December 4, 2019 Vertex Project #: 19E-00614-008

Spill Closure Report: Queenie 15 Federal #001H (Section 14, Township 20 South, Range 32 East)
API: 30-025-40230
County: Lea
Incident Report: 1RP-5563

Prepared For: Marathon Oil Permian LLC
4111 South 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) on June 10, 2019, to conduct a spill assessment and remediation for a crude oil release resulting from equipment failure at Queenie 15 Federal #001H, API 30-025-40230 (hereafter referred to as "site"). Marathon submitted an initial C-141 Release Notification (Attachment 1) to New Mexico Oil Conservation Division (NM OCD) District 1 on June 10, 2019. Incident report number 1RP-5563 was assigned to this incident.

This letter provides a description of the spill assessment and remediation activities and demonstrates that closure criteria established in Table 1 of 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 the release incident.

Incident Description

On June 8, 2019, a release occurred at the site due to a pin hole in the line running from the oil tanks to the heater treater. This incident resulted in the release of approximately 7 barrels (bbls) of crude oil onto the south portion of the well pad. No oil was released into undisturbed areas or waterways. Approximately 3 bbls of free fluid were recovered during initial spill clean-up.

Site Characterization

The release occurred on Bureau of Land Management (BLM) property at N 32.5664978, W 103.7428894, approximately 35 miles northeast of Carlsbad, New Mexico. The legal description for the site is Section 14, Township 20 South, Range 32 East in Lea County, New Mexico. This site is located within the Permian Basin in southeast New Mexico and has historically been used for oil and gas exploration and production, and range land. An aerial photograph and site schematic are included in Attachment 2.

Queenie 15 Federal #001H 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 south portion of the well pad.

The surrounding landscape is comprised of grassland, with a semi-arid climate and average annual precipitation ranging between 10 and 15 inches. Native vegetation is predominantly black grama grass, with bush muhly, blue grama and dropseeds present as sub-dominant grasses. Yucca, javalinabush, prickly pear and mesquite are sparsely scattered among the more uniform grass cover, with bare patches occurring around the bases of shrubs (USDA, 2019). Limited to no vegetation is allowed to grow on the compacted well pad.

The Geological Map of New Mexico (New Mexico Bureau of Geology and Mineral Resources, 2014 – 2017) indicates the site's surface geology is comprised primarily of Qp ---- Piedmont alluvial deposits from the Holocene to lower Pleistocene ages. The United States Department of Agriculture (USDA) Web Soil Survey shows soils at the site to be predominantly Simona-Upton association, consisting of shallow gravelly loam to gravelly fine sandy loam over a cemented material (USDA, 2019). This soil tends to be well-drained with low runoff and very low moisture levels in the soil profile. There is no karst geology present near the site (United States Department of the Interior – BLM, 2019).

No surface water is located at the site. Based on the United States Geological Survey (USGS) National Hydrology Maps, the nearest significant watercourse as defined in Subsection P of 19.15.17.7 NMAC is a perennial pond located 0.8 miles north of the site (USGS, 2019). There are no known water sources within a half mile of the site, nor are there any continuously flowing watercourses or significant 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 depth to groundwater was initially determined using information from Oil and Gas Drilling records and the New Mexico Office of the State Engineer (NM OSE) Water Column/Average Depth to Water report. The shallowest recorded depth to groundwater was determined to be 185 feet below ground surface (bgs) at 4.3 miles from the site (NM OSE, 2019). Due to the NM OSE well's distance (greater than a half mile) from the spill location, it was determined that depth to groundwater should be estimated using the ChevronTexaco Depth to Groundwater map for Lea County. Based on that document, groundwater is less than 50 feet bgs at the site (ChevronTexaco, 2005). Documentation used in Closure Criteria Determination research is included in Attachment 3.

Closure Criteria Determination

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

Table 1.	**Revised Closure Criteria Worksheet**		
Site Name:	**Queenie 15 Federal #001H**		
Spill Coordinates:		**X: 32.5664978**	**Y: -103.7428894**
Site Specific Conditions		**Value**	**Unit**
1	Depth to groundwater	<50	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	3,565	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	3,960	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	12,900	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**	143,023	feet
	ii) Within 1,000 feet of any fresh water well or spring	6,815	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	69,317	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	Not surveyed	year
	NMAC 19.15.29.12 E (Table 1) Closure Criteria	<50 feet	<50 feet 51 – 100 feet >100 feet

Based on the data included in Table 1 above, the spill is not subject to the requirements of Paragraph (4) of Subsection C of 19.15.29.12 NMAC and the closure criteria determined for the site are associated with the following constituent concentration limits as presented in Table 2.

Table 2. Closure Criteria for Soils Impacted by a Release		
Minimum depth below any point within the horizontal boundary of the release to groundwater less than 10,000 mg/L Total Dissolved Solids (TDS)	**Constituent**	**Limit**
≤50 feet	Chloride	600 mg/kg
	TPH (GRO + DRO + MRO)	100 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

Remedial Actions

An initial site inspection of the release area, completed on June 10, 2019, identified the area of the spill specified in the initial C-141 Release Notification, estimated the approximate volume of the spill and white lined the area required for the 811 One Call request. The impacted area was determined to be approximately 24 feet long and 8 feet wide; the total affected area was determined to be 851 square feet. The Daily Field Reports (DFRs) associated with all of the site visits are included in Attachment 4.

Remediation efforts commenced on June 14, 2019 and were completed by June 29, 2019. Vertex personnel supervised the excavation of impacted soils. Field screening was conducted on a total of five sample points and consisted of analysis using a Photo Ionization Detector (volatile hydrocarbons), Dexsil Petroflag using EPA SW-846 Method 9074 (extractable hydrocarbons) and Quantabs (chlorides). Field screening results were used to differentiate areas requiring further remediation from those areas showing concentrations below determined closure criteria levels. Soils were removed to depths between 0.25 to 1 feet bgs from within the spill footprint. Impacted soil was transported by a licensed waste hauler and disposed of at an approved waste management facility. Field screening results are presented in Attachment 5, as well as in the DFRs in Attachment 4.

Notification that confirmatory samples were being collected was provided to the NM OCD on June 12, 2019 (Attachment 6). Confirmatory five-point composite samples were collected from the base and walls of the excavation such that no composite sample was representative of more than 200 square feet per the alternate sampling method outlined in Subparagraph (c) of Paragraph (1) of Subsection D of 19.15.29.12 NMAC. Four confirmation samples and one background sample (Attachment 2) were collected for laboratory analysis following NM OCD soil sampling procedures.

Samples were submitted to Hall Environmental Analysis Laboratory under chain-of-custody (COC) protocols. Laboratory analyses included Method 8021B for volatile organics (including benzene, toluene, ethyl benzene and xylenes [BTEX]); EPA Method 8015M/D for total petroleum hydrocarbons (TPH; including motor oil range organics [MRO], diesel range organics [DRO] and gasoline range organics [GRO]); and Method 300.0/9056A for chlorides. Laboratory results are presented in Table 3 (Attachment 5) and the laboratory data report is included in Attachment 7. All confirmatory samples collected and analyzed were below initially-determined closure criteria for the site.

Closure Rejection and Additional Remediation

A final closure report and request for closure were submitted to NM OCD District 1 on July 30, 2019. That closure request was denied based on an inaccurate depth to groundwater determination of >100 ft bgs. Based on the revised depth to groundwater determination of <50 ft bgs, confirmation sample point TP 19-02 did not meet the appropriate closure criteria of less than 100 mg/kg TPH. The other confirmation sample locations met closure criteria for the revised depth to groundwater determination.

On November 1, 2019, Vertex personnel returned to site to excavate additional soil in the vicinity of sample point TP 19-02, using field screening procedures to guide remediation to a final depth of 1 ft bgs. A confirmation sample was collected from the area of additional remediation and submitted to Xenco Laboratories for analysis using the methods outlined above. The laboratory data report showed TPH levels below the closure criteria for a site with depth to

groundwater of <50 ft bgs (Table 4 – Attachment 5). The laboratory data report and associated COC are included in Attachment 7. The new excavation was backfilled on November 13, 2019.

Closure Request

The spill area has been fully delineated and remediated according to the guidance of NM OCD's explanation of closure request rejection (Attachment 8) and the revised depth to groundwater determination. The confirmation sample collected following additional remediation was below allowable concentrations as per Table 1 19.15.29.12 NMAC – Closure Criteria for Soils Impacted by a Release for locations "less than 50 feet depth to groundwater". There are no anticipated risks to human, ecological or hydrological receptors at the site.

Vertex requests that Incident 1RP-5563 be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. Marathon Oil Permian LLC 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 obtain closure on the June 8, 2019 spill at Queenie 15 Federal #001H.

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

Sincerely,

Natalie Gordon
PROJECT MANAGER

Attachments

Attachment 1. NM OCD C-141 Report
Attachment 2. Figures
Attachment 3. Closure Criteria for Soils Impacted by a Release Research Determination Documentation
Attachment 4. Daily Field Reports with Site Photographs
Attachment 5. Data Tables
Attachment 6. Confirmatory Samples Notification to the NM OCD
Attachment 7. Laboratory Data Reports and COCs
Attachment 8. NM OCD Explanation of Closure Request Rejection

References

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

Google Earth Pro. (2019). *Measured Distance from the Subject Site to Municipal Boundaries.* Retrieved from https://earth.google.comNew Mexico Department of Surface Water Quality Bureau. (2019). *Assessed and Impaired Waters of New Mexico.* Retrieved from https://gis.web.env.nm.gov/oem/?map=swqb.

New Mexico Mining and Minerals Division. (2019). *Coal Mine Resources in New Mexico*. Retrieved from http://www.emnrd.state.nm.us/MMD/gismapminedata.html.

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

New Mexico Oil Conservation Division. (2019). *Natural Resources and Wildlife Oil and Gas Releases*. Santa Fe, New Mexico.

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, National Resources Conservation Service, National Soil Survey Center. (2019). *Field Book for Describing and Sampling Soils*. Retrieved from: https://www.nrcs.usda.gov/ Internet/FSE_DOCUMENTS.

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

United State Fish and Wildlife Service. (2019). *National Wetland Inventory Surface Waters and Wetland*. Retrieved from https://www.fws.gov/wetlands/data/mapper.html.

United States Department of Homeland Security, FEMA Flood Map Service Center. (2010). *Flood Map Number 35015C1875D.* Retrieved from https://msc.fema.gov/portal/search?AddressQuery=malaga%20new%20mexico #searchresultsanchor.

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.

Limitations

This report has been prepared for the sole benefit of Marathon Oil Permian LLC. 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 Oil Permian LLC. 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	OGRID
Contact Name	Contact Telephone
Contact email	Incident # *(assigned by OCD)*
Contact mailing address	

Location of Release Source

Latitude _____ Longitude _____
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Site Type
Date Release Discovered	API# *(if applicable)*

Unit Letter	Section	Township	Range	County

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

Nature and Volume of Release

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

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☐ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of total dissolved solids (TDS) 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		

Form C-141
Page 2

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: _____ Title: _____

Signature: Isaac Castro Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Form C-141
Page 3

State of New Mexico
Oil Conservation Division

Incident ID	nDHR1917230579
District RP	1RP-5563
Facility ID	
Application ID	pDHR1917230326

Site Assessment/Characterization

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

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

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

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☒ Field data
- ☒ Data table of soil contaminant concentration data
- ☒ Depth to water determination
- ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☒ Boring or excavation logs
- ☒ Photographs including date and GIS information
- ☒ Topographic/Aerial maps
- ☒ Laboratory data including chain of custody

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	nDHR1917230576
District RP	1RP-5563
Facility ID	
Application ID	pDHR1917230326

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: ADV HES Technician

Signature: Isaac Castro Date: 12/4/19

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

OCD Only

Received by: Cristina Eads Date: 01/21/2020

Form C-141
Page 6

State of New Mexico
Oil Conservation Division

Incident ID	nDHR1917230576
District RP	1RP-5563
Facility ID	
Application ID	pDHR1917230326

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.***

[x] A scaled site and sampling diagram as described in 19.15.29.11 NMAC

[x] 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)

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

[x] 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: Isaac Castro Title: ADV HES Technician

Signature: Isaac Castro Date: 12/4/19

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

OCD Only

Received by: Cristina Eads Date: 01/21/2020

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: 01/21/2020

Printed Name: Cristina Eads Title: Environmental Specialist

ATTACHMENT 2

LEGEND

- SOIL SAMPLE
- WELLEAD
- ROAD
- TANK
- SPILL AREA
- WELL PAD

0 15 30 60 Ft

SCALE 1:900

Notes: Aerial Image from ESRI Digital Glope 2016

Marathon Oil

Site Schematic
Queenie 15 Federal
#001H

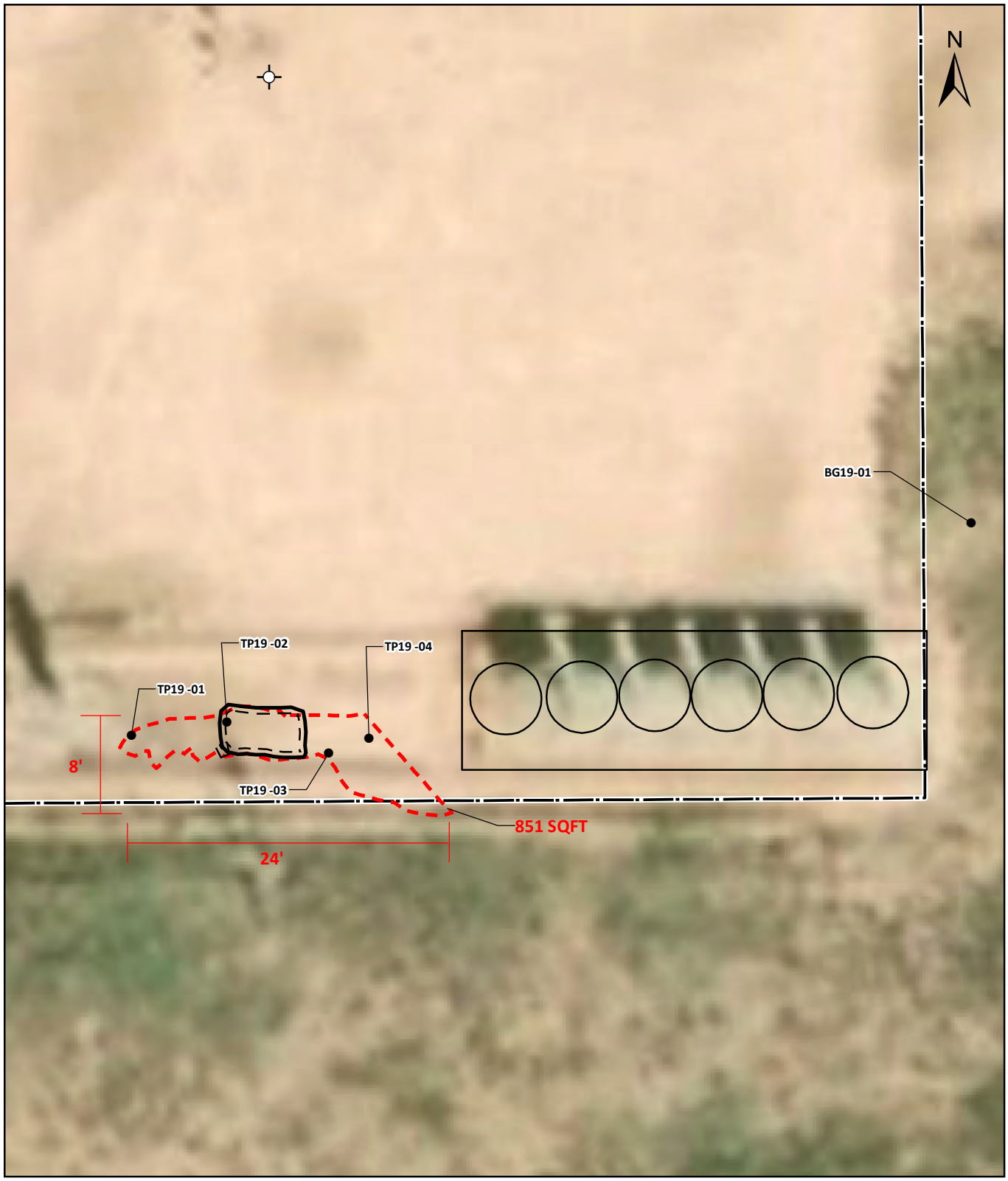
VERTEX

DRAWN:	NM
APPROVED:	KM
DATE:	JUL 12/19

FIGURE: 1

VERSATILITY. EXPERTISE.

