January 20, 2020 Vertex Project #: 19E-00575-020

Spill Closure Report: Apache 25 Fed #006
Unit P, Section 25, Township 22 South, Range 30 East
County: Eddy
API: 30-015-29894
Tracking Number: NAB1927637713

Prepared For: Devon Energy Production Company
6488 Seven Rivers HWY
Artesia, New Mexico 88210

New Mexico Oil Conservation Division – District 2 – Artesia
811 South First Street
Artesia, New Mexico 88210

Devon Energy Production Company (Devon) retained Vertex Resource Services Inc. (Vertex) to conduct a spill assessment and remediation for an oil release that occurred at Apache 25 Fed #006, API 30-015-29894 (hereafter referred to as "Apache"). Devon provided notification of the spill to New Mexico Oil Conservation Division (NM OCD) District 2, and the Bureau of Land Management (BLM), via submission of an initial C-141 Release Notification (Attachment 1) on August 27, 2019. The tracking number for this incident is NAB1927637713.

This letter provides a description of the spill assessment and remediation activities, and demonstrates that closure criteria established in 19.15.29.12 *New Mexico Administrative Code (*NMAC) have been met and all applicable regulations are being followed. This document is intended to serve as a final report to obtain approval from NM OCD for closure of this release, with the understanding that any restoration of the site required as a result of this incident will be deferred until such time as oil and gas activities are terminated and the site is reclaimed per 19.15.29.13 NMAC.

Incident Description

On August 23, 2019, a release occurred at Devon's Apache site when a polish rod liner came lose causing a spill on location. This incident resulted in the release of approximately 7.7 barrels (bbls) of oil onto the wellpad. No oil was released into undisturbed areas or waterways. Upon discovery of the release, a hydrovac truck was dispatched to the site to recover free liquids. Approximately 4 bbls of oil were recovered from the spill area and removed for disposal off-site.

Site Characterization

The release at Apache occurred on federally owned land, N 32.3567047, W 103.8266754, approximately 23 miles east of Carlsbad, New Mexico. The legal description for the site is Unit P, Section 25, Township 22 South, Range 30 East, Eddy County, New Mexico. This location is within the Permian Basin in southeast New Mexico and has historically been used for oil and gas exploration and production, and rangeland. An aerial photograph and site schematic are included in Attachment 2.

Apache 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 north-central portion of the constructed wellpad where the pumpjack is located.

The surrounding landscape has historically been associated with plains and alluvial fans at elevations of 2,000 to 5,700 feet above sea level. The plant community has the aspect of a grassland/shrub mix, dominated by dropseed grass species, bluestems and threeawns, with scattered shinnery oak and soapweed yucca, and a semiarid climate with average annual precipitation ranging between 10 and 14 inches. Bare ground and litter make up a significant portion of the ground cover (United States Department of Agriculture, Natural Resources Conservation Service, 2019). Limited to no vegetation is allowed to grow on the compacted production wellpad.

The Geological Map of New Mexico indicates the surface geology at Apache is comprised primarily of Qep – interlayed eolian sands and piedmont-slope deposits from the Holocene to middle Pleistocene ages (New Mexico Bureau of Geology and Mineral Resources, 2019). The National Resource Conservation Service (NRCS) Web Soil Survey characterizes the soil at the site as on the cusp of Kermit-Berino fine sands and Berino complex, predominantly found on plains, and comprised of fine sand over deep layers of sandy clay loam and loamy sand. It tends to be well-drained with low runoff and moderate available moisture levels in the soil profile (United States Department of Agriculture, Natural Resources Conservation Service, 2019). There is low potential for karst geology to be present near Apache (United States Department of the Interior, Bureau of Land Management, 2019).

There is no surface water located on-site. The nearest significant watercourse, as defined in Subsection P of 19.15.17.7 NMAC, is an intermittent stream located approximately 4.5 miles west of the site (Google Earth Pro, 2019). There are no 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 nearest active well to the site is a New Mexico Office of the State Engineer (NM OSE)-identified well from 1994 located approximately 1.4 miles east (New Mexico Office of the State Engineer, New Mexico Water Rights Reporting System, 2019). Depth to groundwater at this well is 413 feet below ground surface (bgs). The shallowest depth to groundwater identified in the vicinity is a 2013 United States Geological Survey (USGS) well located approximately 1.8 miles south of the site with a depth of 144 feet bgs (United States Department of the Interior, United States Geological Survey 2019). Documentation pertaining to site characterization and depth to groundwater determination is included in Attachment 3.

Closure Criteria Determination

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

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

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

[1] Total petroleum hydrocarbons (TPH) = gasoline range organics (GRO) + diesel range organics (DRO) + motor oil range organics (MRO)

[2] Benzene, toluene, ethylbenzene and xylenes (BTEX)

Remedial Actions

An initial spill inspection, completed on August 27, 2019, identified and mapped the boundaries of the spill. The release area, including the impacted areas around the pumpjack and wellhead, was determined to be approximately 142 feet by 92 feet; the total affected area was determined to be approximately 5,257 square feet. Site characterization efforts were completed on September 5, 2019, in order to further delineate the area of contamination requiring cleanup and develop an excavation plan. The Daily Field Reports (DFR) associated with the site inspection and subsequent site visits are included in Attachment 4.

On October 24, 2019, Vertex provided 48-hour notification of confirmation sampling to NM OCD District 2 and the BLM, as required by Subparagraph (a) of Paragraph (1) of Subsection D 19.15.29.12 NMAC (Attachment 5). On October 26, 2019, Vertex was on-site to conduct spill remediation and confirmatory sampling. Vertex collected 23 composite confirmatory soil samples, each representative of no more than 200 square feet per the alternate sampling method outlined in Subparagraph (c) of Paragraph (1) of Subsection D 19.15.29.12 NMAC, which does not require prior NM OCD approval. The composite samples were placed into laboratory-provided containers, preserved on ice, and submitted to a National Environmental Laboratory Accreditation Program (NELAP)-approved laboratory for chemical analysis.

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

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

Laboratory analyses indicated that several confirmatory samples did not meet NM OCD closure criteria and additional excavation for the site was needed. On November 18, 2019, Vertex provided a second 48-hour notification for the new round of confirmatory sampling that was planned following additional remediation on-site (Attachment 5). Additional excavation began on November 21, 2019, and was completed on November 25, 2019. Composite confirmatory samples were re-collected from the locations that had exceeded NM OCD closure criteria and were submitted for laboratory

analysis per the methods described above. The final confirmatory sample analytical data are summarized in Attachment 6 and laboratory data reports and chain of custody forms are included in Attachment 7.

Closure Request

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

The spill area was excavated, sampled and has been backfilled with clean material to the extent necessary. As the release occurred on an active wellpad, Vertex requests that restoration and reclamation of the spill area be deferred until such time as the wellpad is removed and the pad is reclaimed per 19.15.29.13 NMAC.

Vertex requests that this incident (NAB1927637713) be closed as all closure requirements set forth in Subsection E of 19.15.29.12 and Subsections A to D of 19.15.29.13 NMAC have been met. Devon certifies that all information in this report and the attachments is correct and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NM OCD requirements to obtain closure on the August 23, 2019 release at Apache 25 Fed #006.

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

Sincerely,

Natalie Gordon
PROJECT MANAGER

Attachments

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

References

Chevron Texaco. (2005). *Eddy Co. Depth to Ground Water, Water Wells, Facilities.*

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

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

New Mexico Office of the State Engineer, New Mexico Water Rights Reporting System. (2019). *Well Log/Meter Information Report.* Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/meterReport.html.

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

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

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

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

Limitations

This report has been prepared for the sole benefit of Devon Energy Production Company. 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 Devon Energy Production Company. 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 C381E-190913-C-1410

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		

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: _____

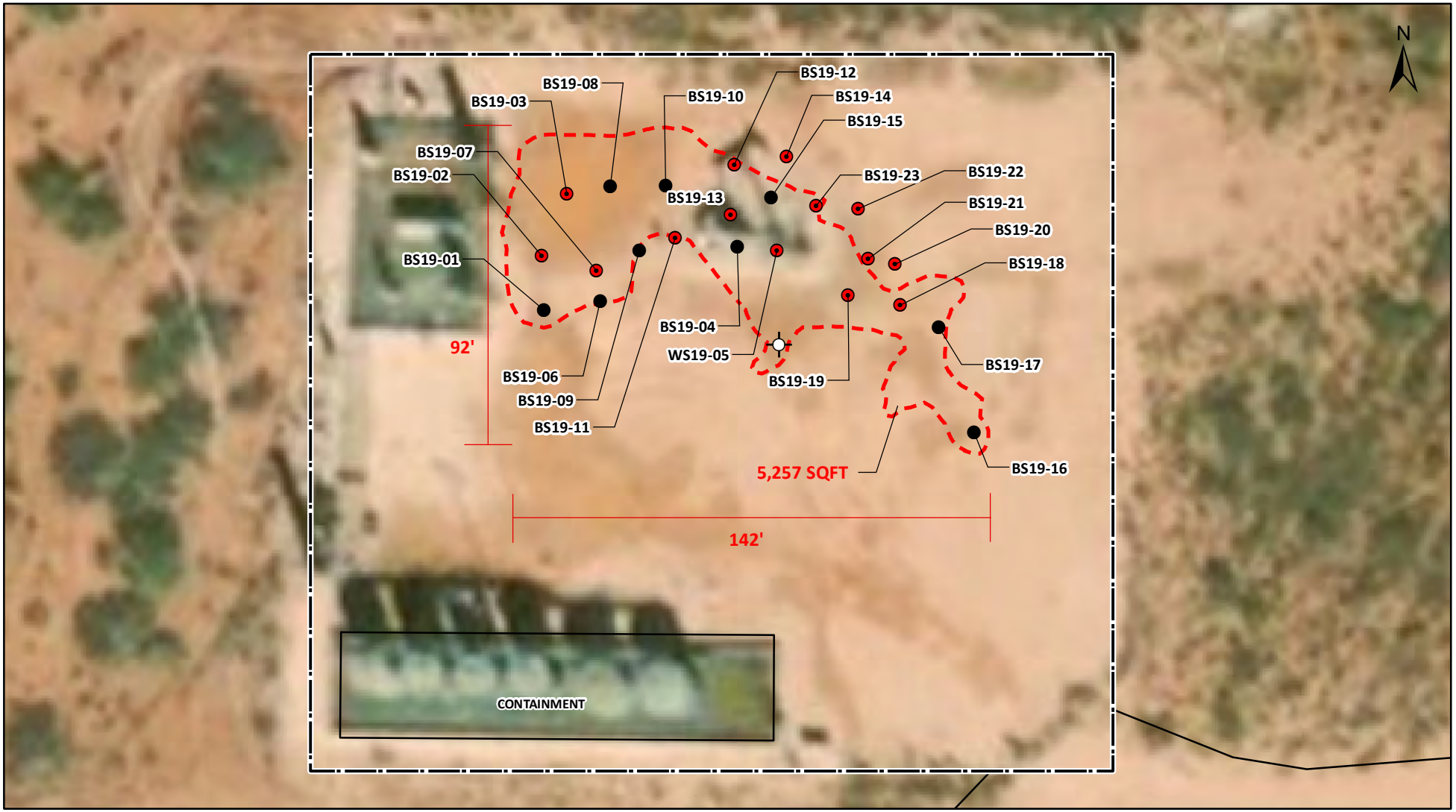
Signature: Kendra DeHoyos Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

ATTACHMENT 2



LEGEND

- NO EXCEEDANCE TO CLOSURE CRITERIA
- EXCEEDANCE TO CLOSURE CRITERIA
- WELLHEAD
- WELLPAD
- ROAD
- SPILL AREA

BG BACKGROUND SAMPLE
BS BASE SAMPLE
WS WALL SAMPLE

0 25 50 100 ft

SCALE 1:500

Notes: Aerial Image from ESRI Digital Globe 2016

devon

Site Schematic and Confirmatory Sample Locations
Apache 25 Federal #006

VERTEX

DRAWN:	NM
APPROVED:	NG
DATE:	NOV 8/19

FIGURE: 1

VERSATILITY. EXPERTISE.

ATTACHMENT 3

Table 1.			
Site Name: Apache 25 Fed #6			
Spill Coordinates:		**32.3567047**	**-103.8266754**
Site Specific Conditions		**Value**	**Unit**
1	Depth to Groundwater	**144**	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	610	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	28,402	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	15,357	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**	7,392	feet
	ii) Within 1000 feet of any fresh water well or spring	7,392	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	6,706	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	Undetermined Shaded Zone D	year
NMAC 19.15.29.12 E (Table 1) Closure Criteria		>100'	<50' 51-100' >100'

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	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
C 03932 POD8	CUB	LE	4	2	4	07	24S	34E	641120	3566769	1983	72		
C 03943 POD1	CUB	LE	2	4	2	21	24S	34E	644523	3564266	2653	610	431	179
C 03666 POD1	C	LE	2	3	4	13	24S	33E	639132	3565078	2834	650	390	260
C 02309	CUB	LE	2	2	2	25	24S	33E	639638	3562994*	3056	60	30	30
C 03932 POD13	CUB	LE	4	2	3	15	24S	34E	645314	3565203	3356	90		
C 03917 POD1	C	LE	4	1	3	13	24S	33E	638374	3565212	3599	600	420	180
C 03932 POD3	CUB	LE	4	3	2	05	24S	34E	642442	3568787	3841	100		
C 03601 POD1	CUB	LE	4	4	2	23	24S	33E	638124	3563937	3978			
C 02373	CUB	LE		4	1	32	24S	34E	641979	3560916*	4059	600		
C 03600 POD2	CUB	LE	4	4	1	25	24S	33E	638824	3562329	4106			
C 03602 POD2	CUB	LE	4	4	1	25	24S	33E	638824	3562329	4106			
C 03601 POD3	CUB	LE	1	3	3	24	24S	33E	638142	3563413	4130			
C 04014 POD1	CUB	LE	1	1	3	06	24S	34E	639811	3568638	4249	91	81	10
C 03601 POD5	CUB	LE	2	4	4	23	24S	33E	637988	3563334	4301			
C 03601 POD2	CUB	LE	3	2	4	23	24S	33E	637846	3563588	4346			
C 04339 POD9	CUB	LE	3	4	2	23	24S	33E	637731	3563913	4365	45		
C 03601 POD7	CUB	LE	4	4	4	23	24S	33E	637946	3563170	4405			
C 03601 POD6	CUB	LE	1	4	4	23	24S	33E	637834	3563338	4443			
C 04339 POD10	CUB	LE	4	1	4	23	24S	33E	637688	3563503	4523	49		
C 04014 POD2	CUB	LE	4	4	2	01	24S	33E	639656	3568917	4568	95	81	14
C 03662 POD1	C	LE	3	1	2	23	24S	33E	637342	3564428	4655	550	110	440
C 04339 POD6	CUB	LE	3	1	2	23	24S	33E	637340	3564386	4662	60		
C 04339 POD5	CUB	LE	2	3	4	23	24S	33E	637580	3563328	4684	54		
C 04014 POD4	CUB	LE	3	4	2	01	24S	33E	639295	3568859	4713	96	86	10
C 04014 POD3	CUB	LE	2	4	2	01	24S	33E	639497	3569007	4727	95	87	8
C 02386	CUB	LE	4	1	2	04	24S	34E	643962	3569290*	4754	575	475	100

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

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

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

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Code	Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
C 02397		CUB	LE	4	1	2	04	24S	34E	643962	3569290*	4754	575	475	100
C 04014 POD5		CUB	LE	1	4	2	01	24S	33E	639284	3569086	4907	95	85	10
C 03600 POD3		CUB	LE	3	4	2	26	24S	33E	637784	3562340	4941			
C 03620 POD1		CUB	LE	1	4	3	32	23S	34E	641790	3569941	4969	480	130	350
C 04339 POD3		CUB	LE	2	4	3	23	24S	33E	637273	3563323	4974	38		
C 04339 POD4		CUB	LE	2	4	3	23	24S	33E	637273	3563323	4974	47		

Average Depth to Water: **221 feet**
Minimum Depth: **30 feet**
Maximum Depth: **475 feet**

Record Count: 32

UTMNAD83 Radius Search (in meters):

Easting (X): 641965.17 **Northing (Y):** 3564975.43 **Radius:** 5000

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

U.S. Fish and Wildlife Service

National Wetlands Inventory

Apache 25 Fed 6 wash 8,968ft

August 27, 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.

