Incident Numbers: nAB1520442349, nAB1520538047

Release Assessment and Closure

Riverside 31 Fed Com #001

Section 31, Township 16 South, Range 27 East

API: 30-015-31351

County: Eddy

Vertex File Number: 23E-04708

Prepared for:
Mack Energy Corporation

Prepared by:
Vertex Resource Services Inc.

Date:
July 2024

Release Assessment and Closure
Riverside 31 Fed Com #001
Section 31, Township 16 South, Range 27 East
API: 30-015-31351
County: Eddy

Prepared for:
Mack Energy Corporation
11344 Lovington Highway
Artesia, New Mexico 88210

New Mexico Oil Conservation Division – District 2
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Prepared by:
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Sally Carttar
Sally Carttar, BA
PROJECT MANAGER, REPORT REVIEW

July 16, 2024
Date

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1.0 Introduction

Mack Energy Corporation (Mack) retained Vertex Resource Services Inc. (Vertex) to conduct a Release Assessment and Closure for a produced water release that occurred on July 19, 2015, at Riverside 31 Fed Com #001 API 30-015-31351 (hereafter referred to as the "site"). An initial C-141 Release Notification was submitted to New Mexico Oil Conservation Division (NMOCD) District 2 on July 20, 2015. Incident ID number nAB1520442349 and RP number 2RP-3147 were assigned to this incident. A search of NMOCD records also returns incident ID nAB1520538047, which lacks any further information and was likely created referencing the same release.

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 closure of this release.

2.0 Incident Description

The release occurred on July 19, 2015, due to a lightning strike on the fiberglass produced water tank on-site. The incident was reported on July 20, 2015, and involved the release of approximately 3.5 barrels (bbl.) of produced water into the containment. An additional 0.5 bbls of overspray were estimated to have been released into the pasture south of the pad. Daily Field Report (DFRs) and site photographs are included in Appendix B.

3.0 Site Characteristics

The site is located approximately 3 miles north of Riverside, New Mexico (Google Inc., 2023). The legal location for the site is Section 31, Township 16 South, Range 27 East in Eddy County, New Mexico. The release area is located on Bureau of Land Management 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 on and adjacent to the south side of the constructed pad (Figure 1).

The surrounding landscape is associated with ridges, plains, and hills with elevations ranging between 2,800 and 5,000 feet. The climate is semiarid with average annual precipitation ranging between 10 and 25 inches. Using information from the United States Department of Agriculture, the dominant vegetation was determined to be alkali sacaton and black or blue grama. Grasses dominate the historic plant community (United States Department of Agriculture, Natural Resources Conservation Service, 2023). Limited to no vegetation is allowed to grow on the compacted production pad, right-of-way and access road.

The surface geology at the site is primarily characterized as Pat - Artesia Group (Guadalupian; New Mexico Bureau of Geology and Mineral Resources, 2023) and the soil at the site is characterized as loam and bedrock (United States Department of Agriculture, Natural Resources Conservation Service, 2023). Soils are characterized as well-drained with

low runoff. The karst geology potential for the site is high (United States Department of the Interior, Bureau of Land Management, 2018).

4.0 Closure Criteria Determination

There are no water wells within 0.5 miles of the site. The nearest active well to the site is a New Mexico Office of the State Engineer (NMOSE) monitoring well located approximately 1.8 miles southwest of the site immediately adjacent to the Pecos River (United States Geological Survey, 2023). Data from 2013 shows the NMOSE borehole recorded a depth to groundwater of 12 feet below ground surface (bgs). Due to the proximity to the river, depth to groundwater is likely significantly less at the borehole location than at the site. Information pertaining to the depth to groundwater determination is included in Appendix A.

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 0.6 miles southeast 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. No lakebeds, sinkholes, playa lakes or other critical water or community features exist near the site as outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

Table 1. Closure Criteria Determination			
Site Name: Riverside 31 Fed Com #001			
Spill Coordinates: 32.873486, -104.311043		**X: 564411.82**	**Y: 3637481.45**
Site Specific Conditions		**Value**	**Unit**
1	Depth to Groundwater	**No reference, assume <50**	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	3,277	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	2,748	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	15,540	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**		feet
	ii) Within 1000 feet of any fresh water well or spring	3,015	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	10,819	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
	Distance to nearest subsurface mine	127,392	
9	Within an unstable area (Karst Map)	**High**	Critical High Medium Low
10	Within a 100-year Floodplain	Zone X	year
	Distance to nearest FEMA Flood Hazard Zone A	2,550	feet
11	Soil Type	Gypsum land-Cottonwood complex	
12	Ecological Classification	Gyp upland	
13	Geology	Pat	
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.