Document Path: C:\Users\tmoony\Documents\Natasha Mocny\Projects\Marathon\Queenie 15 FED 1\Figure 2 - Site Schematic Queenie 15 FED 1.mxd



LEGEND

- SOIL SAMPLE
- WELL HEAD
- TANK
- SPILL AREA
- WELL PAD
- EXCAVATION AREA

BG BACKGROUND SAMPLE
BS BASE SAMPLE
TP TEST PIT

0 10 20 40 Ft

SCALE 1:400

Notes: Aerial Image from ESRI Digital Glope 2016

Marathon Oil

Additional Excavation and Final Confirmatory Queenie 15 Federal #001H

VERTEX

DRAWN:	NM
APPROVED:	NG
DATE:	NOV 05/19

FIGURE: 2

VERSATILITY. EXPERTISE.

Document Path: C:\Users\tmocny\Documents\Natasha Mocny\Projects\Marathon\Queenie 15 FED 1\Figure 3 - Queenie 15 FED 1 Final Confirmatory.mxd

ATTACHMENT 3

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(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	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Twn	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
CP 00075	O	CP	LE		2	4	34	19S	32E	617502	3609301	5397	575		
CP 00317		CP	LE	3	4	3	05	20S	33E	623054	3607235*	6033	680	325	355
L 07023		L	LE	2	3	3	32	19S	33E	622840	3609047*	7039	262	185	77
CP 00368		CP	LE			2	36	20S	31E	610955	3600163*	7994	303		
CP 00653 POD1		CP	LE		4	4	04	20S	33E	625573	3607367*	8310	60		
CP 00370		CP	LE		1	1	36	20S	31E	609945	3600358*	8817	120	80	40
C 03151		CUB	ED	4	1	4	07	21S	32E	621119	3595526*	8959	1352		
CP 01151 POD1		CP	LE				32	22S	36E	627037	3601186	9435	823		
CP 00641 POD1		CP	ED		4	1	36	19S	31E	610247	3609634*	9633	300	130	170

Average Depth to Water: **180 feet**

Minimum Depth: **80 feet**

Maximum Depth: **325 feet**

Record Count: 9

UTMNAD83 Radius Search (in meters):

Easting (X): 618007.96 **Northing (Y):** 3603927.67 **Radius:** 10000

***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 00961	CP	MON	0	GLOBAL NUCLEAR ENERGY PTP	LE	CP 00961 POD1					4 4 1	13	20S	32E	620062	3604791*	2228
CP 01693	CP	MON	0	GEOMECHANICS SOUTHWEST INC	LE	CP 01693 POD6	NA		NON		3 3 4	13	20S	32E	620305	3604049	2300
					LE	CP 01693 POD5			NON		4 1 4	13	20S	32E	620477	3604349	2505
					LE	CP 01693 POD2			NON		4 1 4	13	20S	32E	620481	3604415	2520
					LE	CP 01693 POD3			NON		2 1 4	13	20S	32E	620481	3604415	2520
					LE	CP 01693 POD1			NON		3 2 4	13	20S	32E	620614	3604417	2652
					LE	CP 01693 POD4			NON		1 2 4	13	20S	32E	620613	3604539	2676

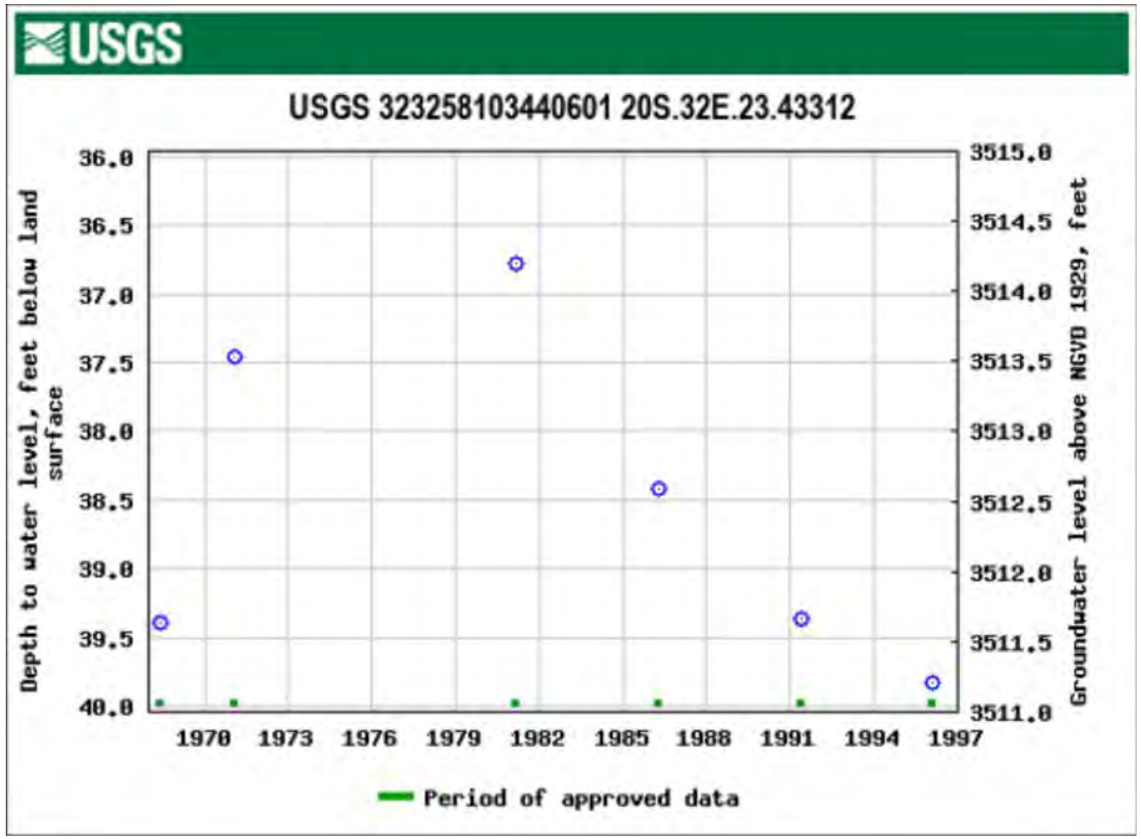
Record Count: 7

UTMNAD83 Radius Search (in meters):

Easting (X): 618007.96 **Northing (Y):** 3603927.67 **Radius:** 5000

Sorted by: Distance

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


USGS
USGS 323258103440601 20S.32E.23.43312
Depth to water level, feet below land surface
36.0
36.5
37.0
37.5
38.0
38.5
39.0
39.5
40.0
Groundwater level above NGVD 1929, feet
3515.0
3514.5
3514.0
3513.5
3513.0
3512.5
3512.0
3511.5
3511.0
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
Period of approved data


Queenie 15 Fed 1
Nearest measured depth to water (DTW): 5,030 feet
DTW: 37.6 feet below ground surface
Legend
Distance = 5,030 feet
ft to GW
Queenie 15 Fed 1
Queenie 15 Fed 1
USGS - 37.6 ft to GW
USGS - 40 ft to GW
GS - 39.8 ft to GW
Google Earth
© 2018 Google
N
1 km

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)

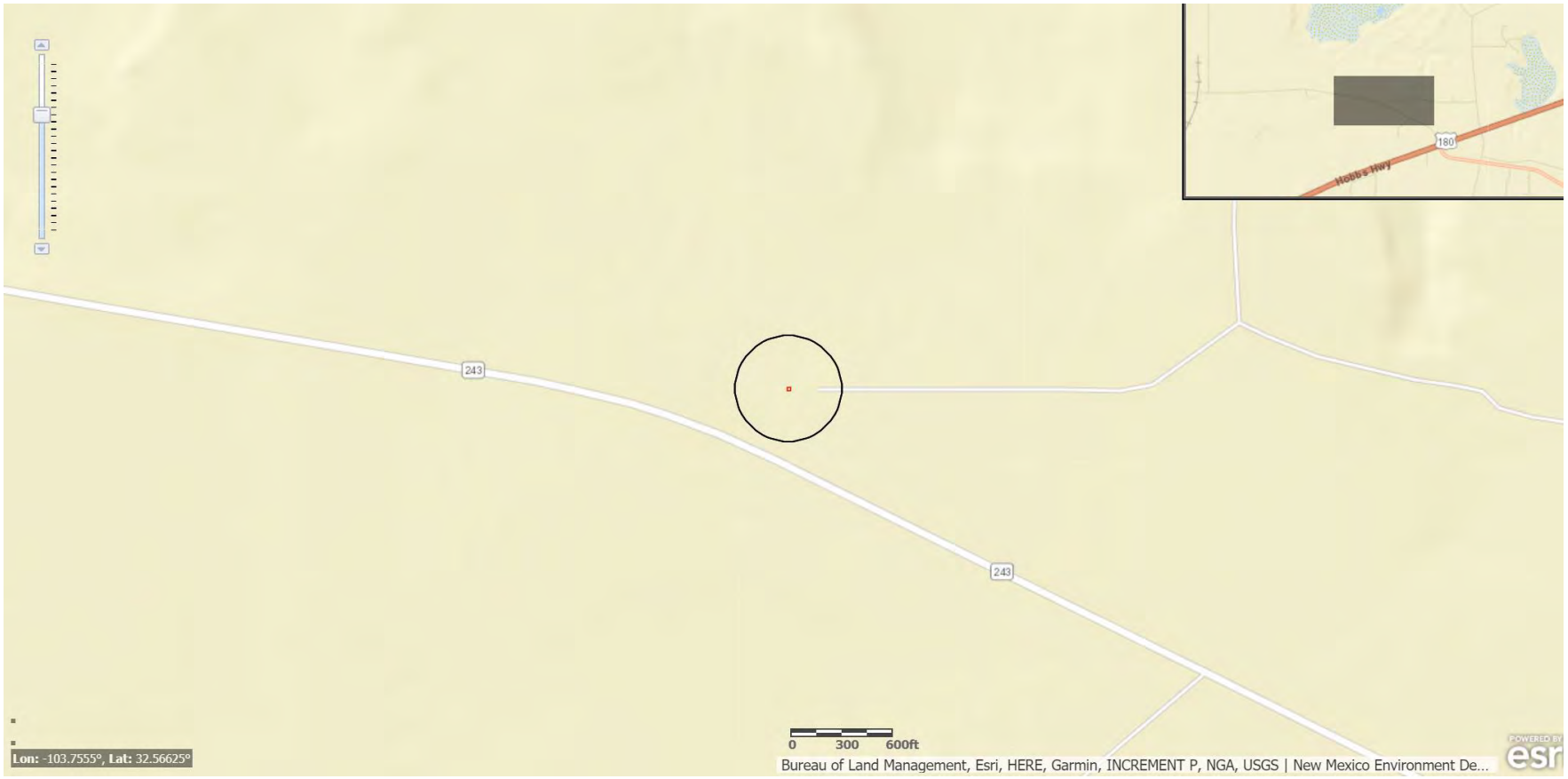
POD Number	POD Sub-basin Code	County	Source	q 6416	q 4	q 3	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
CP 00317	CP	LE	Shallow	3	4	3	05	20S	33E	623054	3607235*	6033	02/05/1966	02/17/1966	02/24/1966	680	325	ABBOTT, MURRIEL	46
L 07023	L	LE	Shallow	2	3	3	32	19S	33E	622840	3609047*	7039	11/12/1970	11/15/1970	11/19/1970	262	185	MURRELL ABBOTT	46
CP 00368	CP	LE	Shallow			2	36	20S	31E	610955	3600163*	7994	06/02/1966	06/10/1966	10/11/1966	303		BARRON, EMMETT	30
CP 00370	CP	LE	Shallow		1	1	36	20S	31E	609945	3600358*	8817	07/11/1966	07/14/1966	10/11/1966	120	80	BARRON, EMMETT	30
C 03151	CUB	ED	Shallow	4	1	4	07	21S	32E	621119	3595526*	8959	08/23/2005	09/10/2005	09/20/2005	1352		BROCKMAN, BERNARD J.	1184
CP 01151 POD1	CP	LE					32	22S	36E	627037	3601186	9435	02/21/2013	04/12/2013	04/24/2013	823		BENTLE, BILLY L.	1292
CP 00641 POD1	CP	ED	Shallow		4	1	36	19S	31E	610247	3609634*	9633	02/11/1982	02/12/1982	02/23/1982	300	130	FELKINS, LARRY	882

Record Count: 7

UTMNAD83 Radius Search (in meters):

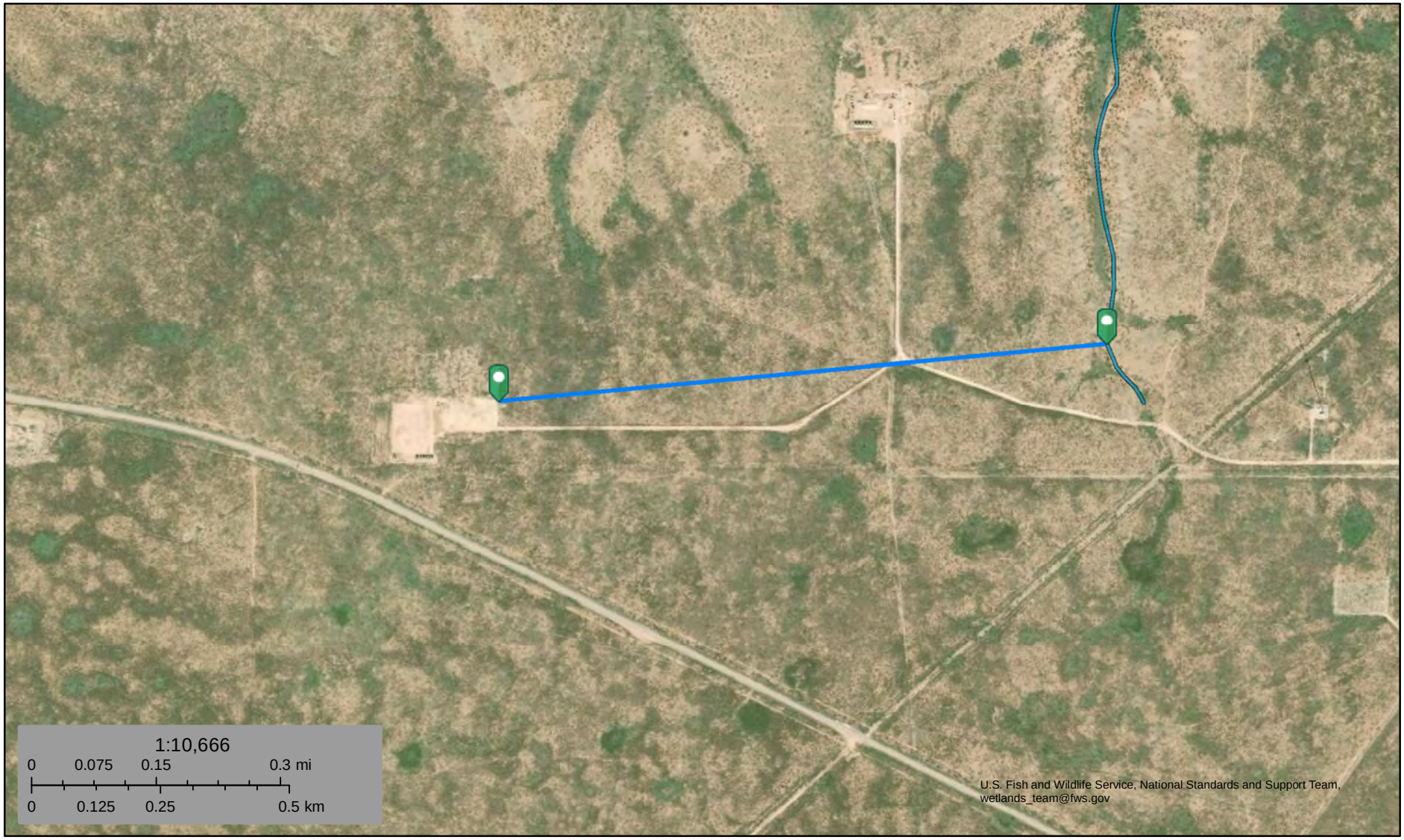
Easting (X): 618007.96 **Northing (Y):** 3603927.67 **Radius:** 10000

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


243
243
180
Hobbs Hwy
0 300 600ft
Lon: -103.7555°, Lat: 32.56625°
Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, NGA, USGS | New Mexico Environment De...