Help Using this Too

Legend | Basemap | Query

1:18,056

Legend

All Layers On/Off

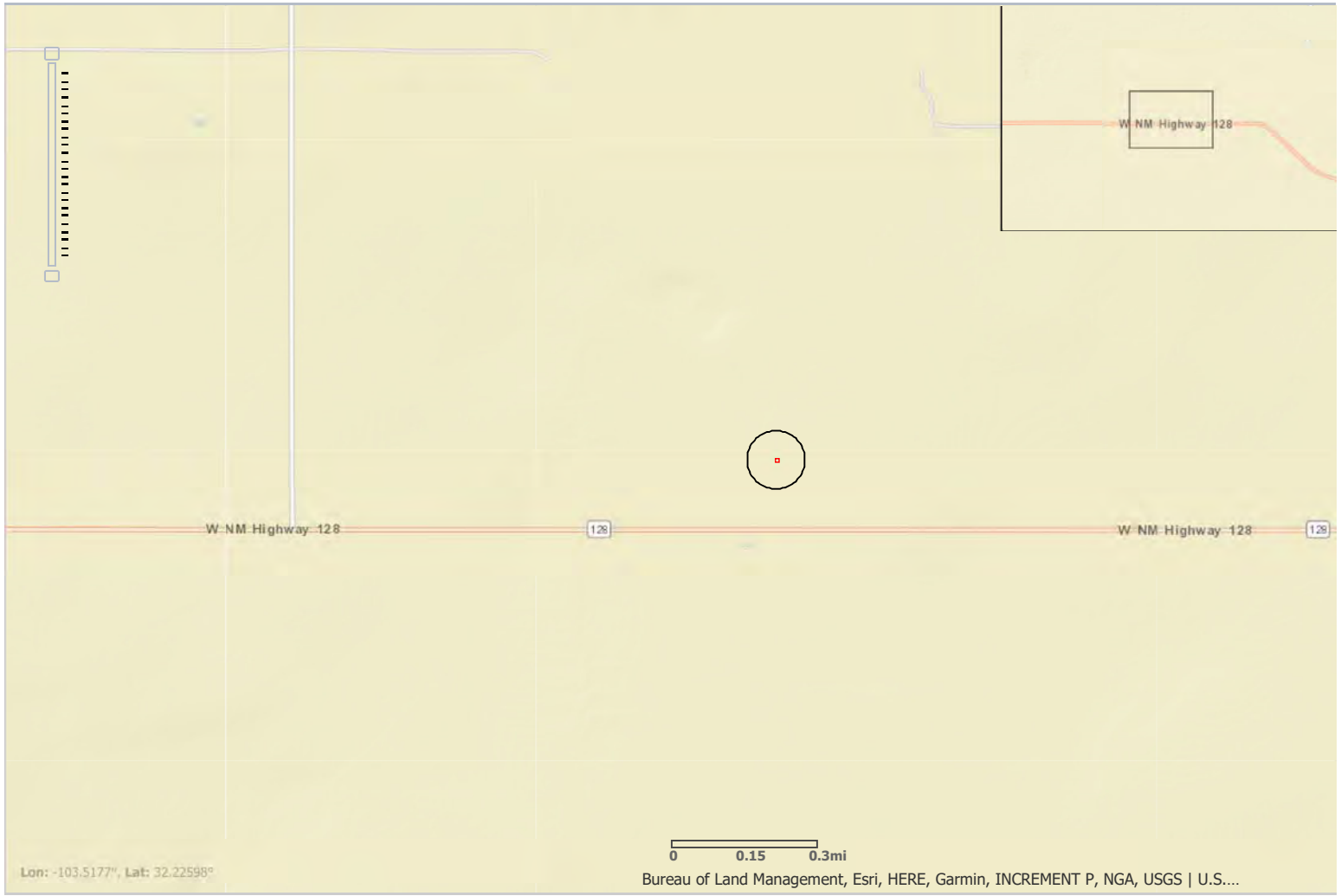
All Layer Transparency

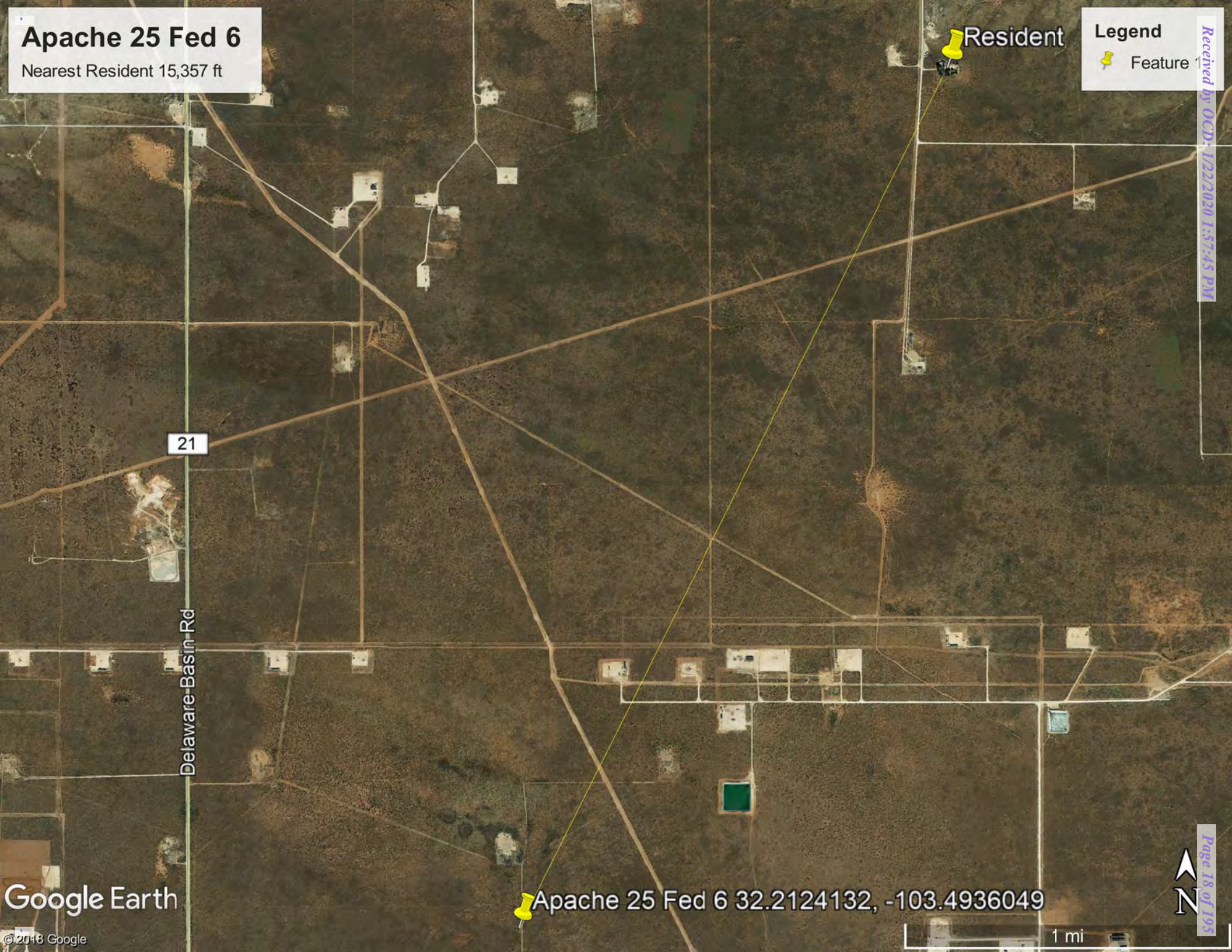
- Roads
- Counties
- Air Emissions
- Air Facilities
- APS Food Facilities
- Dairies
- Brownfields
- Ground Water Discharge Permits
- State Cleanup Program
- Voluntary Remediation Program
- Superfund Sites
- Drinking Water Sources
- Hazardous Waste Facilities
- Landfills
- Petroleum Storage Tanks
- Leaking Tank Sites
- NPDES Permits
- Water Quality Stations
- Nonpoint Source Program
- Impaired Waters
- Assessed Waters
- National Hydrography Dataset

National Hydrography Dataset

Points

- Gaging Station
- Rapids





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
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD9					4 3 3	08	24S	34E	641622	3566525	1587
					LE	C 03932 POD15					1 1 4	19	24S	34E	640660	3563857	1717
					LE	C 03932 POD8					4 2 4	07	24S	34E	641120	3566769	1983
					LE	C 03932 POD10					4 4 3	07	24S	34E	640623	3566514	2041
					LE	C 03932 POD7					4 1 3	08	24S	34E	641616	3567025	2079
C 03927	CUB	EXP	0	BERT MADERA	LE	C 03927 POD1			NON		4 2 4	13	24S	33E	639601	3565269	2382
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD6					1 1 4	07	24S	34E	640617	3567013	2443
C 03902	CUB	EXP	0	BRYCE KARGER	LE	C 03902 POD1					4 1 2	08	24S	34E	642088	3567579	2607
C 03943	CUB	EXP	0	GREGORY ROCKHOUSE RANCH INC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 03946	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 03947	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 03948	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 04088	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 04089	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 04090	C	PRO	0	COG OPERATING LLC	LE	C 03943 POD1			NON	Shallow	2 4 2	21	24S	34E	644522	3564266	2653
C 03666	C	SAN	1	LUCID ENERGY DELAWARE LLC	LE	C 03666 POD1				Shallow	2 3 4	13	24S	33E	639132	3565078	2834
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD14					4 3 3	15	24S	34E	644841	3564948	2876
					LE	C 03932 POD11					1 2 4	15	24S	34E	644834	3565448	2908

(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 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance
C 02309	CUB	STK	3	NGL WATER SOLUTIONS PERMIAN	LE	C 02309					2	2	2	25	24S	33E	639638	3562994*	3056
C 03902	CUB	EXP	0	BRYCE KARGER	LE	C 03902 POD2					4	1	2	09	24S	34E	643697	3567598	3143
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD4					1	3	4	05	24S	34E	642197	3568285	3317
					LE	C 03932 POD13			NON		4	2	3	15	24S	34E	645314	3565203	3356
					LE	C 03932 POD5					2	4	4	05	24S	34E	642697	3568290	3395
C 04303	C	DOM	1	DARWIN DELGADO	LE	C 04303 POD1	221D9				1	1	2	22	24S	24E	645372	3564694	3419
C 03902	CUB	EXP	0	BRYCE KARGER	LE	C 03902 POD4					4	1	2	15	24S	34E	645327	3566008	3517
C 03917	C	DOM	1	NGL WATER SOLUTIONS PERMIAN	LE	C 03917 POD1	NA		NON	Shallow	4	1	3	13	24S	33E	638373	3565212	3599
C 04192	C	PRO	0	ANNETTE MCCLOY	LE	C 03917 POD1	NA		NON	Shallow	4	1	3	13	24S	33E	638373	3565212	3599
C 04193	C	PRO	0	ANNETTE MCCLOY	LE	C 03917 POD1	NA		NON	Shallow	4	1	3	13	24S	33E	638373	3565212	3599
C 04194	C	PRO	0	ANNETTE MCCLOY	LE	C 03917 POD1	NA		NON	Shallow	4	1	3	13	24S	33E	638373	3565212	3599
C 03602	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03602 POD1					2	2	1	25	24S	33E	638799	3563040	3710
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD3			NON		4	3	2	05	24S	34E	642442	3568787	3841
					LE	C 03932 POD12					1	2	4	15	24S	34E	645834	3565459	3899
C 03601	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03601 POD1				Shallow	4	4	2	23	24S	33E	638124	3563937	3978
C 03580	CUB	EXP	0	INTERCONTINENTAL POTASH CORP	LE	C 03580 POD2						3	1	24	24S	33E	638123	3563932	3981
C 02336	C	PRO	0	ENRON OIL AND GAS COMPANY	LE	C 02373				Shallow		4	1	32	24S	34E	641979	3560916*	4059
C 02373	CUB	COM	25	ENRON OIL & GAS COMPANY	LE	C 02373				Shallow		4	1	32	24S	34E	641979	3560916*	4059
C 03600	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03600 POD2				Shallow	4	4	1	25	24S	33E	638824	3562329	4106
C 03602	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03602 POD2				Shallow	4	4	1	25	24S	33E	638824	3562329	4106
C 03601	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03601 POD3				Shallow	1	3	3	24	24S	33E	638141	3563413	4130
C 04014	CUB	MON	0	ENERGY TRANSFER COMPANY	LE	C 04014 POD1			NON	Shallow	1	1	3	06	24S	34E	639811	3568638	4249

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

(acre ft per annum)

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(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 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance
C 03601	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03601 POD5				Shallow	2	4	4	23	24S	33E	637988	3563334	4301
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD1					3	1	2	05	24S	34E	642186	3569284	4314
C 03601	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03601 POD2				Shallow	3	2	4	23	24S	33E	637846	3563588	4346
C 04339	CUB	MON	0	OWL LANDFILL SERVICES LLC	LE	C 04339 POD9	NA				3	4	2	23	24S	33E	637730	3563913	4365
C 03932	CUB	EXP	0	BRYCE KARGER	LE	C 03932 POD2					4	2	2	05	24S	34E	642686	3569290	4374
C 03601	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03601 POD7				Shallow	4	4	4	23	24S	33E	637946	3563170	4405
					LE	C 03601 POD6				Shallow	1	4	4	23	24S	33E	637833	3563338	4443
C 04339	CUB	MON	0	OWL LANDFILL SERVICES LLC	LE	C 04339 POD10	NA				4	1	4	23	24S	33E	637687	3563503	4523
C 04014	CUB	MON	0	TRANSWESTERN PIPELINE CO LLC	LE	C 04014 POD2			NON	Shallow	4	4	2	01	24S	33E	639655	3568917	4568
C 04282	C	SAN	1	KAISER FRANCIS OIL COMPANY	LE	C 04282 POD1	2215A				1	2	1	05	24S	34E	641662	3569541	4576
C 03662	C	DOL	3	MARK MCCLOY (M&M RANCH)	LE	C 03662 POD1				Shallow	3	1	2	23	24S	33E	637342	3564428	4655
C 03727	C	PRO	0	MARK MCCLOY	LE	C 03662 POD1				Shallow	3	1	2	23	24S	33E	637342	3564428	4655
C 03728	C	PRO	0	MARK MCCLOY	LE	C 03662 POD1				Shallow	3	1	2	23	24S	33E	637342	3564428	4655
C 03729	C	PRO	0	MARK MCCLOY	LE	C 03662 POD1				Shallow	3	1	2	23	24S	33E	637342	3564428	4655
C 04339	CUB	MON	0	GORDON ENVIRONMENTAL/PSC	LE	C 04339 POD6	NA				3	1	2	23	24S	33E	637340	3564386	4662
					LE	C 04339 POD5					2	3	4	23	24S	33E	637579	3563328	4684
C 04014	CUB	MON	0	ENERGY TRANSFER COMPANY	LE	C 04014 POD4			NON	Shallow	3	4	2	01	24S	33E	639295	3568859	4713
					LE	C 04014 POD3			NON	Shallow	2	4	2	01	24S	33E	639497	3569007	4727
C 02386	CUB	PDM	3	GENERAL COUNSEL OFFICE	LE	C 02386				Shallow	4	1	2	04	24S	34E	643962	3569290*	4754
C 02397	CUB	COM	30	GENERAL COUNSEL	LE	C 02397				Shallow	4	1	2	04	24S	34E	643962	3569290*	4754
C 02549	C	MUL	3	QUAIL RANCH LLC	LE	C 02397				Shallow	4	1	2	04	24S	34E	643962	3569290*	4754
C 04014	CUB	MON	0	TRANSWESTERN PIPELINE CO LLC	LE	C 04014 POD5			NON	Shallow	1	4	2	01	24S	33E	639284	3569086	4907

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

(acre ft per annum)

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(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 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance
C 03564	C	STK	3	LIMESTONE BASIN PROPERTIES	LE	C 03564 POD1				3	3	4	31	23S	34E	640513	3569695	4938
C 03600	CUB	GEO	0	INTERCONTINENTAL POTASH CORP	LE	C 03600 POD3			Shallow	3	4	2	26	24S	33E	637784	3562340	4941
C 02581	C	PRO	3	LIMESTONE BASIN PROPERTIES	LE	C 02581					4	4	31	23S	34E	641168	3569852	4942
C 03182	C	PRO	0	KAISER FRANCIS OIL COMPANY	LE	C 02581					4	4	31	23S	34E	641168	3569852	4942
C 03236	C	PRO	0	CHESAPEAKE OPERATING	LE	C 02581					4	4	31	23S	34E	641168	3569852	4942
C 03306	C	PRO	0	BOLD ENERGY	LE	C 02581					4	4	31	23S	34E	641168	3569852	4942
C 03356	C	PRO	0	NOVA MUD	LE	C 02581					4	4	31	23S	34E	641168	3569852	4942
C 03620	CUB	EXP	0	LIMESTONE LIVESTOCK LLC	LE	C 03620 POD1			Shallow	1	4	3	32	23S	34E	641790	3569941	4969
C 04339	CUB	MON	0	OWL LANDFILL SERVICES LLC	LE	C 04339 POD3	NA			2	4	3	23	24S	33E	637273	3563323	4974
					LE	C 04339 POD4				2	4	3	23	24S	33E	637273	3563323	4974

Record Count: 72

UTMNAD83 Radius Search (in meters):

Easting (X): 641965.17 **Northing (Y):** 3564975.43 **Radius:** 5000

Sorted by: Distance

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 q q 6416	4	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
C 03932 POD8	CUB	LE		4 2	4	07	24S	34E	641120	3566769	1983	02/08/2016	02/09/2016	03/01/2016	72		LEE PETERSON	1222
C 03943 POD1	CUB	LE	Shallow	2 4	2	21	24S	34E	644523	3564266	2653	04/21/2016	04/24/2016	04/25/2016	610	431	JUSTIN MULLINS	1737
C 03666 POD1	C	LE	Shallow	2 3	4	13	24S	33E	639132	3565078	2834	10/18/2013	10/26/2013	11/14/2013	650	390	CASEY KEYS	1058
C 03932 POD13	CUB	LE		4 2	3	15	24S	34E	645314	3565203	3356	02/10/2016	02/11/2016	03/01/2016	90		LEE PETERSON	1222
C 03917 POD1	C	LE	Shallow	4 1	3	13	24S	33E	638374	3565212	3599	03/01/2016	03/04/2016	03/11/2016	600	420	CASE KEY	1058
C 03932 POD3	CUB	LE		4 3	2	05	24S	34E	642442	3568787	3841	02/09/2016	02/10/2016	03/01/2016	100		LEE PETERSON	1222
C 03601 POD1	CUB	LE	Shallow	4 4	2	23	24S	33E	638124	3563937	3978	12/21/2012	12/21/2012	01/08/2013			RODNEY HAMMER	1186
C 03600 POD2	CUB	LE	Shallow	4 4	1	25	24S	33E	638824	3562329	4106	01/07/2013	01/08/2013	01/30/2013			RODNEY HAMMER	1186
C 03602 POD2	CUB	LE	Shallow	4 4	1	25	24S	33E	638824	3562329	4106	01/15/2013	01/15/2013	01/30/2013			RODNEY HAMMER	1186
C 03601 POD3	CUB	LE	Shallow	1 3	3	24	24S	33E	638142	3563413	4130	01/06/2013	01/06/2013	01/30/2013			RODNEY HAMMER	1186
C 04014 POD1	CUB	LE	Shallow	1 1	3	06	24S	34E	639811	3568638	4249	02/13/2017	02/17/2017	03/03/2017	91	81	HAMMER, RODNEY	1186
C 03601 POD5	CUB	LE	Shallow	2 4	4	23	24S	33E	637988	3563334	4301	01/06/2013	01/06/2013	01/30/2013			RODNEY HAMMER	1186
C 03601 POD2	CUB	LE	Shallow	3 2	4	23	24S	33E	637846	3563588	4346	01/06/2013	01/07/2013	01/30/2013			RODNEY HAMMER	1186
C 04339 POD9	CUB	LE		3 4	2	23	24S	33E	637731	3563913	4365	08/01/2019	08/01/2019	08/22/2019	45		CURRIE, SHANEG..TY" ENER	1575
C 03601 POD7	CUB	LE	Shallow	4 4	4	23	24S	33E	637946	3563170	4405	01/05/2013	01/05/2013	01/30/2013			RODNEY HAMMER	1186
C 03601 POD6	CUB	LE	Shallow	1 4	4	23	24S	33E	637834	3563338	4443	01/05/2013	01/05/2013	01/30/2013			RODNEY HAMMER	1186

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

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(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	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
C 04339 POD10	CUB	LE		4	1	4	23	24S	33E	637688	3563503	4523	08/01/2019	08/01/2019	08/22/2019	49		CURRIE, SHANEG..TY" ENER	1575
C 04014 POD2	CUB	LE	Shallow	4	4	2	01	24S	33E	639656	3568917	4568	02/13/2017	02/17/2017	03/03/2017	95	81	HAMMER, RODNEY	1186
C 03662 POD1	C	LE	Shallow	3	1	2	23	24S	33E	637342	3564428	4655	08/19/2013	08/20/2013	09/16/2013	550	110	JOHN SIRMAN	1654
C 04339 POD6	CUB	LE		3	1	2	23	24S	33E	637340	3564386	4662	07/31/2019	07/31/2019	08/22/2019	60		CURRIE, SHANEG..TY" ENER	1575
C 04339 POD5	CUB	LE		2	3	4	23	24S	33E	637580	3563328	4684	08/06/2019	08/07/2019	08/22/2019	54		CURRIE, SHANEG..TY" ENER	1575
C 04014 POD4	CUB	LE	Shallow	3	4	2	01	24S	33E	639295	3568859	4713	02/13/2017	02/17/2017	03/03/2017	96	86	HAMMER, RODNEY	1186
C 04014 POD3	CUB	LE	Shallow	2	4	2	01	24S	33E	639497	3569007	4727	02/13/2017	02/17/2017	03/03/2017	95	87	HAMMER, RODNEY	1186
C 04014 POD5	CUB	LE	Shallow	1	4	2	01	24S	33E	639284	3569086	4907	02/13/2017	02/17/2017	03/03/2017	95	85	HAMMER, RODNEY	1186
C 03600 POD3	CUB	LE	Shallow	3	4	2	26	24S	33E	637784	3562340	4941	01/16/2013	01/16/2013	01/30/2013			RODNEY HAMMER	1186
C 03620 POD1	CUB	LE	Shallow	1	4	3	32	23S	34E	641790	3569941	4969	04/10/2013	04/29/2013	06/18/2013	480	130	NORRIS, JOHN D. (LD)	1682
C 04339 POD3	CUB	LE		2	4	3	23	24S	33E	637273	3563323	4974	08/06/2019	08/06/2019	08/22/2019	38		CURRIE, SHANEG..TY" ENER	1575
C 04339 POD4	CUB	LE		2	4	3	23	24S	33E	637273	3563323	4974	08/06/2019	08/07/2019	08/22/2019	47		CURRIE, SHANEG..TY" ENER	1575

Record Count: 28

UTMNAD83 Radius Search (in meters):

Easting (X): 641965.17 **Northing (Y):** 3564975.43 **Radius:** 5000

U.S. Fish and Wildlife Service
National Wetlands Inventory

Apache 25 Fed 6 Wetland 5,013 ft

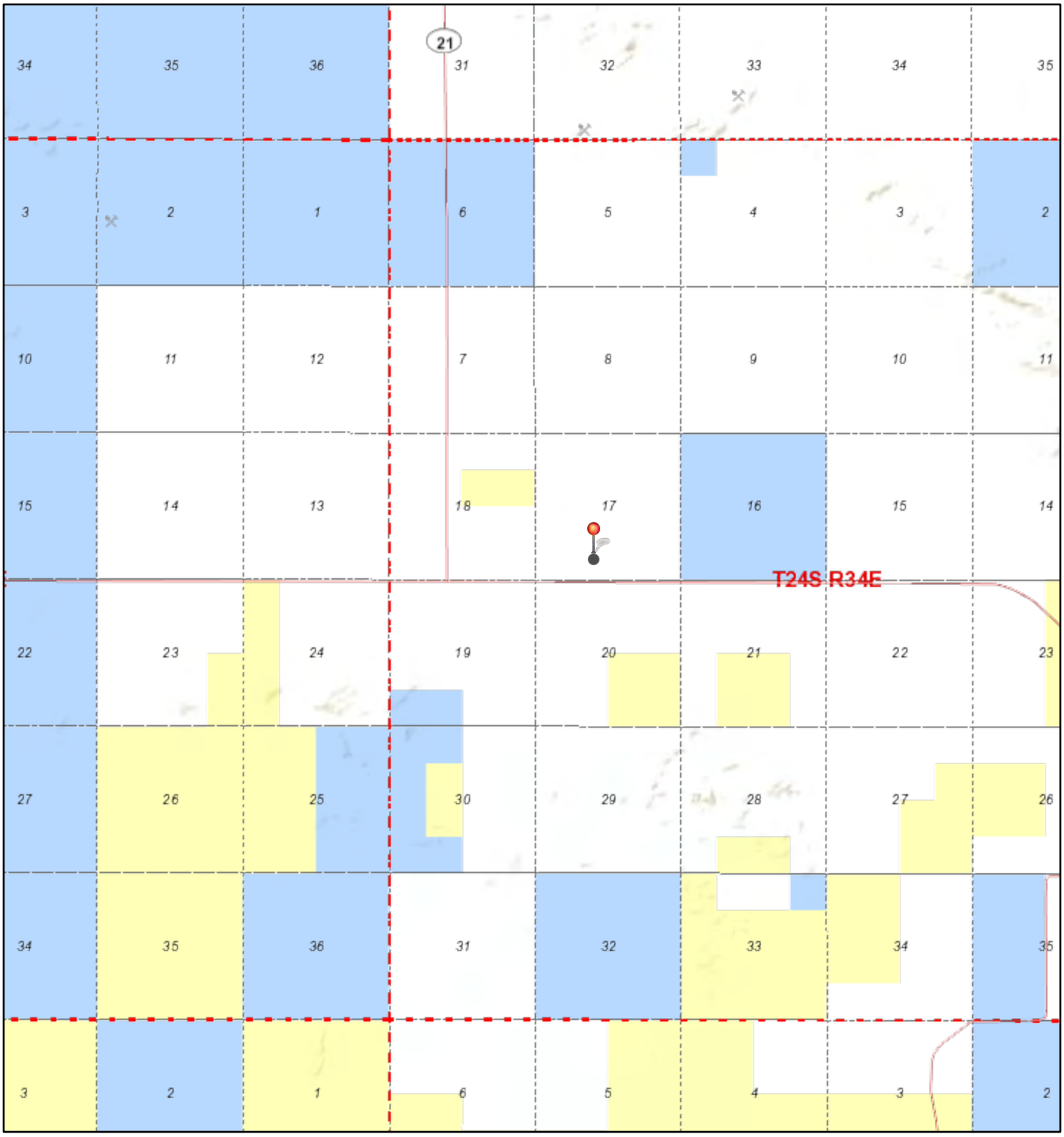
August 27, 2019

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.