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 was completed on October 27, 2023, which identified the area of the release specified in the initial C-141 Report. Vertex returned to the site on December 9, 2023, to begin delineation around the containment and south of the pad. A total of nine sample points were established in the release area. Two depth samples were collected from each borehole, with the exception of BH23-09, which hit refusal at 0.5 feet bgs. A second sampling event on June 3, 2024, was conducted to obtain vertical extent samples among existing borehole locations. Refusal depth averaged 3 feet bgs. All 33 samples screened below closure criteria and were submitted to a state-accredited laboratory for analysis. The sample locations are presented in Figure 1. Daily Field Reports from all visits are presented in Appendix B.

6.0 Closure Denials

The Remediation Closure Report was submitted to NMOCD on May 23, 2024, and Vertex received notice of denial the same day. Correspondence regarding the denial is included in Appendix D. Vertex returned to site to collect additional samples as required by OCD on June 3, 2024. A DFR from this sampling event is included in Appendix B and the sampling notification is attached in Appendix D. All boreholes hit rock refusal at their deepest recorded depths. All 16 additional samples collected were submitted to a state-accredited laboratory and analyzed for chloride only, per NMOCD request. No samples exceeded strictest closure criteria. The Remediation Closure Report was submitted to OCD again on June 29, 2024. The report was entered into OCD records as a Re-vegetation Report in error, which was denied due to the on-pad nature of the release. No changes have been made to the document prior to resubmittal as a Remediation Closure Report.

7.0 Closure Request

Vertex recommends no additional remedial action to address the release at the site. Laboratory analyses of confirmation samples collected show final confirmatory values below NMOCD remediation closure criteria for areas

where depth to groundwater is less than 50 feet, with all samples meeting reclamation requirements of NMAC 19.15.29.13. There are no anticipated risks to human, ecological, or hydrological receptors at this release site. Based on these conditions, Mack requests that the releases nAB1520442349 and nAB1520538047 be closed.

Should you have any questions or concerns, please do not hesitate to contact Sally Carttar at 575.361.3561 or scarttar@vertexresource.com.

8.0 References

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9.0 Limitations

This report has been prepared for the sole benefit of Mack Energy Corporation. This document may not be used by any other person or entity, with the exception of the New Mexico Oil Conservation Division and the Bureau of Land Management, without the express written consent of Vertex Resource Services Inc. (Vertex) and Mack Energy Corporation. 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

Borehole (Prefixed by "BH23-" and "BH24-")

VERTEX

0 10 20 40 ft

NAD 1983 UTM Zone 13N
Date: Dec 15/23

N

Characterization Sampling Schematic
Riverside 31 Fed Com #001

FIGURE:
1

MACK Energy Corporation

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: Georeferenced image from Esri, 2022.
Boreholes from GPS by Vertex Professional Services Ltd., 2023.

VERSATILITY. EXPERTISE.

Document Path: D:\Vertex\GeoRequests\23E-04708\Figure 1 Characterization Sampling Schematic port(23E-04708).mxd

TABLES

Client Name: Mack Energy Corporation
Site Name: Riverside 31 Fed Com #001
NMOCD Tracking #: nAB1520442349
Project #: 23E-04708
Lab Reports: 2312631, 885-5589-1

