: **12/11/2019** SeqNo: **2234123** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	95.2	80	120			
Surr: BFB	950		1000		95.0	66.6	105			

Sample ID: **mb-49278** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235367** 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	820		1000		81.6	66.6	105			

Sample ID: **lcs-49278** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235368** 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	80	120			
Surr: BFB	950		1000		95.4	66.6	105			

Sample ID: **1912462-010ams** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **SS19-08 0.0'** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235370** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	4.8	23.81	0	99.4	69.1	142			
Surr: BFB	840		952.4		88.7	66.6	105			

Sample ID: **1912462-010amsd** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **SS19-08 0.0'** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235371** Units: **mg/Kg**

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical 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#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **1912462-010amsd** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **SS19-08 0.0'** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235371** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.8	23.97	0	103	69.1	142	4.07	20	
Surr: BFB	890		958.8		93.0	66.6	105	0	0	

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#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **mb-49264** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS** Batch ID: **49264** RunNo: **65101**
Prep Date: **12/10/2019** Analysis Date: **12/11/2019** SeqNo: **2234165** 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	0.95		1.000		94.5	80	120			

Sample ID: **LCS-49264** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS** Batch ID: **49264** RunNo: **65101**
Prep Date: **12/10/2019** Analysis Date: **12/11/2019** SeqNo: **2234166** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.025	1.000	0	91.6	80	120			
Toluene	0.90	0.050	1.000	0	90.5	80	120			
Ethylbenzene	0.91	0.050	1.000	0	91.4	80	120			
Xylenes, Total	2.8	0.10	3.000	0	92.1	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Sample ID: **mb-49278** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235407** 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		99.0	80	120			

Sample ID: **LCS-49278** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235413** 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	99.8	80	120			
Toluene	1.0	0.050	1.000	0	99.9	80	120			
Ethylbenzene	1.0	0.050	1.000	0	100	80	120			
Xylenes, Total	3.0	0.10	3.000	0	101	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		105	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#: **1912462**
17-Dec-19

Client: Vertex Resource Group Ltd.
Project: Taylor Deep 12 Fed 009

Sample ID: **1912462-011ams** SampType: **MS** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **SS19-09 0.0'** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235431** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	0.9921	0	100	76	123			
Toluene	1.0	0.050	0.9921	0.01130	101	80.3	127			
Ethylbenzene	1.0	0.050	0.9921	0.01110	102	80.2	131			
Xylenes, Total	3.1	0.099	2.976	0.01365	104	78	133			
Surr: 4-Bromofluorobenzene	0.97		0.9921		97.9	80	120			

Sample ID: **1912462-011amsd** SampType: **MSD** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **SS19-09 0.0'** Batch ID: **49278** RunNo: **65141**
Prep Date: **12/11/2019** Analysis Date: **12/12/2019** SeqNo: **2235432** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	0.9950	0	104	76	123	3.70	20	
Toluene	1.1	0.050	0.9950	0.01130	105	80.3	127	3.87	20	
Ethylbenzene	1.1	0.050	0.9950	0.01110	106	80.2	131	4.15	20	
Xylenes, Total	3.2	0.10	2.985	0.01365	108	78	133	4.08	20	
Surr: 4-Bromofluorobenzene	1.0		0.9950		102	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: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **VERTEX CARLSBAD** Work Order Number: **1912462** RcptNo: **1**

Received By: **Yazmine Garduno** **12/10/2019 10:55:00 AM**

Completed By: **Erin Melendrez** **12/10/2019 11:40:25 AM**

Reviewed By: ENM 12/10/19

Chain of Custody

1. Is Chain of Custody sufficiently 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 12/10/19

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.5	Good				
2	3.8	Good				

Chain-of-Custody Record

Client: Vertex Resource Servi.

Mailing Address: ON FILE

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☐ Standard ☑ Rush Rush

Project Name: Taylor Deep 12 Fed 009

Project #: 19E-00614

Project Manager: Dennis Williams

Sampler: Austin Harris

On Ice: ☑ Yes ☐ No

# of Coolers: 2

Cooler Temp (including CF): 4.5 (0) = 4.5
3.2 (0) = 3.2

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. 1912462	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)
12-7-19	2P	Soil	BG19-01 0.0'	Glass Jar	Ice	-001	X	X					X			
	2:05P		BG19-01 1.0'			-002										
	2:10P		SS19-01 0.0'			-003										
	2:15P		SS19-02 0.0'			-004										
	2:20P		SS19-03 0.0'			-005										
	2:25P		SS19-04 0.0'			-006										
	2:30P		SS19-05 0.0'			-007										
	2:35P		SS19-06 0.0'			-008										
	2:40P		SS19-07 0.0'			-009										
	2:45P		SS19-08 0.0'			-010										
	2:50P		SS19-09 0.0'			-011										
	2:55P		SS19-10 0.0'			-012										