Active Mines in New Mexico



8/27/2019 3:45:15 PM

1:72,224

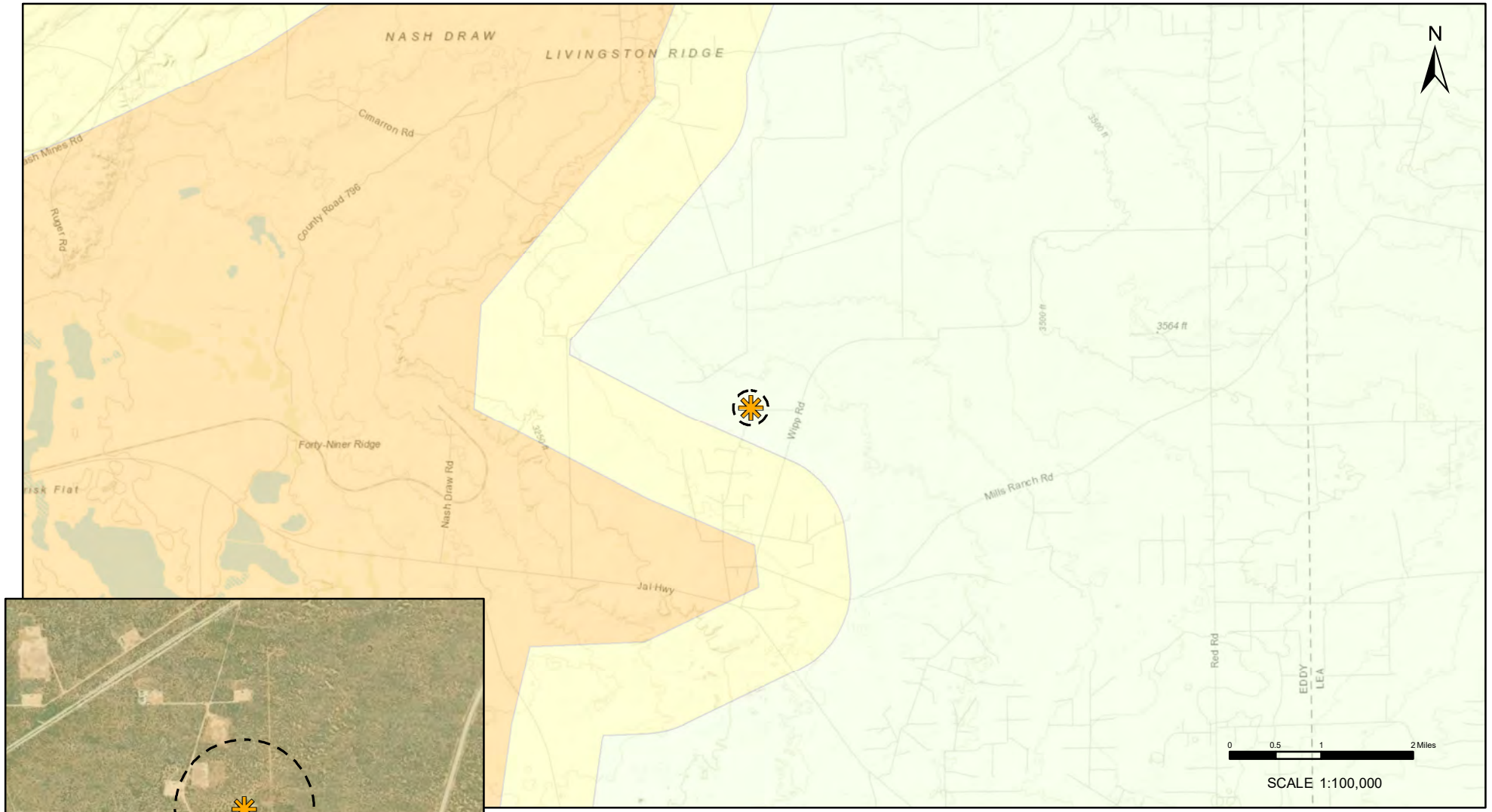
0 0.5 1 2 mi

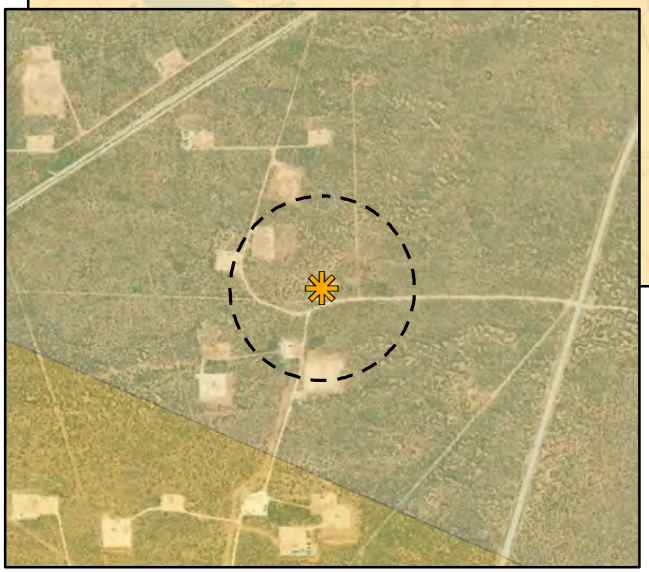
0 0.75 1.5 3 km

Registered Mines

Aggregate, Stone etc.

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





LEGEND

SITE

1000FT BUFFER

KARST POTENTIAL

CRITICAL

HIGH

MEDIUM

LOW

Notes: Aerial Image from ESRI Digital Globe 2018

devon

Karst Potential
Apache 25 Federal
#006

VERTEX

DRAWN:	NM
APPROVED:	KM
DATE:	AUG 28/19

FIGURE: 1

VERSATILITY. EXPERTISE.

National Flood Hazard Layer FIRMette

FEMA

32°12'59.91"N

103°29'55.71"W

103°29'18.25"W

32°12'29.47"N

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

1:6,000

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/27/2019 at 6:46:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

United States Department of Agriculture

NRCS

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

August 27, 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.

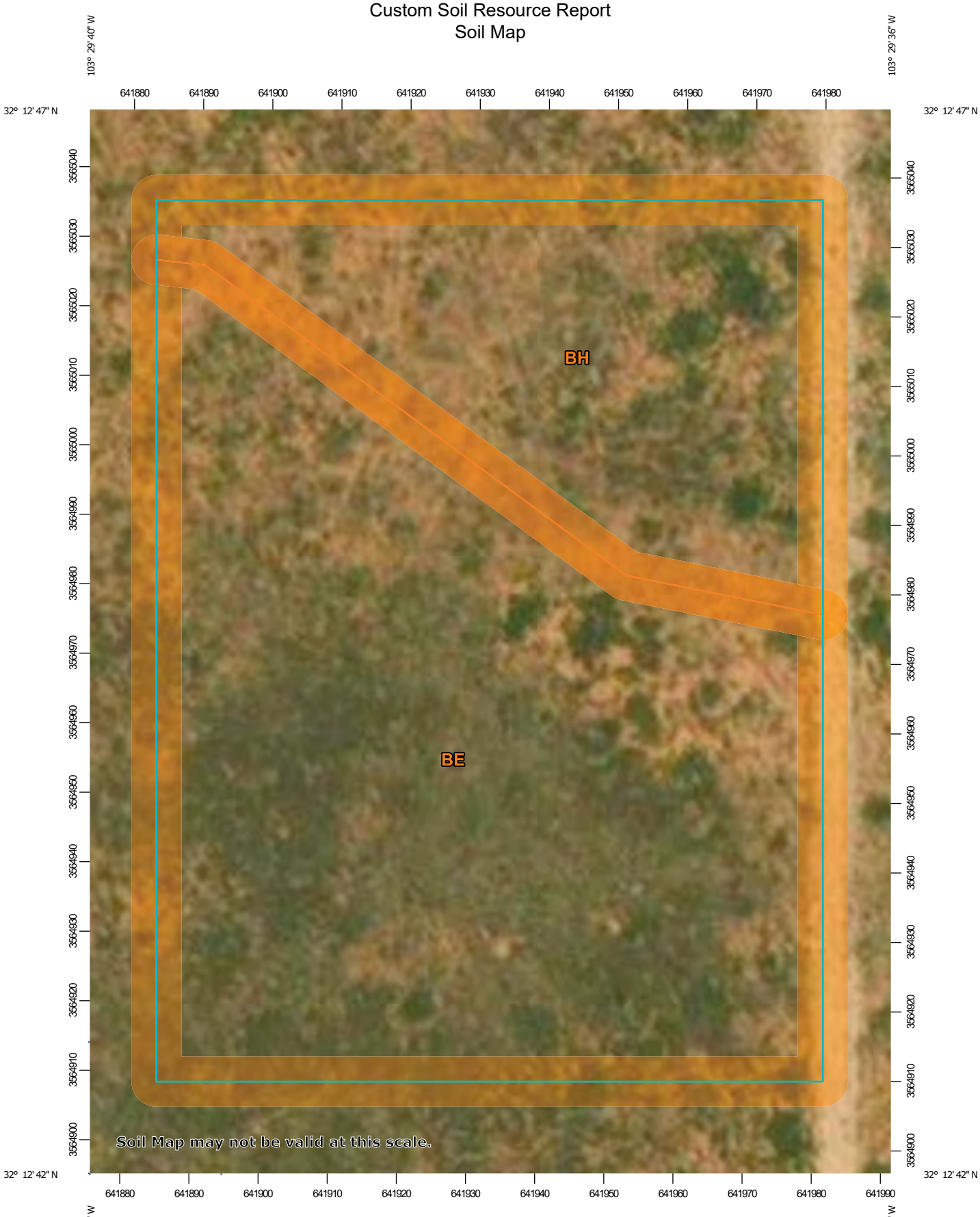
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 Scale: 1:747 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Custom Soil Resource Report

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: Dec 31, 2009—Sep 17, 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
BE	Berino-Cacique loamy fine sands association	2.1	70.5%
BH	Berino-Cacique association, hummocky	0.9	29.5%
Totals for Area of Interest		**3.0**	**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

BE—Berino-Cacique loamy fine sands association

Map Unit Setting

National map unit symbol: dmpd
Elevation: 3,000 to 3,900 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Berino and similar soils: 50 percent
Cacique and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berino

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock over calcareous sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 6 inches: loamy fine sand
Btk - 6 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
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: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Description of Cacique

Setting

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

Typical profile

A - 0 to 12 inches: loamy fine sand
Bt - 12 to 28 inches: sandy clay loam
Bkm - 28 to 38 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: High
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: 5 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: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Sandy (R042XC004NM)
Hydric soil rating: No

Minor Components

Maljamar

Percent of map unit: 6 percent
Ecological site: Limy Upland 16-21" PZ (R077CY028TX)
Hydric soil rating: No

Palomas

Percent of map unit: 4 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

BH—Berino-Cacique association, hummocky

Map Unit Setting

National map unit symbol: dmpg
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Berino and similar soils: 50 percent
Cacique and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berino

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock over calcareous sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 10 inches: fine sand
Btk - 10 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
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: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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

Description of Cacique

Setting

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

Typical profile

A - 0 to 7 inches: fine sand
Bt - 7 to 28 inches: sandy clay loam
Bkm - 28 to 38 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: High
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: 40 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: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Sandy (R042XC004NM)
Hydric soil rating: No

Minor Components

Kermit

Percent of map unit: 4 percent
Ecological site: Deep Sand (R042XC005NM)
Hydric soil rating: No

Maljamar

Percent of map unit: 3 percent
Ecological site: Limy Upland 16-21" PZ (R077CY028TX)
Hydric soil rating: No

Palomas

Percent of map unit: 2 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Dune land

Percent of map unit: 1 percent
Hydric soil rating: No

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U.S. Fish and Wildlife Service
National Wetlands Inventory

Apache 25 Fed 006

January 13, 2020

Wetlands

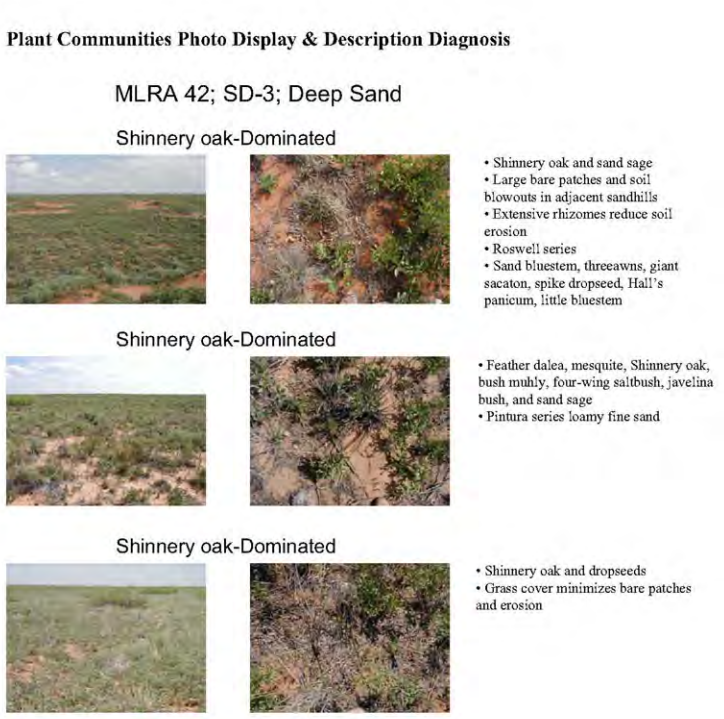
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

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

R042XC005NM — Deep Sand Ecological Site

Plant Community Photos



Historic Climax Plant Community

MLRA 42; SD-3; Deep Sand

Shinnery oak-Dominated

- Shinnery oak and sand sage
- Large bare patches and soil blowouts in adjacent sandhills
- Extensive rhizomes reduce soil erosion
- Roswell series
- Sand bluestem, threeawns, giant sacaton, spike dropseed, Hall's panicum, little bluestem

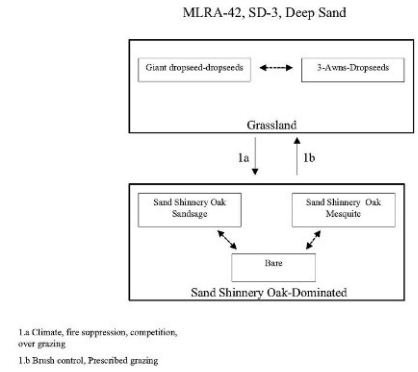
Shinnery oak-Dominated

- Feather dalea, mesquite, Shinnery oak, bush muhly, four-wing saltbush, javelina bush, and sand sage
- Pintura series loamy fine sand

Shinnery oak-Dominated

- Shinnery oak and dropseeds
- Grass cover minimizes bare patches and erosion

Plant Communities and Transitional Pathways (diagram)



State Transition Diagram for R042XC005NM — Deep Sand Ecological Site

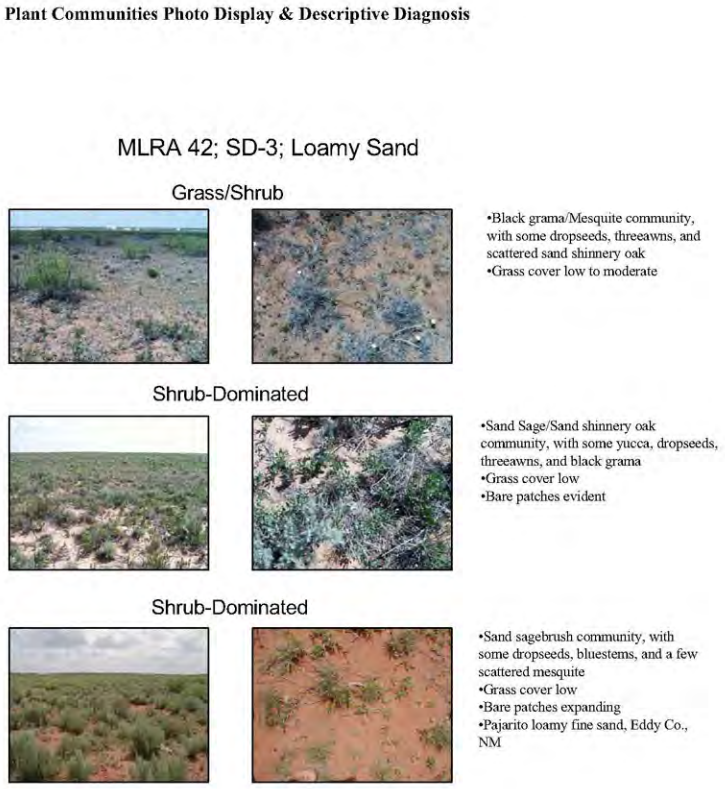
Ecological Dynamics Description

Overview

The Deep Sand site occurs adjacent to and/or intergraded with the Sandhills and Sandy sites (SD-3). The Deep Sand site can be distinguished by slopes less than eight percent (approximately five percent) and textural changes at depths greater than 40 inches. The Deep Sand site has well drained soils with a surface texture of sand or loamy fine sand. The Sandhills site has slopes greater than eight percent and textural depths greater than 60 inches. Conversely, the Sandy site has slopes less than five percent and depths to textural change commonly around 20 inches. The historic plant community of the Deep Sand site is dominated primarily by giant dropseed (Sporobolus giganteus) and other dropseeds (S. flexuosus, S. contractus, S. cryptandrus), with scattered shinnery oak (Quercus havardii) and soapweed yucca (Yucca glauca). Other herbaceous species include threeawns (Aristida spp.), bluestems (Schizachyrium scoparium and Andropogon hallii), and annual and perennial forbs distributed relative to precipitation occurrences. Bare ground and litter compose a significant proportion of ground cover while grasses are the remainder. Shinnery oak will increase with an associated decrease in dropseed and bluestem abundance possibly due to climatic change, fire suppression, interspecific competition, and excessive grazing. Continued grass cover loss may result in a transition to a shinnery oak dominated state with increases in sand sage (Artemisia filifolia) and honey mesquite (Prosopis glandulosa). However, brush management may restore the grassland component and reverse the shinnery oak state back toward the historic plant community.

R042XC003NM — Loamy Sand Ecological Site

Plant Community Photos



Historic Climax Plant Community

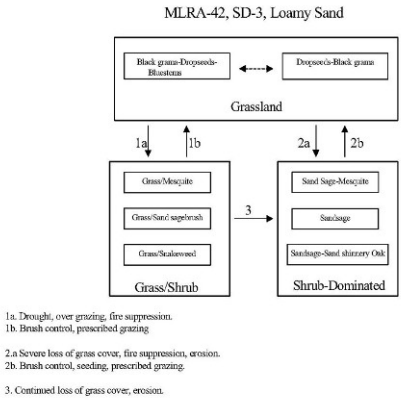
MLRA 42; SD-3; Loamy Sand

Grass/Shrub

- Black grama/Mesquite community, with some dropseeds, threeawns, and scattered sand shinnery oak
- Grass cover low to moderate

Grass/Shrub

Plant Communities and Transitional Pathways (diagram):



1a. Drought, over grazing, fire suppression.
1b. Brush control, prescribed grazing

2.a Severe loss of grass cover, fire suppression, erosion.
2b. Brush control, seeding, prescribed grazing.