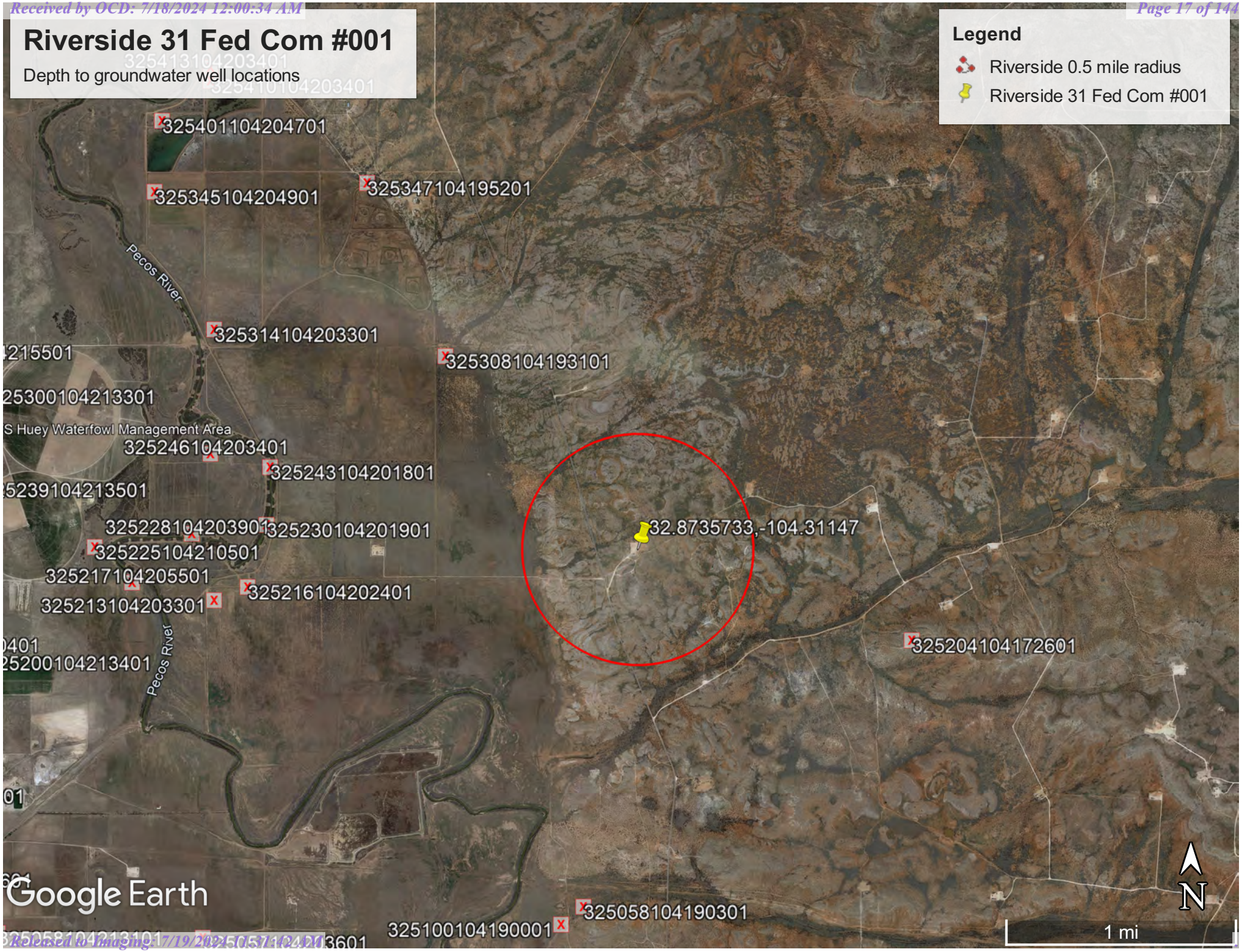
Table 3. Initial Characterization Sample Field Screen and Laboratory Results – Depth to Groundwater <50 feet bgs

Sample Description			Petroleum Hydrocarbons							Inorganic
			Volatile		Extractable					
Sample ID	Depth (ft)	Sample Date	Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	Chloride Concentration
			(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BH23-02	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	2.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-03	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	1.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-04	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	2.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-05	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	1.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-06	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	190
	2.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	260
BH23-07	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	2.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-08	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	1.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-09	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
BH23-10	0.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	ND
	2.0	12/9/2023	ND	ND	ND	ND	ND	ND	ND	68
BH24-04	0.0	6/3/2024	—	—	—	—	—	—	—	402
	1.0	6/3/2024	—	—	—	—	—	—	—	273
	2.0	6/3/2024	—	—	—	—	—	—	—	210
	3.0	6/3/2024	—	—	—	—	—	—	—	265
BH24-05	0.0	6/3/2024	—	—	—	—	—	—	—	422
	1.0	6/3/2024	—	—	—	—	—	—	—	323
	2.0	6/3/2024	—	—	—	—	—	—	—	335
	3.0	6/3/2024	—	—	—	—	—	—	—	253
BH24-06	0.0	6/3/2024	—	—	—	—	—	—	—	420
	1.0	6/3/2024	—	—	—	—	—	—	—	518
	2.0	6/3/2024	—	—	—	—	—	—	—	500
	3.0	6/3/2024	—	—	—	—	—	—	—	565
	3.5	6/3/2024	—	—	—	—	—	—	—	530
BH24-07	0.0	6/3/2024	—	—	—	—	—	—	—	285
	1.0	6/3/2024	—	—	—	—	—	—	—	378
	2.0	6/3/2024	—	—	—	—	—	—	—	398