U.S. Fish and Wildlife Service
National Wetlands Inventory

Queenie Watercourse 3280ft



June 11, 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.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service
National Wetlands Inventory

Queenie 15 Fed 1 Lake 3,960 ft.

June 11, 2019

Wetlands

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

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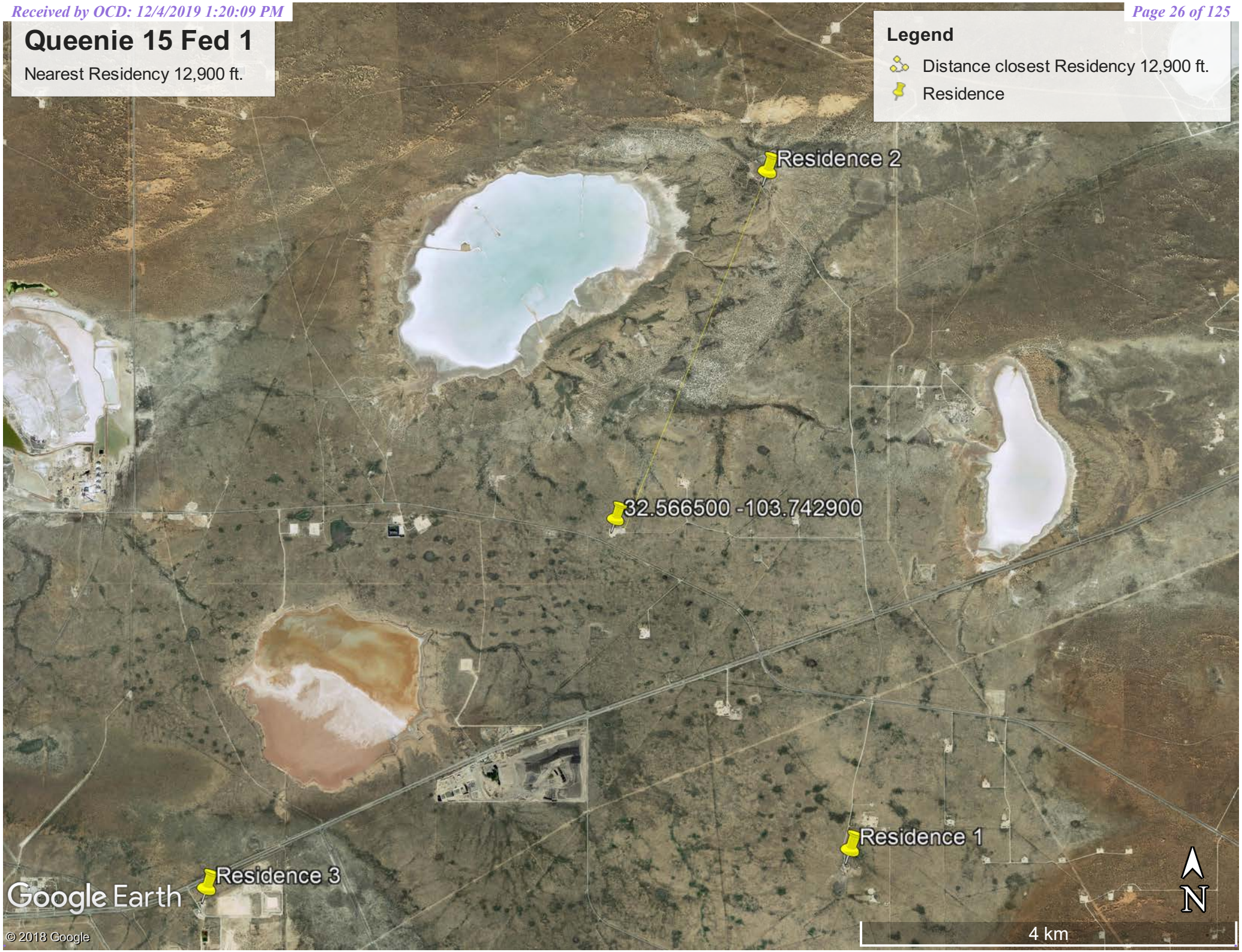
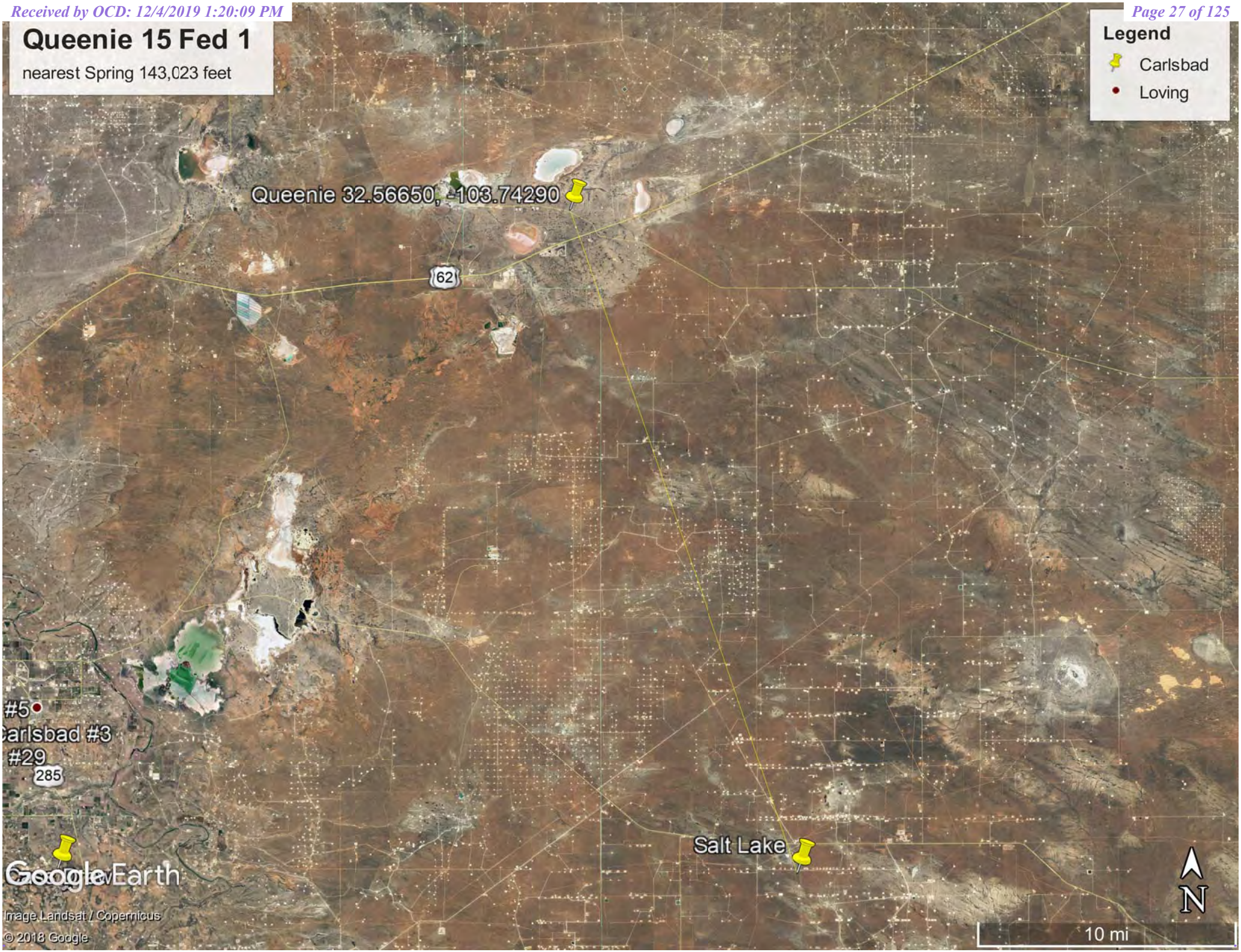
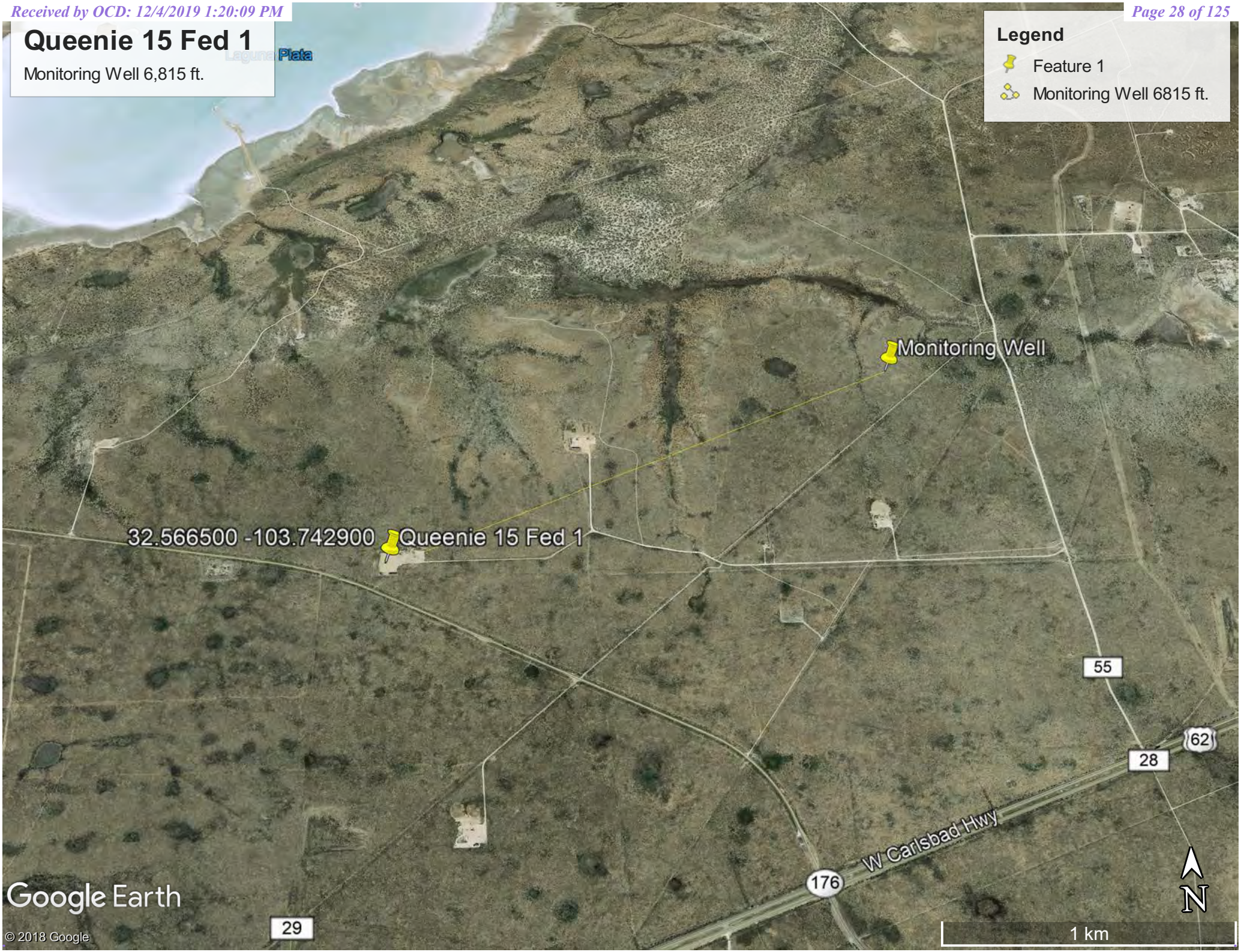
National Wetlands Inventory (NWI)
This page was produced by the NWI mapper


Queenie 15 Fed 1
Nearest Residency 12,900 ft.
Legend
Distance closest Residency 12,900 ft.
Residence
Residence 2
32.566500 -103.742900
Residence 1
Residence 3
Google Earth
© 2018 Google
N
4 km


Queenie 15 Fed 1
nearest Spring 143,023 feet
Legend
Carlsbad
Loving
Queenie 32.56650, -103.74290
62
#5
arlsbad #3
#29
285
Salt Lake
Google Earth
Image Landsat / Copernicus
© 2018 Google
N
10 mi


Queenie 15 Fed 1
Monitoring Well 6,815 ft.
Legend
Feature 1
Monitoring Well 6815 ft.
Laguna Plata
Monitoring Well
32.566500 -103.742900
Queenie 15 Fed 1
55
62
28
W Carlsbad Hwy
176
29
N
1 km
Google Earth
© 2018 Google

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 Sub-basin Code	County	Source	q 6416	q 4	q 3	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
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CP 00368	CP	LE	Shallow			2	36	20S	31E	610955	3600163*	7994	06/02/1966	06/10/1966	10/11/1966	303		BARRON, EMMETT	30