3. Continued loss of grass cover, erosion.

State Transition Diagram for R042XC003NM — Loamy Sand Ecological Site

Ecological Dynamics Description

Overview

The Loamy Sand site intergrades with the Deep Sand and Sandy sites (SD-3). These sites can be differentiated by surface soil texture and depth to a textural change. Loamy Sand and Deep Sand sites have coarse textured (sands and loamy sand) surface soils while Sandy sites have moderately coarse textured (sandy loam and fine sandy loam) surfaces. Although Loamy Sand and Deep Sand sites have similar surface textures, the depth to a textural change is different—Loamy Sand sub-surface textures typically increase in clay at approximately 20 to 30 inches, and Deep Sand sites not until around 40 inches.

The historic plant community of Loamy Sand sites is dominated by black grama (Bouteloua eriopoda), dropseeds (Sporobolus flexuosus, S. contractus, S. cryptandrus), and bluestems (Schizachyrium scoparium and Andropogon hallii), with scattered shinnery oak (Quercus havardii) and sand sage (Artemisia filifolia). Perennial and annual forb abundance and distribution are dependent on precipitation. Litter and to a lesser extent, bare ground, are a significant proportion of ground cover while grasses compose the remainder. Decreases in black grama indicate a transition to either a grass/shrub or shrub-dominated state. The grass/shrub state is composed of grasses/honey mesquite (Prosopis glandulosa), grasses/broom snakeweed (Gutierrezia sarothrae), or grasses/sand sage. The shrub-dominated state occurs after a severe loss of grass cover and a prevalence of sand sage with secondary shinnery oak and mesquite. Heavy grazing intensity and/or drought are influential drivers in decreasing black grama and bluestems and subsequently increasing shrub cover, erosion, and bare patches. Historical fire suppression also encourages shrub pervasiveness and a competitive advantage over grass species (McPherson 1995). Brush and grazing management, however, may reverse grass/shrub and shrub-dominated states toward the grassland-dominated historic plant community.

Eddy Area, New Mexico

BB—Berino complex, 0 to 3 percent slopes, eroded

Map Unit Setting

National map unit symbol: 1w43
Elevation: 2,000 to 5,700 feet
Mean annual precipitation: 5 to 15 inches
Mean annual air temperature: 57 to 70 degrees F
Frost-free period: 180 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Berino and similar soils: 60 percent
Pajarito and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berino

Setting

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

Typical profile

H1 - 0 to 17 inches: fine sand
H2 - 17 to 58 inches: sandy clay loam
H3 - 58 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Description of Pajarito

Setting

Landform: Interdunes, plains, dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Mixed alluvium and/or eolian sands

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 72 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Minor Components

Cacique

Percent of map unit: 4 percent
Ecological site: Sandy (R042XC004NM)
Hydric soil rating: No

Wink

Percent of map unit: 4 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Pajarito

Percent of map unit: 4 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Kermit

Percent of map unit: 3 percent
Ecological site: Deep Sand (R042XC005NM)
Hydric soil rating: No

Data Source Information

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

Eddy Area, New Mexico

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

Map Unit Setting

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

Map Unit Composition

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

Description of Kermit

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Description of Berino

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Active dune land

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

Data Source Information

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

New Mexico Office of the State Engineer
Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
	C 02418	3	2	3	29	22S	31E	612613	3580948*

Driller License: 1311 **Driller Company:** GEOPROJECTS INTERNATIONAL, INC

Driller Name:

Drill Start Date:	09/26/1994	**Drill Finish Date:**	10/04/1994	**Plug Date:**	
Log File Date:	05/07/2003	**PCW Rcv Date:**	10/29/1998	**Source:**	Artesian
Pump Type:	SUBMER	**Pipe Discharge Size:**	.75"	**Estimated Yield:**	
Casing Size:	5.00	**Depth Well:**	617 feet	**Depth Water:**	413 feet

Meter Number:	729	**Meter Make:**	NONE
Meter Serial Number:	NONE	**Meter Multiplier:**	1.0000
Number of Dials:	6	**Meter Type:**	Diversion
Unit of Measure:	Gallons	**Return Flow Percent:**	
Usage Multiplier:		**Reading Frequency:**	

Meter Readings (in Acre-Feet)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount
01/01/2000	2000	0	A	ms		0
01/27/2000	2000	9	A	ms		0.003
07/03/2000	2000	19	A	mb		0.003
01/08/2001	2000	1096	A	RPT		0.003
06/30/2001	2001	2170	A	RPT		0.003
01/08/2002	2001	3473	A	tg		0.004
07/03/2002	2002	4451	A	rm		0.003
01/09/2003	2002	5103	A	RPT		0.002

**YTD Meter Amounts:	Year	Amount
	2000	0.009
	2001	0.007
	2002	0.005

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

National Water Information System: Web Interface

USGS Water Resources

Data Category: Groundwater ▼ Geographic Area: United States ▼ GO

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- Full News

Groundwater levels for the Nation

Search Results -- 1 sites found

site_no list =

- 322215103502701

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

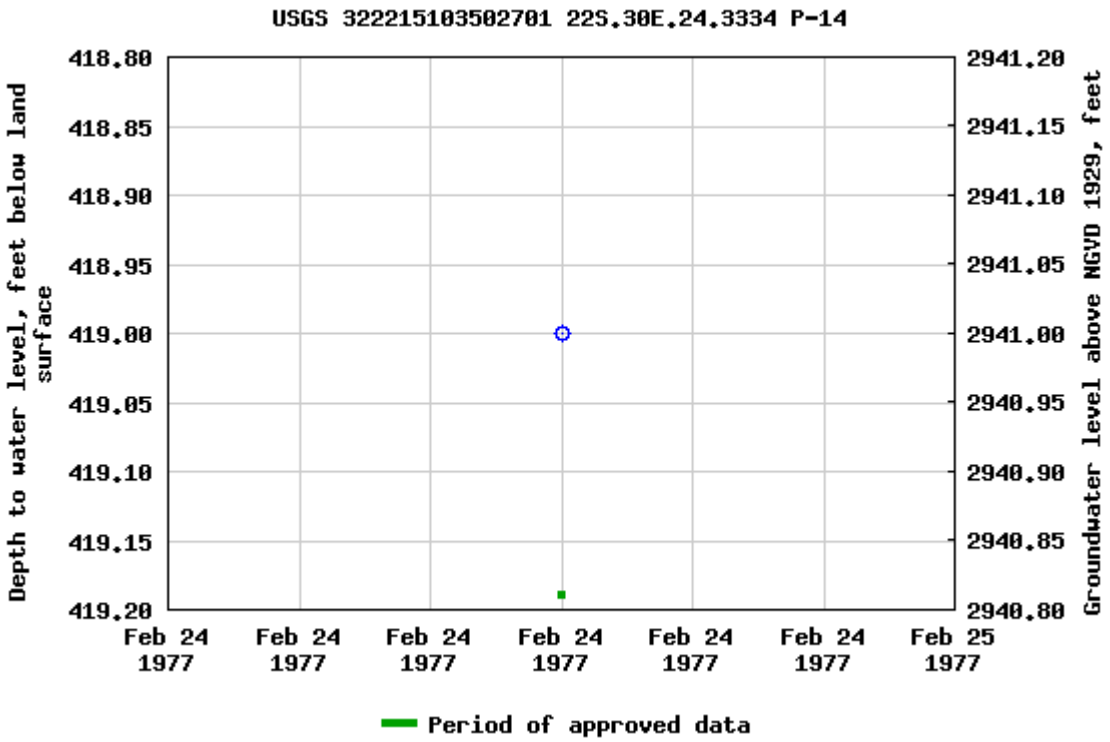
USGS 322215103502701 22S.30E.24.3334 P-14

Available data for this site Groundwater: Field measurements ▼ GO

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°22'15", Longitude 103°50'27" NAD27
Land-surface elevation 3,360 feet above NGVD29

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
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Feedback on this web site
Automated retrievals
Help
Data Tips
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Data Category: Groundwater ▼ Geographic Area: United States ▼ GO

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Groundwater levels for the Nation

Search Results -- 1 sites found

site_no list =

- 322205103480702

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

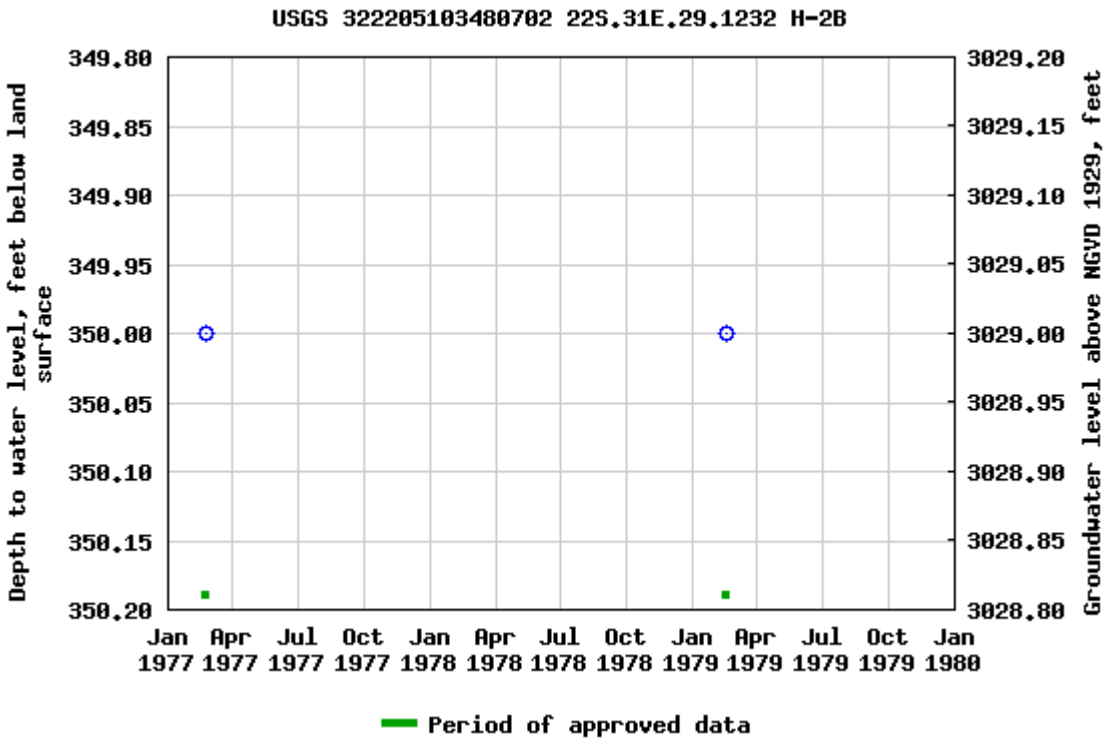
USGS 322205103480702 22S.31E.29.1232 H-2B

Available data for this site Groundwater: Field measurements ▼ GO

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°22'03", Longitude 103°48'08" NAD27
Land-surface elevation 3,379 feet above NGVD29

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
Download a presentation-quality graph

Questions about sites/data?
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Subscribe for system changes
News

Title: Groundwater for USA: Water Levels
URL: https://nwis.waterdata.usgs.gov/nwis/gwlevels?

Page Contact Information: USGS Water Data Support Team
Page Last Modified: 2020-01-13 14:17:53 EST
8.1 0.6 nadww01

National Water Information System: Web Interface

USGS Water Resources

Data Category: Groundwater ▼ Geographic Area: United States ▼ GO

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Groundwater levels for the Nation

Search Results -- 1 sites found

site_no list =

- 321946103492001

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

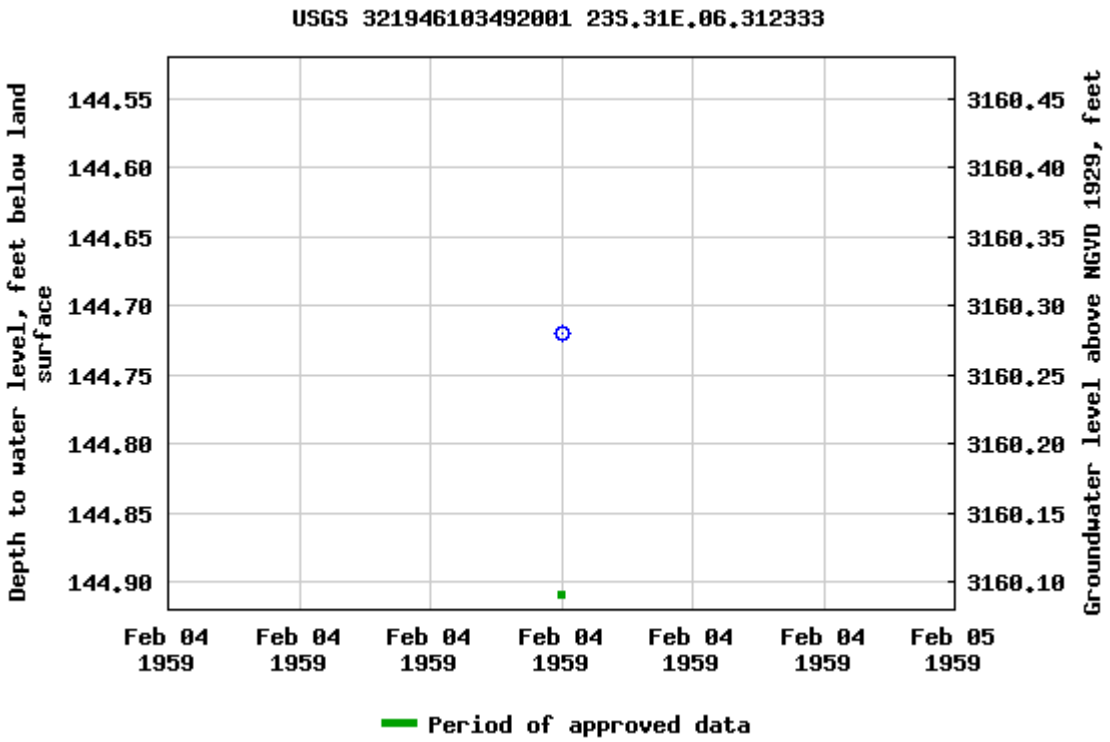
USGS 321946103492001 23S.31E.06.312333

Available data for this site Groundwater: Field measurements ▼ GO

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°19'53.3", Longitude 103°49'24.8" NAD83
Land-surface elevation 3,305.00 feet above NGVD29
The depth of the well is 180 feet below land surface.
This well is completed in the Chinle Formation (231CHNL) local aquifer.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
Download a presentation-quality graph

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

Title: Groundwater for USA: Water Levels
URL: https://nwis.waterdata.usgs.gov/nwis/gwlevels?

Page Contact Information: USGS Water Data Support Team
Page Last Modified: 2020-01-13 14:19:15 EST
0.79 0.58 nadww01

ATTACHMENT 4

Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	8/27/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	8/31/2019 8:08 PM
Project Owner:		File (Project) #:	
Project Manager:		API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	
Client Contact Phone #:	(575) 748-0176		

Summary of Times

Left Office	8/27/2019 5:00 PM
Arrived at Site	8/27/2019 6:06 PM
Departed Site	8/27/2019 6:20 PM
Returned to Office	8/27/2019 7:08 PM

Summary of Daily Operations

18:20 Take pictures
Map spill
Fill out DFR
Return to office

Next Steps & Recommendations

1

Daily Site Visit Report

Site Photos

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

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: South
	
Spill area	Spill area
Viewing Direction: Southwest	**Viewing Direction**: South
	
Spill area	Spill area

Daily Site Visit Report

Viewing Direction: West

Spill area

Viewing Direction: Southeast

Spill area

Viewing Direction: East

Spill area

Viewing Direction: Northeast

Spill area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Jason Crabtree

Signature: 

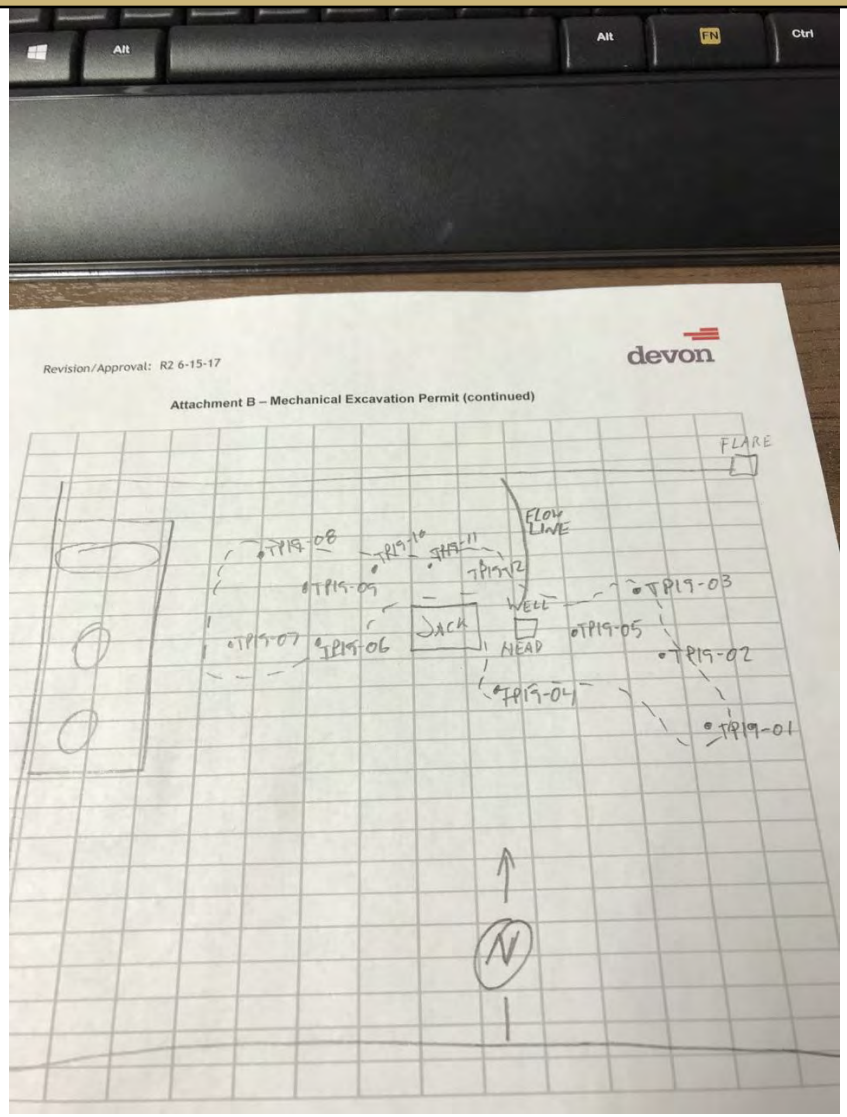
Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	9/5/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	9/6/2019 1:54 AM
Project Owner:	Amanda Davis	File (Project) #:	19E-00575
Project Manager:	Dennis Williams	API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	Stuffing Box Failure
Client Contact Phone #:	(575) 748-0176		

Summary of Times	
Left Office	9/5/2019 7:30 AM
Arrived at Site	9/5/2019 8:15 AM
Departed Site	9/5/2019 4:41 PM
Returned to Office	9/5/2019 5:26 PM

Daily Site Visit Report

Site Sketch



Daily Site Visit Report

Summary of Daily Operations

8:55 Arrive on site.
Complete safety paperwork.
Begin remediation and field screening.
Complete DFR.
Return to office.

Next Steps & Recommendations

1 Send characterization samples to lab for analysis.

2 Confirm samples meet site criteria

3 Schedule excavation

Sampling

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 ft.	2.9 ppm	9690 ppm	High (300-6000ppm)	1985 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35663501, -103.82650640	Yes
2 ft.	1.9 ppm	198 ppm	Low (30-600 ppm)	100 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35663501, -103.82650640	Yes

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 ft.	43.6 ppm	330 ppm	High (300-6000ppm)	1985 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35671005, -103.82652608	Yes

Daily Site Visit Report

	2 ft.	1.4 ppm	83 ppm	Low (30-600 ppm)	237 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35671005, -103.82652608	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 ft.	50 ppm	2550 ppm	High (300-6000ppm)	1425 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35674041, -103.82655055	Yes
2 ft.	1.3 ppm	31 ppm	Low (30-600 ppm)	172 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35674041, -103.82655055	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?
0 ft.	1.6 ppm	267 ppm	High (300-6000ppm)	3821 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35669430, -103.82670240	Yes
2 ft.	1.8 ppm	169 ppm	High (300-6000ppm)	1118 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35669430, -103.82670240	Yes

TP19-05

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	1 ppm	420 ppm	High (300-6000ppm)	6143 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35673821, -103.82658457	Yes

Daily Site Visit Report

	2 ft.	0.5 ppm	20 ppm	High (300-6000ppm)	1546 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35673821, -103.82658457	Yes

TP19-06

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.7 ppm	520 ppm	High (300-6000ppm)	3120 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35677153, -103.82685555	Yes
1 ft.	0.5 ppm	0 ppm	Low (30-600 ppm)	0.1 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35677153, -103.82685555	Yes

TP19-07

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	2.3 ppm	1320 ppm	Low (30-600 ppm)	45 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35678990, -103.82689400	Yes
1 ft.	0.5 ppm	0 ppm	Low (30-600 ppm)	0.1 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35678990, -103.82689400	Yes

TP19-08

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	1.9 ppm	950 ppm	Low (30-600 ppm)	120 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35682382, -103.82690743	Yes

Daily Site Visit Report

	1 ft.	1.2 ppm	0 ppm	Low (30-600 ppm)	0.1 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35682382, -103.82690743	Yes

TP19-09

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.7 ppm	270 ppm	Low (30-600 ppm)	120 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35681353, -103.82686896	Yes
1 ft.	1.1 ppm	7 ppm	Low (30-600 ppm)	0.1 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35681353, -103.82686896	Yes

TP19-10

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	34.8 ppm	660 ppm	Low (30-600 ppm)	172 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35682405, -103.82679474	Yes
2 ft.	0.4 ppm	52 ppm	High (300-6000ppm)	1546 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35682405, -103.82679474	Yes

TP19-11

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	359.2 ppm	4840 ppm	High (300-6000ppm)	6143 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35681076, -103.82673939	Yes

Daily Site Visit Report

	2 ft.	0.3 ppm	0 ppm	Low (30-600 ppm)	0.1 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35681076, -103.82673939	Yes

TP19-12

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	7.9 ppm	2140 ppm	High (300-6000ppm)	950 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35680542, -103.82668680	Yes
2 ft.	0.2 ppm	4 ppm	Low (30-600 ppm)	145 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (SW-4500 Cl), TPH (EPA SW-846 Method 8015M)	✓	32.35680542, -103.82668680	Yes

Daily Site Visit Report

Site Photos

Viewing Direction: Northwest

Spill area

Viewing Direction: West

Spill area

Viewing Direction: West

Spill area

Viewing Direction: Southeast

Spill area

Daily Site Visit Report

Depth Sample Photos

Sample Point ID: TP19-01

Depth: 0 ft.