Date	Time	Relinquished by	Received by	Via	Date	Time
12-7-19	6:30P	Austin Harris				
12/9/19	900				12/9/19	0900
12/9/19	900		Courier		12/10/19	1055

Remarks:

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

Chain-of-Custody Record

Client: Vertex Resource Services

Mailing Address: ON FILE

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☐ Standard ☑ Rush 5 Day Rush

Project Name: Taylor Deep 12 Fed 009

Project #: 19E-00614

Project Manager: Dennis Williams

Sampler: Austin Harris

On Ice: ☑ Yes ☐ No

# of Coolers: 2

Cooler Temp(including CF): 4.5 (0) = 4.5
3.5 (0) = 3.5

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. 1912462	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)
12-7-19	3p	Soil	SS19-11 0.0'	6 Glass Jar	Ice	-013	X	X					X			
	3:05p		SS19-12 0.0'			-014										
	3:10p		SS19-13 0.0'			-015										
	3:15p		SS19-14 0.0'			-016										
	3:20p		SS19-15 0.0'			-017										
	3:25p		SS19-16 0.0'			-018										
	3:30p		SS19-17 0.0'			-019										
	3:35p		SS19-18 0.0'			-020										

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-7-19	6:30p	Austin Harris			12/9/19	0900
12/9/19	1900		Courier		12/10/19	1055

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: www.hallenvironmental.com

April 20, 2020

Melodie Sanjari

Marathon Oil Company
4111 Tidwell Road
Carlsbad, NM 88220
TEL: (575) 297-0956
FAX:

RE: Taylor Deep 12 Federal 9 OrderNo.: 2004518

Dear Melodie Sanjari:

Hall Environmental Analysis Laboratory received 3 sample(s) on 4/10/2020 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 **2004518**
Date Reported: **4/20/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Client Sample ID: SS20-06 0'
Project: Taylor Deep 12 Federal 9
Collection Date: 4/9/2020 12:20:00 PM
Lab ID: 2004518-001 **Matrix:** SOIL
Received Date: 4/10/2020 8:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	4/13/2020 2:00:55 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	4/13/2020 2:00:55 PM
Surr: DNOP	73.5	55.1-146		%Rec	1	4/13/2020 2:00:55 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	4/15/2020 2:08:03 AM
Surr: BFB	93.0	66.6-105		%Rec	1	4/15/2020 2:08:03 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	4/15/2020 2:08:03 AM
Toluene	ND	0.049		mg/Kg	1	4/15/2020 2:08:03 AM
Ethylbenzene	ND	0.049		mg/Kg	1	4/15/2020 2:08:03 AM
Xylenes, Total	ND	0.098		mg/Kg	1	4/15/2020 2:08:03 AM
Surr: 4-Bromofluorobenzene	95.9	80-120		%Rec	1	4/15/2020 2:08:03 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/14/2020 6:22:52 PM

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

Qualifiers:

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

Analytical Report
Lab Order **2004518**
Date Reported: **4/20/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Client Sample ID: SS20-11 0'
Project: Taylor Deep 12 Federal 9
Collection Date: 4/9/2020 12:30:00 PM
Lab ID: 2004518-002 **Matrix:** SOIL **Received Date:** 4/10/2020 8:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	4/13/2020 2:24:38 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	4/13/2020 2:24:38 PM
Surr: DNOP	93.6	55.1-146		%Rec	1	4/13/2020 2:24:38 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	4/15/2020 2:31:20 AM
Surr: BFB	94.3	66.6-105		%Rec	1	4/15/2020 2:31:20 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	4/15/2020 2:31:20 AM
Toluene	ND	0.049		mg/Kg	1	4/15/2020 2:31:20 AM
Ethylbenzene	ND	0.049		mg/Kg	1	4/15/2020 2:31:20 AM
Xylenes, Total	ND	0.097		mg/Kg	1	4/15/2020 2:31:20 AM
Surr: 4-Bromofluorobenzene	98.7	80-120		%Rec	1	4/15/2020 2:31:20 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/14/2020 7:00:06 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 **2004518**
Date Reported: **4/20/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Client Sample ID: SS20-17 0'
Project: Taylor Deep 12 Federal 9
Collection Date: 4/9/2020 12:40:00 PM
Lab ID: 2004518-003 **Matrix:** SOIL **Received Date:** 4/10/2020 8:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	4/13/2020 2:48:21 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	4/13/2020 2:48:21 PM
Surr: DNOP	94.4	55.1-146		%Rec	1	4/13/2020 2:48:21 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	4/15/2020 2:54:38 AM
Surr: BFB	93.8	66.6-105		%Rec	1	4/15/2020 2:54:38 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.025		mg/Kg	1	4/15/2020 2:54:38 AM
Toluene	ND	0.050		mg/Kg	1	4/15/2020 2:54:38 AM
Ethylbenzene	ND	0.050		mg/Kg	1	4/15/2020 2:54:38 AM
Xylenes, Total	ND	0.10		mg/Kg	1	4/15/2020 2:54:38 AM
Surr: 4-Bromofluorobenzene	98.5	80-120		%Rec	1	4/15/2020 2:54:38 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/14/2020 7:12:30 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#: **2004518**