Record Count: 3

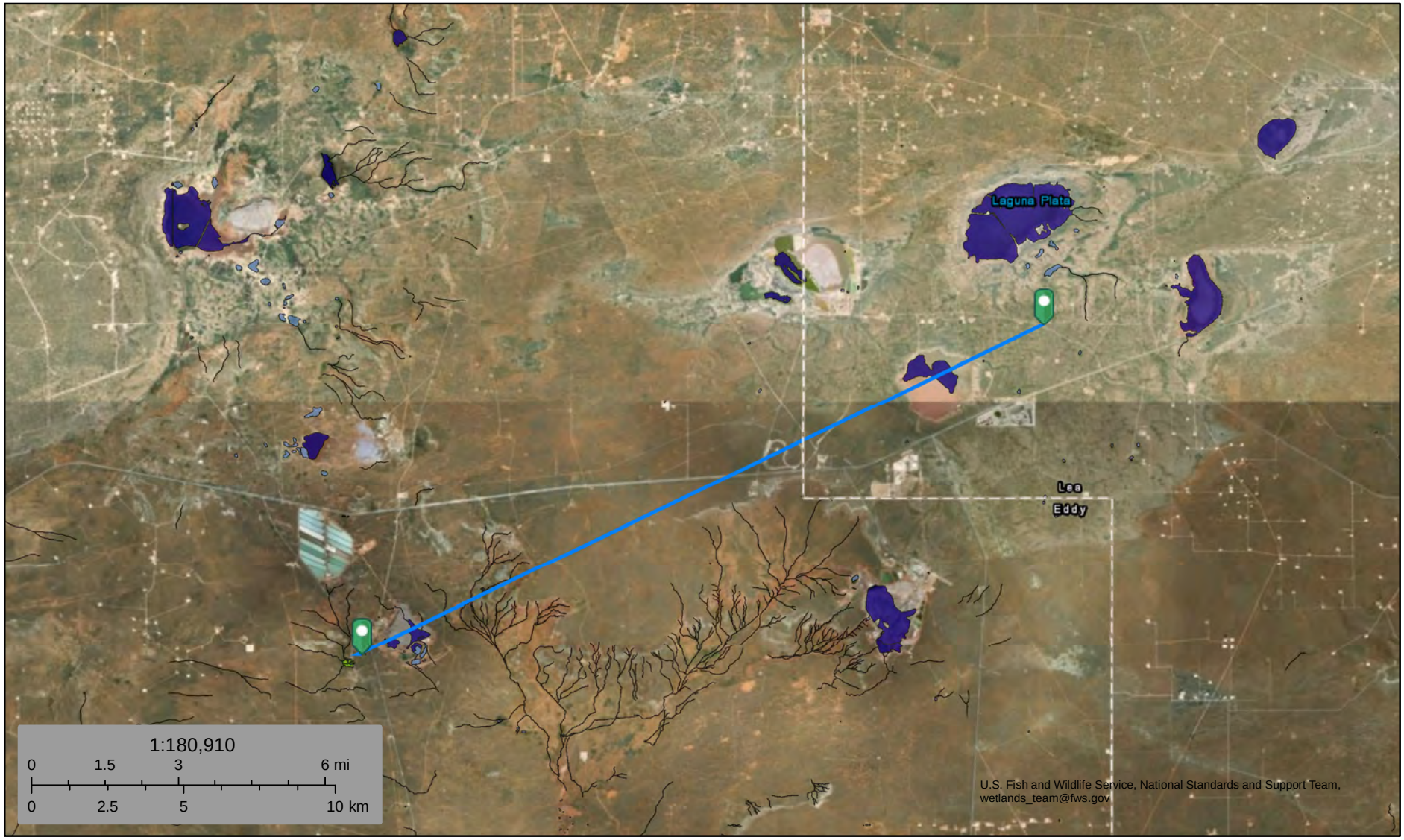
UTMNAD83 Radius Search (in meters):

Easting (X): 618007.96 **Northing (Y):** 3603927.67 **Radius:** 8000

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

U.S. Fish and Wildlife Service
National Wetlands Inventory

Queenie 15 Fed1 wetland 69,317



July 12, 2019

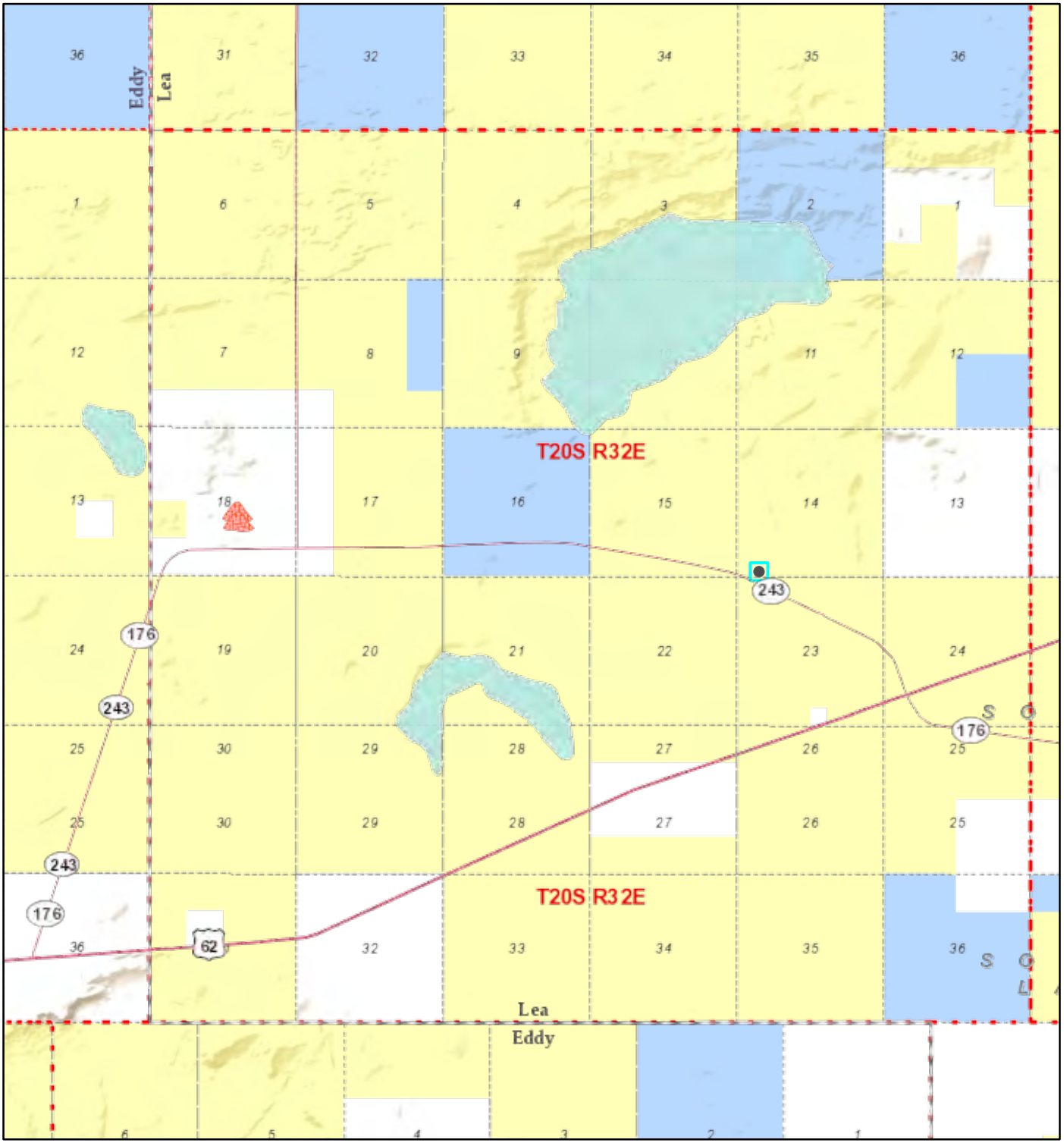
Wetlands

- 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.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Active Mines in New Mexico



6/11/2019, 9:15:30 AM

1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

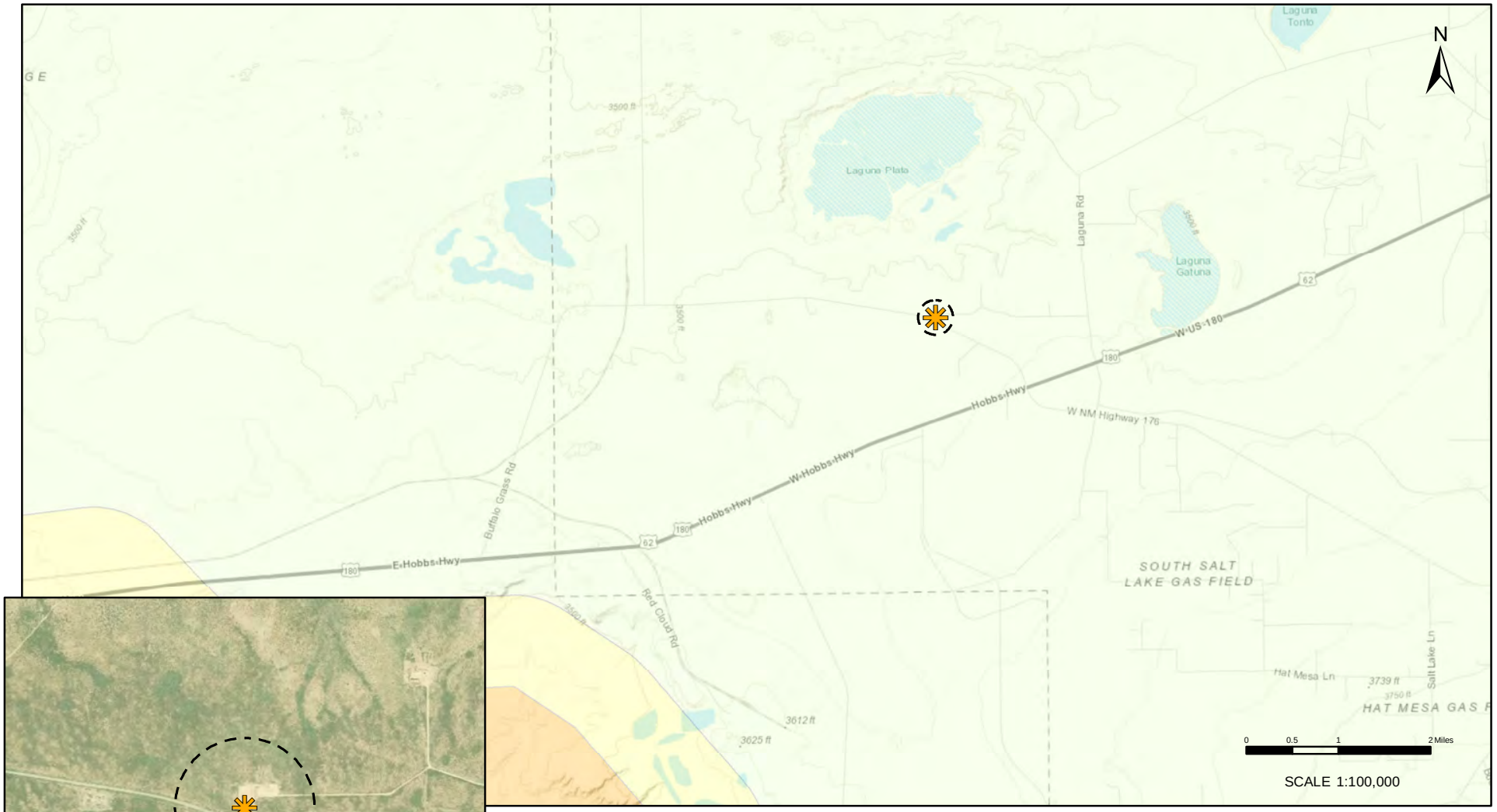
Registered Mines

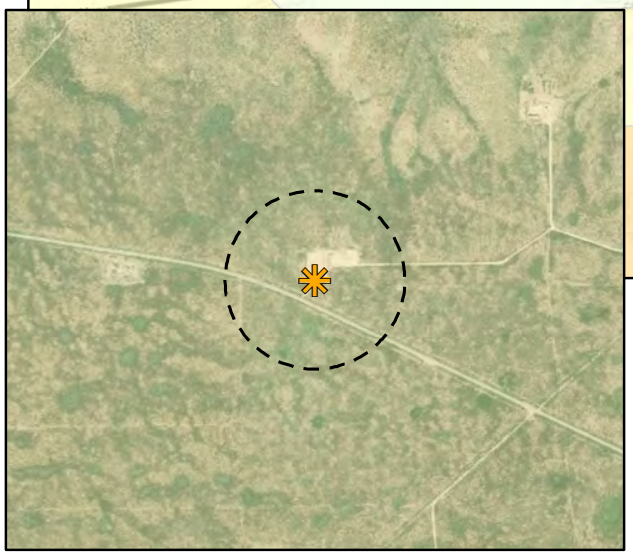
Potash

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

EMNRD MMD GIS Coordinator

NM Energy, Minerals and Natural Resources Department (http://nm-emnrd.maps.arcgis.com/apps/webappviewer/index.html?id=1b5e577974664d689b47790897ca2795)





LEGEND

- SITE
- 1000FT BUFFER

KARST POTENTIAL

- CRITICAL
- HIGH
- MEDIUM
- LOW

Notes: Aerial Image from ESRI Digital Globe 2017

Marathon Oil

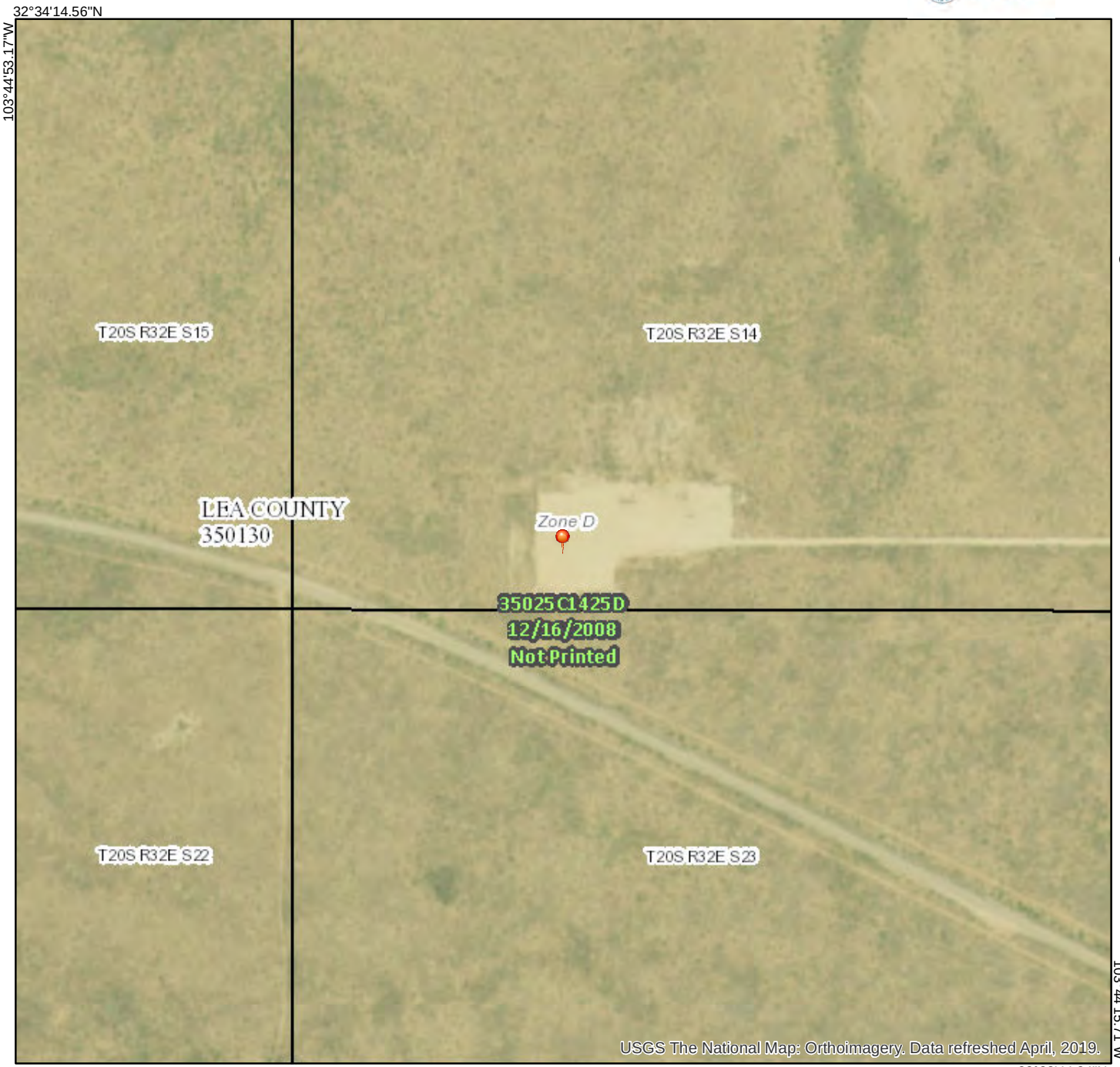
Karst Potential
Queenie 15 FED 1

VERTEX

DRAWN:	NM	FIGURE: 1
APPROVED:	AH	
DATE:	JUN 11/19	

VERSATILITY. EXPERTISE.