Sample Point ID: TP19-01

Depth: 2 ft.

Sample Point ID: TP19-02

Depth: 0 ft.

Sample Point ID: TP19-02

Depth: 2 ft.

Daily Site Visit Report

Sample Point ID: TP19-03	**Sample Point ID**: TP19-03
	
Depth: 0 ft.	**Depth:** 2 ft.
Sample Point ID: TP19-04	**Sample Point ID**: TP19-04
	
Depth: 0 ft.	**Depth:** 2 ft.

Daily Site Visit Report

Sample Point ID: TP19-05

Depth: 0 ft.

Sample Point ID: TP19-05

Depth: 2 ft.

Sample Point ID: TP19-06

Depth: 0 ft.

Sample Point ID: TP19-06

Depth: 1 ft.

Daily Site Visit Report

Sample Point ID: TP19-07	**Sample Point ID**: TP19-07
	
Depth: 0 ft.	**Depth:** 1 ft.
Sample Point ID: TP19-08	**Sample Point ID**: TP19-08
	
Depth: 0 ft.	**Depth:** 1 ft.

Daily Site Visit Report

Sample Point ID: TP19-09	**Sample Point ID**: TP19-09
	
Depth: 0 ft.	**Depth:** 1 ft.
Sample Point ID: TP19-10	**Sample Point ID**: TP19-10
	
Depth: 0 ft.	**Depth:** 2 ft.

Daily Site Visit Report

Sample Point ID: TP19-11	**Sample Point ID**: TP19-11
	
Depth: 0 ft.	**Depth:** 2 ft.
Sample Point ID: TP19-12	**Sample Point ID**: TP19-12
	
Depth: 0 ft.	**Depth:** 2 ft.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 

Signature

Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	10/25/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	10/27/2019 2:44 PM
Project Owner:		File (Project) #:	
Project Manager:		API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	
Client Contact Phone #:	(575) 748-0176		

Summary of Times

Left Office	10/25/2019 11:45 AM
Arrived at Site	10/25/2019 12:30 PM
Departed Site	10/25/2019 7:06 PM
Returned to Office	10/25/2019 7:49 PM

Summary of Daily Operations

13:35 Mobilize to site
Fill out safety forms
Tailgate safety meeting
Sweep area with magnetic locator
Excavate spill area
Field screen samples
Take pictures
Fill out DFR
Demobilize

Next Steps & Recommendations

1

Sampling

Daily Site Visit Report

ES-Base19-01

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.1 ppm	737 ppm	High (300-6000ppm)	1239 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35673416, -103.82689647	Yes

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?
0 ft.	0.1 ppm	120 ppm	High (300-6000ppm)	625 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35677802, -103.82689828	Yes

ES-Base19-03

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.5 ppm	714 ppm	High (300-6000ppm)	893 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35682712, -103.82687376	Yes

ES-Base19-04

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
2 ft.	0 ppm	85 ppm	High (300-6000ppm)	2175 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35678341, -103.82671372	Yes

Daily Site Visit Report

ES-Base19-06

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.1 ppm	687 ppm	High (300-6000ppm)	4542 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35674111, -103.82684336	Yes

ES-Base19-07

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.7 ppm	101 ppm	High (300-6000ppm)	686 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35676533, -103.82684680	Yes

ES-Base19-08

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.2 ppm	717 ppm	High (300-6000ppm)	971 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35683248, -103.82683292	Yes

ES-Base19-09

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.2 ppm	57 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35683248, -103.82683292	Yes

Daily Site Visit Report

ES-Base19-10

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.	0.3 ppm	754 ppm			BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35683297, -103.82678078	Yes

ES-Base19-11

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35679071, -103.82677234	Yes

ES-Base19-12

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35684888, -103.82671548	Yes

ES-Base19-13

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.3568058, -103.82671975	Yes

Daily Site Visit Report

ES-Base19-14

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35685478, -103.82666638	Yes

ES-Base19-15

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35682225, -103.82668127	Yes

ES-Base19-16

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.	0.6 ppm	29 ppm	Low (30-600 ppm)	98 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35663264, -103.82649256	Yes

ES-Base19-17

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0.5 ft.	0.1 ppm	36 ppm	Low (30-600 ppm)	158 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35671719, -103.82652473	Yes

Daily Site Visit Report

ES-Base19-18

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35673492, -103.82656070	Yes

ES-Base19-19

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35674348, -103.82660983	Yes

ES-Base19-20

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35676795, -103.82656542	Yes

ES-Base19-21

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
0 ft.					BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35677226, -103.82659057	Yes

Daily Site Visit Report

ES-Wall19-05

Depth ft	VOC PID	Petro Flag TPH ppm	Quantab Range ppm	Quantab Reading ppm	Lab Analysis	Picture	Trimble Location	Marked On Site Sketch?
2 ft.	0.2 ppm	504 ppm	High (300-6000ppm)	325 ppm	BTEX (EPA SW-846 Method 8021B/8260B), Chloride (EPA 300.0), TPH (EPA SW-846 Method 8015M)	✓	32.35677934, -103.82667612	Yes

Daily Site Visit Report

Depth Sample Photos

Sample Point ID: ES-Base19-01

Depth: 0 ft.

Sample Point ID: ES-Base19-02

Depth: 0 ft.

Sample Point ID: ES-Base19-03

Depth: 0 ft.

Sample Point ID: ES-Base19-04

Depth: 2 ft.

Daily Site Visit Report

Sample Point ID: ES-Wall19-05

Depth: 2 ft.

Sample Point ID: ES-Base19-06

Depth: 0 ft.

Sample Point ID: ES-Base19-07

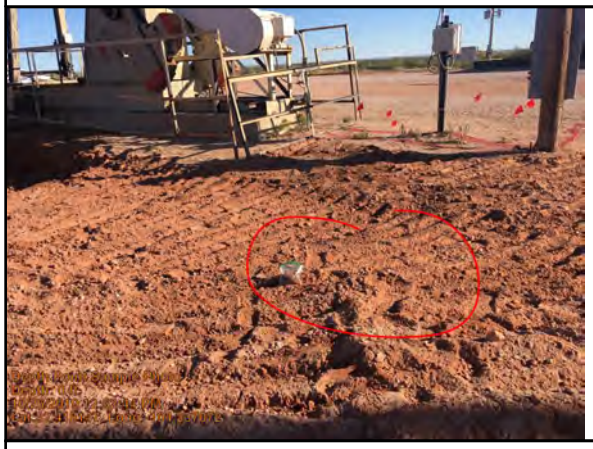
Depth: 0 ft.

Sample Point ID: ES-Base19-08

Depth: 0 ft.

Daily Site Visit Report

Sample Point ID: ES-Base19-09



Depth: 0 ft.

Sample Point ID: ES-Base19-10

Depth: 0 ft.

Sample Point ID: ES-Base19-11

Depth: 0 ft.

Sample Point ID: ES-Base19-12

Depth: 0 ft.

Daily Site Visit Report

Sample Point ID: ES-Base19-13

Depth: 0 ft.

Sample Point ID: ES-Base19-14

Depth: 0 ft.

Sample Point ID: ES-Base19-15

Depth: 0 ft.

Sample Point ID: ES-Base19-16

Depth: 1 ft.

Daily Site Visit Report

Sample Point ID: ES-Base19-17	**Sample Point ID**: ES-Base19-18
	
Depth: 0.5 ft.	**Depth:** 0 ft.
Sample Point ID: ES-Base19-19	**Sample Point ID**: ES-Base19-20
	
Depth: 0 ft.	**Depth:** 0 ft.

Daily Site Visit Report

Sample Point ID: ES-Base19-21

Depth: 0 ft.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Jason Crabtree

Signature: 

Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	11/4/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	11/5/2019 12:10 AM
Project Owner:		File (Project) #:	
Project Manager:		API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	
Client Contact Phone #:	(575) 748-0176		

Summary of Times

Left Office	11/4/2019 7:40 AM
Arrived at Site	11/4/2019 9:00 AM
Departed Site	11/4/2019 3:29 PM
Returned to Office	

Summary of Daily Operations

10:12 Backfill excavations with clean fill

Next Steps & Recommendations

1. Load excavator
2. Return trailer to yard
3. Return to office

Daily Site Visit Report

Site Photos

Viewing Direction: Northeast	**Viewing Direction**: North
	
Excavation area	Excavation to be filled
Viewing Direction: Southwest	**Viewing Direction**: South
	
Excavated area	Back filled excavation

Daily Site Visit Report

Viewing Direction: East

Backfilled excavation

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Tommy Odell

Signature:

Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	11/25/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	11/26/2019 1:02 AM
Project Owner:		File (Project) #:	
Project Manager:		API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	
Client Contact Phone #:	(575) 748-0176		

Summary of Times

Left Office	11/25/2019 8:15 AM
Arrived at Site	11/25/2019 9:40 AM
Departed Site	11/25/2019 4:21 PM
Returned to Office	

Summary of Daily Operations

12:28 Excavate spill area to sample

Next Steps & Recommendations

1 Submit confirmation samples to lab.

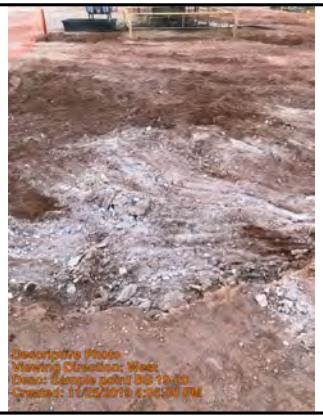
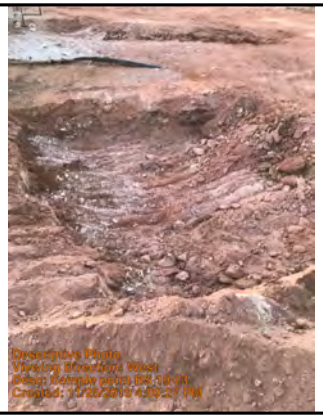
2 Backfill excavation.

Daily Site Visit Report

Site Photos

Viewing Direction: East	**Viewing Direction**: North
	
Excavation location	Excavation area
Viewing Direction: Southeast	**Viewing Direction**: North
	
Spill area being excavated	Sample points BS 19-18, 19-19

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: West
	
Sample point BS 19-20	Sample points BS 19-21, 19-22
Viewing Direction: South	**Viewing Direction**: South
	
Sample point BS 19-23	WS 19-05

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: South
	
Sample points BS 19-12, 19-13, 19-14	Sample points BS 19-02, 19-03, 19-07
Viewing Direction: East	**Viewing Direction**: East
	
Sample point BS 19-11	Spoils pile.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Tommy Odell

Signature:

Daily Site Visit Report

Client:	Devon Energy Corporation	Inspection Date:	12/6/2019
Site Location Name:	Apache 25 Fed #6	Report Run Date:	12/7/2019 3:30 AM
Project Owner:		File (Project) #:	
Project Manager:		API #:	30-015-29894
Client Contact Name:	Amanda Davis	Reference	
Client Contact Phone #:	(575) 748-0176		

Summary of Times

Left Office	12/6/2019 7:05 AM
Arrived at Site	12/6/2019 8:33 AM
Departed Site	
Returned to Office	

Summary of Daily Operations

10:31 Backfill excavations, load out spoils

Next Steps & Recommendations

1 Head back to office

Daily Site Visit Report

Site Photos

Viewing Direction: East	**Viewing Direction**: Northeast
	
Excavations and spoil dirt	Excavation to be filled
Viewing Direction: West	**Viewing Direction**: Northwest
	
Excavations to be filled	Backfill in process

Daily Site Visit Report

Viewing Direction: Southeast

Backfilled location

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Tommy Odell

Signature:

ATTACHMENT 5

Natalie Gordon

From: Natalie Gordon
Sent: Monday, November 18, 2019 5:29 PM
To: Mike Bratcher (mike.bratcher@state.nm.us); Victoria Venegas (Victoria.Venegas@state.nm.us); Robert Hamlet (Robert.Hamlet@state.nm.us)
Cc: Dennis Williams (DWilliams@vertex.ca); blm_nm_cfo_spill@blm.gov; Davis, Amanda
Subject: 2RP-5644: Apache 25 Fed # 6 48-hr Sampling Notification - Devon Energy

All,

Please accept this email as 48-hr notification that Vertex Resource Services Inc. has scheduled confirmation sampling to be conducted at Apache 25 Fed # 6 for Incident 2RP-5644, DOR: 8/23/2019.

On November 21, 2019 beginning at 8:00 a.m., Vertex personnel will be on site completing the remediation work and collecting confirmation samples for incident closure.

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

Thank you,
Natalie

Natalie Gordon

From: Dennis Williams
Sent: Thursday, October 24, 2019 10:32 AM
To: Lea Co Spills (emnrd-ocd-district1spills@state.nm.us); jim.griswold@state.nm.us; R Mann (rmann@slo.state.nm.us)
Cc: Natalie Gordon; Bynum, Tom (Contract); Davis, Amanda
Subject: Devon Energy - Apache 25 Fed 006 - No RP number assigned - Confirmatory Sample Notification

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 October 26th 2019 at 11:00 AM. Jason Crabtree from Vertex will be on site performing the sampling and can be reached at 432-250-3456. 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 6

Client Name: Devon Energy Production Company
Site Name: Apache 25 Fed #006
Project #: 19E-00575-020
Lab Reports: 1910E47, 1911C61 and 1911B26

Table 2. Confirmatory Soil Samples - Depth to Groundwater 51 < 100 feet

Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
						Volatile		Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro Flag)	Inorganics (Quantab - High/Low)	Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	Chloride
			(ppm)	(ppm)	(+/-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BS 19-01	0	10/26/2019	-	-	-	<0.025	<0.221	<4.9	770	1,100	770	1,870	1,200
BS 19-02	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	1,800	1,600	**1,800**	**3,400**	390
BS 19-02	1	11/21/2019	-	97	-	<0.024	<0.215	<4.8	13	<50	13	13	1,700
BS 19-03	0	10/26/2019	-	-	-	<0.025	<0.222	<4.9	1,000	1,000	**1,000**	2,000	1,100
BS 19-03	1	11/21/2019	-	32	-	<0.023	<0.211	<4.7	<9.6	<48	<14.3	<62.3	100
BS 19-04	2	10/26/2019	-	-	-	<0.025	<0.225	<5.0	150	200	150	350	85
WS 19-05	2	10/26/2019	-	-	-	<0.024	<0.220	<4.9	3,700	2,800	**3,700**	**6,500**	2,300
WS 19-05	1	11/25/2019	-	368	-	<0.023	<0.208	<4.6	100	81	100	181	750
BS 19-06	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	50	130	50	180	6,700
BS 19-07	0	10/26/2019	-	-	-	<0.025	<0.221	<4.9	2,700	2,200	**2,700**	**4,900**	2,600
BS 19-07	1	11/21/2019	-	30	-	<0.023	<0.207	<4.6	<9.4	<47	<14.0	<61.0	2,000
BS 19-08	0	10/26/2019	-	-	-	<0.025	<0.222	<4.9	360	500	360	860	1,200
BS 19-09	0	10/26/2019	-	-	-	<0.024	<0.219	<4.9	33	60	33	93	71
BS 19-10	0	10/26/2019	-	-	-	<0.024	<0.219	<4.9	800	920	800	1,720	2,400
BS 19-11	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	1,600	1,400	**1,600**	**3,000**	4,500
BS 19-11	1	11/21/2019	-	64	-	<0.024	<0.219	<4.9	<9.6	<48	<14.5	<62.5	1,600
BS 19-12	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	1,100	820	**1,100**	1,920	1,600
BS 19-12	0.5	11/21/2019	-	102	-	<0.024	<0.212	<4.7	20	<46	20	20	1,600
BS 19-13	0	10/26/2019	-	-	-	<0.025	<0.225	<5.0	1,600	1,500	**1,600**	**3,100**	6,200
BS 19-13	0.5	11/21/2019	-	580	-	<0.024	<0.213	<4.7	110	99	110	209	1,100
BS 19-13	1	11/25/2019	-	181	-	<0.023	<0.211	<4.7	20	<39	20	20	400
BS 19-14	0	10/26/2019	-	-	-	<0.025	<0.222	<4.9	4,500	3,100	**4,500**	**7,600**	2,600
BS 19-14	0.5	11/21/2019	-	44	-	<0.024	<0.216	<4.8	21	<50	21	21	940
BS 19-15	0	10/26/2019	-	-	-	<0.025	<0.221	<4.9	140	94	140	234	8,700
BS 19-16	1	10/26/2019	-	-	-	<0.024	<0.216	<4.8	<9.8	<49	<14.6	<63.6	100
BS 19-17	0.5	10/26/2019	-	-	-	<0.025	<0.221	<4.9	<9.0	<45	<13.9	<58.9	150
BS 19-18	0	10/26/2019	-	-	-	<0.024	<0.219	<4.9	4,100	2,500	**4,100**	**6,600**	1,900
BS 19-18	1	11/21/2019	-	50	-	<0.023	<0.208	<4.6	<9.9	<50	<14.5	<64.5	110
BS 19-19	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	9,700	5,300	**9,705**	**15,005**	2,300
BS 19-19	1	11/21/2019	-	-	-	<0.024	<0.219	<4.9	22	<48	22	22	200
BS 19-20	0	10/26/2019	-	-	-	<0.025	<0.224	<5.0	4,100	2,500	**4,100**	**6,600**	940
BS 19-20	2	11/25/2019	-	326	-	<0.023	<0.211	<4.7	120	110	120	230	130
BS 19-21	0	10/26/2019	-	-	-	<0.025	<0.221	<4.9	3,400	2,100	**3,400**	**5,500**	2,200
BS 19-21	1	11/25/2019	-	422	-	<0.024	<0.213	<4.7	110	110	110	220	220
BS 19-21	1.5	11/25/2019	-	146	-	<0.024	<0.212	<4.7	14	<46	14	14	440
BS 19-22	0	10/26/2019	-	-	-	<0.025	<0.221	<4.9	3,400	2,600	**3,400**	**6,000**	8,200
BS 19-22	1	11/25/2019	-	170	-	<0.025	<0.221	<4.9	23	<43	23	23	290
BS 19-23	0	10/26/2019	-	-	-	<0.024	<0.216	<4.8	1,700	2,000	**1,700**	**3,700**	3,000
BS 19-23	2	11/25/2019	-	212	-	<0.025	<0.224	<5.0	68	75	68	143	150

Bold and shaded indicates exceedance outside of applied action level

VERTEX

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

November 05, 2019

Dennis Williams

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

RE: Apache 25 Fed 6 OrderNo.: 1910E47

Dear Dennis Williams:

Hall Environmental Analysis Laboratory received 23 sample(s) on 10/29/2019 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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1910E47**
Date Reported: **11/5/2019**

CLIENT: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6
Lab ID: 1910E47-001 **Matrix:** SOIL

Client Sample ID: BS19-01 0'
Collection Date: 10/26/2019 2:00:00 PM
Received Date: 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1200	60		mg/Kg	20	10/31/2019 3:13:11 PM	48509
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	770	98		mg/Kg	10	10/31/2019 2:50:16 AM	48459
Motor Oil Range Organics (MRO)	1100	490		mg/Kg	10	10/31/2019 2:50:16 AM	48459
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 2:50:16 AM	48459
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 9:36:00 PM	48446
Surr: BFB	95.7	77.4-118		%Rec	1	10/30/2019 9:36:00 PM	48446
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 9:36:00 PM	48446
Toluene	ND	0.049		mg/Kg	1	10/30/2019 9:36:00 PM	48446
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 9:36:00 PM	48446
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 9:36:00 PM	48446
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	10/30/2019 9:36:00 PM	48446

