

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	NAPP2314544467
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party XTO Energy	OGRID 5380
Contact Name Garrett Green	Contact Telephone 575-200-0729
Contact email garrett.green@exxonmobil.com	Incident # (assigned by OCD)
Contact mailing address 3104 E. Greene Street, Carlsbad, New Mexico, 88220	

Location of Release Source

Latitude 32.26994 Longitude -103.93624
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Remuda 500 TB	Site Type Tank Batter
Date Release Discovered 05/12/2023	API# (if applicable)

Unit Letter	Section	Township	Range	County
O	25	23S	29E	Eddy

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)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Condensate	Volume Released (bbls) .05	Volume Recovered (bbls) 0.0
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release
Condensate filled the pilot gas supply pot and supply lines for the low pressure flare sending condensate out of the flare. The flare pilot ignited the fluids and fire extinguished itself. Fire department was not called and no injuries were reported. A third-party contractor has been retained for remediation purposes.


State of New Mexico
Oil Conservation Division

Incident ID	NAPP2314544467
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release? A release that results in a fire or is the result of a fire.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Yes, by Garrett Green to Enviro, OCD, EMNRD; Bratcher, Michael, EMNRD; Hamlet, Robert, EMNRD; Harimon, Jocelyn, EMNRD on 05/15/2023 via email.	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.	
If all the actions described above have <u>not</u> been undertaken, explain why: NA	
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: Garrett Green	Title: SSHE Coordinator
Signature: 	Date: 5/25/2023
email: garrett.green@exxonmobil.com	Telephone: 575-200-0729
<u>OCD Only</u>	
Received by: Jocelyn Harimon	Date: 05/25/2023

Incident ID	nAPP2314544467
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

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

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>>55</u> (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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.

State of New Mexico
Oil Conservation Division

Page 4

Incident ID	nAPP2314544467
District RP	
Facility ID	
Application ID	

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: Garrett GreenTitle: SSHE CoordinatorSignature: Date: 8/10/2023email: garrett.green@exxonmobil.comTelephone: 575-200-0729**OCD Only**Received by: Shelly WellsDate: 8/10/2023

Incident ID	NAPP2314544467
District RP	
Facility ID	
Application ID	


Closure

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

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

- ☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- ☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- ☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- ☒ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Garrett Green Title: SSHE Coordinator
Signature:  Date: 8/10/2023
email: garrett.green@exxonmobil.com Telephone: 575-200-0729

OCD Only

Received by: Shelly Wells Date: 8/10/2023

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: _____



Incident Number: nAPP2314544467

Release Assessment and Closure

Remuda 500 TB

Section 25, Township 23 South, Range 29 East

County: Eddy

Vertex File Number: 23E-03490

Prepared for:

XTO Energy

Prepared by:

Vertex Resource Services Inc.

Date:

August 2023

XTO Energy
Remuda 500 TB

Release Assessment and Closure
August 2023

Release Assessment and Closure
Remuda 500 TB
Section 25, Township 23 South, Range 29 East
County: Eddy

Prepared for:

XTO Energy
3104 E Greene Street
Carlsbad, New Mexico 88220

New Mexico Oil Conservation Division – District 2
811 S. 1st Street
Artesia, New Mexico 88210

Prepared by:

Vertex Resource Services Inc.
3101 Boyd Drive
Carlsbad, New Mexico 88220


Sally Carttar, B.A.
INT. ENVIRONMENTAL TECHNOLOGIST, REPORTING

8/10/2023

Date


Chance Dixon, B.Sc.
PROJECT MANAGER, REPORT REVIEW

8/10/2023

Date

Table of Contents

1.0 Introduction 1

2.0 Incident Description 1

3.0 Site Characteristics 1

4.0 Closure Criteria Determination 2

5.0 Remedial Actions Taken 4

6.0 Closure Request..... 5

7.0 References..... 6

8.0 Limitations 7

In-text Tables

- Table 1. Closure Criteria Determination
- Table 2. Closure Criteria for Soils Impacted by a Release

List of Figures

- Figure 1. Characterization Schematic Remuda 500 TB
- Figure 2. Confirmatory Schematic Remuda 500 TB

List of Tables

- Table 3. Initial Characterization Sample Field Screen and Laboratory Results – Depth to Groundwater <50 feet bgs
- Table 4. Confirmatory Sample Field Screen and Laboratory Results – Depth to Groundwater <50 feet bgs

List of Appendices

- Appendix A. NMOCD C-141 Report and Notification of Release
- Appendix B. Closure Criteria Research Documentation
- Appendix C. Daily Field and Sampling Reports
- Appendix D. Notification
- Appendix E. Laboratory Data Reports and Chain of Custody Forms

1.0 Introduction

XTO Energy (XTO) retained Vertex Resource Services Inc. (Vertex) to conduct a Release Assessment and Closure for a condensate release that occurred on May 12, 2023, at Remuda 500 TB (hereafter referred to as the “site”). XTO submitted an initial C-141 Release Notification (Appendix A) to New Mexico Oil Conservation Division (NMOCD) District 2 on May 15, 2023. Incident ID number nAPP2314544467 was assigned to this incident.

This report provides a description of the release assessment and remediation activities associated with the site. The information presented demonstrates that closure criteria established in Table I of 19.15.29.12 of the *New Mexico Administrative Code* (NMAC; New Mexico Oil Conservation Division, 2018) related to NMOCD has been met and all applicable regulations are being followed. This document is intended to serve as a final report to obtain approval from NMOCD for the closure of this release, with the understanding that restoration of the release site will be deferred until such time as all oil and gas activities are terminated and the site is reclaimed as per NMAC 19.15.29.13.

2.0 Incident Description

The release occurred on May 12, 2023, due to condensate filling the pilot gas supply and being sent out of the flare. The incident was reported on May 15, 2023, and involved the release of approximately 0.05 barrels of condensate on the pad site. No free fluid was removed during the initial clean-up. Additional details relevant to the release are presented in the C-141 Report. Daily Field Reports (DFRs) and site photographs are included in Appendix C.

3.0 Site Characteristics

The site is located approximately 9.25 miles east of Loving, New Mexico (Google Inc., 2023). The legal location for the site is Section 25, Township 23 South, Range 29 East in Eddy County, New Mexico. The release area is located on State property. An aerial photograph and site schematic are presented on Figure 1.

The location is typical of oil and gas exploration and production sites in the Permian Basin and is currently used for oil and gas production and storage. The following sections specifically describe the release area surrounding the low-pressure flare on the constructed pad (Figure 1).

The Geological Map of New Mexico (New Mexico Bureau of Geology and Mineral Resources, 2023) indicates the site’s surface geology primarily comprises Qep – Piedmont alluvial deposits, which include deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. May locally include uppermost Pliocene deposits. The predominant soil texture on the site is sandy. Soil can be classified as well-drained with very high runoff. The karst geology potential for the site is medium (United States Department of the Interior, Bureau of Land Management, 2018).

The surrounding landscape is associated with plains, alluvial fans, uplands, and fan piedmonts with elevations ranging between 2,800 and 4,500 feet. The climate is semiarid with average annual precipitation ranging between 8 and 13 inches. Using information from the United States Department of Agriculture, the dominant vegetation was determined to be black grama. Grasses dominate the historic plant community, dotted with shrubs (United States

Department of Agriculture, Natural Resources Conservation Service, 2023). Limited to no vegetation is allowed to grow on the compacted production pad.

4.0 Closure Criteria Determination

The nearest depth to groundwater reference to the site is a New Mexico Office of the State Engineer (NMOSE) monitoring well located approximately 0.37 miles northwest of the site (United States Geological Survey, 2023). Data from 2020 shows the NMOSE borehole recorded a dry hole at 55 feet below ground surface (bgs). Information pertaining to the depth to groundwater determination is included in Appendix B.

There is no surface water present at the site. The nearest significant watercourse, as defined in Subsection P of 19.15.17.7 NMAC, is a riverine located approximately 0.68 miles south of the site (United States Fish and Wildlife Service, 2023).

At the site, 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.

XTO Energy
Remuda 500 TB

Release Assessment and Closure
August 2023

Closure Criteria Worksheet			
Site Name: Remuda 500 TB			
Spill Coordinates:		X: 32.26994	Y: -103.93624
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	>55	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	3,605	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	11,389	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	29,146	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	1,925	feet
	ii) Within 1000 feet of any fresh water well or spring		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	2,100	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Medium	Critical High Medium Low
10	Within a 100-year Floodplain	>100	year
11	Soil Type	Simona-Bippus Complex	
12	Ecological Classification	Shallow sandy	
13	Geology	Qep	
	NMAC 19.15.29.12 E (Table 1) Closure Criteria	<50'	<50' 51-100' >100'

The closure criteria determined for the site are associated with the following constituent concentration limits as presented in Table 2. The criteria was chosen based on the amount of impact in the area and to meet the requirements of 19.15.29.13 NMAC.

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

TDS – total dissolved solids

TPH – total petroleum hydrocarbons, GRO – gas range organics, DRO – diesel range organics, MRO – motor oil range organics

BTEX – benzene, toluene, ethylbenzene and xylenes

5.0 Remedial Actions Taken

An initial site inspection of the release area began on June 12, 2023, which identified the area of the release specified in the initial C-141 Report and assessed the contaminant concentrations on the surface of the pad. Horizontal and vertical delineation was completed on June 16, 2023, with a total of nine sample points established on the pad. From these points, 17 samples were collected and submitted to Eurofins Environment Testing for laboratory analysis. The impacted area was determined to be approximately 30 feet long and 45 feet wide; the total affected area was 388 square feet. Field screen and laboratory analysis results are presented in Table 3. The DFR associated with the site inspection is included in Appendix C.

Remediation efforts began and were finalized on July 17, 2023. Vertex personnel supervised the excavation of impacted soils. Field screening was completed during excavation and consisted of analysis using a Photo Ionization Detector (volatile hydrocarbons), Dextsil Petroflag using EPA SW-846 Method 9074 (extractable hydrocarbons), and Silver Nitrate titration (chlorides). Field screening results were used to identify areas requiring further remediation. The contaminated soil was removed to a depth of 6 inches bgs. Impacted soil was transported by a licensed waste hauler and disposed of at an approved waste management facility.

Notification that confirmatory samples were being collected was provided to the NMOCD on June 2, 2023, and is included in Appendix D. Confirmatory composite samples were collected from the base and walls of the excavation in 200-square-foot increments. A total of six samples were collected for laboratory analysis following NMOCD soil sampling procedures (Figure 2). Samples were submitted to Eurofins Environment Testing under chain-of-custody protocols and analyzed for BTEX (EPA Method 8021B), total petroleum hydrocarbons (GRO, DRO, MRO – EPA Method 8015D), and total chlorides (EPA Method 300.0). Laboratory results are presented in Table 4, and the laboratory data reports are included in Appendix E. All confirmatory samples collected and analyzed were below NMOCD's strictest closure criteria for the site.

XTO Energy
Remuda 500 TB

Release Assessment and Closure
August 2023

6.0 Closure Request

Vertex recommends no additional remedial action at the site. Laboratory analyses of confirmation samples collected at the site show final confirmatory values below NMOCD closure criteria for areas where depth to groundwater is between 51 and 100 feet bgs. The excavation also met the reclamation requirements of 19.15.29.13 NMAC with it meeting NMOCD's strictest closure criteria for areas where depth to groundwater is less than 50 feet bgs. There are no anticipated risks to human, ecological, or hydrological receptors at this site.

The excavation was backfilled with non-waste-containing, uncontaminated, earthen material, sourced locally, and placed to meet the site's existing grade to prevent water ponding and erosion.

Vertex requests that this incident (nAPP2314544467) be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. XTO certifies that all information in this report and the appendices are correct and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NMOCD requirements to obtain closure on the site.

Should you have any questions or concerns, please do not hesitate to contact Chance Dixon at 575.988.1472 or cdixon@vertex.ca.

7.0 References

- Google Inc. (2023). *Google Earth Pro (Version 7.3.3)* [Software]. Retrieved from <https://earth.google.com>
- New Mexico Bureau of Geology and Mineral Resources. (2023). *Interactive Geologic Map*. Retrieved from <https://maps.nmt.edu/>
- New Mexico Department of Surface Water Quality Bureau. (2023). *Assessed and Impaired Waters of New Mexico*. Retrieved from <https://gis.web.env.nm.gov/oem/?map=swqb>
- New Mexico Energy, Minerals and Natural Resources Department. (2023). *OCD Permitting - Spill Search*. Retrieved from <https://wwwapps.emnrd.nm.gov/ocd/ocdpermitting/Data/Spills/Spills.aspx>
- New Mexico Mining and Minerals Division. (2023). *Coal Mine Resources in New Mexico*. Retrieved from <https://nm-emnrd.maps.arcgis.com/apps/webappviewer/index.html?id=5f80f3b0faa545e58fe747cc7b037a93>
- New Mexico Office of the State Engineer. (2023a). *Point of Diversion Location Report - New Mexico Water Rights Reporting System*. Retrieved from <http://nmwrrs.ose.state.nm.us/nmwrrs/wellSurfaceDiversion.html>
- New Mexico Office of the State Engineer. (2023b). *Water Column/Average Depth to Water Report - New Mexico Water Rights Reporting System*. Retrieved from <http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html>
- New Mexico Office of the State Engineer. (2023c). *Well Log/Meter Information Report - New Mexico Water Rights Reporting System*. Retrieved from <http://nmwrrs.ose.state.nm.us/nmwrrs/meterReport.html>
- New Mexico Oil Conservation Division. (2018). *New Mexico Administrative Code – Natural Resources and Wildlife Oil and Gas Releases*. Santa Fe, New Mexico.
- United States Department of Agriculture, Natural Resources Conservation Service. (2023). *Web Soil Survey*. Retrieved from <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
- United States Department of Homeland Security, Federal Emergency Management Agency. (2023). *FEMA Flood Map Service: Search by Address*. Retrieved from <https://msc.fema.gov/portal/search?AddressQuery=malaga%20new%20mexico#searchresultsanchor>
- United States Department of the Interior, Bureau of Land Management. (2018). *New Mexico Cave/Karst*. Retrieved from https://www.nm.blm.gov/shapeFiles/cfo/carlsbad_spatial_data.html
- United States Fish and Wildlife Service. (2023). *National Wetland Inventory - Surface Waters and Wetlands*. Retrieved from <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>
- United States Geological Survey. (2023). *National Water Information System: Web Interface*. Retrieved from <https://waterdata.usgs.gov/nwis>

XTO Energy
Remuda 500 TB

Release Assessment and Closure
August 2023

8.0 Limitations

This report has been prepared for the sole benefit of XTO Energy. 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 XTO Energy. 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.

FIGURES

TABLES

APPENDIX A - NMOCD C-141 Report

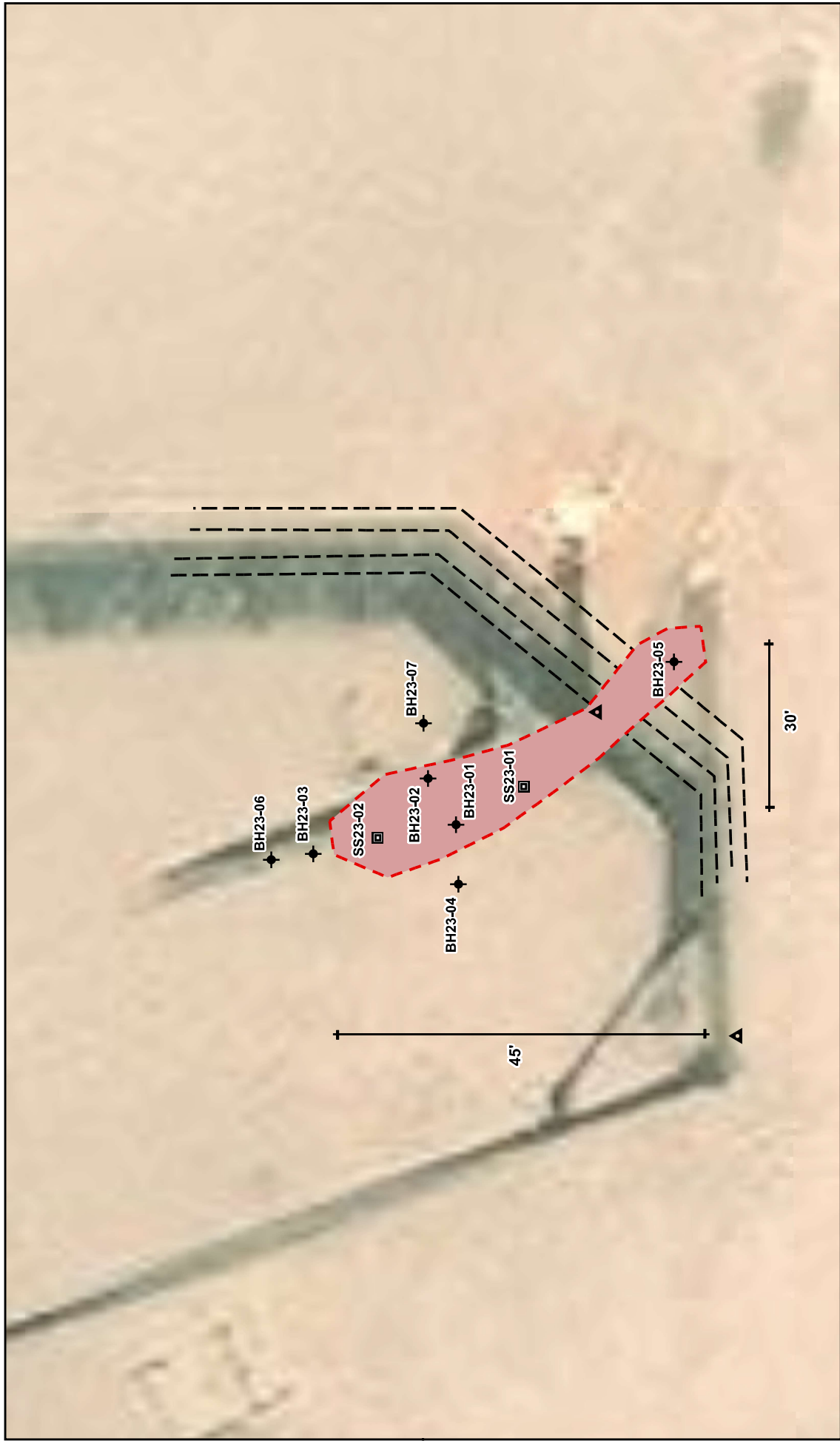
APPENDIX B – Closure Criteria Research Documentation

APPENDIX C – Daily Field Report(s)

APPENDIX D – Notification(s)

APPENDIX E – Laboratory Data Report(s) and Chain of Custody Form(s)

FIGURES



➤ Borehole ➤ Flare Stack 📦 Surface Sample - - - Pipeline (Aboveground) 📦 Approximate Release Area (~388 sq. ft.)



FIGURE: 1

Characterization Schematic Remuda 500 TB



NAD 1983 UTM Zone 13N
Date: Jul 05/23

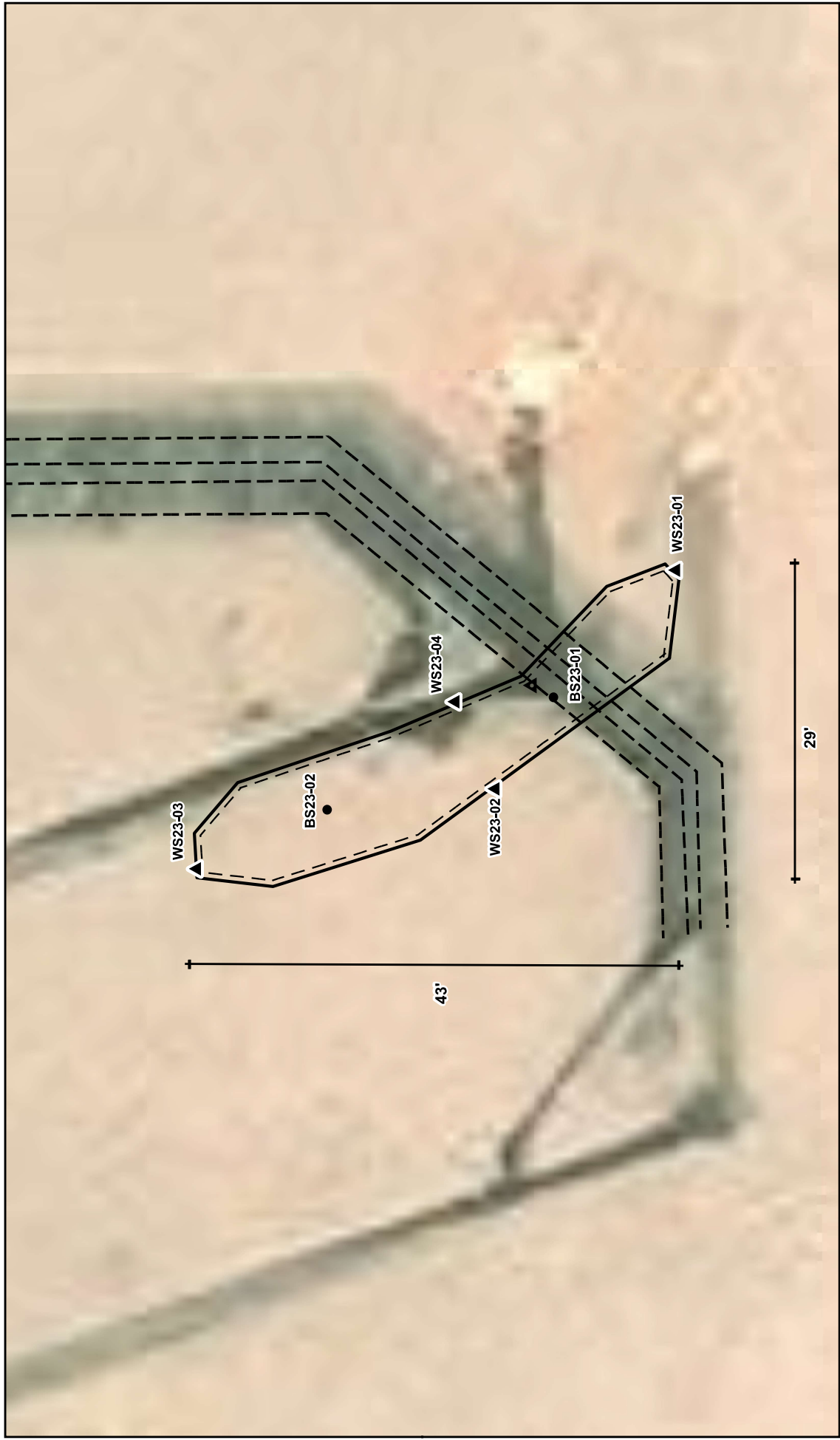
Map Center:
Lat/Long: 32.269834, -103.936924



Note: Georeferenced image from ESRI, 2022. Site features from GPS, Vertex Professional Services Ltd., 2023.

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

VERSATILITY. EXPERTISE.



Excavation to 4' (~394 sq.ft.)

Pipeline (Aboveground)

Wall Sample

Flare Stack

Base Sample



FIGURE: 2

Confirmatory Schematic Remuda 500 TB



NAD 1983 UTM Zone 13N
Date: Jul 24/23

Map Center:
Lat/Long: 32.269807, -103.936934



Note: Georeferenced image from ESRI, 2022. Site features from GPS by Vertex Professional Services Ltd., 2023.

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

VERSATILITY. EXPERTISE.

TABLES

Client Name: XTO Energy
 Site Name: Remuda 500 TB
 NMOCD Tracking #: nAPP2314544467
 Project #: 23E-03490
 Lab Reports: 890-4813-1, 890-4831-1

Table 3. Initial Characterization Field Screen and Laboratory Results - Depth to Groundwater 51-100 feet bgs

Table 3. Initial Characterization Field Screen and Laboratory Results - Depth to Groundwater 51-100 feet bgs													
Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic Chloride Concentration
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (PetroFlag)	Chloride Concentration	Volatile		Extractable					
						Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	
			(ppm)	(ppm)	(ppm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
SS23-01	0	June 12, 2023	0	694	337	ND	ND	ND	564	ND	564	564	211
SS23-02	0	June 12, 2023	0	640	232	ND	ND	ND	487	ND	487	487	102
BH23-01	0	June 15, 2023	0	294	497	ND	ND	ND	282	ND	282	282	143
BH23-01	2	June 15, 2023	0	54	370	ND	ND	ND	ND	ND	ND	ND	243
BH23-01	4	June 15, 2023	0	40	212	ND	ND	ND	ND	ND	ND	ND	185
BH23-02	0	June 15, 2023	0	68	970	ND	ND	ND	ND	ND	ND	ND	974
BH23-02	2	June 15, 2023	0	50	295	ND	ND	ND	ND	ND	ND	ND	253
BH23-03	0	June 15, 2023	0	41	525	ND	ND	ND	ND	ND	ND	ND	259
BH23-03	2	June 15, 2023	0	51	285	ND	ND	ND	ND	ND	ND	ND	237
BH23-04	0	June 15, 2023	0	44	391	ND	ND	ND	ND	ND	ND	ND	188
BH23-04	2	June 15, 2023	0	54	215	ND	ND	ND	ND	ND	ND	ND	238
BH23-05	0	June 15, 2023	0	74	395	ND	ND	ND	ND	ND	ND	ND	662
BH23-05	1	June 15, 2023	0	60	369	ND	ND	ND	ND	ND	ND	ND	403
BH23-06	0	June 16, 2023	0	35	505	ND	ND	ND	ND	ND	ND	ND	340
BH23-06	2	June 16, 2023	0	54	388	ND	ND	ND	ND	ND	ND	ND	251
BH23-07	0	June 16, 2023	0	54	320	ND	ND	ND	ND	ND	ND	ND	246
BH23-07	2	June 16, 2023	0	49	258	ND	ND	ND	ND	ND	ND	ND	229

"ND" Not Detected at the Reporting Limit

"-" indicates not analyzed/assessed

Bold and grey shaded indicates exceedance outside of NMOCD Closure Criteria (on-pad)

Client Name: XTO Energy
 Site Name: Remuda 500 TB
 NMOCD Tracking #: NAPP2314544467
 Project #: 23E-03490
 Lab Report(sX): 890-4967-1

Table 4. Confirmatory Sample Field Screen and Laboratory Results - Depth to Groundwater 51-100 feet bgs

Table 4. Confirmatory Sample Field Screen and Laboratory Results - Depth to Groundwater 51-100 feet bgs													
Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (PetroFlag)	Chloride Concentration	Volatile		Extractable					
						Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	
			(ppm)	(ppm)	(ppm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
BS23-01	6in	2023-07-17	ND	52	585	ND	ND	ND	ND	ND	ND	ND	296
BS23-02	6in	2023-07-17	ND	45	563	ND	ND	ND	ND	ND	ND	ND	371
WS23-01	4in	2023-07-17	ND	49	555	ND	ND	ND	51	ND	51	51	313
WS23-02	4in	2023-07-17	ND	51	538	ND	ND	ND	ND	ND	ND	ND	327
WS23-03	4in	2023-07-17	ND	54	523	ND	ND	ND	ND	ND	ND	ND	324
WS23-04	4in	2023-07-17	ND	60	543	ND	ND	ND	ND	ND	ND	ND	345

"ND" Not Detected at the Reporting Limit

"-" indicates not analyzed/assessed

APPENDIX A - NMOCD C-141 Report

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	NAPP2314544467
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party XTO Energy	OGRID 5380
Contact Name Garrett Green	Contact Telephone 575-200-0729
Contact email garrett.green@exxonmobil.com	Incident # (assigned by OCD)
Contact mailing address 3104 E. Greene Street, Carlsbad, New Mexico, 88220	

Location of Release Source

Latitude 32.26994 Longitude -103.93624
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Remuda 500 TB	Site Type Tank Batter
Date Release Discovered 05/12/2023	API# (if applicable)

Unit Letter	Section	Township	Range	County
O	25	23S	29E	Eddy

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)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Condensate	Volume Released (bbls) .05	Volume Recovered (bbls) 0.0
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release
Condensate filled the pilot gas supply pot and supply lines for the low pressure flare sending condensate out of the flare. The flare pilot ignited the fluids and fire extinguished itself. Fire department was not called and no injuries were reported. A third-party contractor has been retained for remediation purposes.


State of New Mexico
Oil Conservation Division

Incident ID	NAPP2314544467
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release? A release that results in a fire or is the result of a fire.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Yes, by Garrett Green to Enviro, OCD, EMNRD; Bratcher, Michael, EMNRD; Hamlet, Robert, EMNRD; Harimon, Jocelyn, EMNRD on 05/15/2023 via email.	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

<input checked="" type="checkbox"/> The source of the release has been stopped.	
<input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment.	
<input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.	
<input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.	
If all the actions described above have <u>not</u> been undertaken, explain why: NA	
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: Garrett Green	Title: SSHE Coordinator
Signature: 	Date: 5/25/2023
email: garrett.green@exxonmobil.com	Telephone: 575-200-0729
<u>OCD Only</u>	
Received by: Jocelyn Harimon	Date: 05/25/2023

Incident ID	nAPP2314544467
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

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

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>>55</u> (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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.