20-Apr-20

Client: Marathon Oil Company

Project: Taylor Deep 12 Federal 9

Sample ID: **MB-51782**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **51782**	RunNo: **68129**							
Prep Date: **4/14/2020**	Analysis Date: **4/14/2020**	SeqNo: **2355256**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-51782**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **51782**	RunNo: **68129**							
Prep Date: **4/14/2020**	Analysis Date: **4/14/2020**	SeqNo: **2355257**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.2	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#: **2004518**

20-Apr-20

Client: Marathon Oil Company

Project: Taylor Deep 12 Federal 9

Sample ID: **MB-51742**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **51742**	RunNo: **68052**
Prep Date: **4/11/2020**	Analysis Date: **4/13/2020**	SeqNo: **2352273** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.2		10.00		81.7	55.1	146			

Sample ID: **LCS-51742**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **51742**	RunNo: **68052**
Prep Date: **4/11/2020**	Analysis Date: **4/13/2020**	SeqNo: **2352274** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	49	10	50.00	0	97.6	70	130			
Surr: DNOP	4.8		5.000		96.4	55.1	146			

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#: **2004518**

20-Apr-20

Client: Marathon Oil Company

Project: Taylor Deep 12 Federal 9

Sample ID: **mb-51738**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **51738**	RunNo: **68118**
Prep Date: **4/11/2020**	Analysis Date: **4/14/2020**	SeqNo: **2354670** 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		97.3	66.6	105			

Sample ID: **lcs-51738**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **51738**	RunNo: **68118**
Prep Date: **4/11/2020**	Analysis Date: **4/14/2020**	SeqNo: **2354671** 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	87.8	80	120			
Surr: BFB	1100		1000		106	66.6	105			S

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2004518**

20-Apr-20

Client: Marathon Oil Company

Project: Taylor Deep 12 Federal 9

Sample ID: **mb-51738**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **51738**	RunNo: **68086**
Prep Date: **4/11/2020**	Analysis Date: **4/13/2020**	SeqNo: **2353660** 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	0.98		1.000		98.3	80	120			

Sample ID: **LCS-51738**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **51738**	RunNo: **68086**
Prep Date: **4/11/2020**	Analysis Date: **4/13/2020**	SeqNo: **2353661** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.025	1.000	0	89.0	80	120			
Toluene	0.91	0.050	1.000	0	91.4	80	120			
Ethylbenzene	0.94	0.050	1.000	0	94.3	80	120			
Xylenes, Total	2.8	0.10	3.000	0	94.0	80	120			
Surr: 4-Bromofluorobenzene	0.99		1.000		98.6	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: www.hallenvironmental.com

Sample Log-In Check List

Client Name: MARATHON OIL COMPA Work Order Number: 2004518 RcptNo: 1

Received By: Isaiah Ortiz 4/10/2020 8:25:00 AM I_OK

Completed By: Isaiah Ortiz 4/10/2020 10:04:08 AM I_OK

Reviewed By: LB 4/10/20

Chain of Custody

1. Is Chain of Custody sufficiently 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: JR 4/10/20

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	1.8	Good	Not Present			
2	1.7	Good	Not Present			

Chain-of-Custody Record

Client: Marathon
Melodie Sanjari
Mailing Address:

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

Turn-Around Time: 5 Day
☒ Standard ☐ Rush
Project Name: Taylor Deep 12 Federal #9
Project #: 19E-00614
Project Manager: Natalie Gordon
Sampler: MJP
On Ice: ☒ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 1.7+0.1(CF) 1.8 (°C) 1.6+0.1(CF) 1.7°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. 2004518	(BTEX)/ MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	(Cl), F, Br, NO₃, NO₂, PO₄, SO₄	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)						
4/9	12:20	Soil	SS20-06 0'	4oz	ice	-001	✓	✓					✓									
↓	12:30	↓	SS20-11 0'	↓	↓	-002	✓	✓					✓									
↓	12:40	↓	SS20-17 0'	↓	↓	-003	✓	✓					✓									

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
4/9/20	1200	[signature]	[signature]		4/9/20	1200
4/9/20	1910	[signature]	T-CO	Courier	4/10/20	0025

Remarks: Direct bill Marathon
CC: Natalie Gordon
wbs#: CL.19.03087

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.