"ND" Not Detected at the Reporting Limit
"-" indicates not analyzed/assessed
Green and bold indicates an exceedance of NMOCD reclamation closure criteria

VERTEX

APPENDIX A – Closure Criteria Research Documentation


Riverside 31 Fed Com #001
Depth to groundwater well locations
Legend
Riverside 0.5 mile radius
Riverside 31 Fed Com #001
325401104204701
325345104204901
325347104195201
Pecos River
325314104203301
325308104193101
S Huey Waterfowl Management Area
325246104203401
325243104201801
325230104201901
325225104210501
325217104205501
325216104202401
325213104203301
32.8735733,-104.31147
325204104172601
Pecos River
325058104190301
325100104190001
Google Earth
N
1 mi

New Mexico Office of the State Engineer

Water Column/Average Depth to Water

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

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

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

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
RA 00399		RA	ED	2	3		31	16S	27E	563583	3637879*	919			

Average Depth to Water: --
Minimum Depth: --
Maximum Depth: --

Record Count: 1

UTMNAD83 Radius Search (in meters):

Easting (X): 564411.82 **Northing (Y):** 3637481.45 **Radius:** 1000

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

5/21/24 4:46 PM

WATER COLUMN/ AVERAGE DEPTH TO WATER

U.S. Fish and Wildlife Service
National Wetlands Inventory

Riverside 3,277 ft to Riverine

October 23, 2023

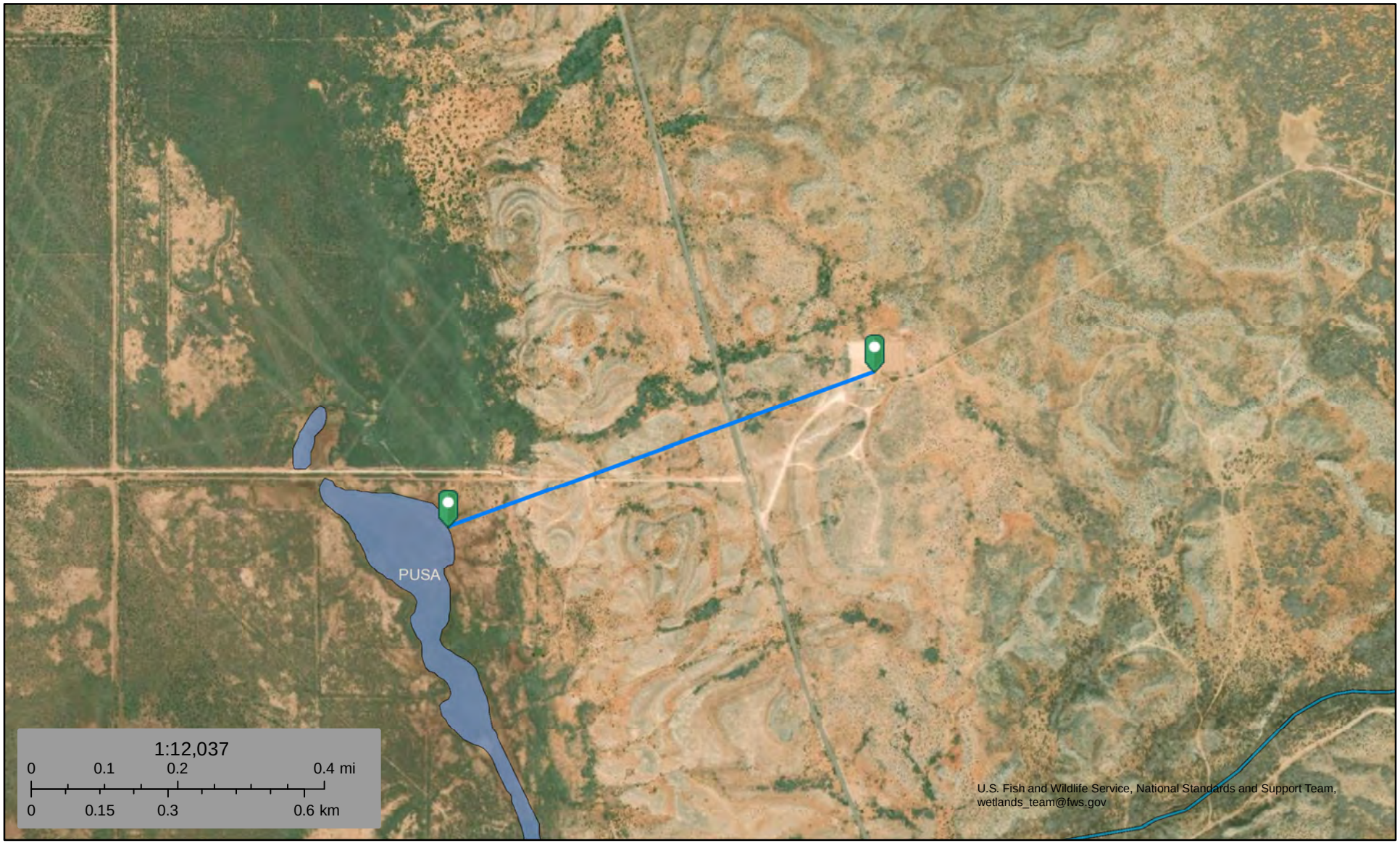
Wetlands

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