State of New Mexico
Oil Conservation Division


Page 4

Incident ID	nAPP2314544467
District RP	
Facility ID	
Application ID	

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: Garrett Green

Title: SSHE Coordinator

Signature: 

Date: 8/10/2023

email: garrett.green@exxonmobil.com

Telephone: 575-200-0729

OCD Only

Received by: _____

Date: _____

Incident ID	NAPP2314544467
District RP	
Facility ID	
Application ID	


Closure

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

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

- ☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- ☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- ☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- ☒ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Garrett Green Title: SSHE Coordinator
Signature:  Date: 8/10/2023
email: garrett.green@exxonmobil.com Telephone: 575-200-0729

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: _____

Foust, Bryan Jacob

From: Green, Garrett J
Sent: Monday, May 15, 2023 12:06 PM
To: Enviro, OCD, EMNRD; Bratcher, Michael, EMNRD; Hamlet, Robert, EMNRD; Harimon, Jocelyn, EMNRD
Cc: DelawareSpills /SM
Subject: XTO - 24 Hour Notification - Remuda 500 Flare Fire- 5/12/23

All,

This is notification of a small flare fire that occurred Friday night at the Remuda 500 Battery near the GPS coordinates given below. A small amount of fluid was released from the flare causing a small fire. No injuries were reported and the fire extinguished itself. Details will be provided with a form C-141. Please contact us with any questions or concerns.

GPS: 32.27051, -103.93732

Thank you,

Garrett Green
Environmental Coordinator
Delaware Business Unit
(575) 200-0729
Garrett.Green@ExxonMobil.com

XTO Energy, Inc.
3104 E. Greene Street | Carlsbad, NM 88220 | M: (575)200-0729

APPENDIX B – Closure Criteria Research Documentation

Remuda 0.5 mile radius



6/12/2023, 3:40:05 PM

GIS WATERS PODs

● Pending

□ OSE District Boundary

□ SiteBoundaries

1:9,028

0 0.07 0.15 0.3 0.3 mi

0 0.15 0.3 0.6 km

Esri, HERE, IPC, U.S. Department of Energy Office of Legacy Management, Esri, HERE, Garmin, IPC, Maxar

Web Generated Map
Map is generated by web users.



New Mexico Office of the State Engineer

Water Right Summary



[get image list](#)

WR File Number: C 04494Subbasin: CUBCross Reference: -

Primary Purpose: MON MONITORING WELL

Primary Status: PMT PERMIT

Total Acres:Subfile: -Header: -

Total Diversion: 0Cause/Case: -

Agent: LT ENVIRONMENTAL INC

Contact: TACOMA MORRISSEY

User: XTO ENERGY INC

Contact: KYLE LITTRELL

Documents on File

Trn #	Doc	File/Act	Status			From/ To	Acres	Diversion	Consumptive
			1	2	Transaction Desc.				
	681639	EXPL 2020-11-12	PMT	APR	C 04494 POD1	T	0	0	

Current Points of Diversion

POD Number	Well Tag	Source	Q					(NAD83 UTM in meters)		Other Location Desc
			64Q	16Q	4Sec	Tw	Rng	X	Y	
C 04494 POD1	NA		2	2	3	25	23S 29E	599857	3571337	BH01

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

WSP #: TE012919260/ TE012919195/ TE012919039

File No.



NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL

A WELL WITH NO WATER RIGHT

(check applicable box):

For fees, see State Engineer website: <http://www.ose.state.nm.us/>

Purpose:	<input type="checkbox"/> Pollution Control And/Or Recovery	<input type="checkbox"/> Ground Source Heat Pump
<input type="checkbox"/> Exploratory Well (Pump test)	<input type="checkbox"/> Construction Site/Public Works Dewatering	<input checked="" type="checkbox"/> Other(Describe): Environmental sampling
<input checked="" type="checkbox"/> Monitoring Well	<input type="checkbox"/> Mine Dewatering	

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

<input checked="" type="checkbox"/> Temporary Request - Requested Start Date:	Requested End Date: TBD
---	-------------------------

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

1. APPLICANT(S)

Name: Kyle Littrell	Name: Tacoma Morrissey
Contact or Agent: check here if Agent <input type="checkbox"/>	Contact or Agent: check here if Agent <input checked="" type="checkbox"/>
XTO Energy, Inc.	LT Environmental, Inc.
Mailing Address: 6401 Holiday Hill Road	Mailing Address: 508 West Stevens Street
City: Midland	City: Carlsbad
State: Zip Code: Texas 79707	State: Zip Code: New Mexico 88220
Phone: 432-682-8873 <input type="checkbox"/> Home <input type="checkbox"/> Cell Phone (Work):	Phone: 432-556-3617 <input type="checkbox"/> Home <input checked="" type="checkbox"/> Cell Phone (Work):
E-mail (optional): kyle_littrell@xtoenergy.com	E-mail (optional): tmorrissey@ltenv.com

FOR OSE INTERNAL USE

Application for Permit, Form WR-07, Rev 11/17/16

File No.:	Trn. No.:	Receipt No.:
Trans Description (optional):		
Sub-Basin:	PCW/LOG Due Date:	

2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84). District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.			
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> NM State Plane (NAD83) (Feet) <input type="checkbox"/> NM West Zone <input type="checkbox"/> NM East Zone <input type="checkbox"/> NM Central Zone </div> <div> <input type="checkbox"/> UTM (NAD83) (Meters) <input type="checkbox"/> Zone 12N <input type="checkbox"/> Zone 13N </div> <div> <input checked="" type="checkbox"/> Lat/Long (WGS84) (to the nearest 1/10th of second) </div> </div>			
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves , Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
BH01	32.274338	-103.939664	NE/SW UNIT K, SEC25, T23S, R29E

NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)

Additional well descriptions are attached: ☐ Yes ☒ No **If yes, how many__**

Other description relating well to common landmarks, streets, or other:

Site located at 32.274338, -103.939664, Eddy County, New Mexico

Well is on land owned by: State

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ Yes ☒ No

If yes, how many_____

Approximate depth of well (feet): 55	Outside diameter of well casing (inches): NA
Driller Name: Atkins Engineering	Driller License Number: 1249

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

XTO Energy respectfully requests to advance one (1) soil boring at the Remuda N 25 State #904H Pad. The soil boring will be advanced to approximately 55 feet below ground surface via a truck-mounted rig with hollow stem auger equipment. The boring will be secured and left open for 72 hours at which time, XTO will assess for the presence or absence of groundwater. Following the assessment XTO will backfill the boring following NMOSE abandonment procedures for soil borings. BLM access approval is attached.

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.:

Trn No.:

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory: <input type="checkbox"/> Include a description of any proposed pump test, if applicable.	Pollution Control and/or Recovery: <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for the pollution control or recovery operation. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The annual diversion amount. <input type="checkbox"/> The annual consumptive use amount. <input type="checkbox"/> The maximum amount of water to be diverted and injected for the duration of the operation. <input type="checkbox"/> The method and place of discharge.	Construction De-Watering: <input type="checkbox"/> Include a description of the proposed dewatering operation, <input type="checkbox"/> The estimated duration of the operation, <input type="checkbox"/> The maximum amount of water to be diverted, <input type="checkbox"/> A description of the need for the dewatering operation, and, <input type="checkbox"/> A description of how the diverted water will be disposed of.	Mine De-Watering: <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for mine dewatering. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The source(s) of the water to be diverted. <input type="checkbox"/> The geohydrologic characteristics of the aquifer(s). <input type="checkbox"/> The maximum amount of water to be diverted per annum. <input type="checkbox"/> The maximum amount of water to be diverted for the duration of the operation. <input type="checkbox"/> The quality of the water. <input type="checkbox"/> The method of measurement of water diverted.
Monitoring: <input checked="" type="checkbox"/> Include the reason for the monitoring well, and, <input checked="" type="checkbox"/> The duration of the planned monitoring.	<input type="checkbox"/> The method of measurement of water produced and discharged. <input type="checkbox"/> The source of water to be injected. <input type="checkbox"/> The method of measurement of water injected. <input type="checkbox"/> The characteristics of the aquifer. <input type="checkbox"/> The method of determining the resulting annual consumptive use of water and depletion from any related stream system. <input type="checkbox"/> Proof of any permit required from the New Mexico Environment Department. <input type="checkbox"/> An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	Ground Source Heat Pump: <input type="checkbox"/> Include a description of the geothermal heat exchange project, <input type="checkbox"/> The number of boreholes for the completed project and required depths. <input type="checkbox"/> The time frame for constructing the geothermal heat exchange project, and, <input type="checkbox"/> The duration of the project. <input type="checkbox"/> Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	<input type="checkbox"/> The recharge of water to the aquifer. <input type="checkbox"/> Description of the estimated area of hydrologic effect of the project. <input type="checkbox"/> The method and place of discharge. <input type="checkbox"/> An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. <input type="checkbox"/> A description of the methods employed to estimate effects on surface water rights and underground water rights. <input type="checkbox"/> Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Tacoma Morrissey

Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

T Morrissey

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☐ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this _____ day of _____, 20_____, for the State Engineer,

_____, State Engineer

By:

Signature

Print

Title:

Print

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.:

Trn No.:



Stephanie Garcia Richard
COMMISSIONER

State of New Mexico
Commissioner of Public Lands

310 OLD SANTA FE TRAIL
P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

COMMISSIONER'S
OFFICE

Phone (505) 827-5760
Fax (505) 827-5766
www.nmstatelands.org

October 27, 2020

XTO Energy, Inc.
6401 N. Holiday Hill Dr., Bldg 5
Midland, TX 79707

Attn: Kyle Littrell: Kyle_Littrell@xtoenergy.com

RE: Rule 12 Water Exploration / Soil Boring Permit # **WE-0791**, Remuda North 25 State #904H

We are in receipt of your application and fees (\$ 100.00 per Application) requesting a TEMPORARY BORING PERMIT for Water exploration. The effective date of this authorization is for a period of not to exceed 30 days, commencing on November 2, 2020 and ending on December 1, 2020.

This Authorization (Right of Entry) letter is for the sole purpose of exploring depth to groundwater in the following location: (Please see attached map)

Township	Range	Section	Subdivision	County	Acres
23S	29E	25	NE4SW4	Eddy	5.5

CONDITIONS OF USE

- A. The issuance of this Exploration Authorization does not guarantee a Water Easement will be issued for this property being explored, nor does it indicate a preference for a future water easement issuance to the holder of the authorization by the Commissioner of Public Lands.
- B. No refund of Permit application fees will occur after Permit approval letter is mailed.
- C. Authorized party shall notify the State Land Office District Resource Manager by telephone at least one business day prior to commencing any exploration activities.
- D. No blading or widening of any two-track dirt roads that provides access to the Property is permitted under this Authorization, except as necessary for the ingress and egress of required vehicles.
- E. No mining or removal of material for purposes other than testing is allowed under this Authorization. No sale of any material extracted from the Property is allowed under this Authorization.
- F. Authorized party shall observe all federal, state and local laws and regulations applicable to the Property.
- G. Authorized party shall take all reasonable precautions to prevent and suppress forest, brush and grass fires and prevent pollution of waters on or in the vicinity of the Property.
- H. Authorized party shall not block or disrupt roads or trails commonly in use.
- I. This Authorization is subject to any and all easements and rights-of-way previously granted and now in force and affect.
- J. Authorized party shall be responsible for repair and restitution for damage to any property improvements as a result of activities related to this exploration.
- K. Authorized party shall conduct exploration activities only if a state-permitted archaeologist as per the Cultural Properties Act, §18-6-5(O) is present on the permitted site. Authorized party shall abide by the decisions of the permitted Archaeologist regarding prevention of damage to cultural property sites. An archaeological report is to be submitted to State Land Office Cultural Resources Specialist within fifteen (15) days of the expiration date of

this Authorization. (An archeologist is not required to be present as long as there are no surface disturbing activities being performed).

SURFACE RECLAMATION AND RESTORATION

- A. All test holes must be plugged as soon as testing is completed.
- B. Drilling, excavation and other surface disturbing activities shall be restricted to areas deemed to have no archaeological significance.
- C. Access to the Property shall be over existing roads. Reclamation of all roads shall conform to the requirements of State Land Office Rule 20. No upgrading of the existing roads shall be done, except as necessary for the ingress and egress of required vehicles.
- D. All topsoil from the areas to be disturbed shall be stockpiled for use in reclamation.
- E. Upon completion of the use and operations permitted by this Authorization, all disturbed sites shall be re-contoured to approximate the original contours.
- F. All material removed by excavation shall be replaced into the test holes, with the exception of an adequate sample, on or before the expiration date of this Authorization.
- G. The natural environmental conditions that exist contemporaneously with this grant shall be preserved and protected. All applicable environmental laws and regulations shall be complied with and such reclamation or corrective actions as may be necessary to conduct EXPLORATORY WELL BORING consistent with safe and sound environmental management principles and practices shall be taken in order to protect the Property from any pollution, erosion or other environmental degradation and to avoid diminishing the value of the Property for any future use.

INDEMNITY

Authorized party shall save, hold harmless, indemnify and defend the State of New Mexico, the Commissioner and Commissioner's employees, agents and contractors, in both their official and individual capacities, from any and all liability, claims, losses, damages, or expenses of any character or nature whatsoever, including but not limited to attorney's fees, court costs, loss of land value or use, third party claims, penalties, or removal, remedial or restoration costs arising out of, or alleged to arise out of:

- A. The operations or presence on the Property, or on adjacent or proximate state trust lands, including those used to access the Property for the purposes of this Authorization, of Authorized party or authorized party's employees, agents, contractors or invitees;
- B. The activities of third parties on the Property, or on adjacent or proximate state trust lands, including those used to access the Property or other adjacent or proximate state trust lands, whether with or without Authorized party's knowledge or consent;
- C. Any Hazardous Materials located in, under, upon or otherwise affecting the Property or adjacent or proximate state trust lands, regardless of their point of origin or date of contamination.

If you have any questions or concerns please contact Jack Yates, Oil, Gas, and Minerals Deputy Commissioner at 505-827-5750, or Faith Crosby, Water Resources Section Manager at (505) 827-5849.

Respectfully,



Stephanie Garcia Richard
Commissioner of Public Lands

Date 10/28/2020

SGR/dg

cc: Mark Naranjo, DRM Supervisor

**NEW MEXICO STATE LAND OFFICE
APPLICATION FOR A RULE 12 (19.2.12 NMAC)
30-DAY WATER / SOIL BORING
EXPLORATION PERMIT**

FOR LAND OFFICE USE ONLY

WE No.: _____

New: _____ Renewal: _____

STID No.: _____

Phone: _____

APPLICANT INFORMATION

I Kyle Littrell hereby submit this application for a 30-DAY WATER/SOIL BORING EXPLORATION PERMIT under the laws of the State of New Mexico and rules and regulations of the State Land Office:

X for myself, as Applicant.

OR

_____ on behalf of the Applicant, as Applicant's Representative. By signing below, Representative represents and warrants that he or she is duly authorized and has legal capacity to submit this application for 30-day exploration permit on behalf of the Applicant:

Signature_____
DateApplicant's name (individual or business): Kyle LittrellMailing Address: XTO Energy, Inc. 6401 Holiday Hill Rd. Bldg 5 Midland, TX 79707Phone: (432)-221-7331Email: kyle_littrell@xtoenergy.com

Representative's name: _____

Relationship to Applicant: _____

Mailing Address: _____

Phone: _____

Email: _____

Applicant is: _____ an individual resident of the State of _____.

OR

X a business that has a home office in the State of Texas and is authorized to do business in the State of New Mexico. Business is a(n) Corporation (partnership, corporation, other).

1. LOCATION OF REQUESTED PERMIT IN EDDY ____ COUNTY

Subdivision Unit K Section 25 Township 23S Range 29E

containing 5.5 acres, more or less. I request this Water Exploration Permit be granted from

August 31, 2020 to September 30, 2020 (insert 30 day date range).

Insert brief description of activities & equipment to be used during this permit period in the box below (i.e. # of pits to be dug, # of bore holes to be drilled, expected depth of drilling, and type work or sampling to be conducted, etc.)

XTO Energy, Inc. (XTO) respectfully requests access to pad soils represented in the attached file on the Remuda North 25 State #904H Pad to advance one (1) soil boring. The soil boring will be advanced to approximately 55 feet below ground surface (bgs) via a truck-mounted rig with hallow stem auger equipment. The boring will be secured and left open for 72 hours at which time XTO will assess for the presence or absence of groundwater. Following the assessment, XTO will backfill the boring following NMOSE abandonment procedures for soil borings.

NOTE TO APPLICANTS: Completion and submission of this application does NOT constitute issuance of a water exploration permit by the New Mexico State Land Office. The application fee is non-refundable. Any other payments submitted with this application will be deposited in a suspense account as provided by law, and do not obligate the Commissioner of Public Lands to issue a water exploration permit. Rev. 01-02-2019

ACKNOWLEDGEMENTS

Please initial each statement below.

_____ A non-refundable application fee of **\$100.00** is submitted with this application.

_____ A **\$500.00** surface damage bond is submitted with this application or is accepted and on file at the State Land Office.

_____ As the Authorized party I shall conduct exploration activities only if a state-permitted archaeologist as per the Cultural Properties Act, §18-6-5(O) is present on the permitted site. Authorized party shall abide by the decisions of the permitted Archaeologist regarding prevention of damage to cultural property sites. An archaeological report is to be submitted to State Land Office Cultural Resources Specialist within fifteen (15) days of the expiration date of this Authorization. (*An archeologist is not required to be present as long as there are no surface disturbing activities being performed*).

If application is being submitted by Applicant, please initial the following statement:

_____ Applicant covenants and agrees to abide by all laws and regulations of the Land Office and to hold harmless, indemnify, and defend the Commissioner, the Commissioner's agents and lessees, in their official and individual capacities of and from any and all liability, claims, losses, or damages arising out of or alleged to arise out of or indirectly connected with operations under any grant made by the Commissioner.

If application is being submitted by Representative on Applicant's behalf, please initial the following statement:

_____ I solemnly swear (or affirm) that I have advised the Applicant of the acknowledgements and agreements of this Paragraph, and that Applicant covenants and agrees to the statements in this Paragraph, and to abide by all laws and regulations of the Land Office and to hold harmless, indemnify, and defend the Commissioner, the Commissioner's agents and lessees, in their official and individual capacities of and from any and all liability, claims, losses, or damages arising out of or alleged to arise out of or indirectly connected with operations under any grant made by the Commissioner.

I, Kyle Littrell, the above applicant, do solemnly swear, or affirm, that each
print name (on behalf of Company/Corporation Name)

and every statement made in this application is true and correct to the best of my knowledge and belief.

Applicant signature

By: _____
Attorney in Fact or Authorized Agent signature

(Title of Authorized Agent)

NOTE TO APPLICANTS: Completion and submission of this application does NOT constitute issuance of a water exploration permit by the New Mexico State Land Office. The application fee is non-refundable. Any other payments submitted with this application will be deposited in a suspense account as provided by law, and do not obligate the Commissioner of Public Lands to issue a water exploration permit. Rev. 01-02-2019

Complete this section if representing yourself as an individual.

ACKNOWLEDGMENT IN AN INDIVIDUAL CAPACITY

State of _____

County of _____

This instrument was acknowledged before me on _____ 20____ by _____
(date) (print name(s) of person(s))

Signature of Notarial Officer

(Seal)

Printed Name: _____
(Notary)

My commission expires: _____

OR

Complete this section if representing another individual or company.

ACKNOWLEDGMENT IN A REPRESENTATIVE CAPACITY

State of _____

County of _____

This instrument was acknowledged before me on _____ (date) by

name(s) of person(s)) (print

as _____ (type of authority, e.g., officer, trustee, etc.) of

(name of party on behalf of whom instrument was executed.)

Signature of Notarial Officer

(Seal)

Printed Name: _____
(Notary)

My commission expires: _____

NOTE TO APPLICANTS: Completion and submission of this application does NOT constitute issuance of a water exploration permit by the New Mexico State Land Office. The application fee is non-refundable. Any other payments submitted with this application will be deposited in a suspense account as provided by law, and do not obligate the Commissioner of Public Lands to issue a water exploration permit. Rev. 01-02-2019



WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. This form may be used to plug a single well, or if you are plugging multiple monitoring wells on the same site using the same plugging methodology.

Alert! Your well may be eligible to participate in the Aquifer Mapping Program (AMP)-NM Bureau of Geology geoinfo.nmt.edu/resources/water/cgmn/ if within an area of interest and meets the minimum construction requirements, such as there is still water in your well, and the well construction reflected in a well record and log is not compromised, contact AMP at 575-835-5038 or -6951, or by email nmbg-waterlevels@nmt.edu, prior to completing this prior form. Showing proof to the OSE that your well was accepted in this program, may delay the plugging of your well until a later date.

I. FILING FEE: There is no filing fee for this form.

I. GENERAL / WELL OWNERSHIP: ☐ Check here if proposing one plan for multiple monitoring wells on the same site and attaching WD-08m

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: C- POD1

Name of well owner: XTO Energy, Inc. attn Kyle Littrell

Mailing address: 6401 Holiday Hill Dr. County: Midland

City: Midland State: Texas Zip code: 79707

Phone number: 432-682-8873 E-mail: kyle_littrell@xtoenergy.com

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: Jackie D. Atkins (Atkins Engineering Associates, Inc.)

New Mexico Well Driller License No.: 1249 Expiration Date: 04/30/2021

IV. WELL INFORMATION: ☐ Check here if this plan describes method for plugging multiple monitoring wells on the same site and attach supplemental form WD-08m and skip to #2 in this section.

Note: A copy of the existing Well Record for the well(s) to be plugged should be attached to this plan.

1) GPS Well Location: Latitude: 32° deg, 16' min, 27.6" sec
Longitude: 103° deg, 56' min, 22.8" sec, NAD 83

2) Reason(s) for plugging well(s):

Soil boring to determine groundwater level

3) Was well used for any type of monitoring program? n/a If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? n/a If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: unknown feet below land surface / feet above land surface (circle one)

6) Depth of the well: 55 feet

- 7) Inside diameter of innermost casing: 2" inches.
- 8) Casing material: Temporary PVC SCH 40
- 9) The well was constructed with:
☒ an open-hole production interval, state the open interval: 0-55 w/optional temp well materials to be pulled
☐ a well screen or perforated pipe, state the screened interval(s): _____
- 10) What annular interval surrounding the artesian casing of this well is cement-grouted? n/a
- 11) Was the well built with surface casing? no If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? n/a If yes, please describe:
- 12) Has all pumping equipment and associated piping been removed from the well? n/a If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING: ☐ If plugging method differs between multiple wells on same site, a separate form must be completed for each method.

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical information, such as geophysical logs, that are necessary to adequately describe the proposal. Attach a copy of any signed OSE variance to this plugging plan.

Also, if this planned plugging plan requires a variance to 19.27.4 NMAC, attach a detailed variance request signed by the applicant.

- 1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well:

The temporary 2" well material will be removed. If no water is encountered then drill cuttings will be used to (10) ten feet of land surface and plugged using hydrated bentonite. If ground water is encountered the boring will be plugged tremie from bottom to a slurry of Portland TYPE I/II Neat cement in lifts
- 2) Will well head be cut-off below land surface after plugging? n/a

VI. PLUGGING AND SEALING MATERIALS:

Note: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant. Attach a copy of the batch mix recipe from the cement company and/or product description for specialty cement mixes or any sealant that deviates from the list of OSE approved sealants.

- 1) For plugging intervals that employ cement grout, complete and attach Table A.
- 2) For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
- 3) Theoretical volume of grout required to plug the well to landsurface: 144
- 4) Type of Cement proposed: Type I/II Neat Cement
- 5) Proposed cement grout mix: <6.0 gallons of water per 94 pound sack of Portland cement.
- 6) Will the grout be: _____ batch-mixed and delivered to the site
X mixed on site

- 7) Grout additives requested, and percent by dry weight relative to cement:

N/A

- 8) Additional notes and calculations:

N/A

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

Volumes calculated on an up to an approximate 8" boring.

VIII. SIGNATURE:

I, _____, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.



11/05/2020

Signature of Applicant

Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

_____ Approved subject to the attached conditions.

_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this _____ day of _____, _____

John R. D'Antonio Jr. P.E., New Mexico State Engineer

By: _____

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)	N/A	N/A	0
Bottom of proposed interval of grout placement (ft bgl)	N/A	N/A	55
Theoretical volume of grout required per interval (gallons)	N/A	N/A	144
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement	N/A	N/A	<6.0
Mixed on-site or batch-mixed and delivered?	N/A	N/A	On-Site
Grout additive 1 requested	N/A	N/A	N/A
Additive 1 percent by dry weight relative to cement	N/A	N/A	N/A
Grout additive 2 requested	N/A	N/A	N/A
Additive 2 percent by dry weight relative to cement	N/A	N/A	N/A

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)	N/A	N/A	0
Bottom of proposed sealant of grout placement (ft bgl)	N/A	N/A	10
Theoretical volume of sealant required per interval (gallons)	N/A	N/A	26
Proposed abandonment sealant (manufacturer and trade name)	N/A	N/A	Bariod Hole Plug

From: [Littrell, Kyle](#)
To: [Ager, Ashley](#); [Cole, Aimee](#); [Hernandez, Joseph](#); [Jennings, Kalei](#)
Cc: [Baker, Adrian](#)
Subject: NMOSE Drilling Permits-Agency Request
Date: Friday, August 21, 2020 1:49:33 PM

NMOSE,


The following LTE personnel have permission to submit and sign NMOSE well permitting documents on behalf of XTO Energy, Inc.


Ashley Ager
Aimee Cole
Tacoma Morrissey
Joseph Hernandez
Kalei Jennings

Thank you. --Kyle


Kyle Littrell
Environmental Supervisor
Permian and Delaware Business Units

XTO Energy Inc.
6401 N. Holiday Hill Dr.
Midland, Tx 79707
Phone:(432)-221-7331
Mobile:(970)-317-1867
kyle_littrell@xtoenergy.com

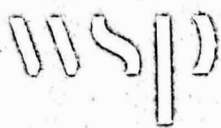
 WSP USA 508 West Stevens Street Carlsbad, New Mexico 88220		BH or PH Name: BH01		Date: 11/18/20				
		Site Name: Remuda N 25 St #904H						
		RP or Incident Number:						
		LTE Job Number:		012919260 / 012919195 / 012919039				
LITHOLOGIC / SOIL SAMPLING LOG								
Lat/Long:		Field Screening: Chloride, PID		Hole Diameter: 6.25 / 4.25				
				Method: H. SA				
				Total Depth: 48'				
Comments: Lithology and descriptions only; no field screening								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Sample Depth (ft bgs)	Depth (ft bgs)	USCS/Rock Symbol	Lithology/Remarks
						1	SP-SC	0-1': SAND, dry, brown, poorly graded, fine grained, clay (10% clay), some roots, no stain, no odor
						2		
						3		
						4		1'-4': SAND, dry, reddish-tight brown, poorly graded, very-fine to fine grained, some round caliche pebbles, no stain, no odor
						5	CCHE	
						6		
						7		4-9': CALICHE, dry, light brown-tan, poorly consolidated, sub-round caliche pebbles and gravel, very silty, gradational
						8		
						9		9-14': Abundant sub-round caliche gravel
						10		
						11		14-19': Some sub-angular caliche gravel and pebbles
						12		
						13		19-24': Abundant sub-angular caliche gravel and pebbles, moderately consolidated
						14		
						15		
						16		
						17		
						18		
						19		
						20		
						21		
						22		
						23		
						24		
						25	CL	

 WSP USA 508 West Stevens Street Carlsbad, New Mexico 88220		BH or PH Name: B101		Date: 11/18/20				
		Site Name: Remuda N 25 St #904H						
		RP or Incident Number:						
		LTE Job Number: 012919260/ 012919195/ 012919039						
LITHOLOGIC / SOIL SAMPLING LOG								
Lat/Long:		Field Screening: Chloride, PID		Hole Diameter: 6.25 / 4.25				
				Total Depth: 48'				
Comments: Lithology and descriptions only; no field screening								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Sample Depth (ft bgs)	Depth (ft bgs)	USCS/Rock Symbol	Lithology/Remarks
						26		24-39' : MUDSTONE, dry, reddish-brown, low plasticity, well consolidated, cohesive, trace sub-angular pebbles, no stain, no odor, sharp transition 34-35' : Some Sub-angular calcium carbonate gravel with dissolution features (1-3 mm), tan-light brown @ 39, begin air rotary (4.25 in.) 39-42 : DOLOMETIC LIMESTONE, tan-light-brown, dry, well consolidated, with dissolution features (1-3 mm), sharp, no stain, no odor, light to moderate reaction with HCl 42-45 : Some light grey dolomite with trace dissolution features (>1mm) @ 48' : Air rotary refusal due to dolomite formation
						27		
						28		
						29		
						30		
						31		
						32		
						33		
						34		
						35		
						36		
						37		
						38		
						39		
						40	LS	
						41		
						42		
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		

11/18/2020 LAD/BB

 WSP USA 508 West Stevens Street Carlsbad, New Mexico 88220		BH or PH Name:		Date:				
		Site Name:		Remuda N 25 St #904H				
		RP or Incident Number:						
		LTE Job Number:		012919260/ 012919195/ 012919039				
LITHOLOGIC / SOIL SAMPLING LOG								
Lat/Long:		Field Screening:		Logged By				
		Chloride, PID		B.B./L.A.D.				
Comments:		Hole Diameter:		Method: HSA				
				Total Depth:				
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Sample Depth (ft bgs)	Depth (ft bgs)	USCS/Rock Symbol	Lithology/Remarks
						76		
						77		
						78		
						79		
						80		
						81		
						82		
						83		
						84		
						85		
						86		
						87		
						88		
						89		
						90		
						91		
						92		
						93		
						94		
						95		
						96		
						97		
						98		
						99		
						100		