National Flood Hazard Layer FIRMette



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 — Cross Sections with 1% Annual Chance
- 17.5 — 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 6/11/2019 at 10:15:00 AM 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.

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lea County, New Mexico

June 11, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 15, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 18, 2016—Nov 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SR	Simona-Upton association	4.2	100.0%
Totals for Area of Interest		**4.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lea County, New Mexico

SR—Simona-Upton association

Map Unit Setting

National map unit symbol: dmr3
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Simona

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: gravelly fine sandy loam
Bk - 8 to 16 inches: fine sandy loam
Bkm - 16 to 26 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Shallow Sandy (R042XC002NM)

Hydric soil rating: No

Description of Upton

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: gravelly loam
Bkm - 8 to 18 inches: cemented material
BCk - 18 to 60 inches: very gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 75 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Shallow (R042XC025NM)
Hydric soil rating: No

Minor Components

Kimbrough

Percent of map unit: 6 percent
Ecological site: Very Shallow 16-21" PZ (R077CY037TX)
Hydric soil rating: No

Stegall

Percent of map unit: 5 percent
Ecological site: Limy Upland 16-21" PZ (R077CY028TX)
Hydric soil rating: No

Slaughter

Percent of map unit: 4 percent
Ecological site: Limy Upland 16-21" PZ (R077CY028TX)
Hydric soil rating: No

Custom Soil Resource Report

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(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	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
CP 00075	O	CP	LE		2	4	34	19S	32E	617502	3609301	5396	575		
CP 00317		CP	LE	3	4	3	05	20S	33E	623054	3607235*	6032	680	325	355
L 07023		L	LE	2	3	3	32	19S	33E	622840	3609047*	7039	262	185	77
CP 00368		CP	LE			2	36	20S	31E	610955	3600163*	7995	303		
CP 00653 POD1		CP	LE		4	4	04	20S	33E	625573	3607367*	8309	60		
CP 00370		CP	LE		1	1	36	20S	31E	609945	3600358*	8818	120	80	40
C 03151		CUB	ED	4	1	4	07	21S	32E	621119	3595526*	8959	1352		
CP 01151 POD1		CP	LE				32	22S	36E	627037	3601186	9435	823		
CP 00641 POD1		CP	ED		4	1	36	19S	31E	610247	3609634*	9633	300	130	170

Average Depth to Water: **180 feet**
Minimum Depth: **80 feet**
Maximum Depth: **325 feet**

Record Count: 9

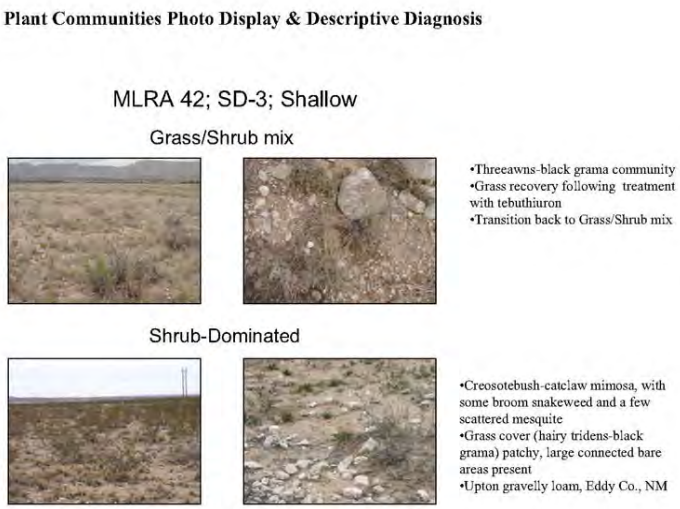
UTMNAD83 Radius Search (in meters):

Easting (X): 618008.24 **Northing (Y):** 3603927.89 **Radius:** 10000

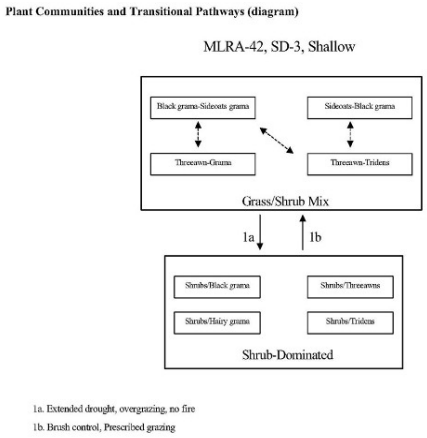
***UTM location was derived from PLSS - see Help**

R042XC025NM — Shallow Ecological Site

Plant Community Photos



Grass/Shrub Mix



State Transition Diagram for R042XC025NM — Shallow Ecological Site

Ecological Dynamics Description

Overview:

The Shallow site is associated with and Limestone Hills, Loamy, and Shallow Sandy sites. When associated with Limestone Hills, the Shallow site occurs on the summits, foot slopes and toeslopes of hills. Loamy sites often occur as areas between low elongated hills with rounded crests (Shallow site). When the Shallow Sandy site and Shallow site occur in association, the Shallow Sandy soils occupy the tops of low ridges and the Shallow site soils occur on the steeper sideslopes of the ridge. The historic plant community of the Shallow site has the aspect of a grassland/shrub mix, dominated by grasses, but with shrubs common throughout the site. Black grama is the dominant grass species; creosotebush, mesquite, and catclaw mimosa are common shrubs. Overgrazing and or extended drought can reduce grass cover, effect a change in grass species dominance, and may result in a shrub-dominated state. 1

R042XC002NM — Shallow Sandy: Historic Climax Plant Community

Plant Community Photos

Plant Communities Photo Display & Descriptive Diagnosis

MLRA 42; SD-3; Shallow Sandy

Grass/Shrub

•Black grama/Mesquite with some dropseeds, threeawns, yucca, and snakeweed
•Grass cover moderate more or less uniform, with bare patches expanding near shrub bases
•Simona fine sandy loam-soil series

Transition to Shrub-Dominated

•Black grama/Mesquite with increased amount of threeawns and dropseeds
•Grass cover becoming patchy
•Simona fine sandy loam-soil series

Shrub-Dominated

•Creosotebush-Mesquite community
•Grasscover very patchy, threeawns, bush muhly, with a little black grama
•Simona gravelly fine sandy loam-soil series

Historic Climax Plant Community

Plant Community Description

Grassland: This site responds well to management and is resistant to state change, due to the shallow depth to petrocalcic horizon and sandy surface textures. The sandy surface textures allow rapid water infiltration and the petrocalcic horizon helps to keep water perched and available to shallow rooted grasses. Black grama is the dominant species in the historic plant community, averaging 50 to 60 percent of the total production for this site. Bush muhly, blue grama, and dropseeds are present as sub-dominants. Typically, yucca, javalinabush, range ratany, prickly pear, and mesquite are sparsely dotted across the landscape. Leatherweed croton, cutleaf happlopappus, wooly groundsel, and threadleaf groundsel are common forbs. Continuous heavy grazing or extended periods of drought will cause a loss of grass cover characterized by a decrease in black grama, bush muhly, blue and sideoats grama, plains bristlegrass, and Arizona cottontop. Dropseeds and or threeawns may increase and become sub-dominant to black grama. Continued loss of grass cover in conjunction with dispersal of shrub seeds and fire suppression is believed to cause the transition to a state with increased amounts of shrubs (Grass/Shrub state).

Diagnosis: Black grama is the dominant grass species. Grass cover uniformly distributed. Shrubs are a minor component averaging only two to five percent canopy cover. Litter cover is high (40-50 percent of area), and litter movement is limited to smaller size class litter and short distances (<. 5m).

Other grasses that could appear on this site would include: six-weeks grama, fluffgrass, false-buffalograss, hairy grama, little bluestem, bristle panicum, cane bluestem, Indian ricegrass, tridens spp., and red lovegrass.

Other woody plants include: pricklypear, cholla, fourwing saltbush, catclaw mimosa, winterfat, American tarbush and mesquite.

Other forbs include: globemallow, verbena, desert holly, senna, plains blackfoot, trailing fleabane, fiddleneck, deerstongue, wooly Indianwheat, and locoweed.

Plant Community Tables

Plant Type	Low	Representative Value	High
Grass/Grasslike	474	652	830
Forb	78	107	136
Shrub/Vine	48	66	84
Totals	**600**	**825**	**1,050**

Grass/Grasslike				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
1: Warm Season			413	495
	black grama	Bouteloua eriopoda	413	495
2: Warm Season			41	83
	bush muhly	Muhlenbergia porteri	41	83
3: Warm Season			41	83
	blue grama	Bouteloua gracilis	41	83
4: Warm Season			25	41
	sideoats grama	Bouteloua curtipendula	25	41
5: Warm Season			41	83
	spike dropseed	Sporobolus contractus	41	83
	sand dropseed	Sporobolus cryptandrus	41	83
	mesa dropseed	Sporobolus flexuosus	41	83
6: Warm Season			17	41
	perennial threeawn spp.	Aristida	17	41
7: Warm Season			41	83
	arizona cottontop	Digitaria californica	41	83
	plains bristlegrass	Setaria vulpiseta	41	83
8: Warm Season			41	83
	field sandbur	Cenchrus longispinus	41	83
	hooded windmillgrass	Chloris cucullata	41	83
9: Other Perennial Grasses			25	41

Forb				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
16: Forb			17	41
	leather croton	Croton pottsii var. pottsii	17	41
	Goodding's tansyaster	Machaeranthera pinnatifida ssp. gooddingii var. gooddingii	17	41
17: Forb			17	41
	woolly groundsel	Packera cana	17	41
	threadleaf groundsel	Senecio flaccidus var. flaccidus	17	41

Forb				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
18: Forb			8	25
	halfshrub sundrop	Oenothera albicaulis	8	25
19: Other Forbs			8	25

Shrub/Vine				
Group	Plant Common Name	Plant Scientific Name	Annual Production Pounds Per Acre	
			Low	High
10: Shrub			8	25
	javilina bush	Condalia ericoides	8	25
11: Shrub			8	25
	yucca spp.	Yucca	8	25
12: Shrub			8	25
	ephedra spp.	Ephedra	8	25
	range ratany (littleleaf)	Krameria erecta	8	25
13: Shrub			8	25
	feather dalea	Dalea formosa	8	25
14: Shrub			8	25
	broom snakeweed	Gutierrezia sarothrae	8	25
15: Other Shrubs			25	41

Growth Curve Name
R042XC002NM-Shallow Sandy-HCPC

Growth Curve Description
SD-3 Shallow Sandy - 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	30.000%	35.000%
Forb	—	—
Shrub/vine/liana	—	—
Tree	—	—
Non-vascular plants	—	—
Biological crust	—	—
Non-Vegetative Cover Type	**Minimum**	**Maximum**
Litter	40.000%	50.000%
Surface fragments > 0.25" and <= 3"	—	—
Surface fragments > 3"	—	—
Bedrock	—	—
Water	—	—
Bare ground	15.000%	25.000%
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	—	—

ATTACHMENT 4

Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	6/10/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	6/10/2019 9:25 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Callie Karrigan	Reference	Containment Spill
Client Contact Phone #:	(405) 202-1028		

Summary of Times

Left Office	6/10/2019 12:15 PM
Arrived at Site	6/10/2019 1:00 PM
Departed Site	6/10/2019 2:00 PM
Returned to Office	6/10/2019 2:45 PM

Summary of Daily Operations

13:04 Arrive on site. Complete safety paperwork. Map spill with GPS. Complete DFR. Return to office.

Next Steps & Recommendations

1. Create work plan
2. Schedule remediation
3. Remove contaminate
4. Field screen

Daily Site Visit Report

Site Photos

Viewing Direction: Southwest

Spill source-possible corroded flow lines

Viewing Direction: West

Flow line source of spill

Viewing Direction: Northwest

Spill area inside containment

Viewing Direction: West

Spill area inside containment

Daily Site Visit Report

Viewing Direction: East	**Viewing Direction**: Southeast
	
Spill area inside containment	Spill area inside containment
Viewing Direction: Northeast	**Viewing Direction**: Southwest
	
Spill area inside containment	Spill area marked

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: East
	
Spill area marked	Spill area marked

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 
Signature

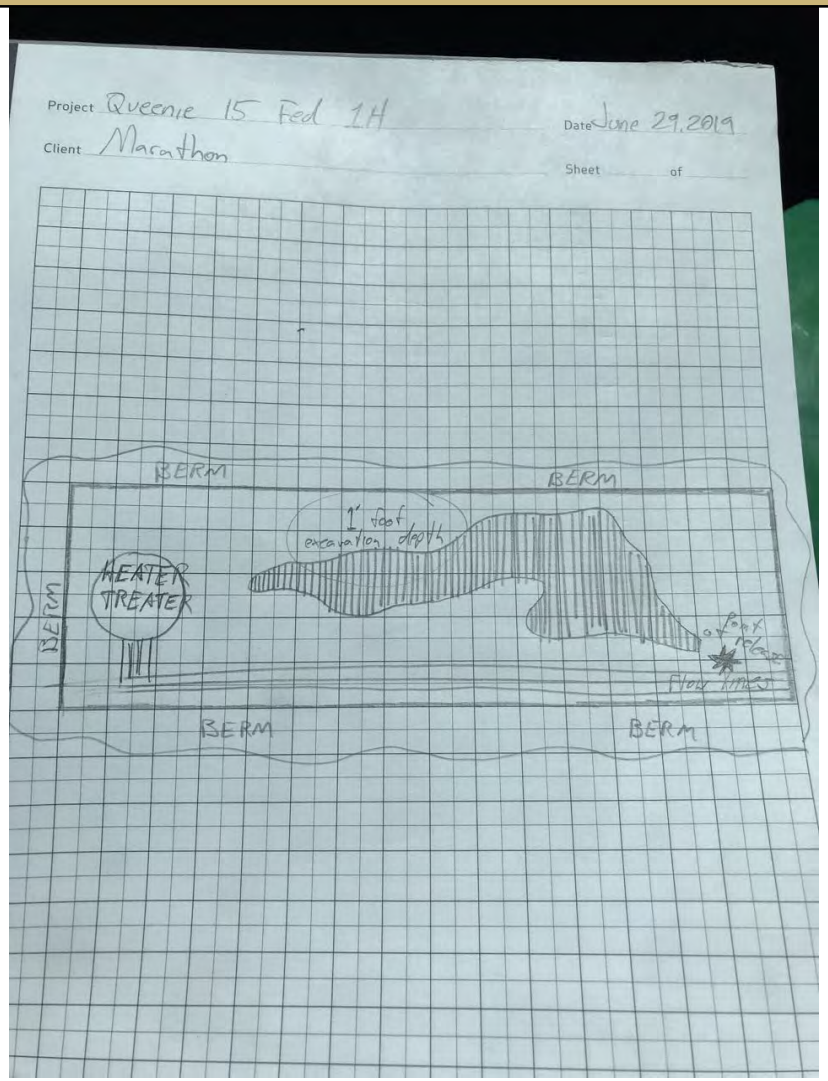
Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	6/29/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	6/29/2019 7:40 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Callie Karrigan	Reference	Containment Spill
Client Contact Phone #:	(405) 202-1028		

Summary of Times	
Left Office	6/29/2019 6:30 AM
Arrived at Site	6/29/2019 7:00 AM
Departed Site	6/29/2019 11:02 AM
Returned to Office	6/29/2019 12:13 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

10:30 Arrive on site.
Complete safety paperwork.
Backfill excavated area.
Complete DFR.
Return to office.