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1910E47**
Date Reported: **11/5/2019**

CLIENT: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6
Lab ID: 1910E47-002 **Matrix:** SOIL

Client Sample ID: BS19-02 0'
Collection Date: 10/26/2019 2:05:00 PM
Received Date: 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**MRA**
Chloride	390	60		mg/Kg	20	11/1/2019 12:15:40 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	1800	93		mg/Kg	10	10/31/2019 3:12:05 AM	48459
Motor Oil Range Organics (MRO)	1600	460		mg/Kg	10	10/31/2019 3:12:05 AM	48459
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 3:12:05 AM	48459
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 8:42:22 AM	48452
Surr: BFB	86.8	77.4-118		%Rec	1	10/30/2019 8:42:22 AM	48452
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.025		mg/Kg	1	10/30/2019 8:42:22 AM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 8:42:22 AM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 8:42:22 AM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 8:42:22 AM	48452
Surr: 4-Bromofluorobenzene	85.2	80-120		%Rec	1	10/30/2019 8:42:22 AM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-03 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 2:10:00 PM
Lab ID: 1910E47-003 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**MRA**
Chloride	1100	60		mg/Kg	20	11/1/2019 12:52:53 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	1000	86		mg/Kg	10	11/1/2019 2:35:43 AM	48459
Motor Oil Range Organics (MRO)	1000	430		mg/Kg	10	11/1/2019 2:35:43 AM	48459
Surr: DNOP	0	70-130	S	%Rec	10	11/1/2019 2:35:43 AM	48459
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 9:50:46 AM	48452
Surr: BFB	88.7	77.4-118		%Rec	1	10/30/2019 9:50:46 AM	48452
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.025		mg/Kg	1	10/30/2019 9:50:46 AM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 9:50:46 AM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 9:50:46 AM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 9:50:46 AM	48452
Surr: 4-Bromofluorobenzene	88.2	80-120		%Rec	1	10/30/2019 9:50:46 AM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-04 2'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 2:15:00 PM
Lab ID: 1910E47-004 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**MRA**
Chloride	85	60		mg/Kg	20	11/1/2019 1:54:56 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	150	19		mg/Kg	2	11/1/2019 2:37:35 PM	48459
Motor Oil Range Organics (MRO)	200	94		mg/Kg	2	11/1/2019 2:37:35 PM	48459
Surr: DNOP	111	70-130		%Rec	2	11/1/2019 2:37:35 PM	48459
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 10:59:14 AM	48452
Surr: BFB	91.0	77.4-118		%Rec	1	10/30/2019 10:59:14 AM	48452
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.025		mg/Kg	1	10/30/2019 10:59:14 AM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 10:59:14 AM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 10:59:14 AM	48452
Xylenes, Total	ND	0.10		mg/Kg	1	10/30/2019 10:59:14 AM	48452
Surr: 4-Bromofluorobenzene	89.9	80-120		%Rec	1	10/30/2019 10:59:14 AM	48452

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1910E47**
Date Reported: **11/5/2019**

CLIENT: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6
Lab ID: 1910E47-005 **Matrix:** SOIL

Client Sample ID: WS19-05 2'
Collection Date: 10/26/2019 2:20:00 PM
Received Date: 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2300	60		mg/Kg	20	11/1/2019 2:07:20 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	3700	92		mg/Kg	10	10/31/2019 4:17:34 AM	48459
Motor Oil Range Organics (MRO)	2800	460		mg/Kg	10	10/31/2019 4:17:34 AM	48459
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 4:17:34 AM	48459
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 11:22:03 AM	48452
Surr: BFB	120	77.4-118	S	%Rec	1	10/30/2019 11:22:03 AM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	10/30/2019 11:22:03 AM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 11:22:03 AM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 11:22:03 AM	48452
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 11:22:03 AM	48452
Surr: 4-Bromofluorobenzene	93.3	80-120		%Rec	1	10/30/2019 11:22:03 AM	48452

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

Qualifiers:

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

Analytical Report
Lab Order **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-06 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 2:25:00 PM
Lab ID: 1910E47-006 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	6700	300		mg/Kg	100	11/4/2019 10:28:04 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	50	9.9		mg/Kg	1	10/31/2019 9:10:36 AM	48461
Motor Oil Range Organics (MRO)	130	50		mg/Kg	1	10/31/2019 9:10:36 AM	48461
Surr: DNOP	122	70-130		%Rec	1	10/31/2019 9:10:36 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 11:44:54 AM	48452
Surr: BFB	93.3	77.4-118		%Rec	1	10/30/2019 11:44:54 AM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 11:44:54 AM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 11:44:54 AM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 11:44:54 AM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 11:44:54 AM	48452
Surr: 4-Bromofluorobenzene	92.4	80-120		%Rec	1	10/30/2019 11:44:54 AM	48452

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1910E47**
Date Reported: **11/5/2019**

CLIENT: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6
Lab ID: 1910E47-007 **Matrix:** SOIL

Client Sample ID: BS19-07 0'
Collection Date: 10/26/2019 2:35:00 PM
Received Date: 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2600	150		mg/Kg	50	11/4/2019 10:40:28 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	2700	98		mg/Kg	10	10/31/2019 9:37:56 AM	48461
Motor Oil Range Organics (MRO)	2200	490		mg/Kg	10	10/31/2019 9:37:56 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 9:37:56 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 12:07:51 PM	48452
Surr: BFB	121	77.4-118	S	%Rec	1	10/30/2019 12:07:51 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 12:07:51 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 12:07:51 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 12:07:51 PM	48452
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 12:07:51 PM	48452
Surr: 4-Bromofluorobenzene	96.3	80-120		%Rec	1	10/30/2019 12:07:51 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-08 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 2:45:00 PM
Lab ID: 1910E47-008 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1200	60		mg/Kg	20	11/1/2019 2:44:33 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	360	90		mg/Kg	10	10/31/2019 9:47:00 AM	48461
Motor Oil Range Organics (MRO)	500	450		mg/Kg	10	10/31/2019 9:47:00 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 9:47:00 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 12:30:36 PM	48452
Surr: BFB	92.8	77.4-118		%Rec	1	10/30/2019 12:30:36 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 12:30:36 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 12:30:36 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 12:30:36 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 12:30:36 PM	48452
Surr: 4-Bromofluorobenzene	91.7	80-120		%Rec	1	10/30/2019 12:30:36 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-09 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 3:00:00 PM
Lab ID: 1910E47-009 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	71	61		mg/Kg	20	11/1/2019 2:56:57 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	33	8.6		mg/Kg	1	11/1/2019 11:03:51 AM	48461
Motor Oil Range Organics (MRO)	60	43		mg/Kg	1	11/1/2019 11:03:51 AM	48461
Surr: DNOP	102	70-130		%Rec	1	11/1/2019 11:03:51 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 12:53:31 PM	48452
Surr: BFB	92.1	77.4-118		%Rec	1	10/30/2019 12:53:31 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	10/30/2019 12:53:31 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 12:53:31 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 12:53:31 PM	48452
Xylenes, Total	ND	0.097		mg/Kg	1	10/30/2019 12:53:31 PM	48452
Surr: 4-Bromofluorobenzene	91.0	80-120		%Rec	1	10/30/2019 12:53:31 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-10 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 3:15:00 PM
Lab ID: 1910E47-010 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2400	150		mg/Kg	50	11/4/2019 10:52:53 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	800	76		mg/Kg	10	10/31/2019 10:05:08 AM	48461
Motor Oil Range Organics (MRO)	920	380		mg/Kg	10	10/31/2019 10:05:08 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 10:05:08 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 1:16:27 PM	48452
Surr: BFB	86.8	77.4-118		%Rec	1	10/30/2019 1:16:27 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	10/30/2019 1:16:27 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 1:16:27 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 1:16:27 PM	48452
Xylenes, Total	ND	0.097		mg/Kg	1	10/30/2019 1:16:27 PM	48452
Surr: 4-Bromofluorobenzene	85.6	80-120		%Rec	1	10/30/2019 1:16:27 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-11 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 3:30:00 PM
Lab ID: 1910E47-011 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	4500	150		mg/Kg	50	11/4/2019 11:30:06 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	1600	95		mg/Kg	10	10/31/2019 10:14:14 AM	48461
Motor Oil Range Organics (MRO)	1400	470		mg/Kg	10	10/31/2019 10:14:14 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 10:14:14 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 1:39:11 PM	48452
Surr: BFB	90.4	77.4-118		%Rec	1	10/30/2019 1:39:11 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 1:39:11 PM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 1:39:11 PM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 1:39:11 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 1:39:11 PM	48452
Surr: 4-Bromofluorobenzene	89.0	80-120		%Rec	1	10/30/2019 1:39:11 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-12 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 3:45:00 PM
Lab ID: 1910E47-012 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1600	60		mg/Kg	20	11/1/2019 3:58:59 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	1100	88		mg/Kg	10	10/31/2019 10:23:18 AM	48461
Motor Oil Range Organics (MRO)	820	440		mg/Kg	10	10/31/2019 10:23:18 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 10:23:18 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 3:10:44 PM	48452
Surr: BFB	91.6	77.4-118		%Rec	1	10/30/2019 3:10:44 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 3:10:44 PM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 3:10:44 PM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 3:10:44 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 3:10:44 PM	48452
Surr: 4-Bromofluorobenzene	86.1	80-120		%Rec	1	10/30/2019 3:10:44 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6
Lab ID: 1910E47-013 **Matrix:** SOIL

Client Sample ID: BS19-13 0'
Collection Date: 10/26/2019 4:00:00 PM
Received Date: 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	6200	300		mg/Kg	100	11/4/2019 11:42:30 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	1600	95		mg/Kg	10	10/31/2019 10:32:23 AM	48461
Motor Oil Range Organics (MRO)	1500	470		mg/Kg	10	10/31/2019 10:32:23 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 10:32:23 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 3:33:23 PM	48452
Surr: BFB	96.4	77.4-118		%Rec	1	10/30/2019 3:33:23 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 3:33:23 PM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 3:33:23 PM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 3:33:23 PM	48452
Xylenes, Total	ND	0.10		mg/Kg	1	10/30/2019 3:33:23 PM	48452
Surr: 4-Bromofluorobenzene	91.5	80-120		%Rec	1	10/30/2019 3:33:23 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-14 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 4:05:00 PM
Lab ID: 1910E47-014 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2600	300		mg/Kg	100	11/4/2019 11:54:55 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	4500	83		mg/Kg	10	10/31/2019 10:41:26 AM	48461
Motor Oil Range Organics (MRO)	3100	420		mg/Kg	10	10/31/2019 10:41:26 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 10:41:26 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 3:56:19 PM	48452
Surr: BFB	91.4	77.4-118		%Rec	1	10/30/2019 3:56:19 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 3:56:19 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 3:56:19 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 3:56:19 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 3:56:19 PM	48452
Surr: 4-Bromofluorobenzene	88.0	80-120		%Rec	1	10/30/2019 3:56:19 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-15 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 4:15:00 PM
Lab ID: 1910E47-015 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**MRA**
Chloride	8700	300		mg/Kg	100	11/5/2019 12:07:19 AM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	140	9.6		mg/Kg	1	11/1/2019 11:28:12 AM	48461
Motor Oil Range Organics (MRO)	94	48		mg/Kg	1	11/1/2019 11:28:12 AM	48461
Surr: DNOP	88.1	70-130		%Rec	1	11/1/2019 11:28:12 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 4:19:11 PM	48452
Surr: BFB	88.0	77.4-118		%Rec	1	10/30/2019 4:19:11 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.025		mg/Kg	1	10/30/2019 4:19:11 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 4:19:11 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 4:19:11 PM	48452
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 4:19:11 PM	48452
Surr: 4-Bromofluorobenzene	86.3	80-120		%Rec	1	10/30/2019 4:19:11 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-16 1'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 4:30:00 PM
Lab ID: 1910E47-016 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	100	60		mg/Kg	20	11/1/2019 4:48:38 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	10/31/2019 10:59:40 AM	48461
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/31/2019 10:59:40 AM	48461
Surr: DNOP	97.2	70-130		%Rec	1	10/31/2019 10:59:40 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	10/30/2019 4:42:00 PM	48452
Surr: BFB	93.0	77.4-118		%Rec	1	10/30/2019 4:42:00 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	10/30/2019 4:42:00 PM	48452
Toluene	ND	0.048		mg/Kg	1	10/30/2019 4:42:00 PM	48452
Ethylbenzene	ND	0.048		mg/Kg	1	10/30/2019 4:42:00 PM	48452
Xylenes, Total	ND	0.096		mg/Kg	1	10/30/2019 4:42:00 PM	48452
Surr: 4-Bromofluorobenzene	90.5	80-120		%Rec	1	10/30/2019 4:42:00 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-17 6"
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 4:35:00 PM
Lab ID: 1910E47-017 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	150	60		mg/Kg	20	11/1/2019 5:01:03 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	9.0		mg/Kg	1	10/31/2019 11:08:44 AM	48461
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	10/31/2019 11:08:44 AM	48461
Surr: DNOP	95.5	70-130		%Rec	1	10/31/2019 11:08:44 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 5:04:54 PM	48452
Surr: BFB	93.0	77.4-118		%Rec	1	10/30/2019 5:04:54 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 5:04:54 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 5:04:54 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 5:04:54 PM	48452
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 5:04:54 PM	48452
Surr: 4-Bromofluorobenzene	91.0	80-120		%Rec	1	10/30/2019 5:04:54 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-18 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 4:45:00 PM
Lab ID: 1910E47-018 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1900	60		mg/Kg	20	11/1/2019 5:13:27 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	4100	88		mg/Kg	10	10/31/2019 11:17:51 AM	48461
Motor Oil Range Organics (MRO)	2500	440		mg/Kg	10	10/31/2019 11:17:51 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 11:17:51 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 5:27:47 PM	48452
Surr: BFB	88.0	77.4-118		%Rec	1	10/30/2019 5:27:47 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.024		mg/Kg	1	10/30/2019 5:27:47 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 5:27:47 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 5:27:47 PM	48452
Xylenes, Total	ND	0.097		mg/Kg	1	10/30/2019 5:27:47 PM	48452
Surr: 4-Bromofluorobenzene	84.5	80-120		%Rec	1	10/30/2019 5:27:47 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-19 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 5:00:00 PM
Lab ID: 1910E47-019 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2300	60		mg/Kg	20	11/1/2019 5:25:51 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	9700	100		mg/Kg	10	10/31/2019 11:26:58 AM	48461
Motor Oil Range Organics (MRO)	5300	500		mg/Kg	10	10/31/2019 11:26:58 AM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 11:26:58 AM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	5.3	5.0		mg/Kg	1	10/30/2019 5:50:43 PM	48452
Surr: BFB	128	77.4-118	S	%Rec	1	10/30/2019 5:50:43 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 5:50:43 PM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 5:50:43 PM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 5:50:43 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 5:50:43 PM	48452
Surr: 4-Bromofluorobenzene	93.5	80-120		%Rec	1	10/30/2019 5:50:43 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-20 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 5:05:00 PM
Lab ID: 1910E47-020 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	940	60		mg/Kg	20	11/1/2019 5:38:16 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	4100	95		mg/Kg	10	10/31/2019 12:40:31 PM	48461
Motor Oil Range Organics (MRO)	2500	470		mg/Kg	10	10/31/2019 12:40:31 PM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 12:40:31 PM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	10/30/2019 6:36:25 PM	48452
Surr: BFB	134	77.4-118	S	%Rec	1	10/30/2019 6:36:25 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 6:36:25 PM	48452
Toluene	ND	0.050		mg/Kg	1	10/30/2019 6:36:25 PM	48452
Ethylbenzene	ND	0.050		mg/Kg	1	10/30/2019 6:36:25 PM	48452
Xylenes, Total	ND	0.099		mg/Kg	1	10/30/2019 6:36:25 PM	48452
Surr: 4-Bromofluorobenzene	99.3	80-120		%Rec	1	10/30/2019 6:36:25 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-21 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 5:10:00 PM
Lab ID: 1910E47-021 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2200	60		mg/Kg	20	11/1/2019 5:50:41 PM	48537
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	3400	87		mg/Kg	10	10/31/2019 12:49:23 PM	48461
Motor Oil Range Organics (MRO)	2100	440		mg/Kg	10	10/31/2019 12:49:23 PM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 12:49:23 PM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 6:59:15 PM	48452
Surr: BFB	101	77.4-118		%Rec	1	10/30/2019 6:59:15 PM	48452
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 6:59:15 PM	48452
Toluene	ND	0.049		mg/Kg	1	10/30/2019 6:59:15 PM	48452
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 6:59:15 PM	48452
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 6:59:15 PM	48452
Surr: 4-Bromofluorobenzene	92.1	80-120		%Rec	1	10/30/2019 6:59:15 PM	48452

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-22 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 5:15:00 PM
Lab ID: 1910E47-022 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	8200	300		mg/Kg	100	11/5/2019 12:19:44 AM	48547
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	3400	430		mg/Kg	50	10/31/2019 12:58:22 PM	48461
Motor Oil Range Organics (MRO)	2600	2200		mg/Kg	50	10/31/2019 12:58:22 PM	48461
Surr: DNOP	0	70-130	S	%Rec	50	10/31/2019 12:58:22 PM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	10/30/2019 9:59:12 PM	48453
Surr: BFB	123	77.4-118	S	%Rec	1	10/30/2019 9:59:12 PM	48453
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.025		mg/Kg	1	10/30/2019 9:59:12 PM	48453
Toluene	ND	0.049		mg/Kg	1	10/30/2019 9:59:12 PM	48453
Ethylbenzene	ND	0.049		mg/Kg	1	10/30/2019 9:59:12 PM	48453
Xylenes, Total	ND	0.098		mg/Kg	1	10/30/2019 9:59:12 PM	48453
Surr: 4-Bromofluorobenzene	116	80-120		%Rec	1	10/30/2019 9:59:12 PM	48453

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 **1910E47**
Date Reported: **11/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS19-23 0'
Project: Apache 25 Fed 6
Collection Date: 10/26/2019 5:30:00 PM
Lab ID: 1910E47-023 **Matrix:** SOIL **Received Date:** 10/29/2019 9:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**MRA**
Chloride	3000	150		mg/Kg	50	11/5/2019 12:32:09 AM	48547
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**BRM**
Diesel Range Organics (DRO)	1700	90		mg/Kg	10	10/31/2019 1:07:24 PM	48461
Motor Oil Range Organics (MRO)	2000	450		mg/Kg	10	10/31/2019 1:07:24 PM	48461
Surr: DNOP	0	70-130	S	%Rec	10	10/31/2019 1:07:24 PM	48461
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	10/31/2019 1:27:58 AM	48453
Surr: BFB	108	77.4-118		%Rec	1	10/31/2019 1:27:58 AM	48453
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.024		mg/Kg	1	10/31/2019 1:27:58 AM	48453
Toluene	ND	0.048		mg/Kg	1	10/31/2019 1:27:58 AM	48453
Ethylbenzene	ND	0.048		mg/Kg	1	10/31/2019 1:27:58 AM	48453
Xylenes, Total	ND	0.096		mg/Kg	1	10/31/2019 1:27:58 AM	48453
Surr: 4-Bromofluorobenzene	112	80-120		%Rec	1	10/31/2019 1:27:58 AM	48453

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#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **MB-48509** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **48509** RunNo: **64117**
Prep Date: **10/31/2019** Analysis Date: **10/31/2019** SeqNo: **2195081** Units: **mg/Kg**

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

Sample ID: **LCS-48509** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **48509** RunNo: **64117**
Prep Date: **10/31/2019** Analysis Date: **10/31/2019** SeqNo: **2195082** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	99.7	90	110			

Sample ID: **MB-48537** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **48537** RunNo: **64181**
Prep Date: **11/1/2019** Analysis Date: **11/1/2019** SeqNo: **2196181** Units: **mg/Kg**

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

Sample ID: **LCS-48537** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **48537** RunNo: **64181**
Prep Date: **11/1/2019** Analysis Date: **11/1/2019** SeqNo: **2196182** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	98.7	90	110			

Sample ID: **MB-48547** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **48547** RunNo: **64181**
Prep Date: **11/1/2019** Analysis Date: **11/1/2019** SeqNo: **2196221** Units: **mg/Kg**

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

Sample ID: **LCS-48547** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **48547** RunNo: **64181**
Prep Date: **11/1/2019** Analysis Date: **11/1/2019** SeqNo: **2196222** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	97.7	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **1910E04-001AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BatchQC** Batch ID: **48458** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193197** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.5		4.912		92.3	70	130			

Sample ID: **1910E04-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BatchQC** Batch ID: **48458** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193198** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.4		4.690		94.6	70	130	0	0	

Sample ID: **1910E04-023AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BatchQC** Batch ID: **48459** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193203** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	78	8.9	44.44	0	177	57	142			S
Surr: DNOP	4.5		4.444		101	70	130			