00510		WSP USA 505 West Stevens Street Caledonia, NM 88220		BH or PH Name: BHØ1		Date: 12/02/20		
				Site Name: Remuda N 25 Observation Well		RP or Incident Number:		
LITHOLOGIC / SOIL SAMPLING LOG				LTE Job Number:				
Lat/Long:		Field Screening: Chloride, PID		Logged By FS		Method:		
				Hole Diameter:		Total Depth: 56.1'		
Comments: Lithology remarks only, no field screenings : Dry hole								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Sample Depth (ft bgs)	Depth (ft bgs)	USCS/Rock Symbol	Lithology/Remarks
						26		
						27		
						28		
						29		
						30		
						31		
						32		
						33		
						34		
						35		
						36		
						37		
						38		
						39		
						40		
						41		
						42		
						43		
						44		
						45		
						46		
						47		previously drilled
						48	DOL	DOLOMITE, dry, white, moderately consolidated, trace mottled oxidation?
						49		no stain, no odor
						50		gypsum x cluster 5mm in diameter

 <p>WSP USA 505 West Stevens Street Carlsbad, New Mexico 88220</p>		BH or PH Name: BHØ1		Date: 12/02/20				
		Site Name: Remuda N 25 Observation Well						
		RP or Incident Number:						
		LTE Job Number:						
LITHOLOGIC / SOIL SAMPLING LOG								
Lat/Long:		Field Screening: Chloride, PID		Hole Diameter:				
				Total Depth: 56.1'				
Comments: Lithology remarks only, no field screenings : Dry hole								
Moisture Content	Chloride (ppm)	Vapor (ppm)	Staining	Sample #	Sample Depth (ft bgs)	Depth (ft bgs)	USCS/Rock Symbol	Lithology/Remarks
						51	DOL	DOLOMITE, dry, white, moderately consolidated, banding? dark grey-black, no stain, no odor
						52		
						53		
						54		
						55		
						56		TD@56'
						57		DTW > 55 ft. bgs
						58		
						59		
						60		
						61		
						62		
						63		
						64		
						65		
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		



New Mexico Office of the State Engineer

Point of Diversion Summary

Well Tag	POD Number	(quarters are 1=NW 2=NE 3=SW 4=SE)						(NAD83 UTM in meters)	
		Q64	Q16	Q4	Sec	Tws	Rng	X	Y
NA	C 04494 POD1	2	2	3	25	23S	29E	599857	3571337

Driller License:	Driller Company:	
Driller Name:		
Drill Start Date:	Drill Finish Date:	Plug Date:
Log File Date:	PCW Rev Date:	Source:
Pump Type:	Pipe Discharge Size:	Estimated Yield:
Casing Size:	Depth Well:	Depth Water:

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

6/12/23 3:33 PM

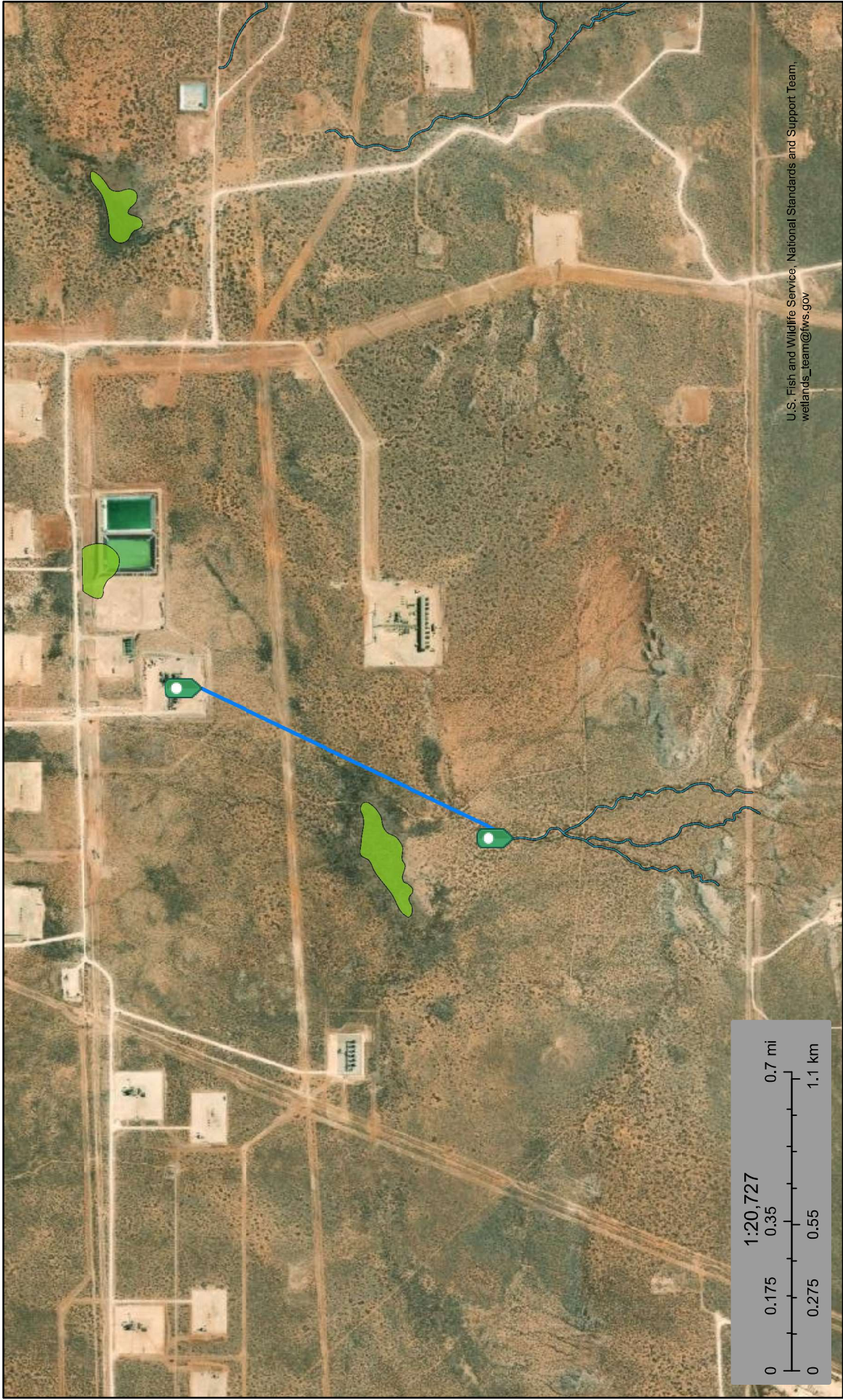
POINT OF DIVERSION SUMMARY



U.S. Fish and Wildlife Service

National Wetlands Inventory

Remuda 500 TB Watercourse 3,605 feet

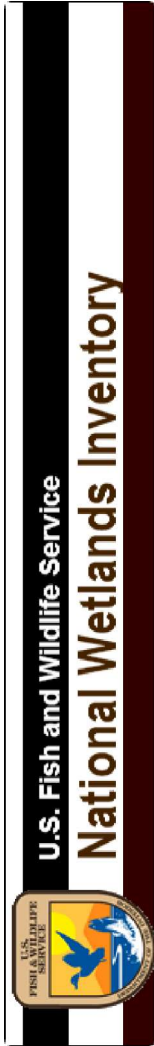


This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

June 12, 2023

Wetlands_Alaska

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



Remuda 500 TB Lakebed 11,389 feet



June 12, 2023

Wetlands_Alaska

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

Remuda 500 TB

Nearest residence: 29,146 feet from release

Released to Imaging: 1/19/2024 11:39:06 AM

Legend

- 29,146 feet
- Remuda 500 TB
- Resident

Official Scenic Historic Markers

Project Gnome

Remuda 500 TB

Resident

Resident

Google Earth

4 mi



Legend

- 1000-foot radius
- 500-foot radius
- Eddy County Springs
- Remuda 500 TB

Remuda 500 TB



Resident



Resident



Resident



Cass Draw



Remuda 500 TB

o springs within 1000 feet

Remuda 500 Nearest well 1,925 feet



6/12/2023, 1:12:56 PM

Override 1

GIS WATERS PODs

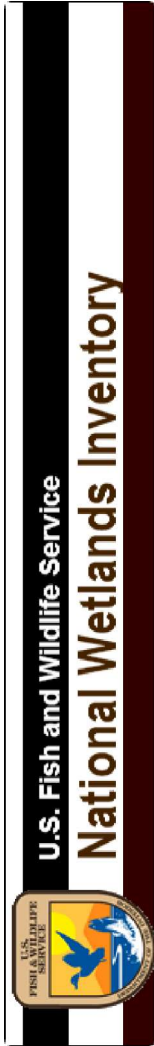
Pending

OSE District Boundary

SiteBoundaries

Esri, HERE, IPC, U.S. Department of Energy Office of Legacy Management, Esri, HERE, Garmin, IPC, Maxar

Web Generated Map
Map is generated by web users.



Remuda 500 TB Wetland 2,100 feet



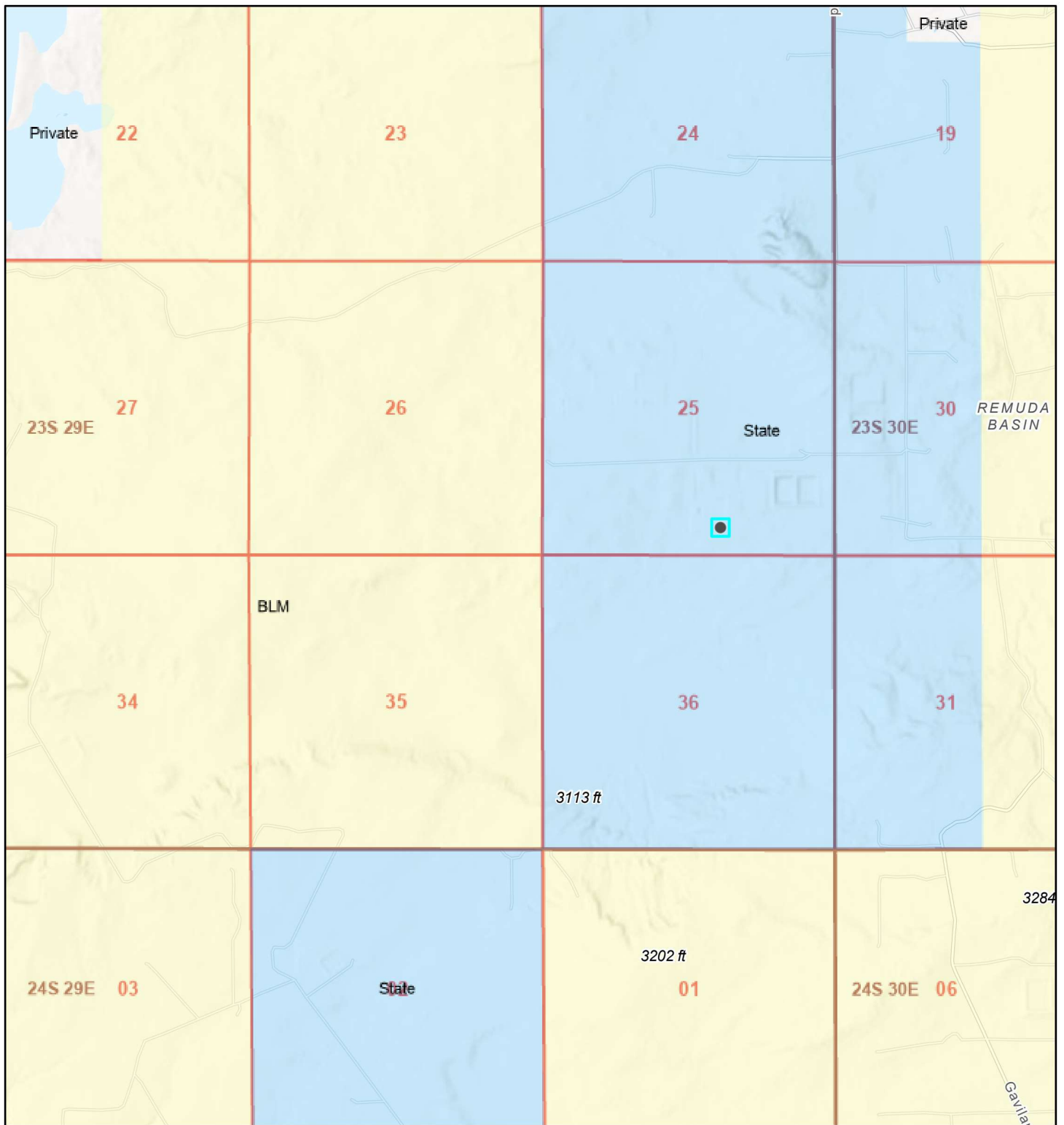
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

June 12, 2023

Wetlands_Alaska

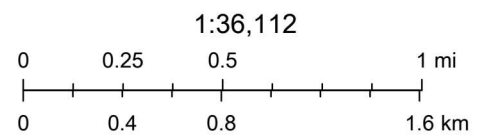
- | | | | | | |
|---|--------------------------------|---|-----------------------------------|---|----------|
|  | Estuarine and Marine Deepwater |  | Freshwater Emergent Wetland |  | Lake |
|  | Estuarine and Marine Wetland |  | Freshwater Forested/Shrub Wetland |  | Other |
| | |  | Freshwater Pond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

Remuda 500 TB Mines



6/12/2023, 2:02:14 PM

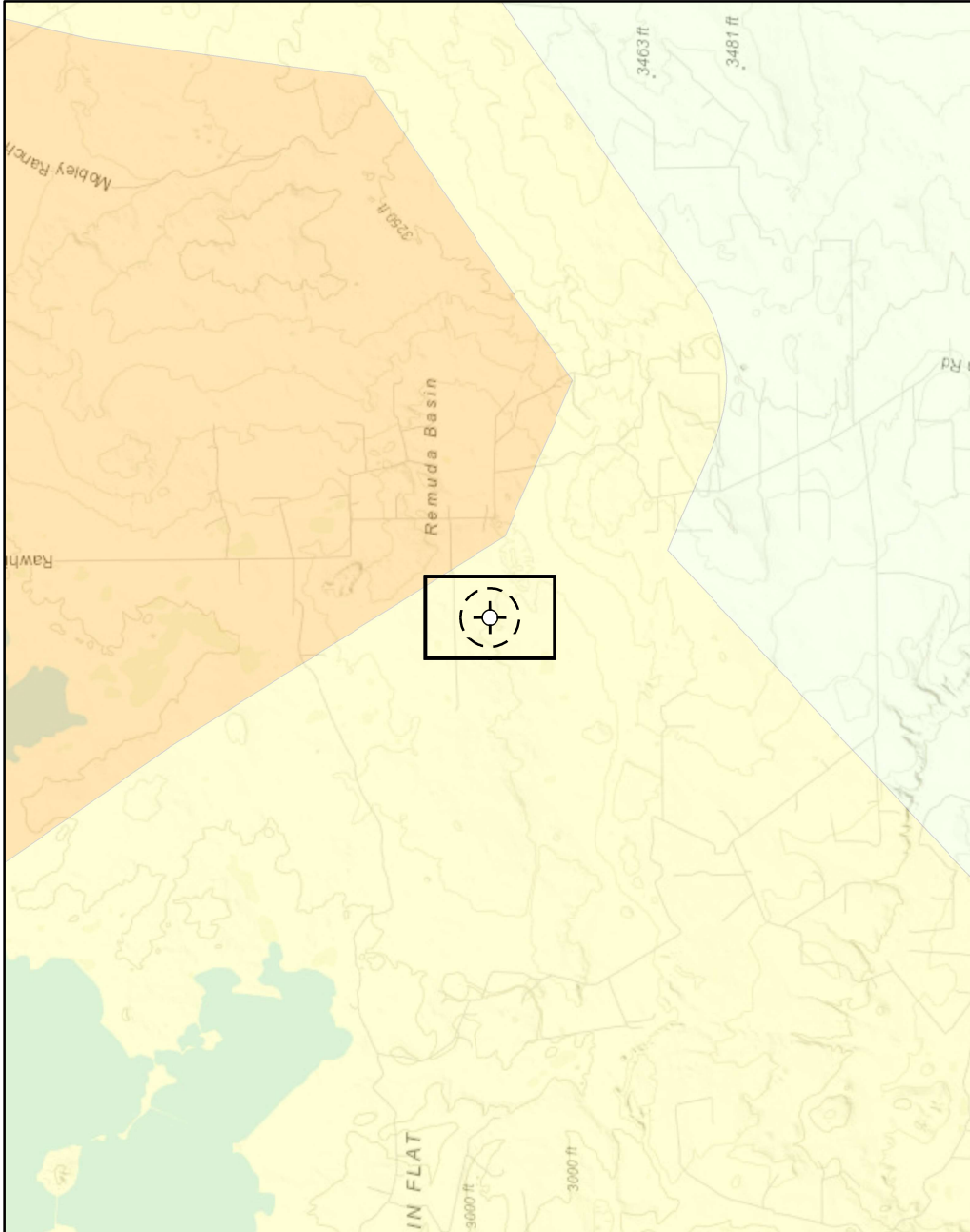
Land Ownership S
 BLM
 P
 PLSS First Division
 PLSS Townships



U.S. BLM, Esri, NASA, NGA, USGS, FEMA, BLM, New Mexico State University, Texas Parks & Wildlife, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA



Detail Map
0 150 300 600 ft.



Overview Map
0 0.25 0.5 1 mi

Karst Potential
Critical
High
Medium
Low

Site Location
Site Buffer (1,000 ft.)



Map Center:
Lat/Long: 32.269940, -103.936240
NAD 1983 UTM Zone 13N
Date: Jun 19/23

Karst Potential Map
Remuda 500 TB



FIGURE:
X

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Inset Map, Georeferenced image from ESRI, 2022; Overview Map: ESRI World Topographic; Karst potential data sourced from Roswell Field Office, Bureau of Land Management, 2020 or United States Department of the Interior, Bureau of Land Management. (2018), Karst Potential.

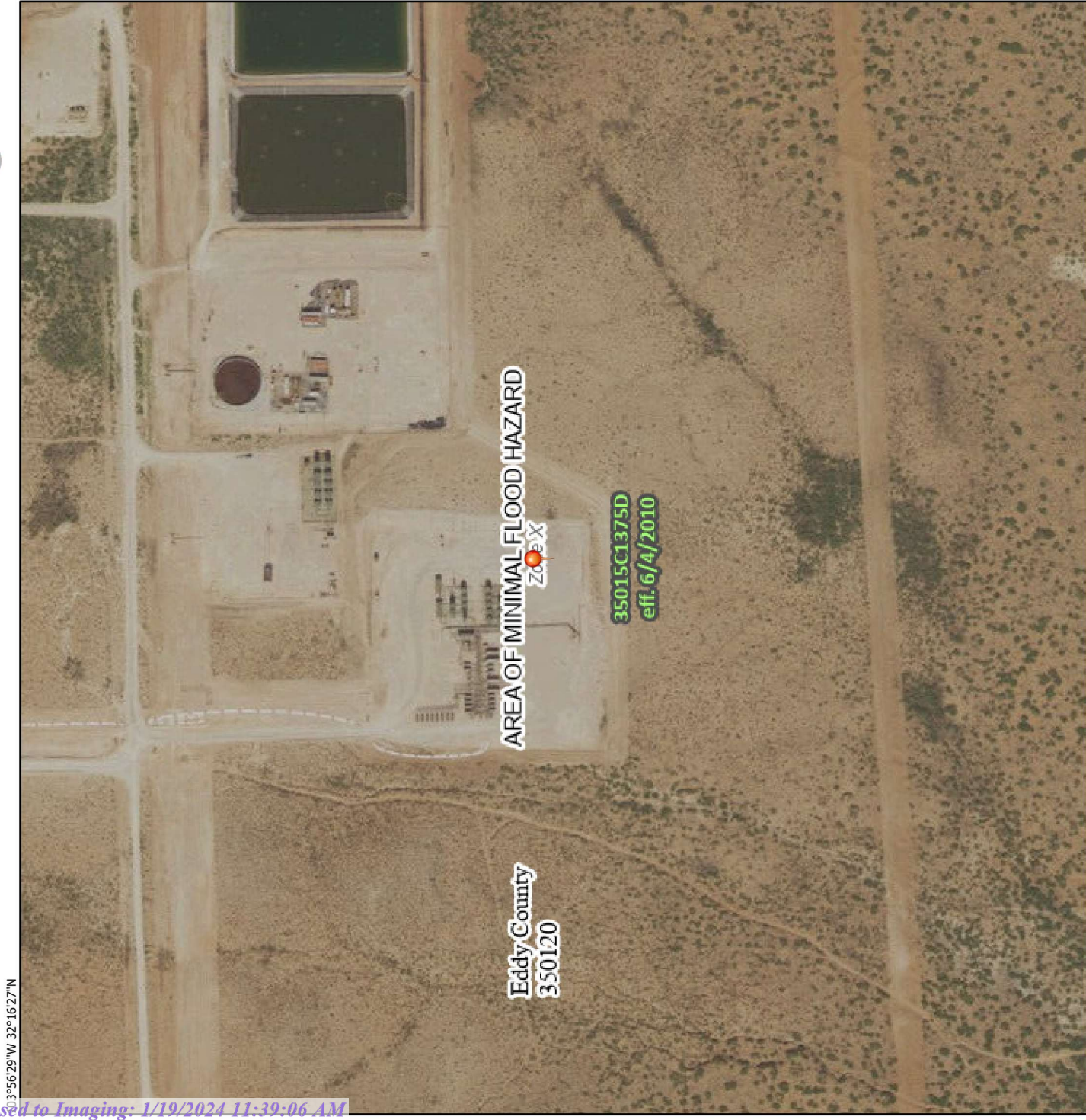
VERSATILITY. EXPERTISE.

National Flood Hazard Layer FIRMette



Received by OCD: 8/10/2023 12:58:21 PM

Released to Imaging: 1/19/2024 11:39:06 AM



33°56'29"W 32°16'27"N

103°55'52"W 32°15'57"N



Basemap Imagery Source: USGS National Map 2023

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, AP
- 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 B
- 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
- Effective LOMR
- Area of Minimal Flood Hazard
Zone X
- Area of Undetermined Flood Hazard
Zone D
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance Water Surface Elevation
20.2
17.5
- 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



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/12/2023 at 4:14 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 Eddy Area, New Mexico



June 17, 2023

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface..... 2

Soil Map..... 5

 Soil Map (Remuda 500 TB)..... 6

 Legend..... 7

 Map Unit Legend (Remuda 500 TB)..... 8

 Map Unit Descriptions (Remuda 500 TB)..... 8

 Eddy Area, New Mexico..... 10

 SM—Simona-Bippus complex, 0 to 5 percent slopes..... 10

Soil Information for All Uses..... 12

 Ecological Sites..... 12

 All Ecological Sites — (Remuda 500 TB Ecological Sites)..... 12

 Map—Dominant Ecological Site (Remuda 500 TB Ecological Sites)..... 13

 Legend—Dominant Ecological Site (Remuda 500 TB Ecological Sites)..... 14

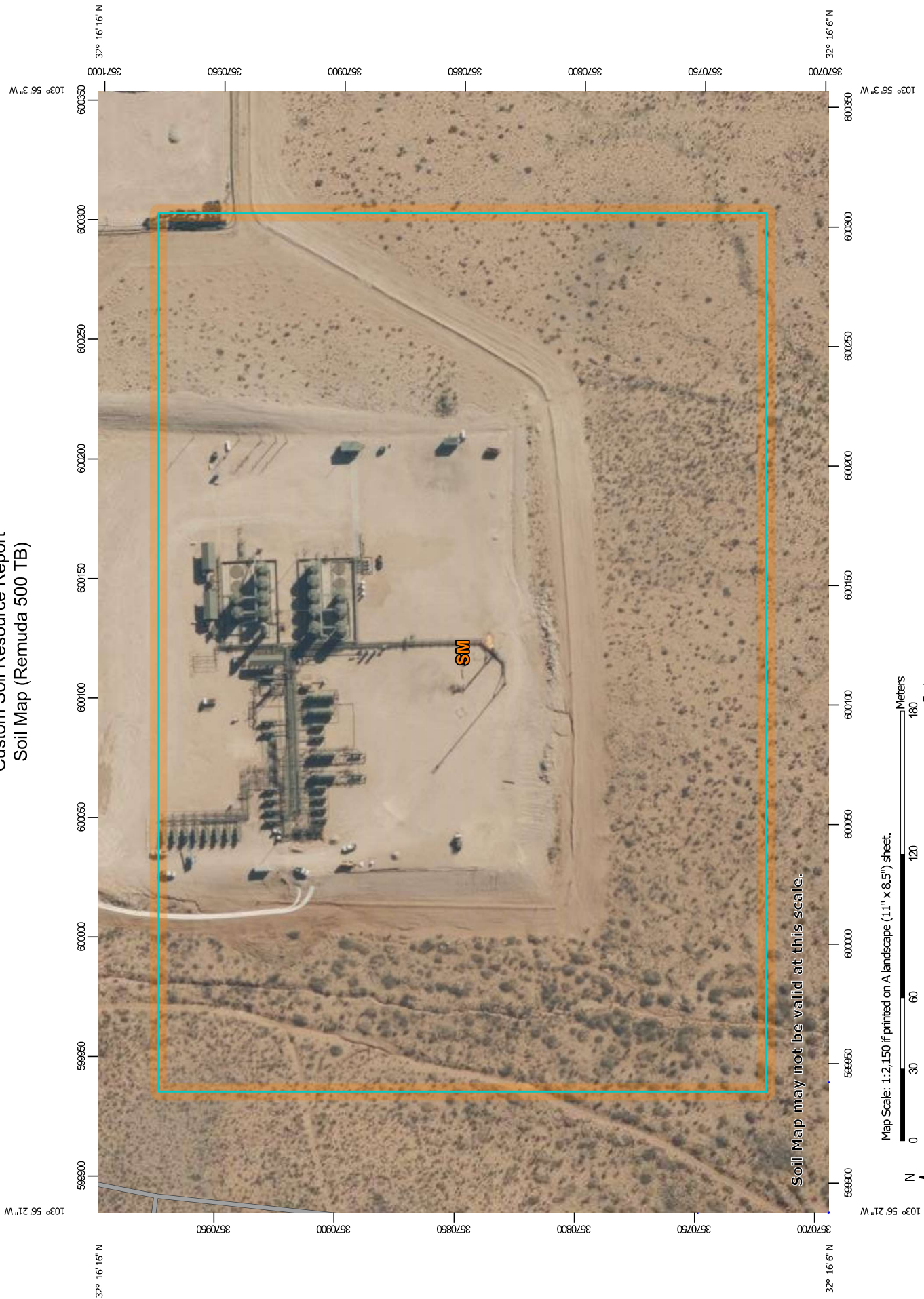
 Table—Ecological Sites by Map Unit Component (Remuda 500 TB Ecological Sites)..... 15

References..... 16

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 (Remuda 500 TB)



Custom Soil Resource Report

Map Unit Legend (Remuda 500 TB)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SM	Simona-Bippus complex, 0 to 5 percent slopes	23.0	100.0%
Totals for Area of Interest		23.0	100.0%

Map Unit Descriptions (Remuda 500 TB)

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.

Custom Soil Resource Report

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.

Custom Soil Resource Report

Eddy Area, New Mexico**SM—Simona-Bippus complex, 0 to 5 percent slopes****Map Unit Setting**

National map unit symbol: 1w5x
Elevation: 1,800 to 5,000 feet
Mean annual precipitation: 8 to 24 inches
Mean annual air temperature: 57 to 70 degrees F
Frost-free period: 180 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Simona and similar soils: 55 percent
Bippus and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Simona**Setting**

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

Typical profile

H1 - 0 to 19 inches: gravelly fine sandy loam
H2 - 19 to 23 inches: indurated

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very 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 content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R070BD002NM - Shallow Sandy
Hydric soil rating: No

Custom Soil Resource Report

Description of Bippus**Setting**

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 37 inches: silty clay loam
H2 - 37 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very 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: OccasionalNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R070BC017NM - Bottomland
Hydric soil rating: No

Minor Components**Simona**

Percent of map unit: 8 percent
Ecological site: R070BD002NM - Shallow Sandy
Hydric soil rating: No

Bippus

Percent of map unit: 7 percent
Ecological site: R070BC017NM - Bottomland
Hydric soil rating: No

Soil Information for All Uses

Ecological Sites

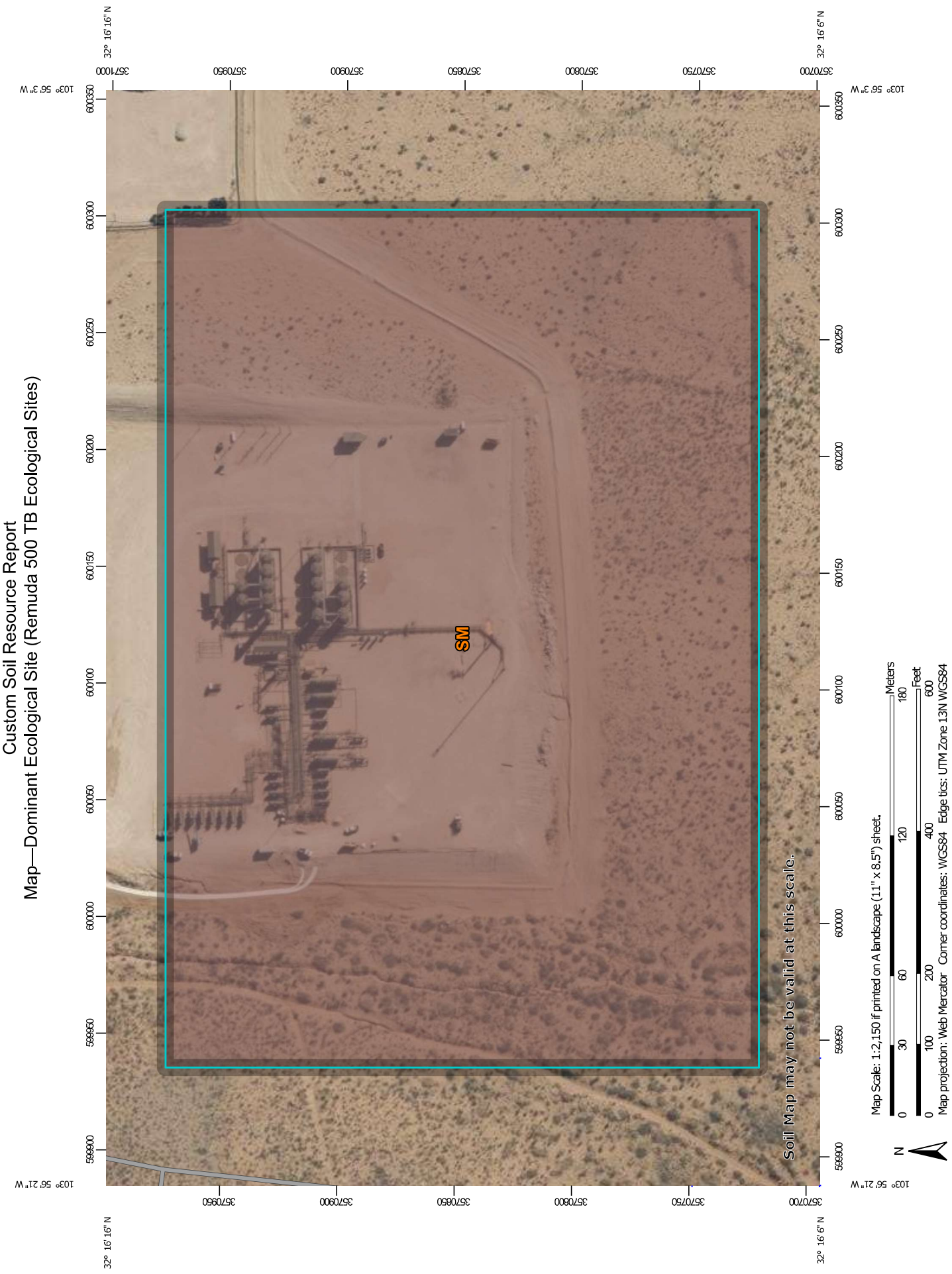
Individual soil map unit components can be correlated to a particular ecological site. The Ecological Site Assessment section includes ecological site descriptions, plant growth curves, state and transition models, and selected National Plants database information.