Next Steps & Recommendations

1 Closure report

2 Send report to client

Daily Site Visit Report

Site Photos

Viewing Direction: West	**Viewing Direction**: South
	
Backfilled area	Backfilled area by point of release
Viewing Direction: West	**Viewing Direction**: East
	
Backfilled area	Backfilled area

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: South
	
Restored burn	Restored fence

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 
Signature

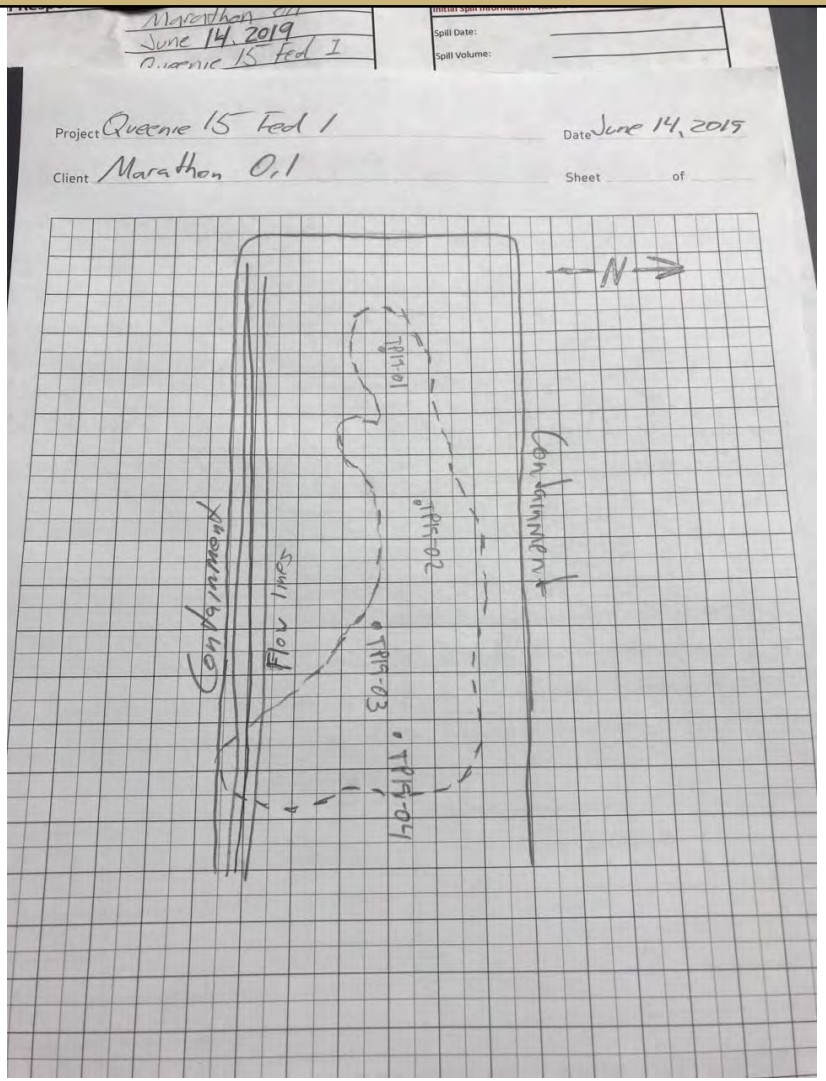
Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	6/14/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	7/30/2019 8:34 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Callie Karrigan	Reference	Containment Spill
Client Contact Phone #:	(405) 202-1028		

Summary of Times	
Left Office	6/14/2019 12:00 PM
Arrived at Site	6/14/2019 12:45 PM
Departed Site	6/14/2019 6:15 PM
Returned to Office	6/14/2019 7:00 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

12:49 Arrive on site.
Complete safety paperwork.
Hydrovac contaminated soil.
Field screen.
Keep samples.
Complete DFR.
Return to office.

Next Steps & Recommendations

1 Send samples to lab

2 Confirm samples under area criteria

3 Schedule backfill

4 Close report

Sampling

BG19-01

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0.25 ft.	0.2 ppm	163 ppm	Low (30-600 ppm)	0 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56618304, -103.74265201	No

TP19-01

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0.5 ft.	2.9 ppm	114 ppm	Low (30-600 ppm)	0 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56606176, -103.74300410	Yes

Daily Site Visit Report

TP19-02

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0.5 ft.	44.7 ppm	2401 ppm	Low (30-600 ppm)	98 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56606984, -103.74292848	Yes

TP19-03

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0.5 ft.	9.2 ppm	132 ppm	Low (30-600 ppm)	137 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56604814, -103.74284835	Yes

TP19-04

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
1 ft.	34.4 ppm	131 ppm	Low (30-600 ppm)	328 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56605812, -103.74281649	Yes

Daily Site Visit Report

Site Photos

Viewing Direction: East	**Viewing Direction**: Southeast
	
Utility locate pothole Approximately 1-1.5 feet below surface	Berm removal for hydrovac to back as close into containment for boom to reach point of release

Viewing Direction: West	**Viewing Direction**: West
	
Excavated area	Excavated area

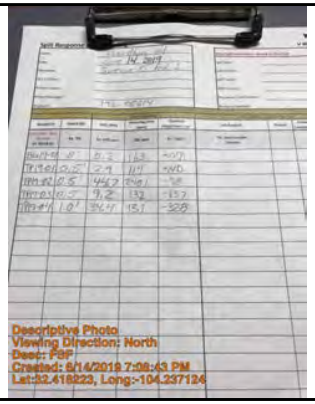
Daily Site Visit Report

Viewing Direction: East	**Viewing Direction**: East
	
Excavated area	Excavated area
Viewing Direction: East	**Viewing Direction**: South
	
Excavated area	Excavated area

Daily Site Visit Report

Viewing Direction: Southwest

Temporary berm and fence

Viewing Direction: North

FSF

Daily Site Visit Report

Depth Sample Photos

Sample Point ID: BG19-01

Depth: 0.25 ft.

Sample Point ID: TP19-01

Depth: 0.5 ft.

Sample Point ID: TP19-02

Depth: 0.5 ft.

Sample Point ID: TP19-03

Depth: 0.5 ft.

Daily Site Visit Report

Sample Point ID: TP19-04

Depth: 1 ft.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 
Signature

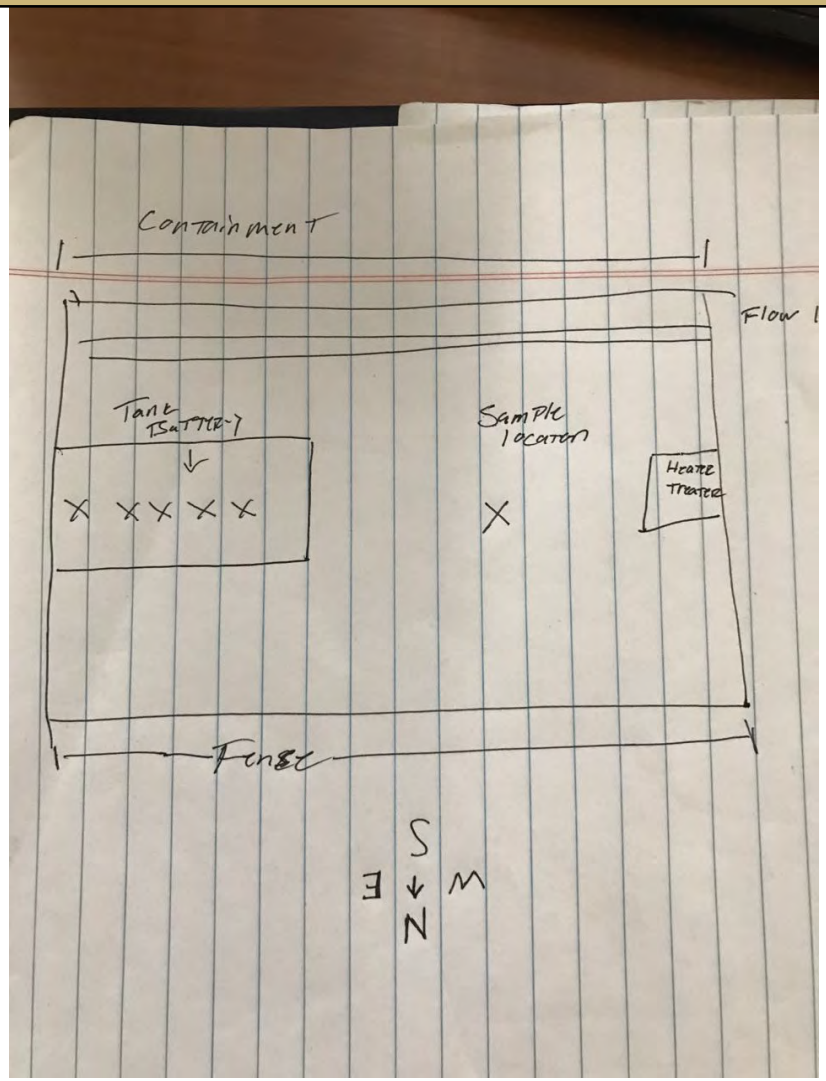
Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	10/29/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	10/31/2019 5:09 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Isaac Castro	Reference	Containment Spill
Client Contact Phone #:	(575) 988-0561		

Summary of Times	
Left Office	10/29/2019 2:30 PM
Arrived at Site	10/29/2019 3:15 PM
Departed Site	10/29/2019 3:30 PM
Returned to Office	10/29/2019 4:15 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

9:36 White lined spill, inside containment.

Next Steps & Recommendations

1 Call in 811

Daily Site Visit Report

Site Photos

Viewing Direction: South

Paint can represents hot sample location

Viewing Direction: West

Spill area, White can represents excavation location

Viewing Direction: East

Spill location, can marking hot sample spot

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Tommy Odell

Signature: 

Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	11/1/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	11/1/2019 9:59 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Isaac Castro	Reference	Containment Spill
Client Contact Phone #:	(575) 988-0561		

Summary of Times

Left Office	11/1/2019 7:15 AM
Arrived at Site	11/1/2019 8:49 AM
Departed Site	
Returned to Office	

Summary of Daily Operations

8:49 Remove contaminated soil, sample, load into truck, backfill with clean soil

Next Steps & Recommendations

1

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Tommy Odell

Signature:

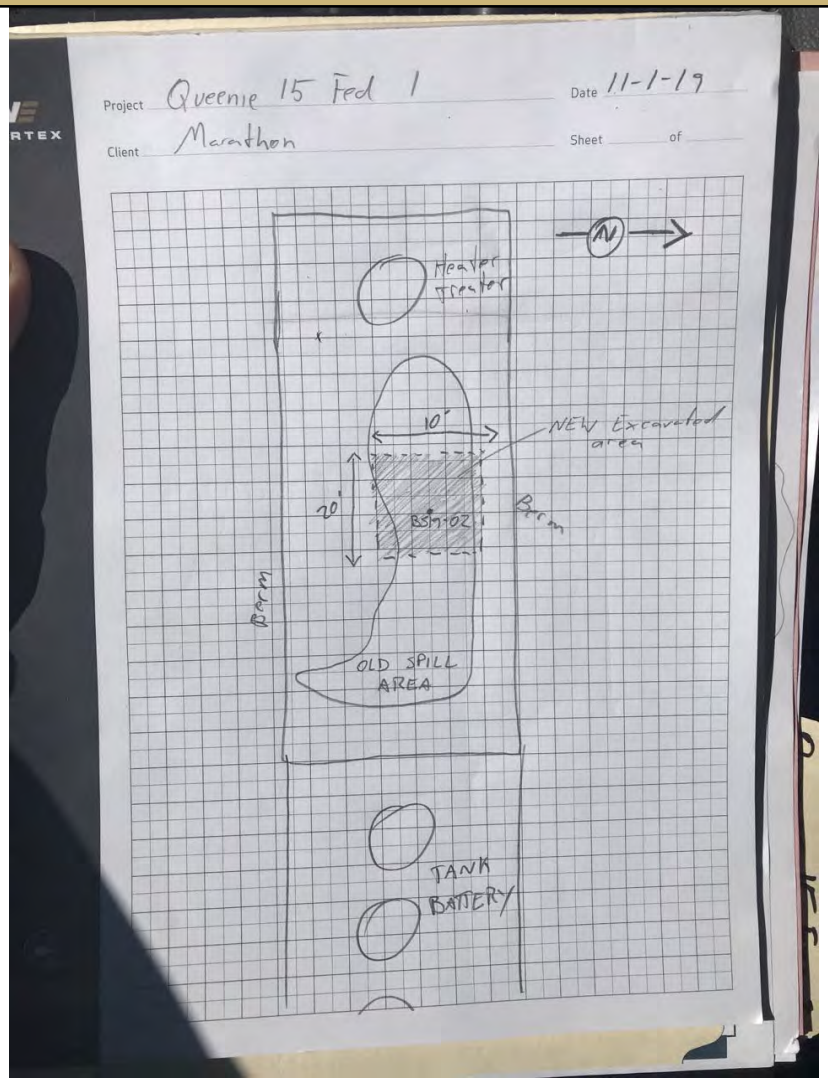
Daily Site Visit Report

Client:	Marathon Oil Permian LLC	Inspection Date:	11/1/2019
Site Location Name:	Queenie 15 Fed #1H	Report Run Date:	11/1/2019 11:35 PM
Project Owner:	Isaac Castro	File (Project) #:	19E-00614
Project Manager:	Dennis Williams	API #:	3002540230
Client Contact Name:	Isaac Castro	Reference	Containment Spill
Client Contact Phone #:	(575) 988-0561		

Summary of Times	
Left Office	11/1/2019 7:30 AM
Arrived at Site	11/1/2019 8:13 AM
Departed Site	11/1/2019 1:44 PM
Returned to Office	11/1/2019 2:31 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

10:21 Arrive on site.
Complete safety paperwork.
Complete excavation permit.
Excavate and re-obtain sample point 2 confirmatory.
Complete DFR.
Return to office.