Sample ID: **1910E04-023AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BatchQC** Batch ID: **48459** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193204** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	42	9.0	45.25	0	93.9	57	142	59.5	20	R
Surr: DNOP	4.4		4.525		97.9	70	130	0	0	

Sample ID: **LCS-48458** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **48458** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193220** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.6		5.000		91.2	70	130			

Sample ID: **LCS-48459** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **48459** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193221** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	50.00	0	93.7	63.9	124			
Surr: DNOP	4.4		5.000		87.0	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **MB-48458** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **48458** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193222** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	10		10.00		102	70	130			

Sample ID: **MB-48459** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **48459** RunNo: **64089**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193223** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.3		10.00		93.4	70	130			

Sample ID: **LCS-48461** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **48461** RunNo: **64124**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2194392** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	50.00	0	94.8	63.9	124			
Surr: DNOP	4.4		5.000		87.5	70	130			

Sample ID: **MB-48461** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **48461** RunNo: **64124**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2194393** 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: **1910E47-006AMS** SampType: **MS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BS19-06 0'** Batch ID: **48461** RunNo: **64124**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2194411** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	70	9.3	46.69	50.14	41.9	57	142			S
Surr: DNOP	3.9		4.669		83.8	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **1910E47-006AMSD** SampType: **MSD** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BS19-06 0'** Batch ID: **48461** RunNo: **64124**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2194412** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	110	9.0	45.13	50.14	137	57	142	46.7	20	R
Surr: DNOP	3.7		4.513		81.0	70	130	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **1910E04-002AMS** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **G64058** RunNo: **64076**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193021** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	630		588.9		108	77.4	118			

Sample ID: **1910E04-002AMSD** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **G64058** RunNo: **64076**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193022** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	650		588.9		110	77.4	118	0	0	

Sample ID: **MB-48446** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **48446** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193023** 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		99.9	77.4	118			

Sample ID: **LCS-48446** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **48446** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193024** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	91.5	80	120			
Surr: BFB	1100		1000		108	77.4	118			

Sample ID: **1910D68-005AMS** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **48446** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193028** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	4.8	23.81	0	103	69.1	142			
Surr: BFB	1100		952.4		113	77.4	118			

Sample ID: **1910D68-005AMSD** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **48446** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193029** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	4.7	23.70	0	96.2	69.1	142	7.26	20	
Surr: BFB	1000		947.9		110	77.4	118	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#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **MB-48453**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **48453**	RunNo: **64076**							
Prep Date: **10/29/2019**	Analysis Date: **10/31/2019**	SeqNo: **2193052**	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		100	77.4	118			

Sample ID: **LCS-48453**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **48453**	RunNo: **64076**							
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193053**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	5.0	25.00	0	84.4	80	120			
Surr: BFB	1100		1000		109	77.4	118			

Sample ID: **1910E47-022AMS**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BS19-22 0'**	Batch ID: **48453**	RunNo: **64076**							
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193055**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	1.752	100	69.1	142			
Surr: BFB	1300		1000		132	77.4	118			S

Sample ID: **1910E47-022AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **BS19-22 0'**	Batch ID: **48453**	RunNo: **64076**							
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193056**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	24.78	1.752	88.7	69.1	142	12.2	20	
Surr: BFB	1200		991.1		116	77.4	118	0	0	

Sample ID: **MB-48452**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **PBS**	Batch ID: **48452**	RunNo: **64077**							
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193097**	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	930		1000		93.4	77.4	118			

Sample ID: **LCS-48452**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**							
Client ID: **LCSS**	Batch ID: **48452**	RunNo: **64077**							
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193098**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **LCS-48452** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **48452** RunNo: **64077**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193098** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	96.8	80	120			
Surr: BFB	1000		1000		105	77.4	118			

Sample ID: **1910E47-002AMS** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BS19-02 0'** Batch ID: **48452** RunNo: **64077**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193101** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	4.9	24.53	0	104	69.1	142			
Surr: BFB	1000		981.4		105	77.4	118			

Sample ID: **1910E47-002AMSD** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BS19-02 0'** Batch ID: **48452** RunNo: **64077**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193102** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	5.0	24.78	0	111	69.1	142	7.44	20	
Surr: BFB	1100		991.1		106	77.4	118	0	0	

Sample ID: **RB** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **G64077** RunNo: **64077**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193126** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	990		1000		98.7	77.4	118			

Sample ID: **2.5UG GRO LCS** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **G64077** RunNo: **64077**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193135** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		113	77.4	118			

Sample ID: **1910E04-022AMS** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **G64077** RunNo: **64077**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193138** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	830		813.0		102	77.4	118			

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#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **1910E04-022AMSD** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **G64077** RunNo: **64077**
Prep Date: Analysis Date: **10/30/2019** SeqNo: **2193140** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	810		813.0		100	77.4	118	0	0	

Sample ID: **MB-48491** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS** Batch ID: **48491** RunNo: **64127**
Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194628** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1000		1000		100	77.4	118			

Sample ID: **LCS-48491** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS** Batch ID: **48491** RunNo: **64127**
Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194629** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		112	77.4	118			

Sample ID: **1910E99-001AMS** SampType: **MS** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **48491** RunNo: **64127**
Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194634** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	6100		1918		318	77.4	118			S

Sample ID: **1910E99-001AMSD** SampType: **MSD** TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BatchQC** Batch ID: **48491** RunNo: **64127**
Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194636** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	6100		1903		320	77.4	118	0	0	S

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **MB-48446**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **48446**	RunNo: **64076**
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193064** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		106	80	120			

Sample ID: **LCS-48453**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **48453**	RunNo: **64076**
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193065** 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	101	80	120			
Toluene	1.0	0.050	1.000	0	100	80	120			
Ethylbenzene	0.98	0.050	1.000	0	98.4	80	120			
Xylenes, Total	3.0	0.10	3.000	0	99.8	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		105	80	120			

Sample ID: **1910E03-001AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BatchQC**	Batch ID: **48446**	RunNo: **64076**
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193068** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.90	0.023	0.9268	0	96.8	76	123			
Toluene	0.91	0.046	0.9268	0.009693	97.3	80.3	127			
Ethylbenzene	0.90	0.046	0.9268	0	96.8	80.2	131			
Xylenes, Total	2.7	0.093	2.780	0	97.4	78	133			
Surr: 4-Bromofluorobenzene	1.0		0.9268		111	80	120			

Sample ID: **1910E03-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BatchQC**	Batch ID: **48446**	RunNo: **64076**
Prep Date: **10/29/2019**	Analysis Date: **10/30/2019**	SeqNo: **2193070** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.024	0.9479	0	96.6	76	123	2.09	20	
Toluene	0.93	0.047	0.9479	0.009693	96.8	80.3	127	1.74	20	
Ethylbenzene	0.92	0.047	0.9479	0	97.4	80.2	131	2.93	20	
Xylenes, Total	2.8	0.095	2.844	0	98.5	78	133	3.29	20	
Surr: 4-Bromofluorobenzene	1.0		0.9479		109	80	120	0	0	

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**
05-Nov-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 6

Sample ID: **MB-48453** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS** Batch ID: **48453** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193088** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Sample ID: **1910E47-023AMS** SampType: **MS** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BS19-23 0'** Batch ID: **48453** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193092** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	0.9940	0	101	76	123			
Toluene	1.0	0.050	0.9940	0.01263	103	80.3	127			
Ethylbenzene	1.0	0.050	0.9940	0.01080	100	80.2	131			
Xylenes, Total	3.0	0.099	2.982	0.03288	99.6	78	133			
Surr: 4-Bromofluorobenzene	1.0		0.9940		104	80	120			

Sample ID: **1910E47-023AMSD** SampType: **MSD** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **BS19-23 0'** Batch ID: **48453** RunNo: **64076**
Prep Date: **10/29/2019** Analysis Date: **10/31/2019** SeqNo: **2193093** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.024	0.9794	0	106	76	123	3.43	20	
Toluene	1.0	0.049	0.9794	0.01263	105	80.3	127	0.559	20	
Ethylbenzene	1.0	0.049	0.9794	0.01080	102	80.2	131	0.471	20	
Xylenes, Total	3.0	0.098	2.938	0.03288	102	78	133	0.431	20	
Surr: 4-Bromofluorobenzene	0.98		0.9794		101	80	120	0	0	

Sample ID: **MB-48452** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS** Batch ID: **48452** RunNo: **64077**
Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193157** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.92		1.000		92.4	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **LCS-48452** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **48452** RunNo: **64077**

Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193158** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	91.1	80	120			
Toluene	0.94	0.050	1.000	0	94.3	80	120			
Ethylbenzene	0.93	0.050	1.000	0	93.1	80	120			
Xylenes, Total	2.7	0.10	3.000	0	91.2	80	120			
Surr: 4-Bromofluorobenzene	0.94		1.000		94.1	80	120			

Sample ID: **1910E47-003AMS** SampType: **MS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BS19-03 0'** Batch ID: **48452** RunNo: **64077**

Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193161** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	0.9960	0.01082	95.4	76	123			
Toluene	1.0	0.050	0.9960	0.01170	99.8	80.3	127			
Ethylbenzene	1.0	0.050	0.9960	0.01216	99.5	80.2	131			
Xylenes, Total	2.9	0.10	2.988	0.03110	96.9	78	133			
Surr: 4-Bromofluorobenzene	0.93		0.9960		93.1	80	120			

Sample ID: **1910E47-003AMSD** SampType: **MSD** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BS19-03 0'** Batch ID: **48452** RunNo: **64077**

Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193162** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.025	0.9980	0.01082	92.2	76	123	3.17	20	
Toluene	0.98	0.050	0.9980	0.01170	97.2	80.3	127	2.42	20	
Ethylbenzene	0.97	0.050	0.9980	0.01216	95.8	80.2	131	3.62	20	
Xylenes, Total	2.9	0.10	2.994	0.03110	94.8	78	133	2.02	20	
Surr: 4-Bromofluorobenzene	0.93		0.9980		93.1	80	120	0	0	

Sample ID: **LCS-48446** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **48446** RunNo: **64076**

Prep Date: **10/29/2019** Analysis Date: **10/30/2019** SeqNo: **2193181** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.99	0.025	1.000	0	99.2	80	120			
Toluene	1.0	0.050	1.000	0	99.6	80	120			
Ethylbenzene	0.99	0.050	1.000	0	99.1	80	120			
Xylenes, Total	3.0	0.10	3.000	0	99.7	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		109	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1910E47**

05-Nov-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 6

Sample ID: **MB-48491** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **PBS** Batch ID: **48491** RunNo: **64127**

Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194655** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		108	80	120			

Sample ID: **LCS-48491** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **48491** RunNo: **64127**

Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194656** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		110	80	120			

Sample ID: **1910E99-002AMS** SampType: **MS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BatchQC** Batch ID: **48491** RunNo: **64127**

Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194660** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		0.9950		114	80	120			

Sample ID: **1910E99-002AMSD** SampType: **MSD** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BatchQC** Batch ID: **48491** RunNo: **64127**

Prep Date: **10/30/2019** Analysis Date: **10/31/2019** SeqNo: **2194661** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		0.9950		114	80	120	0	0	

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: VERTEX CARLSBAD Work Order Number: 1910E47 RcptNo: 1

Received By: Juan Rojas 10/29/2019 9:15:00 AM

Completed By: Yazmine Garduno 10/29/2019 10:16:44 AM Yazmine Garduno

Reviewed By: LB 10/29/19

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: DAD 10/29/19

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.4	Good				
2	1.0	Good				
3	0.2	Good				

Chain-of-Custody Record

Client: Vertex Resource Services

Mailing Address: on file

Phone #: on file

email or Fax#: on file

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☒ Standard ☐ Rush

Project Name: Apache 25 Fed 6

Project #: 19E-00575

Project Manager: Dennis Williams Permian@Vertex.ca; Amanda Davis Amanda.Davis@OVN.com; Natalie Gordon NGordon@Vertex.ca

Sampler: Jason Crabtree

On Ice: ☒ Yes ☐ No

# of Coolers: 3

Cooler Temp(including CF): See Remarks (°C)

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

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1910E47	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)
10/26/19	2:00 pm	Soil	BS19 - 01 0'	1 Jar	ice	-001	X	X					X			
	2:05		BS19 - 02 0'			-002	X	X					X			
	2:10		BS19 - 03 0'			-003	X	X					X			
	2:15		BS19 - 04 2'			-004	X	X					X			
	2:20		WS19 - 05 2'			-005	X	X					X			
	2:25		BS19 - 06 0'			-006	X	X					X			
	2:35		BS19 - 07 0'			-007	X	X					X			
	2:45		BS19 - 08 0'			-008	X	X					X			
	3:00		BS19 - 09 0'			-009	X	X					X			
	3:15		BS19 - 10 0'			-010	X	X					X			
	3:30		BS19 - 11 0'			-011	X	X					X			
	3:45		BS19 - 12 0'			-012	X	X					X			

Analysis Request

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
10-27-19	11:00					
10/28/19	1900			carrier	10/29/19	9:15

Remarks: 2.3 + 0.1 = 2.4
0.9 + 0.1 = 1.0
0.1 + 0.1 = 0.2

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

Chain-of-Custody Record

Client: Vertex Resource Services

Mailing Address: on file

Phone #: on file

email or Fax#: on file

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☒ Standard ☐ Rush

Project Name: Apache 25 Fed 6

Project #: ~~Apache 25 Fed 6~~ 19E-00575

Project Manager: Dennis Williams Dennisn@vertex.ca; Amanda Davis Amanda.Davis@DVN.com; Natalie Gordon NGordon@vertex.ca

Sampler: Jason Crabtree

On Ice: ☒ Yes ☐ No

# of Coolers: 3

Cooler Temp(including CF): See Remarks

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. 1910E47	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)
10/26/19	4:00	Soil	BS19-13 0'	1 Jar	Ice	-013	X	X					X			
	4:05		BS19-14 0'			-014	X	X					X			
	4:15		BS19-15 0'			-015	X	X					X			
	4:30		BS19-16 1'			-016	X	X					X			
	4:35		BS19-17 6"			-017	X	X					X			
	4:45		BS19-18 0'			-018	X	X					X			
	5:00		BS19-19 0'			-019	X	X					X			
	5:05		BS19-20 0'			-020	X	X					X			
	5:10		BS19-21 0'			-021	X	X					X			
	5:15		BS19-22 0'			-022	X	X					X			
	5:30		BS19-23 0'			-023	X	X					X			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
10-27-19	11:00				10/27	1100
10/28/19	1440			carrier	10/29/19	9:15

Remarks: 2.3 + 0.1 = 2.4
0.9 + 0.1 = 1.0
0.1 + 0.1 = 0.2

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

December 05, 2019

Natalie Gordon

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

RE: Apache 25 FED 6 OrderNo.: 1911B26

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 9 sample(s) on 11/23/2019 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

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-02
Project: Apache 25 FED 6
Collection Date: 11/21/2019 1:00:00 PM
Lab ID: 1911B26-001 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	13	9.9		mg/Kg	1	11/27/2019 4:34:29 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/27/2019 4:34:29 PM
Surr: DNOP	86.0	70-130		%Rec	1	11/27/2019 4:34:29 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	11/27/2019 5:47:43 PM
Surr: BFB	110	77.4-118		%Rec	1	11/27/2019 5:47:43 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 5:47:43 PM
Toluene	ND	0.048		mg/Kg	1	11/27/2019 5:47:43 PM
Ethylbenzene	ND	0.048		mg/Kg	1	11/27/2019 5:47:43 PM
Xylenes, Total	ND	0.095		mg/Kg	1	11/27/2019 5:47:43 PM
Surr: 4-Bromofluorobenzene	105	80-120		%Rec	1	11/27/2019 5:47:43 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	1700	60		mg/Kg	20	12/3/2019 11:50:06 AM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-03
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 1:00:00 PM
Lab ID: 1911B26-002 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	11/27/2019 4:43:36 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/27/2019 4:43:36 PM
Surr: DNOP	100	70-130		%Rec	1	11/27/2019 4:43:36 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/27/2019 6:11:09 PM
Surr: BFB	105	77.4-118		%Rec	1	11/27/2019 6:11:09 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	11/27/2019 6:11:09 PM
Toluene	ND	0.047		mg/Kg	1	11/27/2019 6:11:09 PM
Ethylbenzene	ND	0.047		mg/Kg	1	11/27/2019 6:11:09 PM
Xylenes, Total	ND	0.094		mg/Kg	1	11/27/2019 6:11:09 PM
Surr: 4-Bromofluorobenzene	100	80-120		%Rec	1	11/27/2019 6:11:09 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	100	60		mg/Kg	20	12/3/2019 12:51:51 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-07
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 1:00:00 PM
Lab ID: 1911B26-003 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	12/2/2019 10:19:05 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/2/2019 10:19:05 AM
Surr: DNOP	90.3	70-130		%Rec	1	12/2/2019 10:19:05 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	11/27/2019 6:34:35 PM
Surr: BFB	107	77.4-118		%Rec	1	11/27/2019 6:34:35 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	11/27/2019 6:34:35 PM
Toluene	ND	0.046		mg/Kg	1	11/27/2019 6:34:35 PM
Ethylbenzene	ND	0.046		mg/Kg	1	11/27/2019 6:34:35 PM
Xylenes, Total	ND	0.092		mg/Kg	1	11/27/2019 6:34:35 PM
Surr: 4-Bromofluorobenzene	103	80-120		%Rec	1	11/27/2019 6:34:35 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	2000	59		mg/Kg	20	12/3/2019 1:04:12 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-11
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 1:00:00 PM
Lab ID: 1911B26-004 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	11/27/2019 5:01:52 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/27/2019 5:01:52 PM
Surr: DNOP	79.4	70-130		%Rec	1	11/27/2019 5:01:52 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/27/2019 6:57:58 PM
Surr: BFB	101	77.4-118		%Rec	1	11/27/2019 6:57:58 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 6:57:58 PM
Toluene	ND	0.049		mg/Kg	1	11/27/2019 6:57:58 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/27/2019 6:57:58 PM
Xylenes, Total	ND	0.097		mg/Kg	1	11/27/2019 6:57:58 PM
Surr: 4-Bromofluorobenzene	95.9	80-120		%Rec	1	11/27/2019 6:57:58 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	1600	60		mg/Kg	20	12/3/2019 1:16:33 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-12
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 3:30:00 PM
Lab ID: 1911B26-005 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	20	9.2		mg/Kg	1	11/27/2019 5:10:59 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/27/2019 5:10:59 PM
Surr: DNOP	95.9	70-130		%Rec	1	11/27/2019 5:10:59 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/27/2019 7:21:20 PM
Surr: BFB	107	77.4-118		%Rec	1	11/27/2019 7:21:20 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 7:21:20 PM
Toluene	ND	0.047		mg/Kg	1	11/27/2019 7:21:20 PM
Ethylbenzene	ND	0.047		mg/Kg	1	11/27/2019 7:21:20 PM
Xylenes, Total	ND	0.094		mg/Kg	1	11/27/2019 7:21:20 PM
Surr: 4-Bromofluorobenzene	102	80-120		%Rec	1	11/27/2019 7:21:20 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	1600	60		mg/Kg	20	12/3/2019 1:28:54 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-13
Project: Apache 25 FED 6
Collection Date: 11/21/2019 3:30:00 PM
Lab ID: 1911B26-006 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	110	9.8		mg/Kg	1	12/3/2019 10:49:06 AM
Motor Oil Range Organics (MRO)	99	49		mg/Kg	1	12/3/2019 10:49:06 AM
Surr: DNOP	106	70-130		%Rec	1	12/3/2019 10:49:06 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/27/2019 7:44:39 PM
Surr: BFB	102	77.4-118		%Rec	1	11/27/2019 7:44:39 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 7:44:39 PM
Toluene	ND	0.047		mg/Kg	1	11/27/2019 7:44:39 PM
Ethylbenzene	ND	0.047		mg/Kg	1	11/27/2019 7:44:39 PM
Xylenes, Total	ND	0.095		mg/Kg	1	11/27/2019 7:44:39 PM
Surr: 4-Bromofluorobenzene	97.6	80-120		%Rec	1	11/27/2019 7:44:39 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	1100	61		mg/Kg	20	12/3/2019 1:41:15 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-14
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 3:30:00 PM
Lab ID: 1911B26-007 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	21	10		mg/Kg	1	11/27/2019 5:29:09 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/27/2019 5:29:09 PM
Surr: DNOP	90.9	70-130		%Rec	1	11/27/2019 5:29:09 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	11/27/2019 8:07:55 PM
Surr: BFB	102	77.4-118		%Rec	1	11/27/2019 8:07:55 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 8:07:55 PM
Toluene	ND	0.048		mg/Kg	1	11/27/2019 8:07:55 PM
Ethylbenzene	ND	0.048		mg/Kg	1	11/27/2019 8:07:55 PM
Xylenes, Total	ND	0.096		mg/Kg	1	11/27/2019 8:07:55 PM
Surr: 4-Bromofluorobenzene	97.3	80-120		%Rec	1	11/27/2019 8:07:55 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	940	61		mg/Kg	20	12/3/2019 1:53:34 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-18
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 2:00:00 PM
Lab ID: 1911B26-008 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	11/27/2019 5:38:12 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/27/2019 5:38:12 PM
Surr: DNOP	100	70-130		%Rec	1	11/27/2019 5:38:12 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	11/27/2019 8:31:12 PM
Surr: BFB	102	77.4-118		%Rec	1	11/27/2019 8:31:12 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.023		mg/Kg	1	11/27/2019 8:31:12 PM
Toluene	ND	0.046		mg/Kg	1	11/27/2019 8:31:12 PM
Ethylbenzene	ND	0.046		mg/Kg	1	11/27/2019 8:31:12 PM
Xylenes, Total	ND	0.092		mg/Kg	1	11/27/2019 8:31:12 PM
Surr: 4-Bromofluorobenzene	98.0	80-120		%Rec	1	11/27/2019 8:31:12 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	110	60		mg/Kg	20	12/3/2019 2:05:55 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911B26**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-19
Project: Apache 25 FED 6 **Collection Date:** 11/21/2019 2:00:00 PM
Lab ID: 1911B26-009 **Matrix:** SOIL **Received Date:** 11/23/2019 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	22	9.7		mg/Kg	1	11/27/2019 5:47:27 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/27/2019 5:47:27 PM
Surr: DNOP	90.1	70-130		%Rec	1	11/27/2019 5:47:27 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/27/2019 8:54:26 PM
Surr: BFB	105	77.4-118		%Rec	1	11/27/2019 8:54:26 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.024		mg/Kg	1	11/27/2019 8:54:26 PM
Toluene	ND	0.049		mg/Kg	1	11/27/2019 8:54:26 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/27/2019 8:54:26 PM
Xylenes, Total	ND	0.097		mg/Kg	1	11/27/2019 8:54:26 PM
Surr: 4-Bromofluorobenzene	101	80-120		%Rec	1	11/27/2019 8:54:26 PM
EPA METHOD 300.0: ANIONS						Analyst: **CJS**
Chloride	200	60		mg/Kg	20	12/3/2019 2:18:17 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
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#: **1911B26**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 FED 6