All Ecological Sites — (Remuda 500 TB Ecological Sites)

An "ecological site" is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. For example, the hydrology of the site is influenced by development of the soil and plant community. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

An ecological site name provides a general description of a particular ecological site. For example, "Loamy Upland" is the name of a rangeland ecological site. An "ecological site ID" is the symbol assigned to a particular ecological site.

The map identifies the dominant ecological site for each map unit, aggregated by dominant condition. Other ecological sites may occur within each map unit. Each map unit typically consists of one or more components (soils and/or miscellaneous areas). Each soil component is associated with an ecological site. Miscellaneous areas, such as rock outcrop, sand dunes, and badlands, have little or no soil material and support little or no vegetation and therefore are not linked to an ecological site. The table below the map lists all of the ecological sites for each map unit component in your area of interest.



Custom Soil Resource Report
Map—Dominant Ecological Site (Remuda 500 TB Ecological Sites)

Soil Map may not be valid at this scale.

Map Scale: 1:2,150 if printed on A landscape (11" x 8.5") sheet.

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

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: Eddy Area, New Mexico
Survey Area Data: Version 18, Sep 8, 2022

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

Date(s) aerial images were photographed: Feb 7, 2020—May 12, 2020

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 LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

R070BD002NM

Not rated or not available

Soil Rating Lines

R070BD002NM


Not rated or not available

Soil Rating Points

R070BD002NM


Not rated or not available

Water Features


 Streams and Canals

Transportation

Rails

 Interstate Highways

US Routes



Major Roads

Local Roads

Background

Aerial Photography

Custom Soil Resource Report

**Table—Ecological Sites by Map Unit Component
(Remuda 500 TB Ecological Sites)**

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
SM	Simona-Bippus complex, 0 to 5 percent slopes	Simona (55%)	R070BD002NM — Shallow Sandy	23.0	100.0%
		Bippus (30%)	R070BC017NM — Bottomland		
		Simona (8%)	R070BD002NM — Shallow Sandy		
		Bippus (7%)	R070BC017NM — Bottomland		
Totals for Area of Interest				23.0	100.0%

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

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

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

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



Ecological site R070BD002NM Shallow Sandy

Accessed: 06/17/2023

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R070BD004NM	Sandy Sandy sites often occur in association or in a complex with Shallow Sandy Sites.
-------------	--

Similar sites

R070BD004NM	Sandy Sandy ecological sites are similar to Shallow Sandy sites in species composition and Transition pathways.
-------------	---

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on plains, alluvial fans, uplands, or fan piedmonts. The parent material consists of mixed loamy alluvium or eolian material derived from igneous and sedimentary bedrock. The petrocalcic layer is at a depth of 10 to 25 inches and undulating.

Slopes are nearly level to undulating, usually less than 9 percent. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Fan piedmont (3) Alluvial fan
Elevation	2,842–4,500 ft
Slope	1–9%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common.

Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms.

Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.

The average frost-free season is from 207 to 220 days. The last killing frost is in late March or early April, and the first killing frost is in late October or early November.

Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of the site. The vegetation of this site can take advantage of the moisture and the time it falls. Because of the soil profile, little moisture can be stored in the soil for any length of time. Moisture is readily available to the plants from the time it falls. Strong winds from the southwest blow from January through June which rapidly dries out the soil profile during a critical period for plant growth.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced from water from wetlands or streams.

Soil features

Soils are very shallow to shallow, less than 20 inches in depth. Surface and subsurface textures are gravelly loamy sand, gravelly fine sandy loam or fine sandy loam.

An indurated caliche layer occurs at depths of 6 to 25 inches and is at an average of 15 inches from the surface. Underlying material textures are very gravelly fine sandy loam, very gravelly sandy loam, gravelly fine sandy loam. Gravels are calcium carbonate concretions, calcium carbonate content ranges from 30 to 65 percent.

The indurated caliche layer typically holds water up in the profile for short periods within the root zone of plants. These soils will blow if left unprotected by vegetation.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils are:

Simona

Jerag

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to moderate

Soil depth	7–24 in
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	5–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.4–8
Subsurface fragment volume <=3" (Depth not specified)	5–25%
Subsurface fragment volume >3" (Depth not specified)	0%

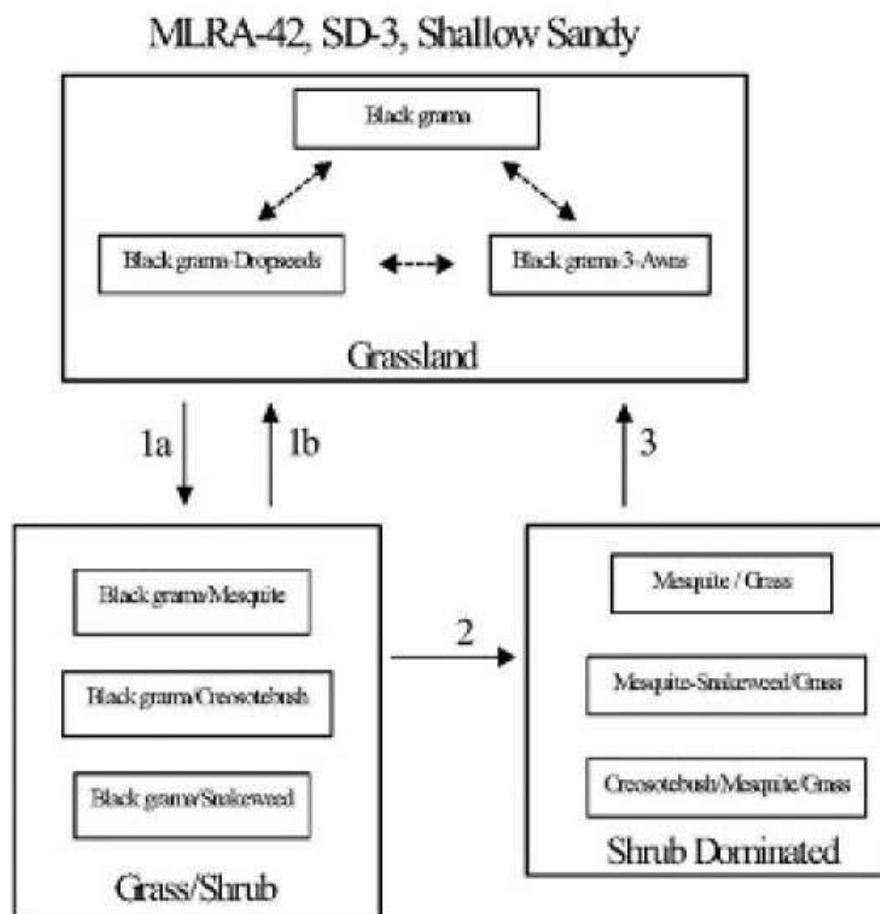
Ecological dynamics

Overview

The Shallow Sandy site occurs on upland plains, and tops of low ridges and mesas, associated with Sandy, Loamy Sand, and Shallow sites. Coarse to moderately coarse soil surface textures, shallow depth (<20 inches) to an indurated caliche layer (petrocalcic horizon), and an overwhelming dominance by black grama help to distinguish this site. The historic plant community of the Shallow Sandy site is a black grama dominated grassland sparsely dotted with shrubs. Shrubs, especially mesquite and creosotebush can increase or colonize due to the dispersal of shrub seeds by livestock or wildlife. This increase in mesquite and colonization of creosotebush may be enhanced by proximity to areas with existing high shrub densities. Fire suppression, and the loss of grass cover due to overgrazing or drought may facilitate the increase and encroachment of shrubs. Persistent loss of grass cover, competition for resources by shrubs, and periods of climate with increased winter precipitation and dry summers, may initiate the transition to a shrub-dominated state.

State and transition model

Plant Communities and Transitional Pathways (diagram)



1a. Seed dispersal, drought, overgrazing, fire suppression.

1b. Prescribed fire, brush control, prescribed grazing.

2. Persistent loss of grass cover, resource competition, increased winter precipitation.

3. Brush control, range seeding, prescribed grazing.

State 1

Historic Climax Plant Community

Community 1.1

Historic Climax Plant Community

Grassland: This site responds well to management and is resistant to state change, due to the shallow depth to petrocalcic horizon and sandy surface textures. The sandy surface textures allow rapid water infiltration and the petrocalcic horizon helps to keep water perched and available to shallow rooted grasses. Black grama is the dominant species in the historic plant community, averaging 50 to 60 percent of the total production for this site. Bush muhly, blue grama, and dropseeds are present as sub-dominants. Typically, yucca, javalinabush, range ratany, prickly pear, and mesquite are sparsely dotted across the landscape. Leatherweed croton, cutleaf

happlopappus, wooly groundsel, and threadleaf groundsel are common forbs. Continuous heavy grazing or extended periods of drought will cause a loss of grass cover characterized by a decrease in black grama, bush muhly, blue and sideoats grama, plains bristlegrass, and Arizona cottontop. Dropseeds and or threeawns may increase and become sub-dominant to black grama. Continued loss of grass cover in conjunction with dispersal of shrub seeds and fire suppression is believed to cause the transition to a state with increased amounts of shrubs (Grass/Shrub state). Diagnosis: Black grama is the dominant grass species. Grass cover uniformly distributed. Shrubs are a minor component averaging only two to five percent canopy cover. Litter cover is high (40-50 percent of area), and litter movement is limited to smaller size class litter and short distances (< . 5m). Other grasses that could appear on this site would include: six-weeks grama, fluffgrass, false-buffalograss, hairy grama, little bluestem, bristle panicum, cane bluestem, Indian ricegrass, tridens spp., and red lovegrass. Other woody plants include: pricklypear, cholla, fourwing saltbush, catclaw mimosa, winterfat, American tarbush and mesquite. Other forbs include: globemallow, verbena, desert holly, senna, plains blackfoot, trailing fleabane, fiddleneck, deerstongue, wooly Indianwheat, and locoweed.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	474	652	830
Forb	78	107	136
Shrub/Vine	48	66	84
Total	600	825	1050

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	30-35%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-25%

Figure 5. Plant community growth curve (percent production by month).
 NM2802, R042XC002NM-Shallow Sandy-HCPC. SD-3 Shallow Sandy - Warm
 season plant community.

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

State 2

Grass/Shrub

Community 2.1

Grass/Shrub

Grass/Shrub: This state is characterized by the notable presence of shrubs, especially mesquite, broom snakeweed, and/or creosotebush, however grasses remain as the dominant species. Black grama is the dominant

grass species. Threeawns and or dropseeds are sub-dominant. The susceptibility of the Shallow Sandy site to shrub encroachment may be higher when located adjacent to other sites with high densities of mesquite or creosotebush. Retrogression within this site is characterized by decreases in grass cover and increasing densities of shrubs. Diagnosis: Black grama remains as the dominant grass species. Grass cover varies in response to the amount of shrub increase, ranging from uniform to patchy. Shrubs are found at increased densities relative to the grassland state, especially mesquite, creosotebush, or broom snakeweed. Transition to Grass/Shrub (1a) Historically fire may have kept mesquite and other shrubs in check by completely killing some species and disrupting seed production cycles and suppressing the establishment of shrub seedlings in others. Fire suppression combined with seed dispersal by livestock and wildlife is believed to be the factors responsible for the establishment and increase in shrubs.1, 3 Loss of grass cover due to overgrazing, prolonged periods of drought, or their combination, reduces fire fuel loads and increases the susceptibility of the site to shrub establishment. Key indicators of approach to transition: Increase in the relative abundance of dropseeds and threeawns Presence of shrub seedlings Loss of organic matter—evidenced by an increase in physical soil crusts 8 Transition back to Grassland (1b) Brush control is necessary to initiate the transition back to the grassland state. If adequate fuel loads remain, possibly the reintroduction of fire as a management tool will assist in the transition back, however, mixed results have been observed concerning the effects of fire on black grama grasslands.6 Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover capable of sustaining fire.

State 3 Shrub Dominated

Community 3.1 Shrub Dominated

Shrub-Dominated: Across the range of soil types included in the Shallow Sandy site, mesquite is typically the dominant shrub, but it does occur as a co-dominant or sub-dominant species with creosotebush or broom snakeweed. Mesquite tends to dominate when the Shallow Sandy site occurs as part of a complex or in association with Sandy or Loamy Sand sites. Creosotebush tends to dominate on Shallow Sandy sites that occur as part of, or adjacent to Shallow Sites. Broom snakeweed increases in response to heavy grazing, but tends to cycle in and out depending on timing of rainfall. However, once the site is dominated by shrubs and snakeweed becomes well established, it tends to remain as a major component in the shrub dominated state. Diagnosis: Mesquite, creosotebush, or snakeweed cover is high, exceeding that of grasses. Grass cover is patchy with large connected bare areas present. Black grama, threeawns, or dropseeds may be the dominant grass. Evidence of accelerated wind erosion in the form of pedestalling of plants, and soil deposition around shrub bases may be common. Transition to Shrub-Dominated (2) Persistent loss of grass cover and the resulting increased competition between shrubs and remaining grasses for dwindling resources (especially soil moisture) may drive this transition.5 Additionally periods of increased winter precipitation may facilitate periodic episodes of shrub expansion and establishment. 4 Key indicators of approach to transition: Increase in size and frequency of bare patches. Loss of grass cover in shrub interspaces. Increased signs of erosion, evidenced by pedestalling of plants, and soil and litter deposition on leeward side of plants. 7 Transition back to Grassland (3) Brush control is necessary to reduce competition from shrubs and reestablish grasses. Range seeding may be necessary if insufficient grasses remain, The benefits, and costs, will vary depending upon the degree of site degradation, and adequate precipitation following seeding.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Warm Season			413–495	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	413–495	–
2	Warm Season			41–83	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	41–83	–
3	Warm Season			41–83	

	blue grama	BOGR2	<i>Bouteloua gracilis</i>	41–83	–
4	Warm Season			25–41	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	25–41	–
5	Warm Season			41–83	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	41–83	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	41–83	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	41–83	–
6	Warm Season			17–41	
	threeawn	ARIST	<i>Aristida</i>	17–41	–
7	Warm Season			41–83	
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	41–83	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	41–83	–
8	Warm Season			41–83	
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	41–83	–
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	41–83	–
9	Other Perennial Grasses			25–41	
	Grass, perennial	2GP	<i>Grass, perennial</i>	25–41	–
Shrub/Vine					
10	Shrub			8–25	
	javelina bush	COER5	<i>Condalia ericoides</i>	8–25	–
11	Shrub			8–25	
	yucca	YUCCA	<i>Yucca</i>	8–25	–
12	Shrub			8–25	
	jointfir	EPHED	<i>Ephedra</i>	8–25	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	8–25	–
13	Shrub			8–25	
	featherplume	DAFO	<i>Dalea formosa</i>	8–25	–
14	Shrub			8–25	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	8–25	–
15	Other Shrubs			25–41	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	25–41	–
Forb					
16	Forb			17–41	
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	17–41	–
	Goodding's tansyaster	MAPIG2	<i>Machaeranthera pinnatifida</i> ssp. <i>gooddingii</i> var. <i>gooddingii</i>	17–41	–
17	Forb			17–41	
	woolly groundsel	PACA15	<i>Packera cana</i>	17–41	–
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	17–41	–
18	Forb			8–25	
	whitest evening primrose	OEAL	<i>Oenothera albicaulis</i>	8–25	–
19	Other Forbs			8–25	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	8–25	–

Animal community

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, swift fox, black-tailed jackrabbit, spotted ground squirrel, Ord's kangaroo rat, northern grasshopper mouse, coyote, horned lark, meadowlark, lark bunting, scaled quail, morning dove, side-blotched lizard, round-tailed horned lizard, marbled whiptail, prairie rattlesnake and ornate box turtle.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Jarag D
Simona D

Recreational uses

This site offers recreation for hiking, horseback riding, nature observation and photography, and quail and dove hunting. During years of abundant spring moisture, this site displays a riot of color from wildflowers during May and June. A few summer and fall flowers also occur.

Wood products

The natural potential plant community of this site affords little or no wood products. Where the site has been invaded by mesquite or cholla cactus the roots and stems of these plants provide attractive material for a variety of curiosities, such as lamps and small furniture.

Other products

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Because of the sandy textures and shallow profile, this site will respond rapidly to management. As this site deteriorates, plants such as black grama, bush muhly, blue and sideoats grama, plains bristlegrass and Arizona cottontop, will decrease and be replaced by plants such as threeawns, mesquite, creosote bush, and broom snakeweed. This also causes a decrease in ground cover, leaving the soil to blow. This site responds best to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index Ac/AUM
100 - 76 2.5 – 3.5
75 – 51 3.2 – 4.6
50 – 26 4.5 – 7.5
25 – 0 7.6 +

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Eddy County, Lea County, and Chaves County.

Other references

Literature References:

1. Brooks, M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species.
2. Hennessy, J.T., R.P. Gibbens, J.M. Tromble, and M. Cardenas. 1983. Water properties of caliche. J. Range Manage. 36: 723-726.
3. Humphrey, R.R. 1974. Fire in the deserts and desert grassland of North America. In: Kozlowski, T. T.; Ahlgren, C. E., eds. Fire and ecosystems. New York: Academic Press: 365-400.
4. Moir, W.H., and J. A. Ludwig. 1991. Plant succession and changing land features in desert grasslands. P. 15-18. In P.F. Ffolliott and W.T. Swank (eds.) People and the temperate region: a summary of research from the United States Man and the Biosphere Program 1991. U.S. Dept. State, Publ No. 9839, Nat. Tech. Info. Serv., U.S. Dept. Commerce, Springfield, Illinois. 63 p.
5. Tiedemann, A. R. and J. O. Klemmedson. 1977. Effect of mesquite trees on vegetation and soils in the desert grassland. J. Range Manage. 30: 361-367.
6. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: <http://www.fs.fed.us/database/feis/> [accessed 2/10/03].
7. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Wind Erosion. Rangeland Sheet 10 [Online]. Available: <http://www.statlab.iastate.edu/survey/SQL/range.html>
8. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Physical and Biological Soil Crusts. Rangeland Sheet 7 [Online]. Available: <http://www.statlab.iastate.edu/survey/SQL/range.html>

Contributors

David Trujillo
Don Sylvester

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

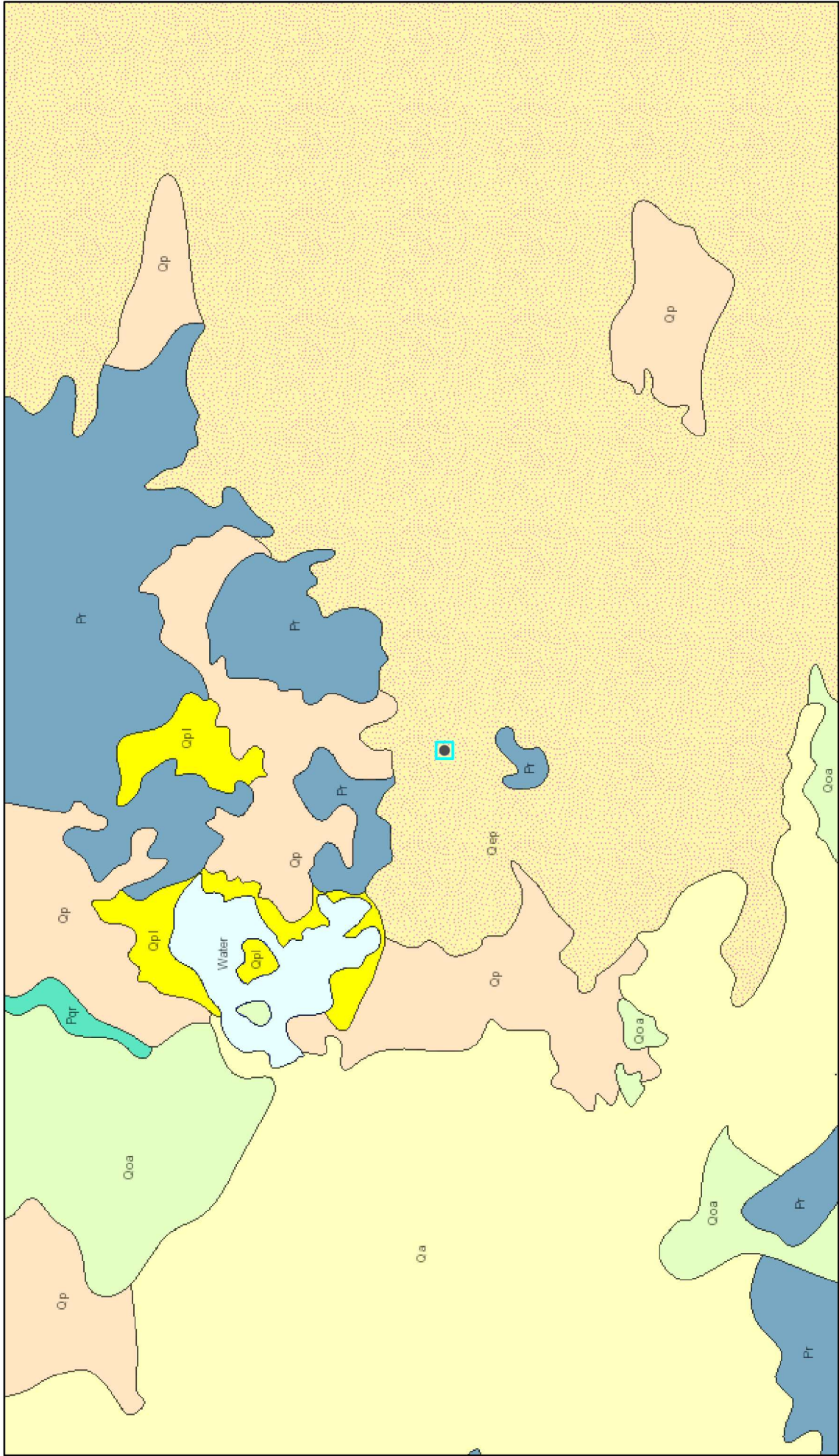
14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

17. Perennial plant reproductive capability:

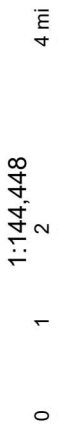
Remuda 500 TB Surface Geology



6/12/2023, 3:04:58 PM

Lithologic Units

- Playa—Alluvium and evaporite deposits (Holocene)
- Water—Perennial standing water
- Qa—Alluvium (Holocene to upper Pleistocene)



Esri, NASA, NGA, USGS, NMBMR, USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census

APPENDIX C – Daily Field Report(s)



Daily Site Visit Report

Client:	XTO Energy Inc. (US)	Inspection Date:	6/12/2023
Site Location Name:	Remuda 500 TB	Report Run Date:	6/12/2023 5:51 PM
Client Contact Name:	Garrett Green	API #:	
Client Contact Phone #:	575-200-0729		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times	
Arrived at Site	6/12/2023 7:47 AM
Departed Site	6/12/2023 10:30 AM

Field Notes
<p>8:24 On site. Completed Vertex and XTO JSAs and received work authorization from XTO representative. Beginning white lining</p> <p>9:04 White lined spill area. Placed locate request exp 7/7 23JN120218</p> <p>9:15 No staining visible, using initial photos to map and select sampling locations</p> <p>10:09 Collected and field screened SS23-01 and SS23-02</p>

Next Steps & Recommendations
<p>1 Excavate impacted area</p>

Daily Site Visit Report

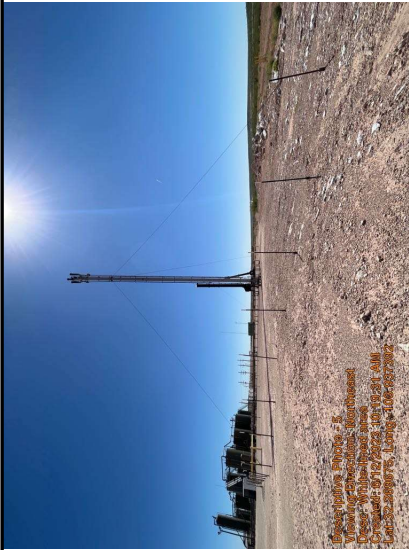
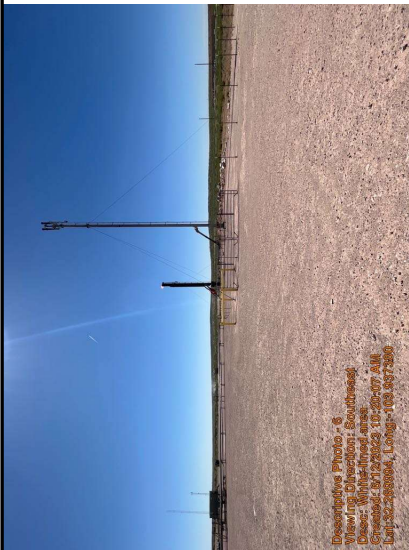


Site Photos

<div>Viewing Direction: Southwest</div> <div><p>DESCRIPTION Photo: 3 Viewing Direction: Southwest Date: 8/12/2023 Operator: 8012023 9:10:25 AM GPS: 32.000851, Long: 103.897968</p></div> <div>Release area</div>	<div>Viewing Direction: Southeast</div> <div><p>DESCRIPTION Photo: 2 Viewing Direction: Southeast Date: 8/12/2023 Operator: 8012023 9:10:25 AM GPS: 32.000851, Long: 103.897968</p></div> <div>Release area</div>
<div>Viewing Direction: South</div> <div><p>DESCRIPTION Photo: 3 Viewing Direction: South Date: 8/12/2023 Operator: 8012023 9:10:25 AM GPS: 32.000851, Long: 103.897968</p></div> <div>Release area</div>	<div>Viewing Direction: East</div> <div><p>DESCRIPTION Photo: 4 Viewing Direction: East Date: 8/12/2023 Operator: 8012023 9:10:25 AM GPS: 32.000851, Long: 103.897968</p></div> <div>Release area and composite sample locations</div>



Daily Site Visit Report

Viewing Direction: Northeast	Viewing Direction: Southeast
<div><p>Describe Photo: 2L Viewing Direction: Northeast Date: 8/12/2023 3:01:52 PM Created: 8/12/2023 3:01:52 PM Lat: 32.95896, Long: -103.897399</p></div> <div>White-lined area</div>	<div><p>Describe Photo: 5 Viewing Direction: Southeast Date: 8/12/2023 12:29:07 AM Created: 8/12/2023 12:29:07 AM Lat: 32.95896, Long: -103.897399</p></div> <div>White-lined area</div>

Daily Site Visit Report



Daily Site Visit Signature

Inspector: Sally Carttar

Signature:

A handwritten signature in black ink, appearing to be 'Sally Carttar', written over a horizontal line. Below the line, the word 'Signature' is printed in a small, vertical font.



Daily Site Visit Report

Client:	XTO Energy Inc. (US)	Inspection Date:	7/17/2023
Site Location Name:	Remuda 500 TB	Report Run Date:	7/18/2023 12:47 AM
Client Contact Name:	Garrett Green	API #:	
Client Contact Phone #:	575-200-0729		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times	
Arrived at Site	7/17/2023 8:02 AM
Departed Site	7/17/2023 6:39 PM

Field Notes

13:38 Arrived at site and filled out safety paperwork. Conducted JSA and PSMS procedures for XTO. On site to excavate areas around flare down to 4-6in. Will collect confirmatory samples as the excavation progresses. Will conduct Last Minute Risk Assessment before starting tasks.