Next Steps & Recommendations

1 Send sample to lab to confirm clean depth.

2 Backfill and close

Sampling

ES-Base19-02

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
1 ft.	0.5 ppm	62 ppm	Low (30-600 ppm)	277.5 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.56606114, -103.74290549	Yes

Daily Site Visit Report

Site Photos

Viewing Direction: West

Excavated area

Viewing Direction: East

Excavated area

Viewing Direction: West

Safety fence around excavation

Daily Site Visit Report

Depth Sample Photos

Sample Point ID: ES-Base19-02

Depth: 1 ft.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 
Signature

ATTACHMENT 5

Table 3. Confirmation Soil Sampling Results - Based on Depth to groundwater of >100 feet
Marathon Oil Permian, LLC
Queenie 15 Fed #001H
Project #: 19E-00614-008
Lab Report: 1906932

Sample Description			Field Screening			Petroleum Hydrocarbons												Inorganic
						Volatile							Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro	Quantab Result (High/Low)	Benzene	Toluene	Ethylbenzene	Xylenes (o&m)	Xylenes (p)	Xylenes (Total)	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	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)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BG 19-01	0.25	June 14, 2019	0.2	163	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND
TP 19-01	0.5	June 14, 2019	2.9	114	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND
TP 19-02	0.5	June 14, 2019	44.7	2,401	low	ND	ND	ND	-	-	0.18	0.18	11	750	ND	11	761	ND
TP 19-03	0.5	June 14, 2019	9.2	132	low	ND	ND	ND	-	-	ND	ND	14	ND	ND	14	14	110.0
TP 19-04	1	June 14, 2019	34.4	131	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	340.0

"-" - Not applicable/assessed

Bold and shaded indicates exceedance outside of applied action level

VERTEX

Table 4. Confirmation Soil Sampling Results - Based on Depth to groundwater of <50 feet
Marathon Oil Permian, LLC
Queenie 15 Fed #001H
Project #: 19E-00614-008
Lab Reports: 1906932 and 641864

Sample Description			Field Screening			Petroleum Hydrocarbons												Inorganic
						Volatile							Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (PetroFlag)	Quantab Result (High/Low)	Benzene	Toluene	Ethylbenzene	Xylenes (o&m)	Xylenes (p)	Xylenes (Total)	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	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)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BG 19-01	0.25	June 14, 2019	0.2	163	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND
TP 19-01	0.5	June 14, 2019	2.9	114	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND
TP 19-02	0.5	June 14, 2019	44.7	2,401	low	ND	ND	ND	-	-	0.18	0.18	11	750	ND	11	**761**	ND
TP 19-02	1	November 1, 2019	0.5	62	278	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	229.0
TP 19-03	0.5	June 14, 2019	9.2	132	low	ND	ND	ND	-	-	ND	ND	14	ND	ND	14	14	110.0
TP 19-04	1	June 14, 2019	34.4	131	low	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	340.0

"-" - Not applicable/assessed

Bold and shaded indicates exceedance outside of closure criteria

VERTEX

ATTACHMENT 6

From:	Dennis Williams
To:	James Amos; emnrd-ocd-district1spills@state.nm.us; jim.griswold@state.nm.us; R Mann (rmann@slo.state.nm.us)
Cc:	icastro@marathonoil.com; Karrigan, Callie N. (MRO); Dhugal Hanton; Kathlene Meadows
Subject:	Marathon Oil - Queenie 15 Federal #001 - Confirmatory sample notification - No RP number assigned
Date:	June 12, 2019 6:51:14 AM

Good morning All,

Please accept this email as 48hr notification that Vertex Resource Services Inc. has scheduled final confirmatory sampling at the above named location on June 14th 2019 at 1:00 PM. Austin Harris from Vertex will be on site performing the sampling and can be reached at (432)-250-5003. If you need assistance with directions to site please do not hesitate to contact them.

If you have any other questions or concerns, please do not hesitate to contact me.

Dennis Williams

Dennis Williams
Environmental Earthworks Advisor

Vertex Resource Group Ltd.
213 S. Mesa Street,
Carlsbad, NM 88220

P 575.645.3111 Ext. 701
C 575.361.1137
F

www.vertex.ca

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

June 25, 2019

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

RE: Queenie 15 Fed 1 OrderNo.: 1906932

Dear Dennis Williams:

Hall Environmental Analysis Laboratory received 5 sample(s) on 6/18/2019 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 **1906932**
Date Reported: **6/25/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Project: Queenie 15 Fed 1
Lab ID: 1906932-001 **Matrix:** SOIL

Client Sample ID: BG19-01 0.25'
Collection Date: 6/14/2019 3:00:00 PM
Received Date: 6/18/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	ND	60		mg/Kg	20	6/24/2019 6:40:29 PM	45776
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	6/20/2019 3:44:33 PM	45682
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	6/20/2019 3:44:33 PM	45682
Surr: DNOP	74.2	70-130		%Rec	1	6/20/2019 3:44:33 PM	45682
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/19/2019 7:20:20 PM	45636
Surr: BFB	102	73.8-119		%Rec	1	6/19/2019 7:20:20 PM	45636
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	6/19/2019 7:20:20 PM	45636
Toluene	ND	0.050		mg/Kg	1	6/19/2019 7:20:20 PM	45636
Ethylbenzene	ND	0.050		mg/Kg	1	6/19/2019 7:20:20 PM	45636
Xylenes, Total	ND	0.10		mg/Kg	1	6/19/2019 7:20:20 PM	45636
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	6/19/2019 7:20:20 PM	45636

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 **1906932**
Date Reported: **6/25/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Client Sample ID: TP19-01 0.5'
Project: Queenie 15 Fed 1
Collection Date: 6/14/2019 3:00:00 PM
Lab ID: 1906932-002 **Matrix:** SOIL **Received Date:** 6/18/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	ND	60		mg/Kg	20	6/24/2019 7:17:42 PM	45776
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	6/20/2019 4:50:51 PM	45682
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	6/20/2019 4:50:51 PM	45682
Surr: DNOP	90.9	70-130		%Rec	1	6/20/2019 4:50:51 PM	45682
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	6/19/2019 7:42:55 PM	45636
Surr: BFB	101	73.8-119		%Rec	1	6/19/2019 7:42:55 PM	45636
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	6/19/2019 7:42:55 PM	45636
Toluene	ND	0.048		mg/Kg	1	6/19/2019 7:42:55 PM	45636
Ethylbenzene	ND	0.048		mg/Kg	1	6/19/2019 7:42:55 PM	45636
Xylenes, Total	ND	0.096		mg/Kg	1	6/19/2019 7:42:55 PM	45636
Surr: 4-Bromofluorobenzene	97.4	80-120		%Rec	1	6/19/2019 7:42:55 PM	45636

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 **1906932**
Date Reported: **6/25/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Project: Queenie 15 Fed 1
Lab ID: 1906932-003 **Matrix:** SOIL

Client Sample ID: TP19-02 0.5'
Collection Date: 6/14/2019 3:00:00 PM
Received Date: 6/18/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	ND	60		mg/Kg	20	6/24/2019 7:30:07 PM	45776
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	750	98		mg/Kg	10	6/20/2019 5:13:10 PM	45682
Motor Oil Range Organics (MRO)	ND	490		mg/Kg	10	6/20/2019 5:13:10 PM	45682
Surr: DNOP	0	70-130	S	%Rec	10	6/20/2019 5:13:10 PM	45682
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	11	5.0		mg/Kg	1	6/20/2019 9:30:59 AM	45636
Surr: BFB	215	73.8-119	S	%Rec	1	6/20/2019 9:30:59 AM	45636
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	6/19/2019 8:05:46 PM	45636
Toluene	ND	0.050		mg/Kg	1	6/19/2019 8:05:46 PM	45636
Ethylbenzene	ND	0.050		mg/Kg	1	6/19/2019 8:05:46 PM	45636
Xylenes, Total	0.18	0.10		mg/Kg	1	6/19/2019 8:05:46 PM	45636
Surr: 4-Bromofluorobenzene	108	80-120		%Rec	1	6/19/2019 8:05:46 PM	45636

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 **1906932**
Date Reported: **6/25/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Project: Queenie 15 Fed 1
Lab ID: 1906932-004 **Matrix:** SOIL

Client Sample ID: TP19-03 0.5'
Collection Date: 6/14/2019 3:00:00 PM
Received Date: 6/18/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	110	60		mg/Kg	20	6/24/2019 7:42:31 PM	45776
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	14	9.8		mg/Kg	1	6/20/2019 5:35:23 PM	45682
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	6/20/2019 5:35:23 PM	45682
Surr: DNOP	96.3	70-130		%Rec	1	6/20/2019 5:35:23 PM	45682
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	6/19/2019 9:13:44 PM	45636
Surr: BFB	102	73.8-119		%Rec	1	6/19/2019 9:13:44 PM	45636
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	6/19/2019 9:13:44 PM	45636
Toluene	ND	0.049		mg/Kg	1	6/19/2019 9:13:44 PM	45636
Ethylbenzene	ND	0.049		mg/Kg	1	6/19/2019 9:13:44 PM	45636
Xylenes, Total	ND	0.098		mg/Kg	1	6/19/2019 9:13:44 PM	45636
Surr: 4-Bromofluorobenzene	98.6	80-120		%Rec	1	6/19/2019 9:13:44 PM	45636

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 **1906932**
Date Reported: **6/25/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Marathon Oil Company
Project: Queenie 15 Fed 1
Lab ID: 1906932-005 **Matrix:** SOIL

Client Sample ID: TP19-04 1.0'
Collection Date: 6/14/2019 3:00:00 PM
Received Date: 6/18/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	340	60		mg/Kg	20	6/24/2019 8:19:44 PM	45776
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	6/20/2019 5:57:47 PM	45682
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	6/20/2019 5:57:47 PM	45682
Surr: DNOP	102	70-130		%Rec	1	6/20/2019 5:57:47 PM	45682
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	6/19/2019 9:36:34 PM	45636
Surr: BFB	104	73.8-119		%Rec	1	6/19/2019 9:36:34 PM	45636
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	6/19/2019 9:36:34 PM	45636
Toluene	ND	0.050		mg/Kg	1	6/19/2019 9:36:34 PM	45636
Ethylbenzene	ND	0.050		mg/Kg	1	6/19/2019 9:36:34 PM	45636
Xylenes, Total	ND	0.099		mg/Kg	1	6/19/2019 9:36:34 PM	45636
Surr: 4-Bromofluorobenzene	98.3	80-120		%Rec	1	6/19/2019 9:36:34 PM	45636

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#: **1906932**

25-Jun-19

Client: Marathon Oil Company

Project: Queenie 15 Fed 1

Sample ID: **MB-45776**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **45776**	RunNo: **60890**							
Prep Date: **6/24/2019**	Analysis Date: **6/24/2019**	SeqNo: **2061472**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-45776**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **45776**	RunNo: **60890**							
Prep Date: **6/24/2019**	Analysis Date: **6/24/2019**	SeqNo: **2061473**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.4	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1906932**

25-Jun-19

Client: Marathon Oil Company

Project: Queenie 15 Fed 1

Sample ID: **LCS-45630** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **45630** RunNo: **60748**

Prep Date: **6/17/2019** Analysis Date: **6/19/2019** SeqNo: **2056656** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	7.5		5.000		150	70	130			S

Sample ID: **LCS-45682** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **45682** RunNo: **60748**

Prep Date: **6/19/2019** Analysis Date: **6/20/2019** SeqNo: **2058091** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	104	63.9	124			
Surr: DNOP	4.6		5.000		92.6	70	130			

Sample ID: **MB-45682** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **PBS** Batch ID: **45682** RunNo: **60748**

Prep Date: **6/19/2019** Analysis Date: **6/20/2019** SeqNo: **2058092** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	70	130			

Sample ID: **1906932-001AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **BG19-01 0.25'** Batch ID: **45682** RunNo: **60748**

Prep Date: **6/19/2019** Analysis Date: **6/20/2019** SeqNo: **2058707** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	49.95	0	94.6	57	142			
Surr: DNOP	3.4		4.995		68.2	70	130			S

Sample ID: **1906932-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **BG19-01 0.25'** Batch ID: **45682** RunNo: **60748**

Prep Date: **6/19/2019** Analysis Date: **6/20/2019** SeqNo: **2058708** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	9.9	49.60	0	105	57	142	9.64	20	
Surr: DNOP	3.5		4.960		71.6	70	130	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1906932**

25-Jun-19

Client: Marathon Oil Company

Project: Queenie 15 Fed 1

Sample ID: **MB-45636** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **PBS** Batch ID: **45636** RunNo: **60770**

Prep Date: **6/17/2019** Analysis Date: **6/19/2019** SeqNo: **2056901** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1000		1000		104	73.8	119			

Sample ID: **LCS-45636** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **LCSS** Batch ID: **45636** RunNo: **60770**

Prep Date: **6/17/2019** Analysis Date: **6/19/2019** SeqNo: **2056902** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	99.1	80.1	123			
Surr: BFB	1100		1000		114	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical 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#: **1906932**

25-Jun-19

Client: Marathon Oil Company

Project: Queenie 15 Fed 1

Sample ID: **MB-45636** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **PBS** Batch ID: **45636** RunNo: **60770**

Prep Date: **6/17/2019** Analysis Date: **6/19/2019** SeqNo: **2056931** Units: **mg/Kg**

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

Sample ID: **LCS-45636** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **45636** RunNo: **60770**

Prep Date: **6/17/2019** Analysis Date: **6/19/2019** SeqNo: **2056932** 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	102	80	120			
Toluene	1.0	0.050	1.000	0	103	80	120			
Ethylbenzene	1.0	0.050	1.000	0	103	80	120			
Xylenes, Total	3.0	0.10	3.000	0	99.9	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		110	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: 1906932 RcptNo: 1

Received By: Jevon Campisi 6/18/2019 9:15:00 AM Jevon Campisi

Completed By: Leah Baca 6/18/2019 12:01:49 PM Leah Baca

Reviewed By: DAD 6/18/19

Chain of Custody

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

Log In

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

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

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.0	Good	Yes			

Chain-of-Custody Record

Client: Marathon Oil

Mailing Address: 4111 S. TIDWELL RD. Carlsbad NM 88220

Phone #: ~~575-361-11~~ 575-988-0561

email or Fax#: lcastro@marathon.com

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 day TurN
☑ Standard ☐ Rush

Project Name: Queenie 15 Fed 1

Project #: 19E-00614

Project Manager: Dennis Williams
Dwilliams@vertex.ca
Permian@vertex.ca

Sampler: Austin Harris

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 0.3 - 0.3CF = 0.0°C (not frozen)

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. 1906932	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)
6-14-19	3pm	Soil	BG19-01 0.25'	14oz g	ICE	-001	X	X					X			
6-14-19		Soil	TP19-01 0.5'			-002	X	X					X			
6-14-19		Soil	TP19-02 0.5'			-003	X	X					X			
6-14-19		Soil	TP19-03 0.5'			-004	X	X					X			
6-14-19		Soil	TP19-04 1.0'			-005	X	X					X			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
15-0619	12p				6/15/19	1200
6/17/19	190			Courier	6-18-19	9:15

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.

Analytical Report 641864

for

Vertex

Project Manager: Natalie Gordon

Queenie 15 Fed 1H

19E-00614-008

06-NOV-19

Collected By: Client

1089 N Canal Street
Carlsbad, NM 88220

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-19-30), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2019-058), North Carolina (681), Arkansas (19-037-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (TX104704295-19-22), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-19-16)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-19-21)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-19)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-19-5)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Tampa: Florida (E87429), North Carolina (483)

06-NOV-19

Project Manager: **Natalie Gordon**
Vertex
6012 W. Campus Circle Drive, Suite 220
Irving, TX 75063

Reference: XENCO Report No(s): **641864**
Queenie 15 Fed 1H
Project Address:

Natalie Gordon:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 641864. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 641864 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Jessica Kramer

Jessica Kramer
Project Assistant

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.
Certified and approved by numerous States and Agencies.
A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America

Sample Cross Reference 641864

Vertex, Irving, TX

Queenie 15 Fed 1H

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
BS19-02 1.0'	S	11-01-19 10:00	1.0 ft	641864-001

CASE NARRATIVE

Client Name: Vertex

Project Name: Queenie 15 Fed 1H

Project ID: *19E-00614-008*
Work Order Number(s): *641864*

Report Date: *06-NOV-19*
Date Received: *11/01/2019*

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3106313 BTEX by EPA 8021B
Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Batch: LBA-3106427 Chloride by EPA 300
Lab Sample ID 641864-001 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 641864-001.
The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3106525 TPH by SW8015 Mod
Surrogate 1-Chlorooctane, Surrogate o-Terphenyl recovered below QC limits. Matrix interferences is suspected; data confirmed by re-analysis.
Samples affected are: 641864-001.