Sample ID: **MB-49115**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **49115**	RunNo: **64888**							
Prep Date: **12/3/2019**	Analysis Date: **12/3/2019**	SeqNo: **2226023**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-49115**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **49115**	RunNo: **64888**							
Prep Date: **12/3/2019**	Analysis Date: **12/3/2019**	SeqNo: **2226024**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.8	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911B26**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 FED 6

Sample ID: **LCS-49026** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **49026** RunNo: **64812**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222660** 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	4.3		5.000		85.4	70	130			

Sample ID: **MB-49026** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **PBS** Batch ID: **49026** RunNo: **64812**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222661** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.1		10.00		91.1	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911B26**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 FED 6

Sample ID: **MB-49032** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **PBS** Batch ID: **49032** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222414** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		113	77.4	118			

Sample ID: **LCS-49032** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **LCSS** Batch ID: **49032** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222415** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	105	80	120			
Surr: BFB	1300		1000		129	77.4	118			S

Sample ID: **MB-49037** SampType: **MBLK** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **PBS** Batch ID: **49037** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222438** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1100		1000		108	77.4	118			

Sample ID: **LCS-49037** SampType: **LCS** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **LCSS** Batch ID: **49037** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222439** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	1200		1000		122	77.4	118			S

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911B26**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 FED 6

Sample ID: **MB-49032** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **PBS** Batch ID: **49032** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222464** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Sample ID: **LCS-49032** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **49032** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222465** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.025	1.000	0	94.3	80	120			
Toluene	0.98	0.050	1.000	0	98.4	80	120			
Ethylbenzene	0.99	0.050	1.000	0	99.0	80	120			
Xylenes, Total	3.0	0.10	3.000	0	99.2	80	120			
Surr: 4-Bromofluorobenzene	1.2		1.000		118	80	120			

Sample ID: **MB-49037** SampType: **MBLK** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **PBS** Batch ID: **49037** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222488** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.0		1.000		103	80	120			

Sample ID: **LCS-49037** SampType: **LCS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **LCSS** Batch ID: **49037** RunNo: **64830**

Prep Date: **11/26/2019** Analysis Date: **11/27/2019** SeqNo: **2222489** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		107	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **VERTEX CARLSBAD** Work Order Number: **1911B26** RcptNo: **1**

Received By: **Yazmine Garduno** **11/23/2019 9:30:00 AM** Yazmine Garduno

Completed By: **Yazmine Garduno** **11/23/2019 11:56:24 AM** Yazmine Garduno

Reviewed By: DM 11/25/19

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: ENM 11/25/19

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.7	Good				
2	1.6	Good				
3	0.8	Good				
4	NA	Good				

Chain-of-Custody Record

Client: VERTEX RESOURCE GROUP

Mailing Address: ON FILE

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush

Project Name: APACHE 25 FED 6

Project #: 19E-00575-020

Project Manager: Natalie Gordon

Sampler: N. GORDON

On Ice: ☒ Yes ☐ No

# of Coolers: 4

Cooler Temp(including CF): Remark

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. 1911B24	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)
11/21	1300	soil	BS 19-02	1 jar	ICE	-001	X	X					X			
			BS 19-03			-002										
			BS 19-07			-003										
	↓		BS 19-11			-004										
	1530		BS 19-12			-005										
			BS 19-13			-006										
	↓		BS 19-14			-007										
	1400		BS 19-18			-008										
↓	↓	↓	BS 19-19	↓	↓	-009	↓	↓					↓			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11/22/19	1400			Courier	11/22	1400
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11/22	1900			Courier	11/23/19	0930

Remarks:
1.7 +0.2 = 1.9
1.4 +0.2 = 1.6
0.6 +0.2 = 0.8

4th cooler
NA air bags
YB 11/23/19

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

December 05, 2019

Natalie Gordon

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

RE: Apache 25 Fed 06 OrderNo.: 1911C61

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 7 sample(s) on 11/27/2019 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 **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: WS19-05 1'
Project: Apache 25 Fed 06
Collection Date: 11/25/2019 11:00:00 AM
Lab ID: 1911C61-001 **Matrix:** SOIL
Received Date: 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	100	8.4		mg/Kg	1	12/4/2019 5:52:49 PM
Motor Oil Range Organics (MRO)	81	42		mg/Kg	1	12/4/2019 5:52:49 PM
Surr: DNOP	109	70-130		%Rec	1	12/4/2019 5:52:49 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	750	60		mg/Kg	20	12/4/2019 6:03:39 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.023		mg/Kg	1	12/2/2019 7:26:26 PM
Toluene	ND	0.046		mg/Kg	1	12/2/2019 7:26:26 PM
Ethylbenzene	ND	0.046		mg/Kg	1	12/2/2019 7:26:26 PM
Xylenes, Total	ND	0.093		mg/Kg	1	12/2/2019 7:26:26 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	12/2/2019 7:26:26 PM
Surr: 4-Bromofluorobenzene	87.6	70-130		%Rec	1	12/2/2019 7:26:26 PM
Surr: Dibromofluoromethane	118	70-130		%Rec	1	12/2/2019 7:26:26 PM
Surr: Toluene-d8	101	70-130		%Rec	1	12/2/2019 7:26:26 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	12/2/2019 7:26:26 PM
Surr: BFB	93.5	70-130		%Rec	1	12/2/2019 7:26:26 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-13 1'
Project: Apache 25 Fed 06
Collection Date: 11/25/2019 11:00:00 AM
Lab ID: 1911C61-002 **Matrix:** SOIL
Received Date: 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	20	7.8		mg/Kg	1	12/3/2019 2:27:55 PM
Motor Oil Range Organics (MRO)	ND	39		mg/Kg	1	12/3/2019 2:27:55 PM
Surr: DNOP	95.5	70-130		%Rec	1	12/3/2019 2:27:55 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	400	60		mg/Kg	20	12/4/2019 6:15:59 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.023		mg/Kg	1	12/2/2019 7:54:58 PM
Toluene	ND	0.047		mg/Kg	1	12/2/2019 7:54:58 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/2/2019 7:54:58 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/2/2019 7:54:58 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	12/2/2019 7:54:58 PM
Surr: 4-Bromofluorobenzene	92.4	70-130		%Rec	1	12/2/2019 7:54:58 PM
Surr: Dibromofluoromethane	119	70-130		%Rec	1	12/2/2019 7:54:58 PM
Surr: Toluene-d8	101	70-130		%Rec	1	12/2/2019 7:54:58 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/2/2019 7:54:58 PM
Surr: BFB	92.9	70-130		%Rec	1	12/2/2019 7:54:58 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-20 2'
Project: Apache 25 Fed 06 **Collection Date:** 11/25/2019 1:30:00 PM
Lab ID: 1911C61-003 **Matrix:** SOIL **Received Date:** 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	120	8.6		mg/Kg	1	12/4/2019 6:36:48 PM
Motor Oil Range Organics (MRO)	110	43		mg/Kg	1	12/4/2019 6:36:48 PM
Surr: DNOP	99.5	70-130		%Rec	1	12/4/2019 6:36:48 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	130	60		mg/Kg	20	12/4/2019 6:28:21 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.023		mg/Kg	1	12/2/2019 8:23:29 PM
Toluene	ND	0.047		mg/Kg	1	12/2/2019 8:23:29 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/2/2019 8:23:29 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/2/2019 8:23:29 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	12/2/2019 8:23:29 PM
Surr: 4-Bromofluorobenzene	82.9	70-130		%Rec	1	12/2/2019 8:23:29 PM
Surr: Dibromofluoromethane	119	70-130		%Rec	1	12/2/2019 8:23:29 PM
Surr: Toluene-d8	102	70-130		%Rec	1	12/2/2019 8:23:29 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/2/2019 8:23:29 PM
Surr: BFB	95.4	70-130		%Rec	1	12/2/2019 8:23:29 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-21 1'
Project: Apache 25 Fed 06
Collection Date: 11/25/2019 12:00:00 PM
Lab ID: 1911C61-004 **Matrix:** SOIL
Received Date: 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	110	8.0		mg/Kg	1	12/4/2019 6:58:38 PM
Motor Oil Range Organics (MRO)	110	40		mg/Kg	1	12/4/2019 6:58:38 PM
Surr: DNOP	98.7	70-130		%Rec	1	12/4/2019 6:58:38 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	220	60		mg/Kg	20	12/4/2019 11:12:21 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	12/2/2019 8:52:00 PM
Toluene	ND	0.047		mg/Kg	1	12/2/2019 8:52:00 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/2/2019 8:52:00 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/2/2019 8:52:00 PM
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	1	12/2/2019 8:52:00 PM
Surr: 4-Bromofluorobenzene	89.8	70-130		%Rec	1	12/2/2019 8:52:00 PM
Surr: Dibromofluoromethane	115	70-130		%Rec	1	12/2/2019 8:52:00 PM
Surr: Toluene-d8	102	70-130		%Rec	1	12/2/2019 8:52:00 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/2/2019 8:52:00 PM
Surr: BFB	97.5	70-130		%Rec	1	12/2/2019 8:52:00 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-21 1.5'
Project: Apache 25 Fed 06
Collection Date: 11/25/2019 12:00:00 PM
Lab ID: 1911C61-005 **Matrix:** SOIL
Received Date: 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	14	9.2		mg/Kg	1	12/3/2019 2:55:38 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/3/2019 2:55:38 PM
Surr: DNOP	115	70-130		%Rec	1	12/3/2019 2:55:38 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	440	60		mg/Kg	20	12/4/2019 11:24:42 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	12/2/2019 9:20:34 PM
Toluene	ND	0.047		mg/Kg	1	12/2/2019 9:20:34 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/2/2019 9:20:34 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/2/2019 9:20:34 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	12/2/2019 9:20:34 PM
Surr: 4-Bromofluorobenzene	86.6	70-130		%Rec	1	12/2/2019 9:20:34 PM
Surr: Dibromofluoromethane	118	70-130		%Rec	1	12/2/2019 9:20:34 PM
Surr: Toluene-d8	102	70-130		%Rec	1	12/2/2019 9:20:34 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/2/2019 9:20:34 PM
Surr: BFB	94.0	70-130		%Rec	1	12/2/2019 9:20:34 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS 19-22 1'
Project: Apache 25 Fed 06
Collection Date: 11/25/2019 12:00:00 PM
Lab ID: 1911C61-006 **Matrix:** SOIL
Received Date: 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	23	8.5		mg/Kg	1	12/3/2019 3:04:52 PM
Motor Oil Range Organics (MRO)	ND	43		mg/Kg	1	12/3/2019 3:04:52 PM
Surr: DNOP	72.6	70-130		%Rec	1	12/3/2019 3:04:52 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	290	60		mg/Kg	20	12/4/2019 11:37:04 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	12/2/2019 9:49:01 PM
Toluene	ND	0.049		mg/Kg	1	12/2/2019 9:49:01 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/2/2019 9:49:01 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/2/2019 9:49:01 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	12/2/2019 9:49:01 PM
Surr: 4-Bromofluorobenzene	92.1	70-130		%Rec	1	12/2/2019 9:49:01 PM
Surr: Dibromofluoromethane	121	70-130		%Rec	1	12/2/2019 9:49:01 PM
Surr: Toluene-d8	104	70-130		%Rec	1	12/2/2019 9:49:01 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/2/2019 9:49:01 PM
Surr: BFB	97.3	70-130		%Rec	1	12/2/2019 9:49:01 PM

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

Qualifiers:

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

Analytical Report
Lab Order **1911C61**
Date Reported: **12/5/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS 19-23 2'
Project: Apache 25 Fed 06 **Collection Date:** 11/25/2019 2:00:00 PM
Lab ID: 1911C61-007 **Matrix:** SOIL **Received Date:** 11/27/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	68	9.0		mg/Kg	1	12/4/2019 7:20:36 PM
Motor Oil Range Organics (MRO)	75	45		mg/Kg	1	12/4/2019 7:20:36 PM
Surr: DNOP	87.2	70-130		%Rec	1	12/4/2019 7:20:36 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	150	60		mg/Kg	20	12/4/2019 11:49:25 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	12/3/2019 12:39:18 AM
Toluene	ND	0.050		mg/Kg	1	12/3/2019 12:39:18 AM
Ethylbenzene	ND	0.050		mg/Kg	1	12/3/2019 12:39:18 AM
Xylenes, Total	ND	0.099		mg/Kg	1	12/3/2019 12:39:18 AM
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	1	12/3/2019 12:39:18 AM
Surr: 4-Bromofluorobenzene	91.5	70-130		%Rec	1	12/3/2019 12:39:18 AM
Surr: Dibromofluoromethane	113	70-130		%Rec	1	12/3/2019 12:39:18 AM
Surr: Toluene-d8	101	70-130		%Rec	1	12/3/2019 12:39:18 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/3/2019 12:39:18 AM
Surr: BFB	96.3	70-130		%Rec	1	12/3/2019 12:39:18 AM

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

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911C61**
05-Dec-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 06

Sample ID: **MB-49148** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **49148** RunNo: **64920**
Prep Date: **12/4/2019** Analysis Date: **12/4/2019** SeqNo: **2227355** Units: **mg/Kg**

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

Sample ID: **LCS-49148** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **49148** RunNo: **64920**
Prep Date: **12/4/2019** Analysis Date: **12/4/2019** SeqNo: **2227356** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.1	90	110			

Sample ID: **MB-49160** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **49160** RunNo: **64920**
Prep Date: **12/4/2019** Analysis Date: **12/4/2019** SeqNo: **2227398** Units: **mg/Kg**

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

Sample ID: **LCS-49160** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **49160** RunNo: **64920**
Prep Date: **12/4/2019** Analysis Date: **12/4/2019** SeqNo: **2227400** 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.
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#: **1911C61**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 06

Sample ID: **LCS-49089** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **49089** RunNo: **64876**

Prep Date: **12/2/2019** Analysis Date: **12/3/2019** SeqNo: **2224924** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	10	50.00	0	88.9	63.9	124			
Surr: DNOP	4.1		5.000		82.7	70	130			

Sample ID: **MB-49089** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **PBS** Batch ID: **49089** RunNo: **64876**

Prep Date: **12/2/2019** Analysis Date: **12/3/2019** SeqNo: **2224925** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.5		10.00		85.3	70	130			

Sample ID: **LCS-49093** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **LCSS** Batch ID: **49093** RunNo: **64876**

Prep Date: **12/2/2019** Analysis Date: **12/3/2019** SeqNo: **2225772** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	3.7		5.000		74.5	70	130			

Sample ID: **MB-49093** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**

Client ID: **PBS** Batch ID: **49093** RunNo: **64876**

Prep Date: **12/2/2019** Analysis Date: **12/3/2019** SeqNo: **2225773** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	7.9		10.00		79.3	70	130			

Qualifiers:

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

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1911C61**
05-Dec-19

Client: Vertex Resource Group Ltd.
Project: Apache 25 Fed 06

Sample ID: **lcs-49064** SampType: **LCS** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS** Batch ID: **49064** RunNo: **64875**
Prep Date: **11/27/2019** Analysis Date: **12/2/2019** SeqNo: **2224128** 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	104	68	135			
Toluene	0.99	0.050	1.000	0	99.1	70	130			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		101	70	130			
Surr: 4-Bromofluorobenzene	0.43		0.5000		85.9	70	130			
Surr: Dibromofluoromethane	0.58		0.5000		116	70	130			
Surr: Toluene-d8	0.50		0.5000		99.5	70	130			

Sample ID: **mb-49064** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **49064** RunNo: **64875**
Prep Date: **11/27/2019** Analysis Date: **12/2/2019** SeqNo: **2224129** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.6	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.2	70	130			
Surr: Dibromofluoromethane	0.55		0.5000		110	70	130			
Surr: Toluene-d8	0.50		0.5000		99.4	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1911C61**

05-Dec-19

Client: Vertex Resource Group Ltd.

Project: Apache 25 Fed 06

Sample ID: **lcs-49064**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **49064**	RunNo: **64875**
Prep Date: **11/27/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224171** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	87.4	70	130			
Surr: BFB	470		500.0		94.5	70	130			

Sample ID: **mb-49064**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **49064**	RunNo: **64875**
Prep Date: **11/27/2019**	Analysis Date: **12/2/2019**	SeqNo: **2224172** 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	470		500.0		93.0	70	130			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **VERTEX CARLSBAD** Work Order Number: **1911C61** RcptNo: **1**

Received By: Juan Rojas **11/27/2019 9:00:00 AM**
Completed By: **Leah Baca** **11/27/2019 9:58:21 AM** Leah Baca
Reviewed By: DM 11/27/19

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: ENM 11/27/19

Special Handling (if applicable)

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

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

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.2	Good				
2	1.7	Good				

Chain-of-Custody Record

Client: VERTEX RESOURCE GROUP

Mailing Address: ON FILE

Phone #:

email or Fax#: ngordon@vertex.ca

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush

Project Name: Apache 25 Fed #06

Project #: 19E-00575-020

Project Manager: N. GORDON

Sampler: N. GORDON
On Ice: ☑ Yes ☐ No
# of Coolers: 2
Cooler Temp(including CF): 0.4-0.2=0.2(°C)

1.9-0.2=1.7

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. 1911C61	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)
11/25/19	1100	soil	WS 19-05 1'	1 Jar	ICE	-001	X	X					X			
	↓		BS 19-13 1'			-002										
	1330		BS 19-20 2'			-003										
	1200		BS 19-21 1'			-004										
			BS 19-21 1.5'			-005										
	↓		BS 19-22 1'			-006										
↓	1400	↓	BS 19-23 2'	↓	↓	-007	↓	↓					↓			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
11/26/19	1400				11/26	1400
11/26	1400			carrier	11/27/19	9:00

Remarks:
Send results to permian@vertex.ca
ngordon@vertex.ca

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.

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State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

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

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

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

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

☐ Extents of contamination must be fully delineated.

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

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

Printed Name: Wesley Mathews Title: EHS Professional

Signature: Wesley Mathews Date: 1-22-2020

email: wesley.mathews@dvn.com Telephone: 575-513-8608

OCD Only

Received by: _____ Date: _____

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

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	NAB1927637713
District RP	2RP-5644
Facility ID	
Application ID	pAB1927637437

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?	144 (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.

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Page 4

State of New Mexico
Oil Conservation Division

Incident ID	NAB1927637713
District RP	2RP-5644
Facility ID	
Application ID	pAB1927637437

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: Wes Mathews . Title: EnvironmentalRepresentative

Signature: Wesley Mathews Date:

email: Wesley.mathews@dvn.com . Telephone: 575-746-5549 .

OCD Only

Received by: Date:

Incident ID	NAB1927637713
District RP	2RP-5644
Facility ID	
Application ID	pAB1927637437

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: Wes Mathews Title: Environmenta_lRepresentative

Signature: Wesley Mathews Date: 1-22-2020

email: wesley.mathews@dvn.com. Telephone: 575-746-5549 .

OCD Only

Received by: Date: _____

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

Closure Approved by: Date: _____

Printed Name: Title: _____