18:18 Collected BS23-01 and 02, then WS23-01, 02, 03, and 04 from the 4in excavated areas. Field screened for chlorides and TPH. All clean samples were placed into glass jars and will be sent in for laboratory analysis. Added sample points to Field Maps and DSS.

Next Steps & Recommendations

Daily Site Visit Report



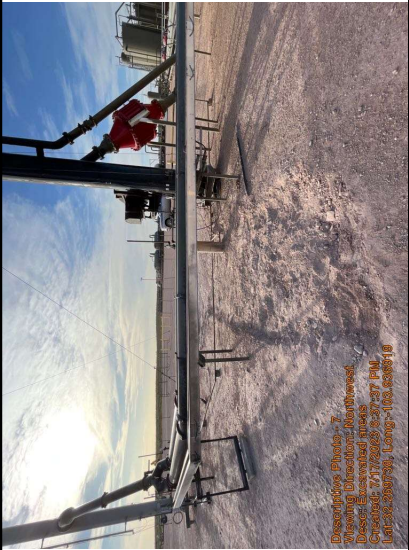



Site Photos

<div>Viewing Direction: South</div> <div><p>Descriptive Photo - 1 Viewing Direction: South Date: Pre-marked excavation Created: 7/17/2023 8:18:12 PM Lat:32.276126, Long:-103.536874</p></div> <div>Pre-marked excavation</div>	<div>Viewing Direction: East</div> <div><p>Descriptive Photo - 2 Viewing Direction: East Date: Pre-marked excavation Created: 7/17/2023 8:16:31 PM Lat:32.276126, Long:-103.536874</p></div> <div>Pre-marked excavation</div>
<div>Viewing Direction: North</div> <div><p>Descriptive Photo - 3 Viewing Direction: North Date: Pre-marked excavation Created: 7/17/2023 8:18:47 PM Lat:32.276126, Long:-103.536874</p></div> <div>Pre-marked excavation</div>	<div>Viewing Direction: Southwest</div> <div><p>Descriptive Photo - 4 Viewing Direction: Southwest Date: Pre-marked excavation Created: 7/17/2023 8:17:15 PM Lat:32.276126, Long:-103.536874</p></div> <div>Pre-marked excavation</div>



Daily Site Visit Report

Viewing Direction: South	 <p>Describe Photo: 5 Viewing Direction: South Date: Excavated areas Created: 7/17/2023 2:35:41 PM Lat: 32.298976, Long: -103.558925</p>	Excavated areas
Viewing Direction: Northeast	 <p>Describe Photo: 6 Viewing Direction: Northeast Date: Excavated areas Created: 7/17/2023 4:28:28 PM Lat: 32.298976, Long: -103.558925</p>	Excavated areas
Viewing Direction: Northwest	 <p>Describe Photo: 7 Viewing Direction: Northwest Date: Excavated areas Created: 7/17/2023 2:27:37 PM Lat: 32.298976, Long: -103.558925</p>	Excavated areas
Viewing Direction: South	 <p>Describe Photo: 8 Viewing Direction: South Date: Excavated areas Created: 7/17/2023 4:28:27 PM Lat: 32.298976, Long: -103.558925</p>	Overview of work area

Daily Site Visit Report



Daily Site Visit Signature

Inspector: Fernando Rodriguez

Signature:

A handwritten signature in black ink, appearing to be 'FR', written over a horizontal line.

Signature

APPENDIX D – Notification

From: [Green, Garrett J](#)
To: [Chance Dixon](#)
Subject: FW: [EXTERNAL] 48-hour Sampling Notification - Remuda TB June 16-17 2023
Date: June 13, 2023 7:59:39 AM
Attachments: [image003.png](#)

From: Collins, Melanie <melanie.collins@exxonmobil.com>
Sent: Tuesday, June 13, 2023 7:51 AM
To: Green, Garrett J <garrett.green@exxonmobil.com>
Subject: FW: [EXTERNAL] 48-hour Sampling Notification - Remuda TB June 16-17 2023

Melanie Collins



Environmental Technician
melanie.collins@exxonmobil.com
432-556-3756

From: Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
Sent: Monday, June 12, 2023 5:35 PM
To: Collins, Melanie <melanie.collins@exxonmobil.com>
Cc: Bratcher, Michael, EMNRD <mike.bratcher@emnrd.nm.gov>; Hamlet, Robert, EMNRD <Robert.Hamlet@emnrd.nm.gov>
Subject: RE: [EXTERNAL] 48-hour Sampling Notification - Remuda TB June 16-17 2023

External Email – Think Before You Click

Melanie,

Thank you for the notification. Please include a copy of this and all notifications in the remedial and/or closure reports to ensure the notifications are documented in the project file.

JH

Jocelyn Harimon • Environmental Specialist
Environmental Bureau
EMNRD - Oil Conservation Division
1220 South St. Francis Drive | Santa Fe, NM 87505
(505)469-2821 | Jocelyn.Harimon@emnrd.nm.gov
[http:// www.emnrd.nm.gov](http://www.emnrd.nm.gov)



From: Collins, Melanie <melanie.collins@exxonmobil.com>
Sent: Monday, June 12, 2023 2:02 PM
To: Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>; Hamlet, Robert, EMNRD <Robert.Hamlet@emnrd.nm.gov>; Bratcher, Michael, EMNRD <mike.bratcher@emnrd.nm.gov>; Harimon, Jocelyn, EMNRD <Jocelyn.Harimon@emnrd.nm.gov>
Cc: Green, Garrett J <garrett.green@exxonmobil.com>; DelawareSpills /SM <DelawareSpills@exxonmobil.com>
Subject: [EXTERNAL] 48-hour Sampling Notification - Remuda TB June 16-17 2023

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

All,

XTO is submitting this 48-hour advance sampling notification for the Remuda 500 TB. Please reach out with questions or concerns.

Site Name	Remuda 500 TB
Location	O-25-23S-29E; Eddy County, NM
Incident ID	nAPP2314544467
Source & Description of Activities	Sampling
Expected Duration for Activities	2 Days 06.15.2023 – 06.16.2023
Env Consultant	Vertex
Contractor	N/A
Sampling Notification Required	Yes, 06.15.2023 – 06.16.2023 (NMOCD District 2)
Surface Owner	Bureau of Land Management

Thank you,

Melanie Collins



Environmental Technician

melanie.collins@exxonmobil.com

432-556-3756

APPENDIX E – Laboratory Data Reports and Chain of Custody Forms



Environment Testing

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

ANALYTICAL REPORT

PREPARED FOR

Attn: Chance Dixon
Vertex
3101 Boyd Dr
Carlsbad, New Mexico 88220

Generated 6/19/2023 3:25:31 PM

JOB DESCRIPTION

Remuda 500 TB
SDG NUMBER 23E-03490

JOB NUMBER

890-4813-1

Eurofins Carlsbad
1089 N Canal St.
Carlsbad NM 88220

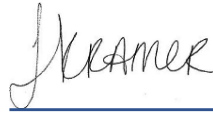
Eurofins Carlsbad

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization



Generated
6/19/2023 3:25:31 PM

Authorized for release by
Jessica Kramer, Project Manager
Jessica.Kramer@et.eurofinsus.com
(432)704-5440

Client: Vertex
Project/Site: Remuda 500 TB

Laboratory Job ID: 890-4813-1
SDG: 23E-03490

Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Client Sample Results	6
Surrogate Summary	8
QC Sample Results	9
QC Association Summary	13
Lab Chronicle	15
Certification Summary	16
Method Summary	17
Sample Summary	18
Chain of Custody	19
Receipt Checklists	20

1
2
3
4
5
6
7
8
9
10
11
12
13
14

Definitions/Glossary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Qualifiers

GC VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
S1-	Surrogate recovery exceeds control limits, low biased.
U	Indicates the analyte was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
⌘	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Job ID: 890-4813-1

Laboratory: Eurofins Carlsbad

Narrative

Job Narrative 890-4813-1

Receipt

The samples were received on 6/12/2023 1:17 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.8°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: SS23-01 0' (890-4813-1) and SS23-02 0' (890-4813-2).

GC VOA

Method 8021B: The surrogate recovery for the blank associated with preparation batch 880-55677 and 880-55680 and analytical batch 880-55652 was outside the control limits.

Method 8021B: Surrogate recovery for the following sample was outside control limits: (LCS 880-55677/1-A). Evidence of matrix interferences is not obvious.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC

Method 300_ORGFM_28D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for preparation batch 880-55414 and analytical batch 880-55523 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory sample control duplicate (LCS/LCSD) precision was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Client Sample ID: SS23-01 0'

Lab Sample ID: 890-4813-1

Date Collected: 06/12/23 09:20

Matrix: Solid

Date Received: 06/12/23 13:17

Sample Depth: 0'

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 12:33	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 12:33	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 12:33	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/16/23 10:43	06/17/23 12:33	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 12:33	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/16/23 10:43	06/17/23 12:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130	06/16/23 10:43	06/17/23 12:33	1
1,4-Difluorobenzene (Surr)	79		70 - 130	06/16/23 10:43	06/17/23 12:33	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00400	U	0.00400	mg/Kg			06/19/23 15:52	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	564		49.9	mg/Kg			06/15/23 12:35	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/14/23 11:36	06/14/23 17:08	1
Diesel Range Organics (Over C10-C28)	564		49.9	mg/Kg		06/14/23 11:36	06/14/23 17:08	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/14/23 11:36	06/14/23 17:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	125		70 - 130	06/14/23 11:36	06/14/23 17:08	1
o-Terphenyl	99		70 - 130	06/14/23 11:36	06/14/23 17:08	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	211		4.99	mg/Kg			06/14/23 19:52	1

Client Sample ID: SS23-02 0'

Lab Sample ID: 890-4813-2

Date Collected: 06/12/23 09:25

Matrix: Solid

Date Received: 06/12/23 13:17

Sample Depth: 0'

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201	mg/Kg		06/16/23 10:43	06/17/23 12:53	1
Toluene	<0.00201	U	0.00201	mg/Kg		06/16/23 10:43	06/17/23 12:53	1
Ethylbenzene	<0.00201	U	0.00201	mg/Kg		06/16/23 10:43	06/17/23 12:53	1
m-Xylene & p-Xylene	<0.00402	U	0.00402	mg/Kg		06/16/23 10:43	06/17/23 12:53	1
o-Xylene	<0.00201	U	0.00201	mg/Kg		06/16/23 10:43	06/17/23 12:53	1
Xylenes, Total	<0.00402	U	0.00402	mg/Kg		06/16/23 10:43	06/17/23 12:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	81		70 - 130	06/16/23 10:43	06/17/23 12:53	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Client Sample ID: SS23-02 0'

Lab Sample ID: 890-4813-2

Date Collected: 06/12/23 09:25

Matrix: Solid

Date Received: 06/12/23 13:17

Sample Depth: 0'

Method: SW846 8021B - Volatile Organic Compounds (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	79		70 - 130	06/16/23 10:43	06/17/23 12:53	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402	mg/Kg			06/19/23 15:52	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	487		49.8	mg/Kg			06/15/23 12:35	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8	mg/Kg		06/14/23 11:36	06/14/23 17:31	1
Diesel Range Organics (Over C10-C28)	487		49.8	mg/Kg		06/14/23 11:36	06/14/23 17:31	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8	mg/Kg		06/14/23 11:36	06/14/23 17:31	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	107		70 - 130			06/14/23 11:36	06/14/23 17:31	1
o-Terphenyl	86		70 - 130			06/14/23 11:36	06/14/23 17:31	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	102		5.05	mg/Kg			06/14/23 19:57	1

Surrogate Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	BFB1 (70-130)	DFBZ1 (70-130)
880-29314-A-1-B MS	Matrix Spike	102	108
880-29314-A-1-C MSD	Matrix Spike Duplicate	106	107
890-4813-1	SS23-01 0'	88	79
890-4813-2	SS23-02 0'	81	79
LCS 880-55677/1-A	Lab Control Sample	137 S1+	110
LCSD 880-55677/2-A	Lab Control Sample Dup	115	106
MB 880-55677/5-A	Method Blank	67 S1-	99
MB 880-55680/5-A	Method Blank	69 S1-	99
Surrogate Legend			
BFB = 4-Bromofluorobenzene (Surr)			
DFBZ = 1,4-Difluorobenzene (Surr)			

Method: 8015B NM - Diesel Range Organics (DRO) (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	1CO1 (70-130)	OTPH1 (70-130)
880-29502-A-21-C MS	Matrix Spike	115	83
880-29502-A-21-D MSD	Matrix Spike Duplicate	116	86
890-4813-1	SS23-01 0'	125	99
890-4813-2	SS23-02 0'	107	86
LCS 880-55508/2-A	Lab Control Sample	123	106
LCSD 880-55508/3-A	Lab Control Sample Dup	104	88
MB 880-55508/1-A	Method Blank	61 S1-	52 S1-
Surrogate Legend			
1CO = 1-Chlorooctane			
OTPH = o-Terphenyl			

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-55677/5-A

Matrix: Solid

Analysis Batch: 55652

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55677

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 09:26	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 09:26	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 09:26	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/16/23 10:43	06/17/23 09:26	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/16/23 10:43	06/17/23 09:26	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/16/23 10:43	06/17/23 09:26	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	67	S1-	70 - 130	06/16/23 10:43	06/17/23 09:26	1
1,4-Difluorobenzene (Surr)	99		70 - 130	06/16/23 10:43	06/17/23 09:26	1

Lab Sample ID: LCS 880-55677/1-A

Matrix: Solid

Analysis Batch: 55652

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55677

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.09597		mg/Kg		96	70 - 130
Toluene	0.100	0.08390		mg/Kg		84	70 - 130
Ethylbenzene	0.100	0.08456		mg/Kg		85	70 - 130
m-Xylene & p-Xylene	0.200	0.1708		mg/Kg		85	70 - 130
o-Xylene	0.100	0.08842		mg/Kg		88	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	137	S1+	70 - 130
1,4-Difluorobenzene (Surr)	110		70 - 130

Lab Sample ID: LCSD 880-55677/2-A

Matrix: Solid

Analysis Batch: 55652

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55677

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	0.100	0.09332		mg/Kg		93	70 - 130	3	35
Toluene	0.100	0.08119		mg/Kg		81	70 - 130	3	35
Ethylbenzene	0.100	0.07964		mg/Kg		80	70 - 130	6	35
m-Xylene & p-Xylene	0.200	0.1616		mg/Kg		81	70 - 130	6	35
o-Xylene	0.100	0.08321		mg/Kg		83	70 - 130	6	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	115		70 - 130
1,4-Difluorobenzene (Surr)	106		70 - 130

Lab Sample ID: 880-29314-A-1-B MS

Matrix: Solid

Analysis Batch: 55652

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55677

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00200	U	0.0994	0.09585		mg/Kg		96	70 - 130
Toluene	<0.00200	U	0.0994	0.08046		mg/Kg		80	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: 880-29314-A-1-B MS
Matrix: Solid
Analysis Batch: 55652

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 55677

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	<0.00200	U	0.0994	0.08588		mg/Kg		86	70 - 130
m-Xylene & p-Xylene	<0.00401	U	0.199	0.1636		mg/Kg		82	70 - 130
o-Xylene	<0.00200	U	0.0994	0.08641		mg/Kg		87	70 - 130
Surrogate	MS %Recovery	MS Qualifier	Limits						
4-Bromofluorobenzene (Surr)	102		70 - 130						
1,4-Difluorobenzene (Surr)	108		70 - 130						

Lab Sample ID: 880-29314-A-1-C MSD
Matrix: Solid
Analysis Batch: 55652

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 55677

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	<0.00200	U	0.0998	0.09425		mg/Kg		94	70 - 130	2	35
Toluene	<0.00200	U	0.0998	0.08280		mg/Kg		82	70 - 130	3	35
Ethylbenzene	<0.00200	U	0.0998	0.08649		mg/Kg		87	70 - 130	1	35
m-Xylene & p-Xylene	<0.00401	U	0.200	0.1697		mg/Kg		85	70 - 130	4	35
o-Xylene	<0.00200	U	0.0998	0.08586		mg/Kg		86	70 - 130	1	35
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
4-Bromofluorobenzene (Surr)	106		70 - 130								
1,4-Difluorobenzene (Surr)	107		70 - 130								

Lab Sample ID: MB 880-55680/5-A
Matrix: Solid
Analysis Batch: 55652

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 55680

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/16/23 11:48	06/16/23 22:47	1
Surrogate	MB %Recovery	MB Qualifier	Limits					
4-Bromofluorobenzene (Surr)	69	S1-	70 - 130					
1,4-Difluorobenzene (Surr)	99		70 - 130					

Method: 8015B NM - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 880-55508/1-A
Matrix: Solid
Analysis Batch: 55457

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 55508

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/14/23 11:36	06/14/23 08:05	1

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: MB 880-55508/1-A

Matrix: Solid

Analysis Batch: 55457

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55508

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/14/23 11:36	06/14/23 08:05	1
OII Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/14/23 11:36	06/14/23 08:05	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	61	S1-	70 - 130			06/14/23 11:36	06/14/23 08:05	1
o-Terphenyl	52	S1-	70 - 130			06/14/23 11:36	06/14/23 08:05	1

Lab Sample ID: LCS 880-55508/2-A

Matrix: Solid

Analysis Batch: 55457

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55508

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline Range Organics (GRO)-C6-C10	1000	842.2		mg/Kg		84	70 - 130
Diesel Range Organics (Over C10-C28)	1000	942.0		mg/Kg		94	70 - 130
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
1-Chlorooctane	123		70 - 130				
o-Terphenyl	106		70 - 130				

Lab Sample ID: LCSD 880-55508/3-A

Matrix: Solid

Analysis Batch: 55457

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55508

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	1000	777.4		mg/Kg		78	70 - 130	8	20
Diesel Range Organics (Over C10-C28)	1000	851.6		mg/Kg		85	70 - 130	10	20
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
1-Chlorooctane	104		70 - 130						
o-Terphenyl	88		70 - 130						

Lab Sample ID: 880-29502-A-21-C MS

Matrix: Solid

Analysis Batch: 55457

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55508

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline Range Organics (GRO)-C6-C10	<50.0	U F1	997	1706	F1	mg/Kg		169	70 - 130
Diesel Range Organics (Over C10-C28)	<50.0	U F1	997	1634	F1	mg/Kg		161	70 - 130
Surrogate	MS %Recovery	MS Qualifier	Limits						
1-Chlorooctane	115		70 - 130						
o-Terphenyl	83		70 - 130						

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: 880-29502-A-21-D MSD

Matrix: Solid

Analysis Batch: 55457

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 55508

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<50.0	U F1	997	1707	F1	mg/Kg		169	70 - 130	0	20
Diesel Range Organics (Over C10-C28)	<50.0	U F1	997	1690	F1	mg/Kg		167	70 - 130	3	20
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1-Chlorooctane	116		70 - 130								
o-Terphenyl	86		70 - 130								

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-55414/1-A

Matrix: Solid

Analysis Batch: 55523

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00	mg/Kg			06/14/23 16:49	1

Lab Sample ID: LCS 880-55414/2-A

Matrix: Solid

Analysis Batch: 55523

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	261.6		mg/Kg		105	90 - 110

Lab Sample ID: LCSD 880-55414/3-A

Matrix: Solid

Analysis Batch: 55523

Client Sample ID: Lab Control Sample Dup

Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	249.4		mg/Kg		100	90 - 110	5	20

Lab Sample ID: 880-29448-A-10-B MS

Matrix: Solid

Analysis Batch: 55523

Client Sample ID: Matrix Spike

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	651	F1	250	848.9	F1	mg/Kg		79	90 - 110

Lab Sample ID: 880-29448-A-10-C MSD

Matrix: Solid

Analysis Batch: 55523

Client Sample ID: Matrix Spike Duplicate

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	651	F1	250	882.3		mg/Kg		93	90 - 110	4	20

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

GC VOA

Analysis Batch: 55652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	8021B	55677
890-4813-2	SS23-02 0'	Total/NA	Solid	8021B	55677
MB 880-55677/5-A	Method Blank	Total/NA	Solid	8021B	55677
MB 880-55680/5-A	Method Blank	Total/NA	Solid	8021B	55680
LCS 880-55677/1-A	Lab Control Sample	Total/NA	Solid	8021B	55677
LCSD 880-55677/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	55677
880-29314-A-1-B MS	Matrix Spike	Total/NA	Solid	8021B	55677
880-29314-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	55677

Prep Batch: 55677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	5035	
890-4813-2	SS23-02 0'	Total/NA	Solid	5035	
MB 880-55677/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-55677/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-55677/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-29314-A-1-B MS	Matrix Spike	Total/NA	Solid	5035	
880-29314-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Prep Batch: 55680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 880-55680/5-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 55868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	Total BTEX	
890-4813-2	SS23-02 0'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 55457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	8015B NM	55508
890-4813-2	SS23-02 0'	Total/NA	Solid	8015B NM	55508
MB 880-55508/1-A	Method Blank	Total/NA	Solid	8015B NM	55508
LCS 880-55508/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	55508
LCSD 880-55508/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	55508
880-29502-A-21-C MS	Matrix Spike	Total/NA	Solid	8015B NM	55508
880-29502-A-21-D MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	55508

Prep Batch: 55508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	8015NM Prep	
890-4813-2	SS23-02 0'	Total/NA	Solid	8015NM Prep	
MB 880-55508/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-55508/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-55508/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
880-29502-A-21-C MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
880-29502-A-21-D MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

GC Semi VOA

Analysis Batch: 55601

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Total/NA	Solid	8015 NM	
890-4813-2	SS23-02 0'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 55414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Soluble	Solid	DI Leach	
890-4813-2	SS23-02 0'	Soluble	Solid	DI Leach	
MB 880-55414/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-55414/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-55414/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
880-29448-A-10-B MS	Matrix Spike	Soluble	Solid	DI Leach	
880-29448-A-10-C MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 55523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4813-1	SS23-01 0'	Soluble	Solid	300.0	55414
890-4813-2	SS23-02 0'	Soluble	Solid	300.0	55414
MB 880-55414/1-A	Method Blank	Soluble	Solid	300.0	55414
LCS 880-55414/2-A	Lab Control Sample	Soluble	Solid	300.0	55414
LCSD 880-55414/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	55414
880-29448-A-10-B MS	Matrix Spike	Soluble	Solid	300.0	55414
880-29448-A-10-C MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	55414

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Client Sample ID: SS23-01 0'
Date Collected: 06/12/23 09:20
Date Received: 06/12/23 13:17

Lab Sample ID: 890-4813-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.00 g	5 mL	55677	06/16/23 10:43	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55652	06/17/23 12:33	SM	EET MID
Total/NA	Analysis	Total BTEX		1			55868	06/19/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			55601	06/15/23 12:35	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	55508	06/14/23 11:36	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55457	06/14/23 17:08	AJ	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	55414	06/13/23 12:00	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	55523	06/14/23 19:52	CH	EET MID

Client Sample ID: SS23-02 0'
Date Collected: 06/12/23 09:25
Date Received: 06/12/23 13:17

Lab Sample ID: 890-4813-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	55677	06/16/23 10:43	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55652	06/17/23 12:53	SM	EET MID
Total/NA	Analysis	Total BTEX		1			55868	06/19/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			55601	06/15/23 12:35	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	55508	06/14/23 11:36	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55457	06/14/23 17:31	AJ	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	55414	06/13/23 12:00	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	55523	06/14/23 19:57	CH	EET MID

Laboratory References:
EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Accreditation/Certification Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Laboratory: Eurofins Midland

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704400-22-25	06-30-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015 NM		Solid	Total TPH
Total BTEX		Solid	Total BTEX

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Method Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Method	Method Description	Protocol	Laboratory
8021B	Volatile Organic Compounds (GC)	SW846	EET MID
Total BTEX	Total BTEX Calculation	TAL SOP	EET MID
8015 NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
8015B NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
300.0	Anions, Ion Chromatography	EPA	EET MID
5035	Closed System Purge and Trap	SW846	EET MID
8015NM Prep	Microextraction	SW846	EET MID
DI Leach	Deionized Water Leaching Procedure	ASTM	EET MID

Protocol References:

- ASTM = ASTM International
- EPA = US Environmental Protection Agency
- SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
- TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

- EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Sample Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4813-1
SDG: 23E-03490

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4813-1	SS23-01 0'	Solid	06/12/23 09:20	06/12/23 13:17	0'
890-4813-2	SS23-02 0'	Solid	06/12/23 09:25	06/12/23 13:17	0'

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14



Environment Testing

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300
Midland, TX (432) 704-5440, San Antonio, TX (210) 509-3334
El Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Work Order No:

www.xenco.com Page 1 of 1

Chain of Custody

Project Manager:	Chance Dixon	Bill to: (if different)	Garrett Green
Company Name:	Vertex	Company Name:	XTO
Address:	on file	Address:	on file
City, State ZIP:		City, State ZIP:	
Phone:	575 988 1472	Email:	pdixon@vertex.ca, cdixon@vertex.ca



Work Order Comments			
Program:	UST/PST <input type="checkbox"/>	PRP <input type="checkbox"/>	Brownfields <input type="checkbox"/> RRC <input type="checkbox"/> Superfund <input type="checkbox"/>
State of Project:			
Reporting:	Level II <input type="checkbox"/>	Level III <input type="checkbox"/>	PST/UST <input type="checkbox"/> TRRP <input type="checkbox"/> Level IV <input type="checkbox"/>
Deliverables:	EDD <input type="checkbox"/>	Adapt <input type="checkbox"/>	Other: <input type="text"/>

Project Name:		Rennua 500 TB		Turn Around		Prep. Code		ANALYSIS REQUEST		Preservative Codes	
Project Number:		23E-03490		<input checked="" type="checkbox"/> Routine <input type="checkbox"/> Rush						Name: NO	
Project Location:		Carlsbad, NM		Due Date:						Cool: Cool	
Sampler's Name:		Sally Carthur		TAT starts the day received by the lab, if received by 4:30pm						HCL: HC	
PO #:										H ₂ SO ₄ : H ₂	
SAMPLE RECEIPT		Temp Blank:		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		Wet Ice:		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		H ₃ PO ₄ : HP	
Samples Received Inact:		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		Thermometer ID:		<input checked="" type="checkbox"/> 1111-007 <input type="checkbox"/> 1111-008				NaHSO ₄ : NABIS	
Cooler Custody Seals:		Yes No		Correction Factor:		<input checked="" type="checkbox"/> 1.0 <input type="checkbox"/> 0.8				Na ₂ S ₂ O ₃ : NaSO ₃	
Sample Custody Seals:		Yes No		Temperature Reading:		<input checked="" type="checkbox"/> 1.0 <input type="checkbox"/> 0.8				Zn Acetate+NaOH: Zn	
Total Containers:				Corrected Temperature:						NaOH+Ascorbic Acid: SACP	

[illegible]

Total 2007/6010	2008/6020:	8RCRA	13PPM Texas 11	Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	K	Se	Ag	SiO ₂	Na	Sr	Ti	Sn	U	V	Zn
Circle Method(s) and Metal(s) to be analyzed		TCIP / SPLP 6010 :	8RCRA	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mn	Mo	Ni	Se	Ag	Ti	U					Hg: 1631 / 245.1 / 7470 / 7471							

Notice: Signature of this document and enrollment of sample constitutes a valid purchase order from client company to Eurofins Xeno, its affiliates and subcontractors. The signatories, standard terms and conditions of service, Eurofins Xeno will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client. If such losses are due to circumstances beyond the control of Eurofins Xeno, a minimum charge of \$85.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xeno, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
1		10/12/03 1317			
3			4		
5			6		

Revised Date 08/25/2020 Rev. 2000.2

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4813-1

SDG Number: 23E-03490

Login Number: 4813

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	N/A	Refer to Job Narrative for details.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4813-1

SDG Number: 23E-03490

Login Number: 4813

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 06/13/23 10:37 AM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	



Environment Testing

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

ANALYTICAL REPORT

PREPARED FOR

Attn: Chance Dixon
Vertex
3101 Boyd Dr
Carlsbad, New Mexico 88220

Generated 6/21/2023 1:28:37 PM

JOB DESCRIPTION

Remuda 500 TB
SDG NUMBER 23E-03490

JOB NUMBER

890-4831-1

Eurofins Carlsbad
1089 N Canal St.
Carlsbad NM 88220

Eurofins Carlsbad

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization



Generated
6/21/2023 1:28:37 PM

Authorized for release by
Jessica Kramer, Project Manager
Jessica.Kramer@et.eurofinsus.com
(432)704-5440

Client: Vertex
Project/Site: Remuda 500 TB

Laboratory Job ID: 890-4831-1
SDG: 23E-03490

Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Client Sample Results	6
Surrogate Summary	18
QC Sample Results	20
QC Association Summary	27
Lab Chronicle	32
Certification Summary	37
Method Summary	38
Sample Summary	39
Chain of Custody	40
Receipt Checklists	42

1
2
3
4
5
6
7
8
9
10
11
12
13
14

Definitions/Glossary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Qualifiers

GC VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
S1-	Surrogate recovery exceeds control limits, low biased.
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Job ID: 890-4831-1**Laboratory: Eurofins Carlsbad****Narrative****Job Narrative
890-4831-1****Receipt**

The samples were received on 6/16/2023 1:40 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.0°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BH23-01 (890-4831-1), BH23-01 (890-4831-2), BH23-01 (890-4831-3), BH23-02 (890-4831-4), BH23-02 (890-4831-5), BH23-03 (890-4831-6), BH23-03 (890-4831-7), BH23-04 (890-4831-8), BH23-04 (890-4831-9), BH23-05 (890-4831-10), BH23-05 (890-4831-11), BH23-06 (890-4831-12), BH23-06 (890-4831-13), BH23-07 (890-4831-14) and BH23-07 (890-4831-15).