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

U.S. Fish and Wildlife Service
National Wetlands Inventory

Riverside 2,748 ft to pond



October 23, 2023

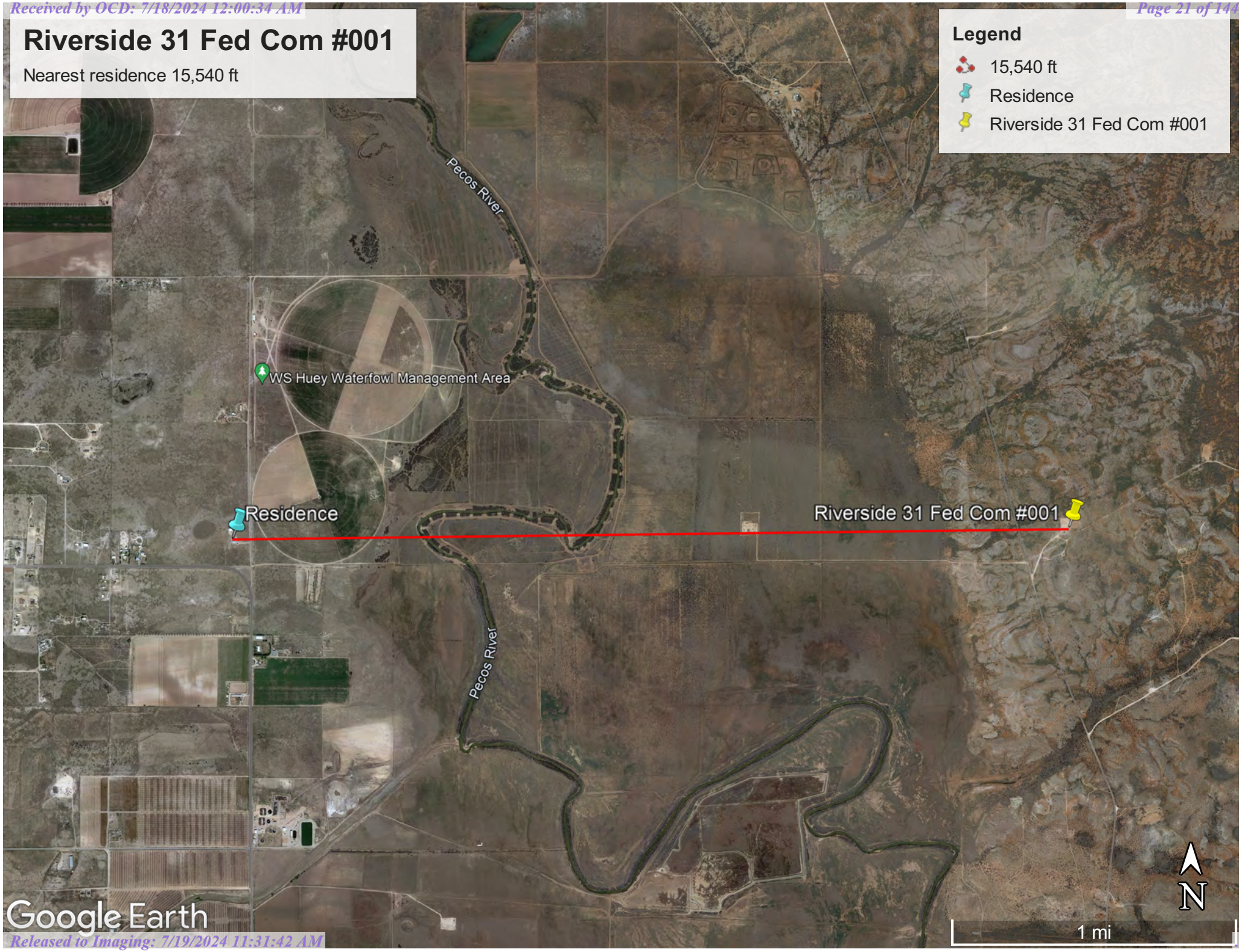
Wetlands

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

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

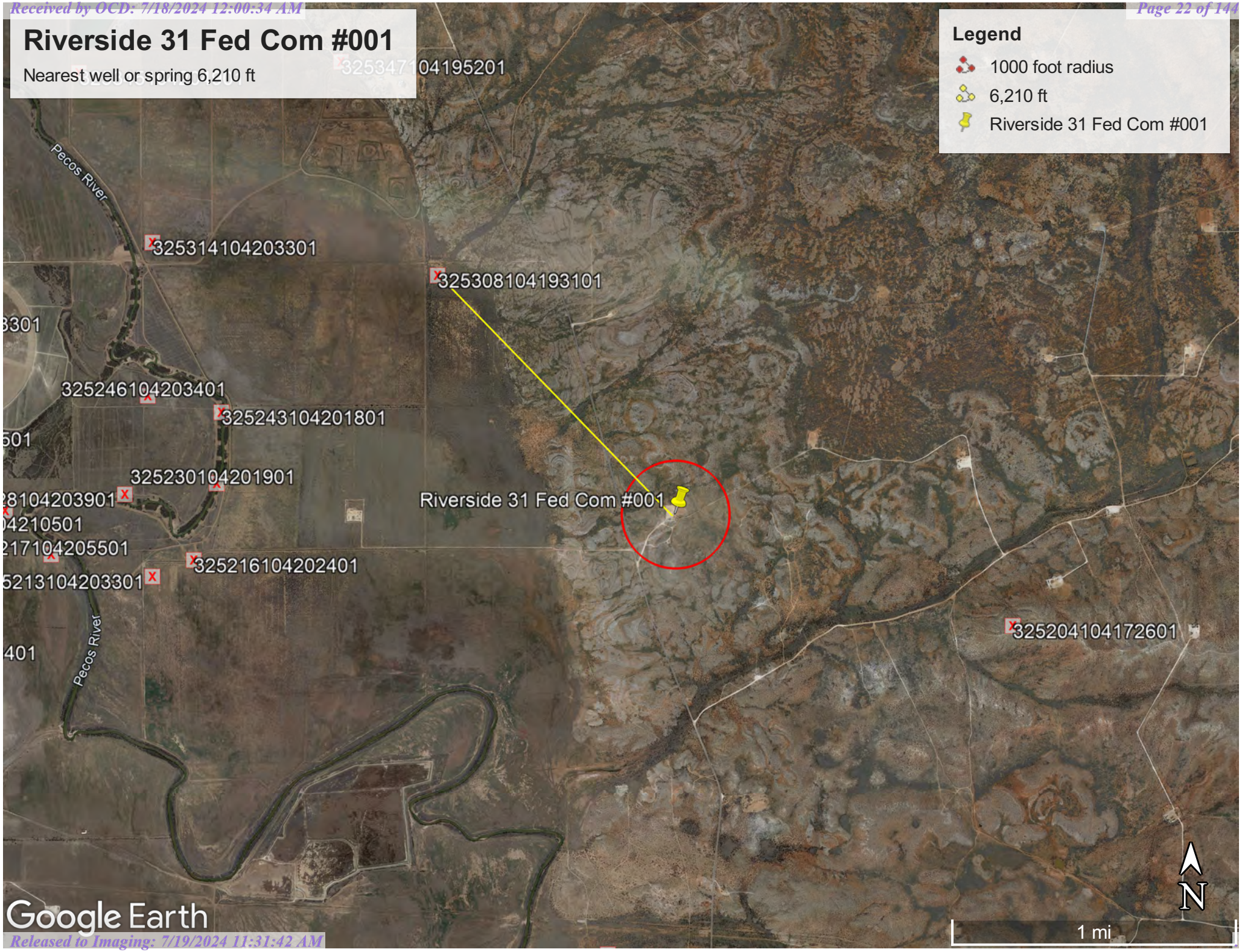
Riverside 31 Fed Com #001

Nearest residence 15,540 ft



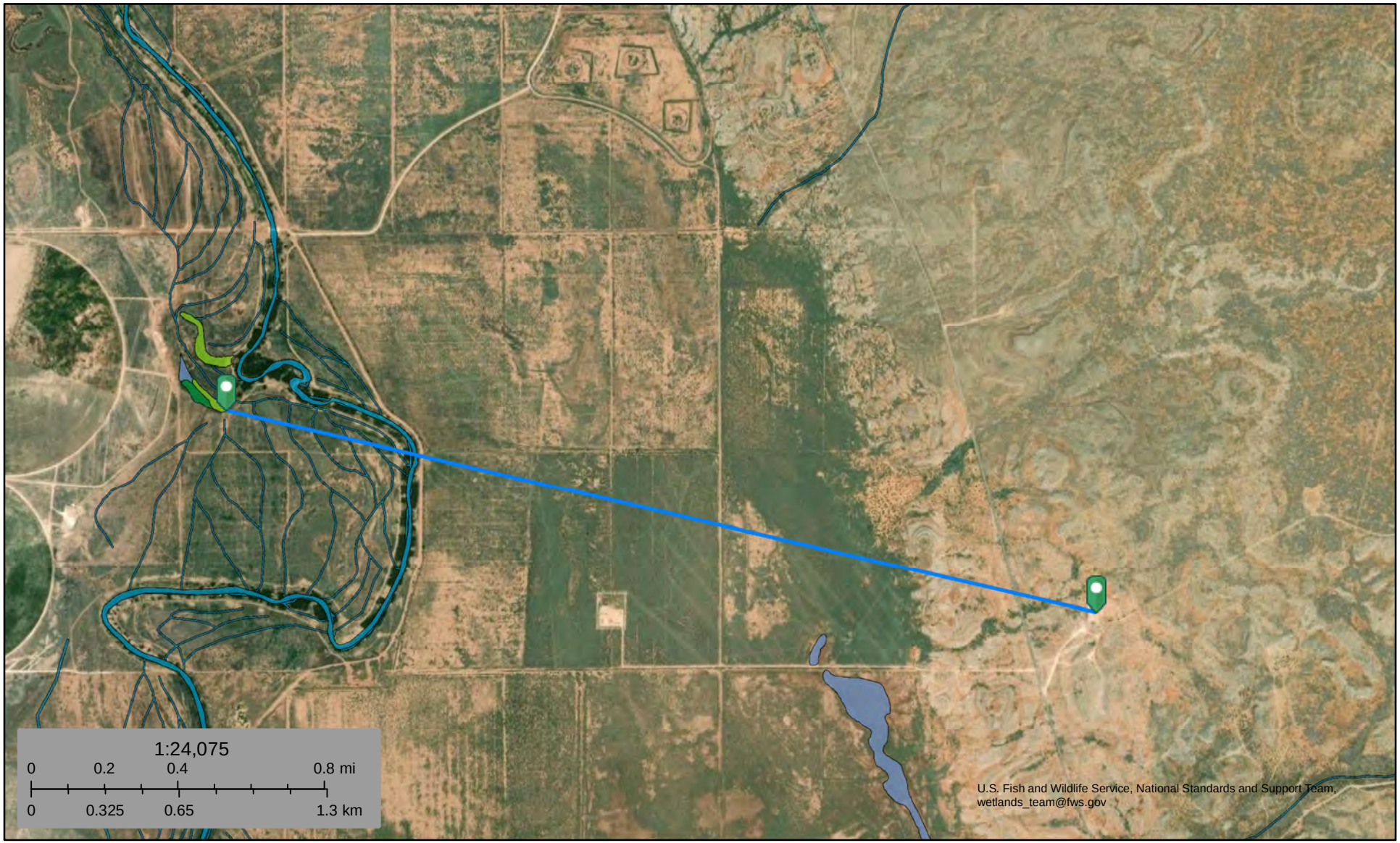
Riverside 31 Fed Com #001

Nearest well or spring 6,210 ft



U.S. Fish and Wildlife Service