Certificate of Analysis Summary 641864

Vertex, Irving, TX

Project Name: Queenie 15 Fed 1H

Project Id: 19E-00614-008
Contact: Natalie Gordon
Project Location:

Date Received in Lab: Fri Nov-01-19 02:41 pm
Report Date: 06-NOV-19
Project Manager: Jessica Kramer

Analysis Requested							
	Lab Id:	641864-001					
	Field Id:	BS19-02 1.0'					
	Depth:	1.0- ft					
	Matrix:	SOIL					
	Sampled:	Nov-01-19 10:00					
BTEX by EPA 8021B	***Extracted:***	Nov-01-19 15:11					
	Analyzed:	Nov-02-19 03:57					
	Units/RL:	mg/kg RL					
Benzene		U 0.00101					
Toluene		U 0.00101					
Ethylbenzene		U 0.00101					
m,p-Xylenes		U 0.00202					
o-Xylene		U 0.00101					
Total Xylenes		U 0.00101					
Total BTEX		U 0.00101					
Chloride by EPA 300	***Extracted:***	Nov-04-19 11:11					
	Analyzed:	Nov-04-19 17:23					
	Units/RL:	mg/kg RL					
Chloride		229 9.94					
TPH By SW8015 Mod	***Extracted:***	Nov-04-19 17:00					
	Analyzed:	Nov-05-19 14:58					
	Units/RL:	mg/kg RL					
Gasoline Range Hydrocarbons (GRO)		U 49.9					
Diesel Range Organics (DRO)		U 49.9					
Motor Oil Range Hydrocarbons (MRO)		U 49.9					
Total TPH		U 49.9					

Jessica Kramer
Project Assistant

Certificate of Analytical Results 641864

Vertex, Irving, TX

Queenie 15 Fed 1H

Sample Id:	**BS19-02 1.0'**	Matrix:	Soil	Date Received:	11.01.19 14.41
Lab Sample Id:	641864-001	Date Collected:	11.01.19 10.00	Sample Depth:	1.0 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	11.04.19 11.11	Basis:	Wet Weight
Seq Number:	3106427				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**229**	9.94	mg/kg	11.04.19 17.23		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	11.04.19 17.00	Basis:	Wet Weight
Seq Number:	3106525				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	U	49.9	mg/kg	11.05.19 14.58	U	1
Diesel Range Organics (DRO)	C10C28DRO	U	49.9	mg/kg	11.05.19 14.58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	U	49.9	mg/kg	11.05.19 14.58	U	1
Total TPH	PHC635	U	49.9	mg/kg	11.05.19 14.58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	62	%	70-135	11.05.19 14.58	**
o-Terphenyl	84-15-1	63	%	70-135	11.05.19 14.58	**

Certificate of Analytical Results 641864

Vertex, Irving, TX

Queenie 15 Fed 1H

Sample Id:	**BS19-02 1.0'**	Matrix:	Soil	Date Received:	11.01.19 14.41
Lab Sample Id:	641864-001	Date Collected:	11.01.19 10.00	Sample Depth:	1.0 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	11.01.19 15.11	Basis:	Wet Weight
Seq Number:	3106313				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	U	0.00101	mg/kg	11.02.19 03.57	U	1
Toluene	108-88-3	U	0.00101	mg/kg	11.02.19 03.57	U	1
Ethylbenzene	100-41-4	U	0.00101	mg/kg	11.02.19 03.57	U	1
m,p-Xylenes	179601-23-1	U	0.00202	mg/kg	11.02.19 03.57	U	1
o-Xylene	95-47-6	U	0.00101	mg/kg	11.02.19 03.57	U	1
Total Xylenes	1330-20-7	U	0.00101	mg/kg	11.02.19 03.57	U	1
Total BTEX		U	0.00101	mg/kg	11.02.19 03.57	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	115	%	70-130	11.02.19 03.57	
1,4-Difluorobenzene	540-36-3	102	%	70-130	11.02.19 03.57	

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

QC Summary 641864

Vertex

Queenie 15 Fed 1H

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3106427 — Matrix: Solid — Date Prep: 11.04.19
MB Sample Id: 7689529-1-BLK — LCS Sample Id: 7689529-1-BKS — LCSD Sample Id: 7689529-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	230	92	230	92	90-110	0	20	mg/kg	11.04.19 15:48	

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3106427 — Matrix: Soil — Date Prep: 11.04.19
Parent Sample Id: 641852-001 — MS Sample Id: 641852-001 S — MSD Sample Id: 641852-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	3.13	199	247	123	246	121	90-110	0	20	mg/kg	11.04.19 16:06	X

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3106427 — Matrix: Soil — Date Prep: 11.04.19
Parent Sample Id: 641864-001 — MS Sample Id: 641864-001 S — MSD Sample Id: 641864-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	229	198	467	120	492	132	90-110	5	20	mg/kg	11.04.19 17:29	X

Analytical Method: TPH By SW8015 Mod — Prep Method: SW8015P
Seq Number: 3106525 — Matrix: Solid — Date Prep: 11.04.19
MB Sample Id: 7689591-1-BLK — LCS Sample Id: 7689591-1-BKS — LCSD Sample Id: 7689591-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.0	1000	878	88	807	81	70-135	8	35	mg/kg	11.04.19 15:09	
Diesel Range Organics (DRO)	<50.0	1000	1070	107	938	94	70-135	13	35	mg/kg	11.04.19 15:09	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		106		96		70-135	%	11.04.19 15:09
o-Terphenyl	103		108		97		70-135	%	11.04.19 15:09

Analytical Method: TPH By SW8015 Mod — Prep Method: SW8015P
Seq Number: 3106525 — Matrix: Solid — Date Prep: 11.04.19
MB Sample Id: 7689591-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	U	mg/kg	11.04.19 14:48	

MS/MSD Percent Recovery — [D] = 100*(C-A) / B — LCS = Laboratory Control Sample — MS = Matrix Spike
Relative Percent Difference — RPD = 200* | (C-E) / (C+E) | — A = Parent Result — B = Spike Added
LCS/LCSD Recovery — [D] = 100 * (C) / [B] — C = MS/LCS Result — D = MSD/LCSD % Rec
Log Difference — Log Diff. = Log(Sample Duplicate) - Log(Original Sample) — E = MSD/LCSD Result

QC Summary 641864

Vertex

Queenie 15 Fed 1H

Analytical Method: TPH By SW8015 Mod — Prep Method: SW8015P
Seq Number: 3106525 — Matrix: Soil — Date Prep: 11.04.19
Parent Sample Id: 641907-019 — MS Sample Id: 641907-019 S — MSD Sample Id: 641907-019 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<50.1	1000	1150	115	1010	101	70-135	13	35	mg/kg	11.04.19 16:20	
Diesel Range Organics (DRO)	21.8	1000	1350	133	1180	116	70-135	13	35	mg/kg	11.04.19 16:20	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	134		136	**	70-135	%	11.04.19 16:20
o-Terphenyl	123		131		70-135	%	11.04.19 16:20

Analytical Method: BTEX by EPA 8021B — Prep Method: SW5030B
Seq Number: 3106313 — Matrix: Solid — Date Prep: 11.01.19
MB Sample Id: 7689516-1-BLK — LCS Sample Id: 7689516-1-BKS — LCSD Sample Id: 7689516-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00100	0.100	0.101	101	0.0911	91	70-130	10	35	mg/kg	11.01.19 23:38	
Toluene	<0.00100	0.100	0.101	101	0.0915	92	70-130	10	35	mg/kg	11.01.19 23:38	
Ethylbenzene	<0.00100	0.100	0.104	104	0.0944	94	71-129	10	35	mg/kg	11.01.19 23:38	
m,p-Xylenes	<0.00200	0.200	0.210	105	0.192	96	70-135	9	35	mg/kg	11.01.19 23:38	
o-Xylene	<0.00100	0.100	0.106	106	0.0977	98	71-133	8	35	mg/kg	11.01.19 23:38	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	99		99		99		70-130	%	11.01.19 23:38
4-Bromofluorobenzene	111		110		111		70-130	%	11.01.19 23:38

Analytical Method: BTEX by EPA 8021B — Prep Method: SW5030B
Seq Number: 3106313 — Matrix: Soil — Date Prep: 11.01.19
Parent Sample Id: 641842-001 — MS Sample Id: 641842-001 S — MSD Sample Id: 641842-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00101	0.101	0.0815	81	0.0930	93	70-130	13	35	mg/kg	11.02.19 00:19	
Toluene	<0.00101	0.101	0.0807	80	0.0922	92	70-130	13	35	mg/kg	11.02.19 00:19	
Ethylbenzene	<0.00101	0.101	0.0825	82	0.0943	94	71-129	13	35	mg/kg	11.02.19 00:19	
m,p-Xylenes	<0.00202	0.202	0.167	83	0.191	95	70-135	13	35	mg/kg	11.02.19 00:19	
o-Xylene	<0.00101	0.101	0.0844	84	0.0966	97	71-133	13	35	mg/kg	11.02.19 00:19	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	100		104		70-130	%	11.02.19 00:19
4-Bromofluorobenzene	113		118		70-130	%	11.02.19 00:19

MS/MSD Percent Recovery — [D] = 100*(C-A) / B — LCS = Laboratory Control Sample — MS = Matrix Spike
Relative Percent Difference — RPD = 200* | (C-E) / (C+E) | — A = Parent Result — B = Spike Added
LCS/LCSD Recovery — [D] = 100 * (C) / [B] — C = MS/LCS Result — D = MSD/LCSD % Rec
Log Difference — Log Diff. = Log(Sample Duplicate) - Log(Original Sample) — E = MSD/LCSD Result

Chain of Custody

XENCO LABORATORIES

Houston,TX (281) 240-4200 Dallas,TX (214) 902-0300 San Antonio,TX (210) 509-3334
Midland,TX (432) 704-5440 EL Paso,TX (915) 585-3443 Lubbock,TX (806) 794-1296 Crasbad, NM (432) 704-5440
Phoenix,AZ (480) 355-0900 Atlanta,GA (770) 449-8800 Tampa,FL (813) 620-2000 West Palm Beach, FL (561) 689-6701 www.xenco.com Page _____ of _____

Work Order No: 641 0164

Project Manager:	Natalie Gordon	**Bill to:** (if different)	
Company Name:	VERTEX RESOURCE SERVICES	**Company Name:**	
Address:	213 S MESA ST	**Address:**	
City, State ZIP:	CARLSBAD NM 88220	**City, State ZIP:**	
Phone:		**Email:**	PERMIAN@VERTEX.CA

Work Order Comments

Program: UST/PST ☐ PRP ☐ Brownfields ☐ RRC ☐ Superfund ☐
State of Project:
Reporting:Level II ☐ Level III ☐ PST/UST ☐ TRRP ☐ Level IV ☐
Deliverables: EDD ☐ ADaPT ☐ Other:

Project Name:	QUEENIE IS FEDIH	**Turn Around**	
Project Number:	19E-00014-008	Routine ☒	
Project Location		Rush:	
Sampler's Name:	AUSTIN HARRIS	Due Date:	
PO #:		**Quote #:**	

SAMPLE RECEIPT			
Temp Blank:	Yes No	**Wet Ice:**	~~Yes~~ No
Temperature (°C):	13.0	**Thermometer ID**	T-NM-007
Received Intact:	Yes No		
Cooler Custody Seals:	Yes No N/A	**Correction Factor:**	-0.2
Sample Custody Seals:	Yes No N/A	**Total Containers:**	1

Preservative Codes

MeOH: Me
None: NO
HNO3: HN
H2S04: H2
HCL: HL
NaOH: Na
Zn Acetate+ NaOH: Zn

TAT starts the day recevied by the lab, if received by 4:00pm

Lab ID	Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Number of Containers	BTEX 8021	TPH 8015	Cl E300	Sample Comments
	BS19-02 1.0'	S	11/1	10:00	1.0	1	X	X	X	

Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Tl Sn U V Zn
Circle Method(s) and Metal(s) to be analyzed **TCLP / SPLP 6010**: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl U **1631 / 245.1 / 7470 / 7471** : Hg

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Xenco. A minimum charge of $75.00 will be applied to each project and a charge of $5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

	Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1			11/1 /14:41	2		
3				4		
5				6		

Revised Date 022619 Rev. 2019.1

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Vertex

Date/ Time Received: 11.01.2019 02.41.00 PM

Work Order #: 641864

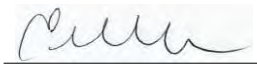
Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : T-NM-007

Sample Receipt Checklist		Comments
#1 *Temperature of cooler(s)?	13	
#2 *Shipping container in good condition?	**Yes**	
#3 *Samples received on ice?	**Yes**	Additional cooling process began at lab after receipt and processing of samples
#4 *Custody Seals intact on shipping container/ cooler?	**Yes**	
#5 Custody Seals intact on sample bottles?	**Yes**	
#6*Custody Seals Signed and dated?	**Yes**	
#7 *Chain of Custody present?	**Yes**	
#8 Any missing/extra samples?	**No**	
#9 Chain of Custody signed when relinquished/ received?	**Yes**	
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**	
#11 Container label(s) legible and intact?	**Yes**	
#12 Samples in proper container/ bottle?	**Yes**	
#13 Samples properly preserved?	**Yes**	
#14 Sample container(s) intact?	**Yes**	
#15 Sufficient sample amount for indicated test(s)?	**Yes**	
#16 All samples received within hold time?	**Yes**	
#17 Subcontract of sample(s)?	**No**	
#18 Water VOC samples have zero headspace?	**N/A**	

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by:  Date: 11.04.2019
Elizabeth McClellan

Checklist reviewed by:  Date: 11.05.2019
Martha Castro

ATTACHMENT 8

From: Hamlet, Robert, EMNRD <Robert.Hamlet@state.nm.us>
Sent: Thursday, October 17, 2019 1:20 PM
To: Castro, Isaac (MRO) <icastro@marathonoil.com>
Cc: Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Venegas, Victoria, EMNRD <Victoria.Venegas@state.nm.us>; blm_nm_cfo_spill@blm.gov
Subject: [External] Closure Denied - Marathon - Queenie 15 Fed #1H - (1RP-5563) 6-8-2019

Beware of links/attachments.

Isaac,

We have received your closure report and final C-141 for **1RP-5563 Queenie 15 Fed #1H**, thank you. This closure is denied.

The depth in the report was determined to be 185 ft below ground water surface (bgs). The NM OCD environmental map doesn't have any well data with ½ mile radius. The Lea County Chevron map is showing <50 ft. The New Mexico Office of the State Engineer database isn't showing any water depth within a ½ mile radius. The release will need to be remediated <50 ft. Chlorides are under 600 mg/kg for all sample points. The only sample point location that is over the 100 mg/kg limit for TPH is TP19-02 @ 0.5 ft, which is 761 mg/kg. Please excavate sample point location TP19-02 @ 0.5 ft until it is under the 100 mg/kg limit for TPH.

Please let me know if you have any further questions.

Thank you,