GC VOA

Method 8021B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-55524 and analytical batch 880-55938 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8021B: Surrogate recovery for the following sample was outside control limits: (MB 880-55524/5-A). Evidence of matrix interferences is not obvious.

Method 8021B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-55933 and analytical batch 880-55914 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA

Method 8015MOD_NM: The continuing calibration verification (CCV) associated with batch 880-55875 recovered above the upper control limit for Gasoline Range Organics (GRO)-C6-C10. An acceptable CCV was ran within the 12 hour window therefore, the data have been reported.

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-55882 and analytical batch 880-55879 was outside the upper control limits.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (CCV 880-55879/20) and (CCV 880-55879/5). Evidence of matrix interferences is not obvious.

Method 8015MOD_NM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for preparation batch 880-55882 and analytical batch 880-55879 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory sample control duplicate (LCS/LCSD) precision was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-01

Lab Sample ID: 890-4831-1

Date Collected: 06/15/23 08:05

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 01:52	1
Toluene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 01:52	1
Ethylbenzene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 01:52	1
m-Xylene & p-Xylene	<0.00397	U	0.00397	mg/Kg		06/20/23 13:24	06/21/23 01:52	1
o-Xylene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 01:52	1
Xylenes, Total	<0.00397	U	0.00397	mg/Kg		06/20/23 13:24	06/21/23 01:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130	06/20/23 13:24	06/21/23 01:52	1
1,4-Difluorobenzene (Surr)	95		70 - 130	06/20/23 13:24	06/21/23 01:52	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00397	U	0.00397	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	282		49.8	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U F2	49.8	mg/Kg		06/20/23 08:15	06/20/23 11:47	1
Diesel Range Organics (Over C10-C28)	282	F1	49.8	mg/Kg		06/20/23 08:15	06/20/23 11:47	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 11:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	102		70 - 130	06/20/23 08:15	06/20/23 11:47	1
o-Terphenyl	120		70 - 130	06/20/23 08:15	06/20/23 11:47	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	143		5.05	mg/Kg			06/20/23 22:56	1

Client Sample ID: BH23-01

Lab Sample ID: 890-4831-2

Date Collected: 06/15/23 10:30

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 02:18	1
Toluene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 02:18	1
Ethylbenzene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 02:18	1
m-Xylene & p-Xylene	<0.00402	U	0.00402	mg/Kg		06/20/23 13:24	06/21/23 02:18	1
o-Xylene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 02:18	1
Xylenes, Total	<0.00402	U	0.00402	mg/Kg		06/20/23 13:24	06/21/23 02:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130	06/20/23 13:24	06/21/23 02:18	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-01

Lab Sample ID: 890-4831-2

Date Collected: 06/15/23 10:30

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	99		70 - 130	06/20/23 13:24	06/21/23 02:18	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 12:54	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 12:54	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 12:54	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	94		70 - 130			06/20/23 08:15	06/20/23 12:54	1
o-Terphenyl	106		70 - 130			06/20/23 08:15	06/20/23 12:54	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	243		5.05	mg/Kg			06/20/23 23:02	1

Client Sample ID: BH23-01

Lab Sample ID: 890-4831-3

Date Collected: 06/15/23 10:45

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 3

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
m-Xylene & p-Xylene	<0.00401	U	0.00401	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
Xylenes, Total	<0.00401	U	0.00401	mg/Kg		06/20/23 13:24	06/21/23 02:44	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130			06/20/23 13:24	06/21/23 02:44	1
1,4-Difluorobenzene (Surr)	106		70 - 130			06/20/23 13:24	06/21/23 02:44	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8	mg/Kg			06/21/23 14:00	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-01

Lab Sample ID: 890-4831-3

Date Collected: 06/15/23 10:45

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 3

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 13:17	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 13:17	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 13:17	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	117		70 - 130			06/20/23 08:15	06/20/23 13:17	1
o-Terphenyl	129		70 - 130			06/20/23 08:15	06/20/23 13:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	185		4.99	mg/Kg			06/20/23 23:08	1

Client Sample ID: BH23-02

Lab Sample ID: 890-4831-4

Date Collected: 06/15/23 08:20

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
m-Xylene & p-Xylene	<0.00399	U	0.00399	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
Xylenes, Total	<0.00399	U	0.00399	mg/Kg		06/20/23 13:24	06/21/23 03:09	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			06/20/23 13:24	06/21/23 03:09	1
1,4-Difluorobenzene (Surr)	86		70 - 130			06/20/23 13:24	06/21/23 03:09	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 13:41	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 13:41	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 13:41	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	103		70 - 130			06/20/23 08:15	06/20/23 13:41	1
o-Terphenyl	117		70 - 130			06/20/23 08:15	06/20/23 13:41	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-02

Lab Sample ID: 890-4831-4

Date Collected: 06/15/23 08:20

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	974		25.0	mg/Kg			06/20/23 23:14	5

Client Sample ID: BH23-02

Lab Sample ID: 890-4831-5

Date Collected: 06/15/23 11:00

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
Toluene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
Ethylbenzene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
m-Xylene & p-Xylene	<0.00396	U	0.00396	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
o-Xylene	<0.00198	U	0.00198	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
Xylenes, Total	<0.00396	U	0.00396	mg/Kg		06/20/23 13:24	06/21/23 03:35	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130			06/20/23 13:24	06/21/23 03:35	1
1,4-Difluorobenzene (Surr)	107		70 - 130			06/20/23 13:24	06/21/23 03:35	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 14:04	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 14:04	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 14:04	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	95		70 - 130			06/20/23 08:15	06/20/23 14:04	1
o-Terphenyl	108		70 - 130			06/20/23 08:15	06/20/23 14:04	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	253		5.04	mg/Kg			06/20/23 23:19	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-03

Lab Sample ID: 890-4831-6

Date Collected: 06/15/23 08:30

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:01	1
Toluene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:01	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:01	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		06/20/23 13:24	06/21/23 04:01	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:01	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		06/20/23 13:24	06/21/23 04:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130	06/20/23 13:24	06/21/23 04:01	1
1,4-Difluorobenzene (Surr)	104		70 - 130	06/20/23 13:24	06/21/23 04:01	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 14:27	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 14:27	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8	mg/Kg		06/20/23 08:15	06/20/23 14:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	100		70 - 130	06/20/23 08:15	06/20/23 14:27	1
o-Terphenyl	107		70 - 130	06/20/23 08:15	06/20/23 14:27	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	259		4.95	mg/Kg			06/20/23 23:25	1

Client Sample ID: BH23-03

Lab Sample ID: 890-4831-7

Date Collected: 06/15/23 11:30

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:26	1
Toluene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:26	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:26	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		06/20/23 13:24	06/21/23 04:26	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		06/20/23 13:24	06/21/23 04:26	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		06/20/23 13:24	06/21/23 04:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130	06/20/23 13:24	06/21/23 04:26	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-03

Lab Sample ID: 890-4831-7

Date Collected: 06/15/23 11:30

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	103		70 - 130	06/20/23 13:24	06/21/23 04:26	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 14:50	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 14:50	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 14:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	105		70 - 130	06/20/23 08:15	06/20/23 14:50	1
o-Terphenyl	124		70 - 130	06/20/23 08:15	06/20/23 14:50	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	237		5.03	mg/Kg			06/20/23 23:43	1

Client Sample ID: BH23-04

Lab Sample ID: 890-4831-8

Date Collected: 06/15/23 08:43

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 04:52	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 04:52	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 04:52	1
m-Xylene & p-Xylene	<0.00399	U	0.00399	mg/Kg		06/20/23 13:24	06/21/23 04:52	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/21/23 04:52	1
Xylenes, Total	<0.00399	U	0.00399	mg/Kg		06/20/23 13:24	06/21/23 04:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130	06/20/23 13:24	06/21/23 04:52	1
1,4-Difluorobenzene (Surr)	104		70 - 130	06/20/23 13:24	06/21/23 04:52	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 14:00	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-04
Date Collected: 06/15/23 08:43
Date Received: 06/16/23 13:40
Sample Depth: 0

Lab Sample ID: 890-4831-8
Matrix: Solid

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 15:14	1	
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 15:14	1	
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/20/23 08:15	06/20/23 15:14	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	104		70 - 130			06/20/23 08:15	06/20/23 15:14	1	
o-Terphenyl	107		70 - 130			06/20/23 08:15	06/20/23 15:14	1	

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Chloride	188		4.97	mg/Kg			06/20/23 23:49	1	

Client Sample ID: BH23-04
Date Collected: 06/15/23 12:00
Date Received: 06/16/23 13:40
Sample Depth: 2

Lab Sample ID: 890-4831-9
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzene	<0.00202	U	0.00202	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
Toluene	<0.00202	U	0.00202	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
Ethylbenzene	<0.00202	U	0.00202	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
m-Xylene & p-Xylene	<0.00403	U	0.00403	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
o-Xylene	<0.00202	U	0.00202	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
Xylenes, Total	<0.00403	U	0.00403	mg/Kg		06/20/23 13:24	06/21/23 05:18	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	106		70 - 130			06/20/23 13:24	06/21/23 05:18	1	
1,4-Difluorobenzene (Surr)	100		70 - 130			06/20/23 13:24	06/21/23 05:18	1	

Method: TAL SOP Total BTEX - Total BTEX Calculation									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total BTEX	<0.00403	U	0.00403	mg/Kg			06/21/23 10:10	1	

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total TPH	<50.0	U	50.0	mg/Kg			06/21/23 14:00	1	

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 15:37	1	
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 15:37	1	
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 15:37	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	104		70 - 130			06/20/23 08:15	06/20/23 15:37	1	
o-Terphenyl	120		70 - 130			06/20/23 08:15	06/20/23 15:37	1	

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-04

Lab Sample ID: 890-4831-9

Date Collected: 06/15/23 12:00

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	238		4.96	mg/Kg			06/21/23 00:07	1

Client Sample ID: BH23-05

Lab Sample ID: 890-4831-10

Date Collected: 06/15/23 08:50

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
Toluene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
Ethylbenzene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
m-Xylene & p-Xylene	<0.00402	U	0.00402	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
o-Xylene	<0.00201	U	0.00201	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
Xylenes, Total	<0.00402	U	0.00402	mg/Kg		06/20/23 13:24	06/21/23 05:43	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	115		70 - 130			06/20/23 13:24	06/21/23 05:43	1
1,4-Difluorobenzene (Surr)	109		70 - 130			06/20/23 13:24	06/21/23 05:43	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402	mg/Kg			06/21/23 10:10	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0	mg/Kg			06/21/23 14:00	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 16:00	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 16:00	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 16:00	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	95		70 - 130			06/20/23 08:15	06/20/23 16:00	1
o-Terphenyl	98		70 - 130			06/20/23 08:15	06/20/23 16:00	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	662		5.04	mg/Kg			06/21/23 00:12	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-05

Lab Sample ID: 890-4831-11

Date Collected: 06/15/23 12:15

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 1

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U *	0.00199	mg/Kg		06/20/23 14:08	06/21/23 07:28	1
Toluene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 07:28	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 07:28	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		06/20/23 14:08	06/21/23 07:28	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 07:28	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		06/20/23 14:08	06/21/23 07:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130	06/20/23 14:08	06/21/23 07:28	1
1,4-Difluorobenzene (Surr)	108		70 - 130	06/20/23 14:08	06/21/23 07:28	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			06/21/23 11:59	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0	mg/Kg			06/21/23 10:56	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 11:22	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 11:22	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 11:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	88		70 - 130	06/20/23 08:20	06/20/23 11:22	1
o-Terphenyl	91		70 - 130	06/20/23 08:20	06/20/23 11:22	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	403		5.03	mg/Kg			06/21/23 00:18	1

Client Sample ID: BH23-06

Lab Sample ID: 890-4831-12

Date Collected: 06/16/23 08:26

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U *	0.00200	mg/Kg		06/20/23 14:08	06/21/23 07:48	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 07:48	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 07:48	1
m-Xylene & p-Xylene	<0.00399	U	0.00399	mg/Kg		06/20/23 14:08	06/21/23 07:48	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 07:48	1
Xylenes, Total	<0.00399	U	0.00399	mg/Kg		06/20/23 14:08	06/21/23 07:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		70 - 130	06/20/23 14:08	06/21/23 07:48	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-06

Lab Sample ID: 890-4831-12

Date Collected: 06/16/23 08:26

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 0

Method: SW846 8021B - Volatile Organic Compounds (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	104		70 - 130	06/20/23 14:08	06/21/23 07:48	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399	mg/Kg			06/21/23 11:59	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 10:56	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 12:29	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 12:29	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 12:29	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	87		70 - 130			06/20/23 08:20	06/20/23 12:29	1
o-Terphenyl	88		70 - 130			06/20/23 08:20	06/20/23 12:29	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	340		4.99	mg/Kg			06/21/23 00:24	1

Client Sample ID: BH23-06

Lab Sample ID: 890-4831-13

Date Collected: 06/16/23 08:40

Matrix: Solid

Date Received: 06/16/23 13:40

Sample Depth: 2

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U *	0.00199	mg/Kg		06/20/23 14:08	06/21/23 08:09	1
Toluene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 08:09	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 08:09	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		06/20/23 14:08	06/21/23 08:09	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		06/20/23 14:08	06/21/23 08:09	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		06/20/23 14:08	06/21/23 08:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130	06/20/23 14:08	06/21/23 08:09	1
1,4-Difluorobenzene (Surr)	104		70 - 130	06/20/23 14:08	06/21/23 08:09	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			06/21/23 11:59	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 10:56	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-06
Date Collected: 06/16/23 08:40
Date Received: 06/16/23 13:40
Sample Depth: 2

Lab Sample ID: 890-4831-13
Matrix: Solid

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg	-	06/20/23 08:20	06/20/23 12:53	1	
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg	-	06/20/23 08:20	06/20/23 12:53	1	
Oil Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg	-	06/20/23 08:20	06/20/23 12:53	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	85		70 - 130			06/20/23 08:20	06/20/23 12:53	1	
o-Terphenyl	88		70 - 130			06/20/23 08:20	06/20/23 12:53	1	

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Chloride	251		5.02	mg/Kg	-		06/21/23 00:30	1	

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:35
Date Received: 06/16/23 13:40
Sample Depth: 0

Lab Sample ID: 890-4831-14
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzene	<0.00198	U *	0.00198	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
Toluene	<0.00198	U	0.00198	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
Ethylbenzene	<0.00198	U	0.00198	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
m-Xylene & p-Xylene	<0.00397	U	0.00397	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
o-Xylene	<0.00198	U	0.00198	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
Xylenes, Total	<0.00397	U	0.00397	mg/Kg	-	06/20/23 14:08	06/21/23 08:29	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	87		70 - 130			06/20/23 14:08	06/21/23 08:29	1	
1,4-Difluorobenzene (Surr)	107		70 - 130			06/20/23 14:08	06/21/23 08:29	1	

Method: TAL SOP Total BTEX - Total BTEX Calculation									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total BTEX	<0.00397	U	0.00397	mg/Kg	-		06/21/23 11:59	1	

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total TPH	<50.0	U	50.0	mg/Kg	-		06/21/23 10:56	1	

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg	-	06/20/23 08:20	06/20/23 13:16	1	
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg	-	06/20/23 08:20	06/20/23 13:16	1	
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg	-	06/20/23 08:20	06/20/23 13:16	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	86		70 - 130			06/20/23 08:20	06/20/23 13:16	1	
o-Terphenyl	87		70 - 130			06/20/23 08:20	06/20/23 13:16	1	

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:35
Date Received: 06/16/23 13:40
Sample Depth: 0

Lab Sample ID: 890-4831-14
Matrix: Solid

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	246		4.98	mg/Kg			06/21/23 00:36	1

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:50
Date Received: 06/16/23 13:40
Sample Depth: 2

Lab Sample ID: 890-4831-15
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U **	0.00201	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
Toluene	<0.00201	U	0.00201	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
Ethylbenzene	<0.00201	U	0.00201	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
m-Xylene & p-Xylene	<0.00402	U	0.00402	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
o-Xylene	<0.00201	U	0.00201	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
Xylenes, Total	<0.00402	U	0.00402	mg/Kg		06/20/23 14:08	06/21/23 08:49	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130			06/20/23 14:08	06/21/23 08:49	1
1,4-Difluorobenzene (Surr)	106		70 - 130			06/20/23 14:08	06/21/23 08:49	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402	mg/Kg			06/21/23 11:59	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9	mg/Kg			06/21/23 10:56	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 13:40	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 13:40	1
OII Range Organics (Over C28-C36)	<49.9	U	49.9	mg/Kg		06/20/23 08:20	06/20/23 13:40	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	86		70 - 130			06/20/23 08:20	06/20/23 13:40	1
o-Terphenyl	91		70 - 130			06/20/23 08:20	06/20/23 13:40	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	229		4.96	mg/Kg			06/21/23 00:42	1

Surrogate Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC)
Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	BFB1	DFBZ1				
		(70-130)	(70-130)				
880-29738-A-1-B MS	Matrix Spike	96	93				
880-29738-A-1-C MSD	Matrix Spike Duplicate	102	109				
890-4831-1	BH23-01	97	95				
890-4831-2	BH23-01	91	99				
890-4831-3	BH23-01	107	106				
890-4831-4	BH23-02	96	86				
890-4831-5	BH23-02	113	107				
890-4831-6	BH23-03	105	104				
890-4831-7	BH23-03	113	103				
890-4831-8	BH23-04	106	104				
890-4831-9	BH23-04	106	100				
890-4831-10	BH23-05	115	109				
890-4831-11	BH23-05	96	108				
890-4831-12	BH23-06	82	104				
890-4831-13	BH23-06	99	104				
890-4831-14	BH23-07	87	107				
890-4831-15	BH23-07	93	106				
890-4832-A-11-H MS	Matrix Spike	98	99				
890-4832-A-11-I MSD	Matrix Spike Duplicate	95	100				
LCS 880-55524/1-A	Lab Control Sample	93	100				
LCS 880-55933/1-A	Lab Control Sample	85	111				
LCSD 880-55524/2-A	Lab Control Sample Dup	94	105				
LCSD 880-55933/2-A	Lab Control Sample Dup	93	108				
MB 880-55524/5-A	Method Blank	59 S1-	95				
MB 880-55913/5-A	Method Blank	94	115				
MB 880-55933/5-A	Method Blank	96	127				
Surrogate Legend							
BFB = 4-Bromofluorobenzene (Surr)							
DFBZ = 1,4-Difluorobenzene (Surr)							

Method: 8015B NM - Diesel Range Organics (DRO) (GC)
Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	1CO1	OTPH1				
		(70-130)	(70-130)				
890-4831-1	BH23-01	102	120				
890-4831-1 MS	BH23-01	92	95				
890-4831-1 MSD	BH23-01	105	103				
890-4831-2	BH23-01	94	106				
890-4831-3	BH23-01	117	129				
890-4831-4	BH23-02	103	117				
890-4831-5	BH23-02	95	108				
890-4831-6	BH23-03	100	107				
890-4831-7	BH23-03	105	124				
890-4831-8	BH23-04	104	107				
890-4831-9	BH23-04	104	120				
890-4831-10	BH23-05	95	98				
890-4831-11	BH23-05	88	91				

Eurofins Carlsbad

Surrogate Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	1CO1 (70-130)	OTPH1 (70-130)
890-4831-11 MS	BH23-05	92	84
890-4831-11 MSD	BH23-05	89	81
890-4831-12	BH23-06	87	88
890-4831-13	BH23-06	85	88
890-4831-14	BH23-07	86	87
890-4831-15	BH23-07	86	91
LCS 880-55882/2-A	Lab Control Sample	95	121
LCS 880-55883/2-A	Lab Control Sample	80	86
LCSD 880-55882/3-A	Lab Control Sample Dup	82	102
LCSD 880-55883/3-A	Lab Control Sample Dup	76	75
MB 880-55882/1-A	Method Blank	116	138 S1+
MB 880-55883/1-A	Method Blank	93	97
Surrogate Legend			
1CO = 1-Chlorooctane			
OTPH = o-Terphenyl			

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-55524/5-A

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55524

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/20/23 19:49	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/20/23 19:49	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/20/23 19:49	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/20/23 13:24	06/20/23 19:49	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 13:24	06/20/23 19:49	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/20/23 13:24	06/20/23 19:49	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	59	S1-	70 - 130	06/20/23 13:24	06/20/23 19:49	1
1,4-Difluorobenzene (Surr)	95		70 - 130	06/20/23 13:24	06/20/23 19:49	1

Lab Sample ID: LCS 880-55524/1-A

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55524

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1263		mg/Kg		126	70 - 130
Toluene	0.100	0.1186		mg/Kg		119	70 - 130
Ethylbenzene	0.100	0.1210		mg/Kg		121	70 - 130
m-Xylene & p-Xylene	0.200	0.2473		mg/Kg		124	70 - 130
o-Xylene	0.100	0.1224		mg/Kg		122	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	93		70 - 130
1,4-Difluorobenzene (Surr)	100		70 - 130

Lab Sample ID: LCSD 880-55524/2-A

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55524

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	0.100	0.1241		mg/Kg		124	70 - 130	2	35
Toluene	0.100	0.1142		mg/Kg		114	70 - 130	4	35
Ethylbenzene	0.100	0.1171		mg/Kg		117	70 - 130	3	35
m-Xylene & p-Xylene	0.200	0.2397		mg/Kg		120	70 - 130	3	35
o-Xylene	0.100	0.1182		mg/Kg		118	70 - 130	3	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	94		70 - 130
1,4-Difluorobenzene (Surr)	105		70 - 130

Lab Sample ID: 890-4832-A-11-H MS

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55524

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00201	U	0.100	0.1182		mg/Kg		118	70 - 130
Toluene	<0.00201	U	0.100	0.1111		mg/Kg		111	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: 890-4832-A-11-H MS

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55524

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	<0.00201	U F2	0.100	0.1043		mg/Kg		104	70 - 130
m-Xylene & p-Xylene	<0.00402	U F2	0.200	0.2094		mg/Kg		104	70 - 130
o-Xylene	<0.00201	U	0.100	0.1042		mg/Kg		104	70 - 130
Surrogate	MS %Recovery	MS Qualifier	MS Limits						
4-Bromofluorobenzene (Surr)	98		70 - 130						
1,4-Difluorobenzene (Surr)	99		70 - 130						

Lab Sample ID: 890-4832-A-11-I MSD

Matrix: Solid

Analysis Batch: 55938

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 55524

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	<0.00201	U	0.101	0.09777		mg/Kg		97	70 - 130	19	35
Toluene	<0.00201	U	0.101	0.08276		mg/Kg		82	70 - 130	29	35
Ethylbenzene	<0.00201	U F2	0.101	0.07112	F2	mg/Kg		71	70 - 130	38	35
m-Xylene & p-Xylene	<0.00402	U F2	0.202	0.1414	F2	mg/Kg		70	70 - 130	39	35
o-Xylene	<0.00201	U	0.101	0.07388		mg/Kg		73	70 - 130	34	35
Surrogate	MSD %Recovery	MSD Qualifier	MSD Limits								
4-Bromofluorobenzene (Surr)	95		70 - 130								
1,4-Difluorobenzene (Surr)	100		70 - 130								

Lab Sample ID: MB 880-55913/5-A

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55913

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/20/23 10:43	06/20/23 14:03	1
Surrogate	MB %Recovery	MB Qualifier	MB Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130			06/20/23 10:43	06/20/23 14:03	1
1,4-Difluorobenzene (Surr)	115		70 - 130			06/20/23 10:43	06/20/23 14:03	1

Lab Sample ID: MB 880-55933/5-A

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55933

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 01:44	1
Toluene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 01:44	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 01:44	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		06/20/23 14:08	06/21/23 01:44	1

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: MB 880-55933/5-A

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55933

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	<0.00200	U	0.00200	mg/Kg		06/20/23 14:08	06/21/23 01:44	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		06/20/23 14:08	06/21/23 01:44	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			06/20/23 14:08	06/21/23 01:44	1
1,4-Difluorobenzene (Surr)	127		70 - 130			06/20/23 14:08	06/21/23 01:44	1

Lab Sample ID: LCS 880-55933/1-A

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55933

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1216		mg/Kg		122	70 - 130
Toluene	0.100	0.1286		mg/Kg		129	70 - 130
Ethylbenzene	0.100	0.09470		mg/Kg		95	70 - 130
m-Xylene & p-Xylene	0.200	0.1928		mg/Kg		96	70 - 130
o-Xylene	0.100	0.09421		mg/Kg		94	70 - 130
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	85		70 - 130				
1,4-Difluorobenzene (Surr)	111		70 - 130				

Lab Sample ID: LCSD 880-55933/2-A

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55933

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	0.100	0.1340	*+	mg/Kg		134	70 - 130	10	35
Toluene	0.100	0.1265		mg/Kg		126	70 - 130	2	35
Ethylbenzene	0.100	0.09135		mg/Kg		91	70 - 130	4	35
m-Xylene & p-Xylene	0.200	0.1903		mg/Kg		95	70 - 130	1	35
o-Xylene	0.100	0.09469		mg/Kg		95	70 - 130	1	35
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	93		70 - 130						
1,4-Difluorobenzene (Surr)	108		70 - 130						

Lab Sample ID: 880-29738-A-1-B MS

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55933

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00201	U *+ F1	0.0996	0.1359	F1	mg/Kg		136	70 - 130
Toluene	<0.00201	U	0.0996	0.1234		mg/Kg		124	70 - 130
Ethylbenzene	<0.00201	U	0.0996	0.09163		mg/Kg		92	70 - 130
m-Xylene & p-Xylene	<0.00402	U	0.199	0.1872		mg/Kg		94	70 - 130
o-Xylene	<0.00201	U	0.0996	0.09252		mg/Kg		92	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: 880-29738-A-1-B MS

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 55933

	MS	MS	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	96		70 - 130
1,4-Difluorobenzene (Surr)	93		70 - 130

Lab Sample ID: 880-29738-A-1-C MSD

Matrix: Solid

Analysis Batch: 55914

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 55933

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	<0.00201	U *+ F1	0.0990	0.1274		mg/Kg		129	70 - 130	6	35
Toluene	<0.00201	U	0.0990	0.1196		mg/Kg		121	70 - 130	3	35
Ethylbenzene	<0.00201	U	0.0990	0.09192		mg/Kg		93	70 - 130	0	35
m-Xylene & p-Xylene	<0.00402	U	0.198	0.1910		mg/Kg		96	70 - 130	2	35
o-Xylene	<0.00201	U	0.0990	0.09483		mg/Kg		95	70 - 130	2	35

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		70 - 130
1,4-Difluorobenzene (Surr)	109		70 - 130

Method: 8015B NM - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 880-55882/1-A

Matrix: Solid

Analysis Batch: 55879

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55882

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 08:20	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 08:20	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:15	06/20/23 08:20	1

	MB	MB						
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac		
1-Chlorooctane	116		70 - 130	06/20/23 08:15	06/20/23 08:20	1		
o-Terphenyl	138	S1+	70 - 130	06/20/23 08:15	06/20/23 08:20	1		

Lab Sample ID: LCS 880-55882/2-A

Matrix: Solid

Analysis Batch: 55879

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55882

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline Range Organics (GRO)-C6-C10	1000	971.6		mg/Kg		97	70 - 130
Diesel Range Organics (Over C10-C28)	1000	944.2		mg/Kg		94	70 - 130

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
1-Chlorooctane	95		70 - 130
o-Terphenyl	121		70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: LCSD 880-55882/3-A

Matrix: Solid

Analysis Batch: 55879

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55882

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	1000	901.9		mg/Kg		90	70 - 130	7	20
Diesel Range Organics (Over C10-C28)	1000	852.1		mg/Kg		85	70 - 130	10	20
		LCSD	LCSD						
Surrogate	%Recovery	Qualifier	Limits						
1-Chlorooctane	82		70 - 130						
o-Terphenyl	102		70 - 130						

Lab Sample ID: 890-4831-1 MS

Matrix: Solid

Analysis Batch: 55879

Client Sample ID: BH23-01

Prep Type: Total/NA

Prep Batch: 55882

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<49.8	U F2	998	980.4		mg/Kg		96	70 - 130		
Diesel Range Organics (Over C10-C28)	282	F1	998	792.4	F1	mg/Kg		51	70 - 130		
		MS	MS								
Surrogate	%Recovery	Qualifier	Limits								
1-Chlorooctane	92		70 - 130								
o-Terphenyl	95		70 - 130								

Lab Sample ID: 890-4831-1 MSD

Matrix: Solid

Analysis Batch: 55879

Client Sample ID: BH23-01

Prep Type: Total/NA

Prep Batch: 55882

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<49.8	U F2	997	1208	F2	mg/Kg		119	70 - 130	21	20
Diesel Range Organics (Over C10-C28)	282	F1	997	882.8	F1	mg/Kg		60	70 - 130	11	20
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
1-Chlorooctane	105		70 - 130								
o-Terphenyl	103		70 - 130								

Lab Sample ID: MB 880-55883/1-A

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55883

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 08:30	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 08:30	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		06/20/23 08:20	06/20/23 08:30	1

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: MB 880-55883/1-A

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 55883

	MB	MB							
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac		
1-Chlorooctane	93		70 - 130	06/20/23 08:20	06/20/23 08:30	1			
o-Terphenyl	97		70 - 130	06/20/23 08:20	06/20/23 08:30	1			

Lab Sample ID: LCS 880-55883/2-A

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 55883

			Spike	LCS	LCS				%Rec		
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits		
Gasoline Range Organics (GRO)-C6-C10			1000	868.7		mg/Kg		87	70 - 130		
Diesel Range Organics (Over C10-C28)			1000	885.3		mg/Kg		89	70 - 130		
Surrogate		LCS	LCS								
	%Recovery	Qualifier	Limits								
1-Chlorooctane	80		70 - 130								
o-Terphenyl	86		70 - 130								

Lab Sample ID: LCSD 880-55883/3-A

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 55883

			Spike	LCSD	LCSD				%Rec			RPD	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit		
Gasoline Range Organics (GRO)-C6-C10			1000	894.5		mg/Kg		89	70 - 130	3	20		
Diesel Range Organics (Over C10-C28)			1000	909.8		mg/Kg		91	70 - 130	3	20		
Surrogate		LCSD	LCSD										
	%Recovery	Qualifier	Limits										
1-Chlorooctane	76		70 - 130										
o-Terphenyl	75		70 - 130										

Lab Sample ID: 890-4831-11 MS

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: BH23-05

Prep Type: Total/NA

Prep Batch: 55883

	Sample	Sample	Spike	MS	MS				%Rec		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	998	1060		mg/Kg		104	70 - 130		
Diesel Range Organics (Over C10-C28)	<50.0	U	998	982.2		mg/Kg		96	70 - 130		
Surrogate		MS	MS								
	%Recovery	Qualifier	Limits								
1-Chlorooctane	92		70 - 130								
o-Terphenyl	84		70 - 130								

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: 890-4831-11 MSD

Matrix: Solid

Analysis Batch: 55875

Client Sample ID: BH23-05

Prep Type: Total/NA

Prep Batch: 55883

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	999	926.1		mg/Kg		91	70 - 130	13	20
Diesel Range Organics (Over C10-C28)	<50.0	U	999	960.2		mg/Kg		93	70 - 130	2	20
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1-Chlorooctane	89		70 - 130								
o-Terphenyl	81		70 - 130								

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-55807/1-A

Matrix: Solid

Analysis Batch: 55936

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00	mg/Kg			06/20/23 21:46	1

Lab Sample ID: LCS 880-55807/2-A

Matrix: Solid

Analysis Batch: 55936

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	249.2		mg/Kg		100	90 - 110

Lab Sample ID: LCSD 880-55807/3-A

Matrix: Solid

Analysis Batch: 55936

Client Sample ID: Lab Control Sample Dup

Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	249.5		mg/Kg		100	90 - 110	0	20

Lab Sample ID: 890-4831-6 MS

Matrix: Solid

Analysis Batch: 55936

Client Sample ID: BH23-03

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	259		248	512.8		mg/Kg		102	90 - 110

Lab Sample ID: 890-4831-6 MSD

Matrix: Solid

Analysis Batch: 55936

Client Sample ID: BH23-03

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	259		248	513.1		mg/Kg		103	90 - 110	0	20

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

GC VOA

Prep Batch: 55524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	5035	
890-4831-2	BH23-01	Total/NA	Solid	5035	
890-4831-3	BH23-01	Total/NA	Solid	5035	
890-4831-4	BH23-02	Total/NA	Solid	5035	
890-4831-5	BH23-02	Total/NA	Solid	5035	
890-4831-6	BH23-03	Total/NA	Solid	5035	
890-4831-7	BH23-03	Total/NA	Solid	5035	
890-4831-8	BH23-04	Total/NA	Solid	5035	
890-4831-9	BH23-04	Total/NA	Solid	5035	
890-4831-10	BH23-05	Total/NA	Solid	5035	
MB 880-55524/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-55524/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-55524/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4832-A-11-H MS	Matrix Spike	Total/NA	Solid	5035	
890-4832-A-11-I MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Prep Batch: 55913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 880-55913/5-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 55914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-11	BH23-05	Total/NA	Solid	8021B	55933
890-4831-12	BH23-06	Total/NA	Solid	8021B	55933
890-4831-13	BH23-06	Total/NA	Solid	8021B	55933
890-4831-14	BH23-07	Total/NA	Solid	8021B	55933
890-4831-15	BH23-07	Total/NA	Solid	8021B	55933
MB 880-55913/5-A	Method Blank	Total/NA	Solid	8021B	55913
MB 880-55933/5-A	Method Blank	Total/NA	Solid	8021B	55933
LCS 880-55933/1-A	Lab Control Sample	Total/NA	Solid	8021B	55933
LCSD 880-55933/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	55933
880-29738-A-1-B MS	Matrix Spike	Total/NA	Solid	8021B	55933
880-29738-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	55933

Prep Batch: 55933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-11	BH23-05	Total/NA	Solid	5035	
890-4831-12	BH23-06	Total/NA	Solid	5035	
890-4831-13	BH23-06	Total/NA	Solid	5035	
890-4831-14	BH23-07	Total/NA	Solid	5035	
890-4831-15	BH23-07	Total/NA	Solid	5035	
MB 880-55933/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-55933/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-55933/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-29738-A-1-B MS	Matrix Spike	Total/NA	Solid	5035	
880-29738-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 55938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	8021B	55524
890-4831-2	BH23-01	Total/NA	Solid	8021B	55524

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

GC VOA (Continued)

Analysis Batch: 55938 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-3	BH23-01	Total/NA	Solid	8021B	55524
890-4831-4	BH23-02	Total/NA	Solid	8021B	55524
890-4831-5	BH23-02	Total/NA	Solid	8021B	55524
890-4831-6	BH23-03	Total/NA	Solid	8021B	55524
890-4831-7	BH23-03	Total/NA	Solid	8021B	55524
890-4831-8	BH23-04	Total/NA	Solid	8021B	55524
890-4831-9	BH23-04	Total/NA	Solid	8021B	55524
890-4831-10	BH23-05	Total/NA	Solid	8021B	55524
MB 880-55524/5-A	Method Blank	Total/NA	Solid	8021B	55524
LCS 880-55524/1-A	Lab Control Sample	Total/NA	Solid	8021B	55524
LCSD 880-55524/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	55524
890-4832-A-11-H MS	Matrix Spike	Total/NA	Solid	8021B	55524
890-4832-A-11-I MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	55524

Analysis Batch: 55985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	Total BTEX	
890-4831-2	BH23-01	Total/NA	Solid	Total BTEX	
890-4831-3	BH23-01	Total/NA	Solid	Total BTEX	
890-4831-4	BH23-02	Total/NA	Solid	Total BTEX	
890-4831-5	BH23-02	Total/NA	Solid	Total BTEX	
890-4831-6	BH23-03	Total/NA	Solid	Total BTEX	
890-4831-7	BH23-03	Total/NA	Solid	Total BTEX	
890-4831-8	BH23-04	Total/NA	Solid	Total BTEX	
890-4831-9	BH23-04	Total/NA	Solid	Total BTEX	
890-4831-10	BH23-05	Total/NA	Solid	Total BTEX	
890-4831-11	BH23-05	Total/NA	Solid	Total BTEX	
890-4831-12	BH23-06	Total/NA	Solid	Total BTEX	
890-4831-13	BH23-06	Total/NA	Solid	Total BTEX	
890-4831-14	BH23-07	Total/NA	Solid	Total BTEX	
890-4831-15	BH23-07	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 55875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-11	BH23-05	Total/NA	Solid	8015B NM	55883
890-4831-12	BH23-06	Total/NA	Solid	8015B NM	55883
890-4831-13	BH23-06	Total/NA	Solid	8015B NM	55883
890-4831-14	BH23-07	Total/NA	Solid	8015B NM	55883
890-4831-15	BH23-07	Total/NA	Solid	8015B NM	55883
MB 880-55883/1-A	Method Blank	Total/NA	Solid	8015B NM	55883
LCS 880-55883/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	55883
LCSD 880-55883/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	55883
890-4831-11 MS	BH23-05	Total/NA	Solid	8015B NM	55883
890-4831-11 MSD	BH23-05	Total/NA	Solid	8015B NM	55883

Analysis Batch: 55879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	8015B NM	55882
890-4831-2	BH23-01	Total/NA	Solid	8015B NM	55882

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

GC Semi VOA (Continued)

Analysis Batch: 55879 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-3	BH23-01	Total/NA	Solid	8015B NM	55882
890-4831-4	BH23-02	Total/NA	Solid	8015B NM	55882
890-4831-5	BH23-02	Total/NA	Solid	8015B NM	55882
890-4831-6	BH23-03	Total/NA	Solid	8015B NM	55882
890-4831-7	BH23-03	Total/NA	Solid	8015B NM	55882
890-4831-8	BH23-04	Total/NA	Solid	8015B NM	55882
890-4831-9	BH23-04	Total/NA	Solid	8015B NM	55882
890-4831-10	BH23-05	Total/NA	Solid	8015B NM	55882
MB 880-55882/1-A	Method Blank	Total/NA	Solid	8015B NM	55882
LCS 880-55882/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	55882
LCSD 880-55882/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	55882
890-4831-1 MS	BH23-01	Total/NA	Solid	8015B NM	55882
890-4831-1 MSD	BH23-01	Total/NA	Solid	8015B NM	55882

Prep Batch: 55882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	8015NM Prep	
890-4831-2	BH23-01	Total/NA	Solid	8015NM Prep	
890-4831-3	BH23-01	Total/NA	Solid	8015NM Prep	
890-4831-4	BH23-02	Total/NA	Solid	8015NM Prep	
890-4831-5	BH23-02	Total/NA	Solid	8015NM Prep	
890-4831-6	BH23-03	Total/NA	Solid	8015NM Prep	
890-4831-7	BH23-03	Total/NA	Solid	8015NM Prep	
890-4831-8	BH23-04	Total/NA	Solid	8015NM Prep	
890-4831-9	BH23-04	Total/NA	Solid	8015NM Prep	
890-4831-10	BH23-05	Total/NA	Solid	8015NM Prep	
MB 880-55882/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-55882/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-55882/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4831-1 MS	BH23-01	Total/NA	Solid	8015NM Prep	
890-4831-1 MSD	BH23-01	Total/NA	Solid	8015NM Prep	

Prep Batch: 55883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-11	BH23-05	Total/NA	Solid	8015NM Prep	
890-4831-12	BH23-06	Total/NA	Solid	8015NM Prep	
890-4831-13	BH23-06	Total/NA	Solid	8015NM Prep	
890-4831-14	BH23-07	Total/NA	Solid	8015NM Prep	
890-4831-15	BH23-07	Total/NA	Solid	8015NM Prep	
MB 880-55883/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-55883/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-55883/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4831-11 MS	BH23-05	Total/NA	Solid	8015NM Prep	
890-4831-11 MSD	BH23-05	Total/NA	Solid	8015NM Prep	

Analysis Batch: 55991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Total/NA	Solid	8015 NM	
890-4831-2	BH23-01	Total/NA	Solid	8015 NM	
890-4831-3	BH23-01	Total/NA	Solid	8015 NM	
890-4831-4	BH23-02	Total/NA	Solid	8015 NM	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

GC Semi VOA (Continued)

Analysis Batch: 55991 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-5	BH23-02	Total/NA	Solid	8015 NM	
890-4831-6	BH23-03	Total/NA	Solid	8015 NM	
890-4831-7	BH23-03	Total/NA	Solid	8015 NM	
890-4831-8	BH23-04	Total/NA	Solid	8015 NM	
890-4831-9	BH23-04	Total/NA	Solid	8015 NM	
890-4831-10	BH23-05	Total/NA	Solid	8015 NM	
890-4831-11	BH23-05	Total/NA	Solid	8015 NM	
890-4831-12	BH23-06	Total/NA	Solid	8015 NM	
890-4831-13	BH23-06	Total/NA	Solid	8015 NM	
890-4831-14	BH23-07	Total/NA	Solid	8015 NM	
890-4831-15	BH23-07	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 55807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Soluble	Solid	DI Leach	
890-4831-2	BH23-01	Soluble	Solid	DI Leach	
890-4831-3	BH23-01	Soluble	Solid	DI Leach	
890-4831-4	BH23-02	Soluble	Solid	DI Leach	
890-4831-5	BH23-02	Soluble	Solid	DI Leach	
890-4831-6	BH23-03	Soluble	Solid	DI Leach	
890-4831-7	BH23-03	Soluble	Solid	DI Leach	
890-4831-8	BH23-04	Soluble	Solid	DI Leach	
890-4831-9	BH23-04	Soluble	Solid	DI Leach	
890-4831-10	BH23-05	Soluble	Solid	DI Leach	
890-4831-11	BH23-05	Soluble	Solid	DI Leach	
890-4831-12	BH23-06	Soluble	Solid	DI Leach	
890-4831-13	BH23-06	Soluble	Solid	DI Leach	
890-4831-14	BH23-07	Soluble	Solid	DI Leach	
890-4831-15	BH23-07	Soluble	Solid	DI Leach	
MB 880-55807/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-55807/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-55807/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4831-6 MS	BH23-03	Soluble	Solid	DI Leach	
890-4831-6 MSD	BH23-03	Soluble	Solid	DI Leach	

Analysis Batch: 55936

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-1	BH23-01	Soluble	Solid	300.0	55807
890-4831-2	BH23-01	Soluble	Solid	300.0	55807
890-4831-3	BH23-01	Soluble	Solid	300.0	55807
890-4831-4	BH23-02	Soluble	Solid	300.0	55807
890-4831-5	BH23-02	Soluble	Solid	300.0	55807
890-4831-6	BH23-03	Soluble	Solid	300.0	55807
890-4831-7	BH23-03	Soluble	Solid	300.0	55807
890-4831-8	BH23-04	Soluble	Solid	300.0	55807
890-4831-9	BH23-04	Soluble	Solid	300.0	55807
890-4831-10	BH23-05	Soluble	Solid	300.0	55807
890-4831-11	BH23-05	Soluble	Solid	300.0	55807
890-4831-12	BH23-06	Soluble	Solid	300.0	55807

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

HPLC/IC (Continued)

Analysis Batch: 55936 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4831-13	BH23-06	Soluble	Solid	300.0	55807
890-4831-14	BH23-07	Soluble	Solid	300.0	55807
890-4831-15	BH23-07	Soluble	Solid	300.0	55807
MB 880-55807/1-A	Method Blank	Soluble	Solid	300.0	55807
LCS 880-55807/2-A	Lab Control Sample	Soluble	Solid	300.0	55807
LCSD 880-55807/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	55807
890-4831-6 MS	BH23-03	Soluble	Solid	300.0	55807
890-4831-6 MSD	BH23-03	Soluble	Solid	300.0	55807

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-01
Date Collected: 06/15/23 08:05
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.04 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 01:52	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 11:47	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 22:56	CH	EET MID

Client Sample ID: BH23-01
Date Collected: 06/15/23 10:30
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 02:18	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 12:54	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:02	CH	EET MID

Client Sample ID: BH23-01
Date Collected: 06/15/23 10:45
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 02:44	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 13:17	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:08	CH	EET MID

Client Sample ID: BH23-02
Date Collected: 06/15/23 08:20
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 03:09	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-02

Lab Sample ID: 890-4831-4

Date Collected: 06/15/23 08:20

Matrix: Solid

Date Received: 06/16/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 13:41	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		5	10 mL	10 mL	55936	06/20/23 23:14	CH	EET MID

Client Sample ID: BH23-02

Lab Sample ID: 890-4831-5

Date Collected: 06/15/23 11:00

Matrix: Solid

Date Received: 06/16/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 03:35	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 14:04	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:19	CH	EET MID

Client Sample ID: BH23-03

Lab Sample ID: 890-4831-6

Date Collected: 06/15/23 08:30

Matrix: Solid

Date Received: 06/16/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 04:01	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 14:27	SM	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:25	CH	EET MID

Client Sample ID: BH23-03

Lab Sample ID: 890-4831-7

Date Collected: 06/15/23 11:30

Matrix: Solid

Date Received: 06/16/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 04:26	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 14:50	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-03
Date Collected: 06/15/23 11:30
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-7
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			4.97 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:43	CH	EET MID

Client Sample ID: BH23-04
Date Collected: 06/15/23 08:43
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-8
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 04:52	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 15:14	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/20/23 23:49	CH	EET MID

Client Sample ID: BH23-04
Date Collected: 06/15/23 12:00
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-9
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 05:18	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 15:37	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:07	CH	EET MID

Client Sample ID: BH23-05
Date Collected: 06/15/23 08:50
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.98 g	5 mL	55524	06/20/23 13:24	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55938	06/21/23 05:43	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 10:10	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 14:00	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	55882	06/20/23 08:15	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55879	06/20/23 16:00	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:12	CH	EET MID

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-05
Date Collected: 06/15/23 12:15
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-11
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	55933	06/20/23 14:08	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55914	06/21/23 07:28	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 11:59	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 10:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	55883	06/20/23 08:20	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55875	06/20/23 11:22	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:18	CH	EET MID

Client Sample ID: BH23-06
Date Collected: 06/16/23 08:26
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-12
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	55933	06/20/23 14:08	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55914	06/21/23 07:48	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 11:59	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 10:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	55883	06/20/23 08:20	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55875	06/20/23 12:29	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:24	CH	EET MID

Client Sample ID: BH23-06
Date Collected: 06/16/23 08:40
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-13
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	55933	06/20/23 14:08	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55914	06/21/23 08:09	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 11:59	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 10:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	55883	06/20/23 08:20	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55875	06/20/23 12:53	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:30	CH	EET MID

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:35
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.04 g	5 mL	55933	06/20/23 14:08	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55914	06/21/23 08:29	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 11:59	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:35
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			55991	06/21/23 10:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	55883	06/20/23 08:20	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55875	06/20/23 13:16	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:36	CH	EET MID

Client Sample ID: BH23-07
Date Collected: 06/16/23 09:50
Date Received: 06/16/23 13:40

Lab Sample ID: 890-4831-15
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	55933	06/20/23 14:08	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	55914	06/21/23 08:49	AJ	EET MID
Total/NA	Analysis	Total BTEX		1			55985	06/21/23 11:59	AJ	EET MID
Total/NA	Analysis	8015 NM		1			55991	06/21/23 10:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	55883	06/20/23 08:20	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	55875	06/20/23 13:40	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	55807	06/19/23 09:52	SMC	EET MID
Soluble	Analysis	300.0		1	10 mL	10 mL	55936	06/21/23 00:42	CH	EET MID

Laboratory References:
EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Accreditation/Certification Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Laboratory: Eurofins Midland

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704400-22-25	06-30-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015 NM		Solid	Total TPH
Total BTEX		Solid	Total BTEX

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Method Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Method	Method Description	Protocol	Laboratory
8021B	Volatile Organic Compounds (GC)	SW846	EET MID
Total BTEX	Total BTEX Calculation	TAL SOP	EET MID
8015 NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
8015B NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
300.0	Anions, Ion Chromatography	EPA	EET MID
5035	Closed System Purge and Trap	SW846	EET MID
8015NM Prep	Microextraction	SW846	EET MID
DI Leach	Deionized Water Leaching Procedure	ASTM	EET MID

Protocol References:

- ASTM = ASTM International
- EPA = US Environmental Protection Agency
- SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
- TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

- EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Sample Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4831-1
SDG: 23E-03490

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4831-1	BH23-01	Solid	06/15/23 08:05	06/16/23 13:40	0
890-4831-2	BH23-01	Solid	06/15/23 10:30	06/16/23 13:40	2
890-4831-3	BH23-01	Solid	06/15/23 10:45	06/16/23 13:40	3
890-4831-4	BH23-02	Solid	06/15/23 08:20	06/16/23 13:40	0
890-4831-5	BH23-02	Solid	06/15/23 11:00	06/16/23 13:40	2
890-4831-6	BH23-03	Solid	06/15/23 08:30	06/16/23 13:40	0
890-4831-7	BH23-03	Solid	06/15/23 11:30	06/16/23 13:40	2
890-4831-8	BH23-04	Solid	06/15/23 08:43	06/16/23 13:40	0
890-4831-9	BH23-04	Solid	06/15/23 12:00	06/16/23 13:40	2
890-4831-10	BH23-05	Solid	06/15/23 08:50	06/16/23 13:40	0
890-4831-11	BH23-05	Solid	06/15/23 12:15	06/16/23 13:40	1
890-4831-12	BH23-06	Solid	06/16/23 08:26	06/16/23 13:40	0
890-4831-13	BH23-06	Solid	06/16/23 08:40	06/16/23 13:40	2
890-4831-14	BH23-07	Solid	06/16/23 09:35	06/16/23 13:40	0
890-4831-15	BH23-07	Solid	06/16/23 09:50	06/16/23 13:40	2



Environment Testing
Xenco

Houston, TX (281) 240-4200 Dallas, TX (214) 902-0300
Midland, TX (432) 704-5440 San Antonio, TX (210) 509-3334
El Paso, TX (915) 585-3443 Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7550 Carlsbad, NM (575) 988-3199

Chain of Custody

Work Order No: _____

www.xenco.com Page 1 of 2

Project Manager:	Chance Dixon	Bill to: (if different)	Barrett Green
Company Name:	Vertex	Company Name:	XTO
Address:	On file	Address:	On file
City, State ZIP:	(575) 988-1472	City, State ZIP:	
Phone:		Email:	perman@vertex.ca, cdixones@vertex.ca

Work Order Comments	
Program:	UST/PT <input type="checkbox"/> PRP <input type="checkbox"/> Brownfields <input type="checkbox"/> RRC <input type="checkbox"/> Superfund <input type="checkbox"/>
State of Project:	
Reporting:	Level II <input type="checkbox"/> Level III <input type="checkbox"/> PST/UST <input type="checkbox"/> TRRP <input type="checkbox"/> Level IV <input type="checkbox"/>
Deliverables:	EDD <input type="checkbox"/> ADAPT <input type="checkbox"/> Other: _____

Project Name:	Remuda 500 TB	Turn Around	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> Rush	Pres. Code	
Project Number:	23E-03490	Due Date:			
Project Location:	Carlsbad, NM	TAT starts the day received by the lab, if received by 4:30pm			
Sampler's Name:	SPC	Wet Ice:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
P.O. #:		Thermometer ID:	JM0073		
SAMPLE RECEIPT		Correction Factor:	-0.3		
Samples Received Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Temperature Reading:	1.0		
Cooler Custody Seals:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Corrected Temperature:	1.0		
Sample Custody Seals:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Total Containers:					



890-4831 Chain of Custody

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters	Preservative Codes	Sample Comments
BH23-01	Soil	6/15/23	0805	0'	A	1	BTEX	None: NO	DI Water: H ₂ O
BH23-01			1030	2'				Cool: Cool	MeOH: Me
BH23-01			1045	3'				HCL: HC	HNO ₃ : HN
BH23-02			0820	0'				H ₂ SO ₄ : H ₂	NaOH: Na
BH23-02			1100	2'				H ₃ PO ₄ : HP	
BH23-03			0830	0'				NaHSO ₄ : NABIS	
BH23-03			1130	2'				Na ₂ S ₂ O ₃ : NaSO ₃	
BH23-04			0843	0'				Zn Acetate+NaOH: Zn	
BH23-04			1200	2'				NaOH+Ascorbic Acid: SAPC	
BH23-05			0850	0'					

Total 200.7 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

Notes: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Eurofins Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Eurofins Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Eurofins Xenco. A minimum charge of \$85.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Jully Canton	Joe Vg	6-16-23 1340			



Environment Testing
Xenco

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300
Midland, TX (432) 704-5440, San Antonio, TX (210) 509-3334
El Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Chain of Custody

Work Order No: _____

www.xenco.com Page 2 of 2

Project Manager:	Chance Dixon	Bill to: (if different)	Garrett Green
Company Name:	Vertex	Company Name:	XTO
Address:	on file	Address:	on file
City, State ZIP:		City, State ZIP:	
Phone:	(575) 988-1472	Email:	perimac@vertex.ca, cdixon@vertex.ca

Work Order Comments	
Program:	UST/PST <input type="checkbox"/> PRP <input type="checkbox"/> Brownfields <input type="checkbox"/> RRC <input type="checkbox"/> Superfund <input type="checkbox"/>
State of Project:	
Reporting:	Level II <input type="checkbox"/> Level III <input type="checkbox"/> PST/UST <input type="checkbox"/> TRRP <input type="checkbox"/> Level IV <input type="checkbox"/>
Deliverables:	EDD <input type="checkbox"/> ADAPT <input type="checkbox"/> Other: _____

Project Name:	Remuda 500 TB	Turn Around	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> Rush	Pres. Code	
Project Number:	23E-03490	Due Date:			
Project Location:	Carlsbad, NM	TAT starts the day received by the lab, if received by 4:30pm			
Sampler's Name:	SPC				
P.O. #:					
SAMPLE RECEIPT		Temp Blank:	Yes <input type="checkbox"/> No <input type="checkbox"/>	Wet Ice:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Samples Received Intact:	Yes <input type="checkbox"/> No <input type="checkbox"/>	Thermometer:	Yes <input type="checkbox"/> No <input type="checkbox"/>		
Cooler Custody Seals:	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Correction Factor:			
Sample Custody Seals:	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Temperature Reading:			
Total Containers:		Corrected Temperature:			

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters	ANALYSIS REQUEST	Preservative Codes	Sample Comments
BH23-05	Soil	6/15/23	1215	1'	G	1	BTEX		None: NO	DI Water: H ₂ O
BH23-06		6/16/23	0820	0'		1	TPH 80150		Cool: Cool	MeOH: Me
BH23-06			0840	2'		1			HCL: HC	HNO ₃ : HN
BH23-07			0935	0'		1			H ₂ SO ₄ : H ₂	NaOH: Na
BH23-07			0950	2'		1			H ₃ PO ₄ : HP	
									NaHSO ₄ : NABIS	
									Na ₂ S ₂ O ₅ : NaSO ₃	
									Zn Acetate+NaOH: Zn	
									NaOH+Ascorbic Acid: SAPC	

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

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Eurofins Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Eurofins Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Eurofins Xenco. A minimum charge of \$85.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Sally Carter	Garrett Green	6-16-23 1340			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4831-1

SDG Number: 23E-03490

Login Number: 4831

List Number: 1

Creator: Clifton, Cloe

List Source: Eurofins Carlsbad

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	N/A	Refer to Job Narrative for details.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4831-1

SDG Number: 23E-03490

Login Number: 4831

List Number: 2

Creator: Teel, Brianna

List Source: Eurofins Midland

List Creation: 06/20/23 10:53 AM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	



Environment Testing

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

ANALYTICAL REPORT

PREPARED FOR

Attn: Chance Dixon
Vertex
3101 Boyd Dr
Carlsbad, New Mexico 88220

Generated 7/27/2023 4:09:00 PM

JOB DESCRIPTION

Remuda 500 TB
SDG NUMBER Carlsbad NM

JOB NUMBER

890-4967-1

Eurofins Carlsbad
1089 N Canal St.
Carlsbad NM 88220

Eurofins Carlsbad

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization



Generated
7/27/2023 4:09:00 PM

Authorized for release by
Jessica Kramer, Project Manager
Jessica.Kramer@et.eurofinsus.com
(432)704-5440

Client: Vertex
Project/Site: Remuda 500 TB

Laboratory Job ID: 890-4967-1
SDG: Carlsbad NM

Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Client Sample Results	6
Surrogate Summary	11
QC Sample Results	12
QC Association Summary	16
Lab Chronicle	18
Certification Summary	20
Method Summary	21
Sample Summary	22
Chain of Custody	23
Receipt Checklists	24

1
2
3
4
5
6
7
8
9
10
11
12
13
14

Definitions/Glossary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Qualifiers

GC VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

Qualifier	Qualifier Description
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Job ID: 890-4967-1

Laboratory: Eurofins Carlsbad

Narrative

Job Narrative
890-4967-1

Receipt

The samples were received on 7/20/2023 8:40 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BS23-01 4IN (890-4967-1), BS23-02 4IN (890-4967-2), WS23-01 4IN (890-4967-3), WS23-02 4IN (890-4967-4), WS23-03 4IN (890-4967-5) and WS23-04 4IN (890-4967-6).

GC VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC

Method 300_ORGFM_28D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for preparation batch 880-58211 and analytical batch 880-58248 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory sample control duplicate (LCS/LCSD) precision was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

1
2
3
4
5
6
7
8
9
10
11
12
13
14

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: BS23-01 6IN

Lab Sample ID: 890-4967-1

Date Collected: 07/17/23 16:00

Matrix: Solid

Date Received: 07/20/23 08:40

Sample Depth: 4

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198	mg/Kg		07/24/23 08:45	07/24/23 12:52	1
Toluene	<0.00198	U	0.00198	mg/Kg		07/24/23 08:45	07/24/23 12:52	1
Ethylbenzene	<0.00198	U	0.00198	mg/Kg		07/24/23 08:45	07/24/23 12:52	1
m-Xylene & p-Xylene	<0.00396	U	0.00396	mg/Kg		07/24/23 08:45	07/24/23 12:52	1
o-Xylene	<0.00198	U	0.00198	mg/Kg		07/24/23 08:45	07/24/23 12:52	1
Xylenes, Total	<0.00396	U	0.00396	mg/Kg		07/24/23 08:45	07/24/23 12:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130	07/24/23 08:45	07/24/23 12:52	1
1,4-Difluorobenzene (Surr)	108		70 - 130	07/24/23 08:45	07/24/23 12:52	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396	mg/Kg			07/24/23 16:55	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.4	U	50.4	mg/Kg			07/27/23 16:57	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 12:34	1
Diesel Range Organics (Over C10-C28)	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 12:34	1
Oil Range Organics (Over C28-C36)	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 12:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	91		70 - 130	07/24/23 10:38	07/27/23 12:34	1
o-Terphenyl	105		70 - 130	07/24/23 10:38	07/27/23 12:34	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	296	F1	5.04	mg/Kg			07/21/23 17:23	1

Client Sample ID: BS23-02 6IN

Lab Sample ID: 890-4967-2

Date Collected: 07/17/23 16:05

Matrix: Solid

Date Received: 07/20/23 08:40

Sample Depth: 4

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 12:10	1
Toluene	0.00482		0.00202	mg/Kg		07/24/23 08:45	07/24/23 12:10	1
Ethylbenzene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 12:10	1
m-Xylene & p-Xylene	<0.00403	U	0.00403	mg/Kg		07/24/23 08:45	07/24/23 12:10	1
o-Xylene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 12:10	1
Xylenes, Total	<0.00403	U	0.00403	mg/Kg		07/24/23 08:45	07/24/23 12:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130	07/24/23 08:45	07/24/23 12:10	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: BS23-02 6IN
Date Collected: 07/17/23 16:05
Date Received: 07/20/23 08:40
Sample Depth: 4

Lab Sample ID: 890-4967-2
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC) (Continued)									
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1,4-Difluorobenzene (Surr)	98		70 - 130			07/24/23 08:45	07/24/23 12:10	1	
Method: TAL SOP Total BTEX - Total BTEX Calculation									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total BTEX	0.00482		0.00403	mg/Kg			07/24/23 16:55	1	
Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total TPH	<50.2	U	50.2	mg/Kg			07/27/23 16:57	1	
Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<50.2	U	50.2	mg/Kg		07/24/23 10:38	07/27/23 12:56	1	
Diesel Range Organics (Over C10-C28)	<50.2	U	50.2	mg/Kg		07/24/23 10:38	07/27/23 12:56	1	
Oil Range Organics (Over C28-C36)	<50.2	U	50.2	mg/Kg		07/24/23 10:38	07/27/23 12:56	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	95		70 - 130			07/24/23 10:38	07/27/23 12:56	1	
o-Terphenyl	112		70 - 130			07/24/23 10:38	07/27/23 12:56	1	
Method: EPA 300.0 - Anions, Ion Chromatography - Soluble									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Chloride	371		5.02	mg/Kg			07/21/23 17:38	1	

Client Sample ID: WS23-01 4IN
Date Collected: 07/17/23 16:10
Date Received: 07/20/23 08:40
Sample Depth: 4

Lab Sample ID: 890-4967-3
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzene	<0.00201	U	0.00201	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
Toluene	<0.00201	U	0.00201	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
Ethylbenzene	<0.00201	U	0.00201	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
m-Xylene & p-Xylene	<0.00402	U	0.00402	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
o-Xylene	<0.00201	U	0.00201	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
Xylenes, Total	<0.00402	U	0.00402	mg/Kg		07/24/23 08:45	07/24/23 13:12	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	112		70 - 130			07/24/23 08:45	07/24/23 13:12	1	
1,4-Difluorobenzene (Surr)	113		70 - 130			07/24/23 08:45	07/24/23 13:12	1	
Method: TAL SOP Total BTEX - Total BTEX Calculation									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total BTEX	<0.00402	U	0.00402	mg/Kg			07/24/23 16:55	1	
Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total TPH	51.4		50.3	mg/Kg			07/27/23 16:57	1	

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: WS23-01 4IN
Date Collected: 07/17/23 16:10
Date Received: 07/20/23 08:40
Sample Depth: 4

Lab Sample ID: 890-4967-3
Matrix: Solid

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<50.3	U	50.3	mg/Kg		07/24/23 10:38	07/27/23 11:28	1	
Diesel Range Organics (Over C10-C28)	51.4		50.3	mg/Kg		07/24/23 10:38	07/27/23 11:28	1	
Oil Range Organics (Over C28-C36)	<50.3	U	50.3	mg/Kg		07/24/23 10:38	07/27/23 11:28	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	91		70 - 130			07/24/23 10:38	07/27/23 11:28	1	
o-Terphenyl	105		70 - 130			07/24/23 10:38	07/27/23 11:28	1	

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Chloride	313		4.99	mg/Kg			07/21/23 17:43	1	

Client Sample ID: WS23-02 4IN
Date Collected: 07/17/23 16:15
Date Received: 07/20/23 08:40
Sample Depth: 4

Lab Sample ID: 890-4967-4
Matrix: Solid

Method: SW846 8021B - Volatile Organic Compounds (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
Toluene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
Ethylbenzene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
m-Xylene & p-Xylene	<0.00404	U	0.00404	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
o-Xylene	<0.00202	U	0.00202	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
Xylenes, Total	<0.00404	U	0.00404	mg/Kg		07/24/23 08:45	07/24/23 13:33	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	116		70 - 130			07/24/23 08:45	07/24/23 13:33	1	
1,4-Difluorobenzene (Surr)	101		70 - 130			07/24/23 08:45	07/24/23 13:33	1	

Method: TAL SOP Total BTEX - Total BTEX Calculation									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total BTEX	<0.00404	U	0.00404	mg/Kg			07/24/23 16:55	1	

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Total TPH	<49.6	U	49.6	mg/Kg			07/27/23 16:57	1	

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline Range Organics (GRO)-C6-C10	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:18	1	
Diesel Range Organics (Over C10-C28)	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:18	1	
Oil Range Organics (Over C28-C36)	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:18	1	
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1-Chlorooctane	103		70 - 130			07/24/23 10:38	07/27/23 13:18	1	
o-Terphenyl	119		70 - 130			07/24/23 10:38	07/27/23 13:18	1	

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: WS23-02 4IN

Lab Sample ID: 890-4967-4

Date Collected: 07/17/23 16:15

Matrix: Solid

Date Received: 07/20/23 08:40

Sample Depth: 4

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	327		5.05	mg/Kg			07/21/23 17:49	1

Client Sample ID: WS23-03 4IN

Lab Sample ID: 890-4967-5

Date Collected: 07/17/23 16:20

Matrix: Solid

Date Received: 07/20/23 08:40

Sample Depth: 4

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
Toluene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		07/24/23 08:45	07/24/23 13:54	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	111		70 - 130			07/24/23 08:45	07/24/23 13:54	1
1,4-Difluorobenzene (Surr)	107		70 - 130			07/24/23 08:45	07/24/23 13:54	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			07/24/23 16:55	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.6	U	49.6	mg/Kg			07/27/23 16:57	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:39	1
Diesel Range Organics (Over C10-C28)	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:39	1
Oil Range Organics (Over C28-C36)	<49.6	U	49.6	mg/Kg		07/24/23 10:38	07/27/23 13:39	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	99		70 - 130			07/24/23 10:38	07/27/23 13:39	1
o-Terphenyl	121		70 - 130			07/24/23 10:38	07/27/23 13:39	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	324		5.03	mg/Kg			07/21/23 17:54	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: WS23-04 4IN

Lab Sample ID: 890-4967-6

Date Collected: 07/17/23 16:25

Matrix: Solid

Date Received: 07/20/23 08:40

Sample Depth: 4

Method: SW846 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 14:14	1
Toluene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 14:14	1
Ethylbenzene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 14:14	1
m-Xylene & p-Xylene	<0.00398	U	0.00398	mg/Kg		07/24/23 08:45	07/24/23 14:14	1
o-Xylene	<0.00199	U	0.00199	mg/Kg		07/24/23 08:45	07/24/23 14:14	1
Xylenes, Total	<0.00398	U	0.00398	mg/Kg		07/24/23 08:45	07/24/23 14:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	112		70 - 130	07/24/23 08:45	07/24/23 14:14	1
1,4-Difluorobenzene (Surr)	111		70 - 130	07/24/23 08:45	07/24/23 14:14	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398	mg/Kg			07/24/23 16:55	1

Method: SW846 8015 NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.4	U	50.4	mg/Kg			07/27/23 16:57	1

Method: SW846 8015B NM - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 14:01	1
Diesel Range Organics (Over C10-C28)	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 14:01	1
Oil Range Organics (Over C28-C36)	<50.4	U	50.4	mg/Kg		07/24/23 10:38	07/27/23 14:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	91		70 - 130	07/24/23 10:38	07/27/23 14:01	1
o-Terphenyl	111		70 - 130	07/24/23 10:38	07/27/23 14:01	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	345		5.02	mg/Kg			07/21/23 18:09	1

Eurofins Carlsbad

Surrogate Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	BFB1 (70-130)	DFBZ1 (70-130)
890-4967-1	BS23-01 4IN	113	108
890-4967-2	BS23-02 4IN	106	98
890-4967-2 MS	BS23-02 4IN	114	101
890-4967-2 MSD	BS23-02 4IN	121	105
890-4967-3	WS23-01 4IN	112	113
890-4967-4	WS23-02 4IN	116	101
890-4967-5	WS23-03 4IN	111	107
890-4967-6	WS23-04 4IN	112	111
LCS 880-58297/1-A	Lab Control Sample	124	96
LCSD 880-58297/2-A	Lab Control Sample Dup	112	102
MB 880-58297/5-A	Method Blank	95	91
Surrogate Legend			
BFB = 4-Bromofluorobenzene (Surr)			
DFBZ = 1,4-Difluorobenzene (Surr)			

Method: 8015B NM - Diesel Range Organics (DRO) (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	1CO1 (70-130)	OTPH1 (70-130)
890-4967-1	BS23-01 4IN	91	105
890-4967-2	BS23-02 4IN	95	112
890-4967-3	WS23-01 4IN	91	105
890-4967-3 MS	WS23-01 4IN	88	98
890-4967-3 MSD	WS23-01 4IN	100	110
890-4967-4	WS23-02 4IN	103	119
890-4967-5	WS23-03 4IN	99	121
890-4967-6	WS23-04 4IN	91	111
LCS 880-58344/2-A	Lab Control Sample	96	123
LCSD 880-58344/3-A	Lab Control Sample Dup	92	112
MB 880-58344/1-A	Method Blank	146 S1+	183 S1+
Surrogate Legend			
1CO = 1-Chlorooctane			
OTPH = o-Terphenyl			

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-58297/5-A

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 58297

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200	mg/Kg		07/24/23 08:45	07/24/23 11:48	1
Toluene	<0.00200	U	0.00200	mg/Kg		07/24/23 08:45	07/24/23 11:48	1
Ethylbenzene	<0.00200	U	0.00200	mg/Kg		07/24/23 08:45	07/24/23 11:48	1
m-Xylene & p-Xylene	<0.00400	U	0.00400	mg/Kg		07/24/23 08:45	07/24/23 11:48	1
o-Xylene	<0.00200	U	0.00200	mg/Kg		07/24/23 08:45	07/24/23 11:48	1
Xylenes, Total	<0.00400	U	0.00400	mg/Kg		07/24/23 08:45	07/24/23 11:48	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130	07/24/23 08:45	07/24/23 11:48	1
1,4-Difluorobenzene (Surr)	91		70 - 130	07/24/23 08:45	07/24/23 11:48	1

Lab Sample ID: LCS 880-58297/1-A

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 58297

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.09399		mg/Kg		94	70 - 130
Toluene	0.100	0.1113		mg/Kg		111	70 - 130
Ethylbenzene	0.100	0.1098		mg/Kg		110	70 - 130
m-Xylene & p-Xylene	0.200	0.2206		mg/Kg		110	70 - 130
o-Xylene	0.100	0.1096		mg/Kg		110	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	124		70 - 130
1,4-Difluorobenzene (Surr)	96		70 - 130

Lab Sample ID: LCSD 880-58297/2-A

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 58297

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	0.100	0.1046		mg/Kg		105	70 - 130	11	35
Toluene	0.100	0.1124		mg/Kg		112	70 - 130	1	35
Ethylbenzene	0.100	0.1042		mg/Kg		104	70 - 130	5	35
m-Xylene & p-Xylene	0.200	0.2026		mg/Kg		101	70 - 130	8	35
o-Xylene	0.100	0.1009		mg/Kg		101	70 - 130	8	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	112		70 - 130
1,4-Difluorobenzene (Surr)	102		70 - 130

Lab Sample ID: 890-4967-2 MS

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: BS23-02 4IN

Prep Type: Total/NA

Prep Batch: 58297

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00202	U	0.0994	0.08614		mg/Kg		86	70 - 130
Toluene	0.00482		0.0994	0.09343		mg/Kg		89	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: 890-4967-2 MS

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: BS23-02 4IN

Prep Type: Total/NA

Prep Batch: 58297

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	<0.00202	U	0.0994	0.08596		mg/Kg		86	70 - 130
m-Xylene & p-Xylene	<0.00403	U	0.199	0.1626		mg/Kg		80	70 - 130
o-Xylene	<0.00202	U	0.0994	0.08309		mg/Kg		83	70 - 130
Surrogate	MS %Recovery	MS Qualifier	MS Limits						
4-Bromofluorobenzene (Surr)	114		70 - 130						
1,4-Difluorobenzene (Surr)	101		70 - 130						

Lab Sample ID: 890-4967-2 MSD

Matrix: Solid

Analysis Batch: 58303

Client Sample ID: BS23-02 4IN

Prep Type: Total/NA

Prep Batch: 58297

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	<0.00202	U	0.0998	0.1023		mg/Kg		102	70 - 130	17	35
Toluene	0.00482		0.0998	0.1096		mg/Kg		105	70 - 130	16	35
Ethylbenzene	<0.00202	U	0.0998	0.1026		mg/Kg		102	70 - 130	18	35
m-Xylene & p-Xylene	<0.00403	U	0.200	0.1979		mg/Kg		97	70 - 130	20	35
o-Xylene	<0.00202	U	0.0998	0.09806		mg/Kg		97	70 - 130	17	35
Surrogate	MSD %Recovery	MSD Qualifier	MSD Limits								
4-Bromofluorobenzene (Surr)	121		70 - 130								
1,4-Difluorobenzene (Surr)	105		70 - 130								

Method: 8015B NM - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 880-58344/1-A

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 58344

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0	mg/Kg		07/24/23 10:38	07/27/23 08:53	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0	mg/Kg		07/24/23 10:38	07/27/23 08:53	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0	mg/Kg		07/24/23 10:38	07/27/23 08:53	1
Surrogate	MB %Recovery	MB Qualifier	MB Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctane	146	S1+	70 - 130			07/24/23 10:38	07/27/23 08:53	1
o-Terphenyl	183	S1+	70 - 130			07/24/23 10:38	07/27/23 08:53	1

Lab Sample ID: LCS 880-58344/2-A

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 58344

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline Range Organics (GRO)-C6-C10	1000	864.9		mg/Kg		86	70 - 130
Diesel Range Organics (Over C10-C28)	1000	948.4		mg/Kg		95	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method: 8015B NM - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: LCS 880-58344/2-A

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 58344

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
1-Chlorooctane	96		70 - 130
o-Terphenyl	123		70 - 130

Lab Sample ID: LCSD 880-58344/3-A

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 58344

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	1000	811.0		mg/Kg		81	70 - 130	6	20
Diesel Range Organics (Over C10-C28)	1000	885.4		mg/Kg		89	70 - 130	7	20

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
1-Chlorooctane	92		70 - 130
o-Terphenyl	112		70 - 130

Lab Sample ID: 890-4967-3 MS

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: WS23-01 4IN

Prep Type: Total/NA

Prep Batch: 58344

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Gasoline Range Organics (GRO)-C6-C10	<50.3	U	997	1279		mg/Kg		125	70 - 130
Diesel Range Organics (Over C10-C28)	51.4		997	878.8		mg/Kg		83	70 - 130

	MS	MS	
Surrogate	%Recovery	Qualifier	Limits
1-Chlorooctane	88		70 - 130
o-Terphenyl	98		70 - 130

Lab Sample ID: 890-4967-3 MSD

Matrix: Solid

Analysis Batch: 58605

Client Sample ID: WS23-01 4IN

Prep Type: Total/NA

Prep Batch: 58344

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<50.3	U	997	1304		mg/Kg		128	70 - 130	2	20
Diesel Range Organics (Over C10-C28)	51.4		997	996.1		mg/Kg		95	70 - 130	13	20

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
1-Chlorooctane	100		70 - 130
o-Terphenyl	110		70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-58211/1-A

Matrix: Solid

Analysis Batch: 58248

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00	mg/Kg			07/21/23 17:07	1

Lab Sample ID: LCS 880-58211/2-A

Matrix: Solid

Analysis Batch: 58248

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	234.8		mg/Kg		94	90 - 110

Lab Sample ID: LCSD 880-58211/3-A

Matrix: Solid

Analysis Batch: 58248

Client Sample ID: Lab Control Sample Dup

Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	233.1		mg/Kg		93	90 - 110	1	20

Lab Sample ID: 890-4967-1 MS

Matrix: Solid

Analysis Batch: 58248

Client Sample ID: BS23-01 4IN

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	296	F1	252	525.6		mg/Kg		91	90 - 110

Lab Sample ID: 890-4967-1 MSD

Matrix: Solid

Analysis Batch: 58248

Client Sample ID: BS23-01 4IN

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	296	F1	252	519.2	F1	mg/Kg		88	90 - 110	1	20

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

GC VOA

Prep Batch: 58297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	5035	
890-4967-2	BS23-02 4IN	Total/NA	Solid	5035	
890-4967-3	WS23-01 4IN	Total/NA	Solid	5035	
890-4967-4	WS23-02 4IN	Total/NA	Solid	5035	
890-4967-5	WS23-03 4IN	Total/NA	Solid	5035	
890-4967-6	WS23-04 4IN	Total/NA	Solid	5035	
MB 880-58297/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-58297/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-58297/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4967-2 MS	BS23-02 4IN	Total/NA	Solid	5035	
890-4967-2 MSD	BS23-02 4IN	Total/NA	Solid	5035	

Analysis Batch: 58303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	8021B	58297
890-4967-2	BS23-02 4IN	Total/NA	Solid	8021B	58297
890-4967-3	WS23-01 4IN	Total/NA	Solid	8021B	58297
890-4967-4	WS23-02 4IN	Total/NA	Solid	8021B	58297
890-4967-5	WS23-03 4IN	Total/NA	Solid	8021B	58297
890-4967-6	WS23-04 4IN	Total/NA	Solid	8021B	58297
MB 880-58297/5-A	Method Blank	Total/NA	Solid	8021B	58297
LCS 880-58297/1-A	Lab Control Sample	Total/NA	Solid	8021B	58297
LCSD 880-58297/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	58297
890-4967-2 MS	BS23-02 4IN	Total/NA	Solid	8021B	58297
890-4967-2 MSD	BS23-02 4IN	Total/NA	Solid	8021B	58297

Analysis Batch: 58400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	Total BTEX	
890-4967-2	BS23-02 4IN	Total/NA	Solid	Total BTEX	
890-4967-3	WS23-01 4IN	Total/NA	Solid	Total BTEX	
890-4967-4	WS23-02 4IN	Total/NA	Solid	Total BTEX	
890-4967-5	WS23-03 4IN	Total/NA	Solid	Total BTEX	
890-4967-6	WS23-04 4IN	Total/NA	Solid	Total BTEX	

GC Semi VOA

Prep Batch: 58344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	8015NM Prep	
890-4967-2	BS23-02 4IN	Total/NA	Solid	8015NM Prep	
890-4967-3	WS23-01 4IN	Total/NA	Solid	8015NM Prep	
890-4967-4	WS23-02 4IN	Total/NA	Solid	8015NM Prep	
890-4967-5	WS23-03 4IN	Total/NA	Solid	8015NM Prep	
890-4967-6	WS23-04 4IN	Total/NA	Solid	8015NM Prep	
MB 880-58344/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-58344/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-58344/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4967-3 MS	WS23-01 4IN	Total/NA	Solid	8015NM Prep	
890-4967-3 MSD	WS23-01 4IN	Total/NA	Solid	8015NM Prep	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

GC Semi VOA

Analysis Batch: 58605

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	8015B NM	58344
890-4967-2	BS23-02 4IN	Total/NA	Solid	8015B NM	58344
890-4967-3	WS23-01 4IN	Total/NA	Solid	8015B NM	58344
890-4967-4	WS23-02 4IN	Total/NA	Solid	8015B NM	58344
890-4967-5	WS23-03 4IN	Total/NA	Solid	8015B NM	58344
890-4967-6	WS23-04 4IN	Total/NA	Solid	8015B NM	58344
MB 880-58344/1-A	Method Blank	Total/NA	Solid	8015B NM	58344
LCS 880-58344/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	58344
LCSD 880-58344/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	58344
890-4967-3 MS	WS23-01 4IN	Total/NA	Solid	8015B NM	58344
890-4967-3 MSD	WS23-01 4IN	Total/NA	Solid	8015B NM	58344

Analysis Batch: 58675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Total/NA	Solid	8015 NM	
890-4967-2	BS23-02 4IN	Total/NA	Solid	8015 NM	
890-4967-3	WS23-01 4IN	Total/NA	Solid	8015 NM	
890-4967-4	WS23-02 4IN	Total/NA	Solid	8015 NM	
890-4967-5	WS23-03 4IN	Total/NA	Solid	8015 NM	
890-4967-6	WS23-04 4IN	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 58211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Soluble	Solid	DI Leach	
890-4967-2	BS23-02 4IN	Soluble	Solid	DI Leach	
890-4967-3	WS23-01 4IN	Soluble	Solid	DI Leach	
890-4967-4	WS23-02 4IN	Soluble	Solid	DI Leach	
890-4967-5	WS23-03 4IN	Soluble	Solid	DI Leach	
890-4967-6	WS23-04 4IN	Soluble	Solid	DI Leach	
MB 880-58211/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-58211/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-58211/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4967-1 MS	BS23-01 4IN	Soluble	Solid	DI Leach	
890-4967-1 MSD	BS23-01 4IN	Soluble	Solid	DI Leach	

Analysis Batch: 58248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4967-1	BS23-01 4IN	Soluble	Solid	300.0	58211
890-4967-2	BS23-02 4IN	Soluble	Solid	300.0	58211
890-4967-3	WS23-01 4IN	Soluble	Solid	300.0	58211
890-4967-4	WS23-02 4IN	Soluble	Solid	300.0	58211
890-4967-5	WS23-03 4IN	Soluble	Solid	300.0	58211
890-4967-6	WS23-04 4IN	Soluble	Solid	300.0	58211
MB 880-58211/1-A	Method Blank	Soluble	Solid	300.0	58211
LCS 880-58211/2-A	Lab Control Sample	Soluble	Solid	300.0	58211
LCSD 880-58211/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	58211
890-4967-1 MS	BS23-01 4IN	Soluble	Solid	300.0	58211
890-4967-1 MSD	BS23-01 4IN	Soluble	Solid	300.0	58211

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: BS23-01 4IN

Lab Sample ID: 890-4967-1

Date Collected: 07/17/23 16:00

Matrix: Solid

Date Received: 07/20/23 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 12:52	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			9.92 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 12:34	AJ	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 17:23	CH	EET MID

Client Sample ID: BS23-02 4IN

Lab Sample ID: 890-4967-2

Date Collected: 07/17/23 16:05

Matrix: Solid

Date Received: 07/20/23 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 12:10	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			9.97 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 12:56	AJ	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 17:38	CH	EET MID

Client Sample ID: WS23-01 4IN

Lab Sample ID: 890-4967-3

Date Collected: 07/17/23 16:10

Matrix: Solid

Date Received: 07/20/23 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 13:12	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			9.94 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 11:28	AJ	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 17:43	CH	EET MID

Client Sample ID: WS23-02 4IN

Lab Sample ID: 890-4967-4

Date Collected: 07/17/23 16:15

Matrix: Solid

Date Received: 07/20/23 08:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 13:33	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Client Sample ID: WS23-02 4IN
Date Collected: 07/17/23 16:15
Date Received: 07/20/23 08:40

Lab Sample ID: 890-4967-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.08 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 13:18	AJ	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 17:49	CH	EET MID

Client Sample ID: WS23-03 4IN
Date Collected: 07/17/23 16:20
Date Received: 07/20/23 08:40

Lab Sample ID: 890-4967-5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 13:54	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.09 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 13:39	AJ	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 17:54	CH	EET MID

Client Sample ID: WS23-04 4IN
Date Collected: 07/17/23 16:25
Date Received: 07/20/23 08:40

Lab Sample ID: 890-4967-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	58297	07/24/23 08:45	AJ	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	58303	07/24/23 14:14	SM	EET MID
Total/NA	Analysis	Total BTEX		1			58400	07/24/23 16:55	SM	EET MID
Total/NA	Analysis	8015 NM		1			58675	07/27/23 16:57	AJ	EET MID
Total/NA	Prep	8015NM Prep			9.92 g	10 mL	58344	07/24/23 10:38	TKC	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	58605	07/27/23 14:01	AJ	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	58211	07/21/23 09:31	KS	EET MID
Soluble	Analysis	300.0		1			58248	07/21/23 18:09	CH	EET MID

Laboratory References:
EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Accreditation/Certification Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Laboratory: Eurofins Midland

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704400-23-26	06-30-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015 NM		Solid	Total TPH
Total BTEX		Solid	Total BTEX

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Method Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Method	Method Description	Protocol	Laboratory
8021B	Volatile Organic Compounds (GC)	SW846	EET MID
Total BTEX	Total BTEX Calculation	TAL SOP	EET MID
8015 NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
8015B NM	Diesel Range Organics (DRO) (GC)	SW846	EET MID
300.0	Anions, Ion Chromatography	EPA	EET MID
5035	Closed System Purge and Trap	SW846	EET MID
8015NM Prep	Microextraction	SW846	EET MID
DI Leach	Deionized Water Leaching Procedure	ASTM	EET MID

Protocol References:

- ASTM = ASTM International
- EPA = US Environmental Protection Agency
- SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
- TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

- EET MID = Eurofins Midland, 1211 W. Florida Ave, Midland, TX 79701, TEL (432)704-5440

Sample Summary

Client: Vertex
Project/Site: Remuda 500 TB

Job ID: 890-4967-1
SDG: Carlsbad NM

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4967-1	BS23-01 4IN	Solid	07/17/23 16:00	07/20/23 08:40	4
890-4967-2	BS23-02 4IN	Solid	07/17/23 16:05	07/20/23 08:40	4
890-4967-3	WS23-01 4IN	Solid	07/17/23 16:10	07/20/23 08:40	4
890-4967-4	WS23-02 4IN	Solid	07/17/23 16:15	07/20/23 08:40	4
890-4967-5	WS23-03 4IN	Solid	07/17/23 16:20	07/20/23 08:40	4
890-4967-6	WS23-04 4IN	Solid	07/17/23 16:25	07/20/23 08:40	4

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14



Environment Testing
Xenco

Chain of Custody

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300
Midland, TX (432) 704-5440, San Antonio, TX (210) 509-3334
EL Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Work Order No: _____

www.xenco.com Page 1 of 1

Work Order Comments

Program: ☐ UST/PST ☐ PRP ☐ Brownfields ☐ RRC ☐ Superfund ☐

State of Project: ☐ Level II ☐ Level III ☐ PST/UST ☐ TRRP ☐ Level IV ☐

Reporting: ☐ Level II ☐ Level III ☐ PST/UST ☐ TRRP ☐ Level IV ☐

Deliverables: ☐ EDD ☐ ADAPT ☐ Other: _____

Project Manager: Charles Dixon

Company Name: Xenco

Address: 3101 Boyd Dr

City, State ZIP: Carlsbad, NM 88502

Phone: 575 988 3199

Bill to: (if different) Carlsbad, NM 88502

Company Name: Xenco

Address: 3101 Boyd Dr

City, State ZIP: Carlsbad, NM 88502

Email: charles.dixon@xenco.com

Project Name: Remediation TB

Project Number: 735-

Project Location: Carlsbad, NM

Sampler's Name: Fernando Rodriguez

PO #: _____

Turn Around: ☐ Routine ☒ Rush 4/24/23

Due Date: 2/24/23

TAT starts the day received by the lab, if received by 4:30pm

Temp Blank: ☒ Yes ☐ No

Thermometer ID: TDMS07

Correction Factor: -0.2

Temperature Reading: 2.0

Corrected Temperature: 1.8

Wet Ice: ☒ Yes ☐ No

Parameters

DI Water: H₂O

Cool: Cool

HCL: HC

H₂SO₄: H₂

H₃PO₄: HP

NaHSO₄: NABIS

Na₂S₂O₃: NaSO

Zn Acetate+NaOH: Zn

NaOH+Ascorbic Acid: SAPC

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Sample Comments
8523-01	u/n	7/17	18:00	4in	50t	1	
8523-02	u/n		18:05	4in			
W523-01	u/n		16:10	4in			
W523-02	u/n		16:15	4in			
W523-03	u/n		16:20	4in			
W523-04	u/n		16:25	4in			

Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Eurofins Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Eurofins Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Eurofins Xenco. A minimum charge of \$85.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<u>[Signature]</u>	<u>[Signature]</u>	7-20-23 8:40

Revised Date: 08/25/2020 Rev. 20/02

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4967-1

SDG Number: Carlsbad NM

Login Number: 4967

List Number: 1

Creator: Clifton, Cloe

List Source: Eurofins Carlsbad

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	N/A	Refer to Job Narrative for details.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4967-1

SDG Number: Carlsbad NM

Login Number: 4967

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 07/21/23 10:58 AM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 250584

CONDITIONS

Operator: XTO ENERGY, INC 6401 Holiday Hill Road Midland, TX 79707	OGRID: 5380
	Action Number: 250584
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
rhamlet	We have received your Remediation Closure Report for Incident #NAPP2314544467 REMUDA 500 TANK BATTERY, thank you. This Remediation Closure Report is approved. Areas reasonably needed for production or subsequent drilling operations will need to be reclaimed and revegetated as soon as they are no longer reasonably needed. A report for reclamation and revegetation including pictures of the contoured backfilled excavation surface and a thorough discussion on reseeding mixture, vegetation ratio, timelines, etc., will need to be submitted and approved prior to this incident receiving the final status of "Restoration Complete".	1/19/2024