National Wetlands Inventory

Riverside 10,819 ft to wetland



October 23, 2023

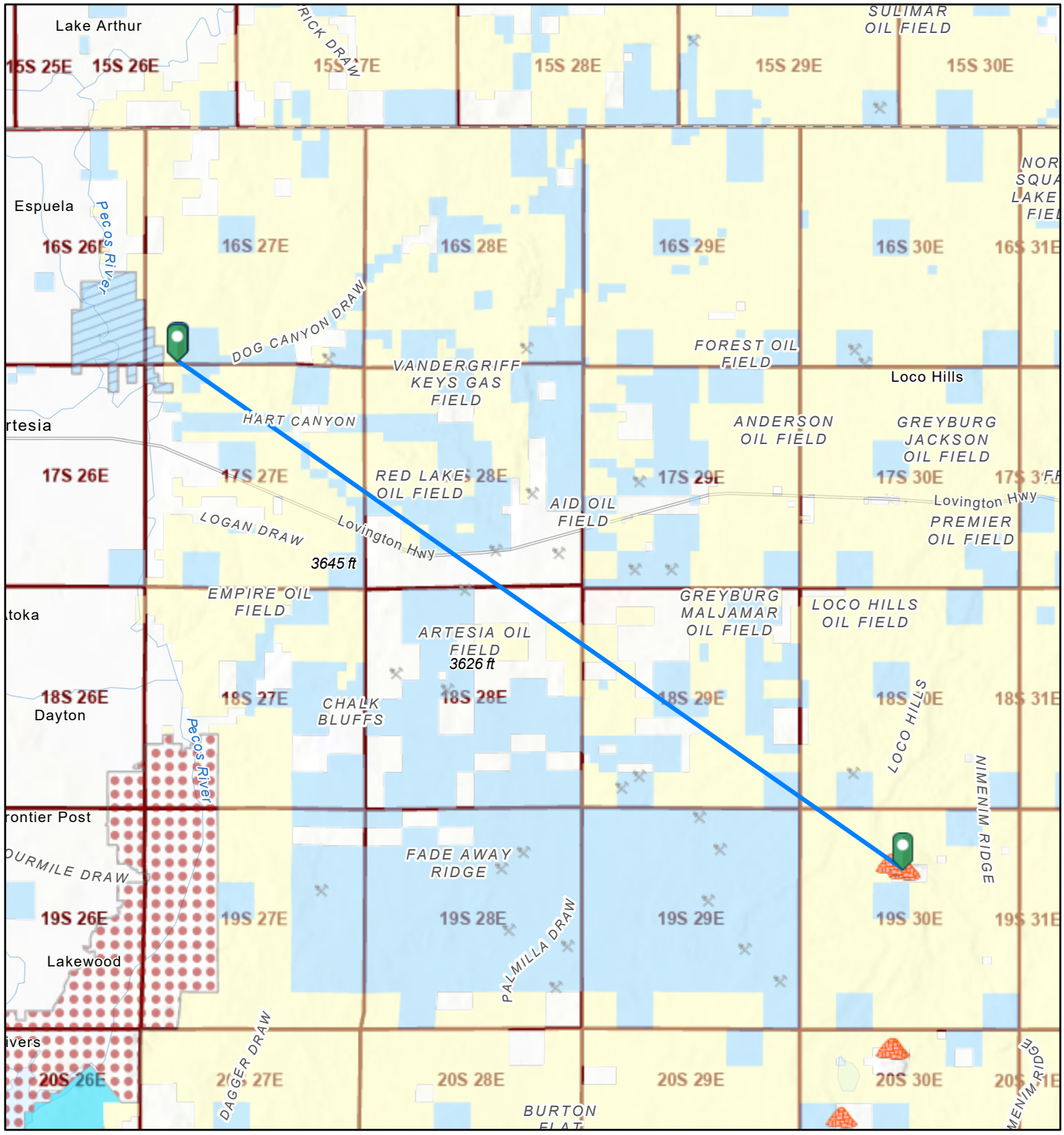
Wetlands

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

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

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

Riverside 31 Fed Com #1 Mine 127,392 ft.



12/15/2023, 5:30:39 PM

1:288,895

0 2 4 8 mi

0 3.25 6.5 13 km

Registered Mines

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

Land Ownership

- BLM
- BOR
- P
- S

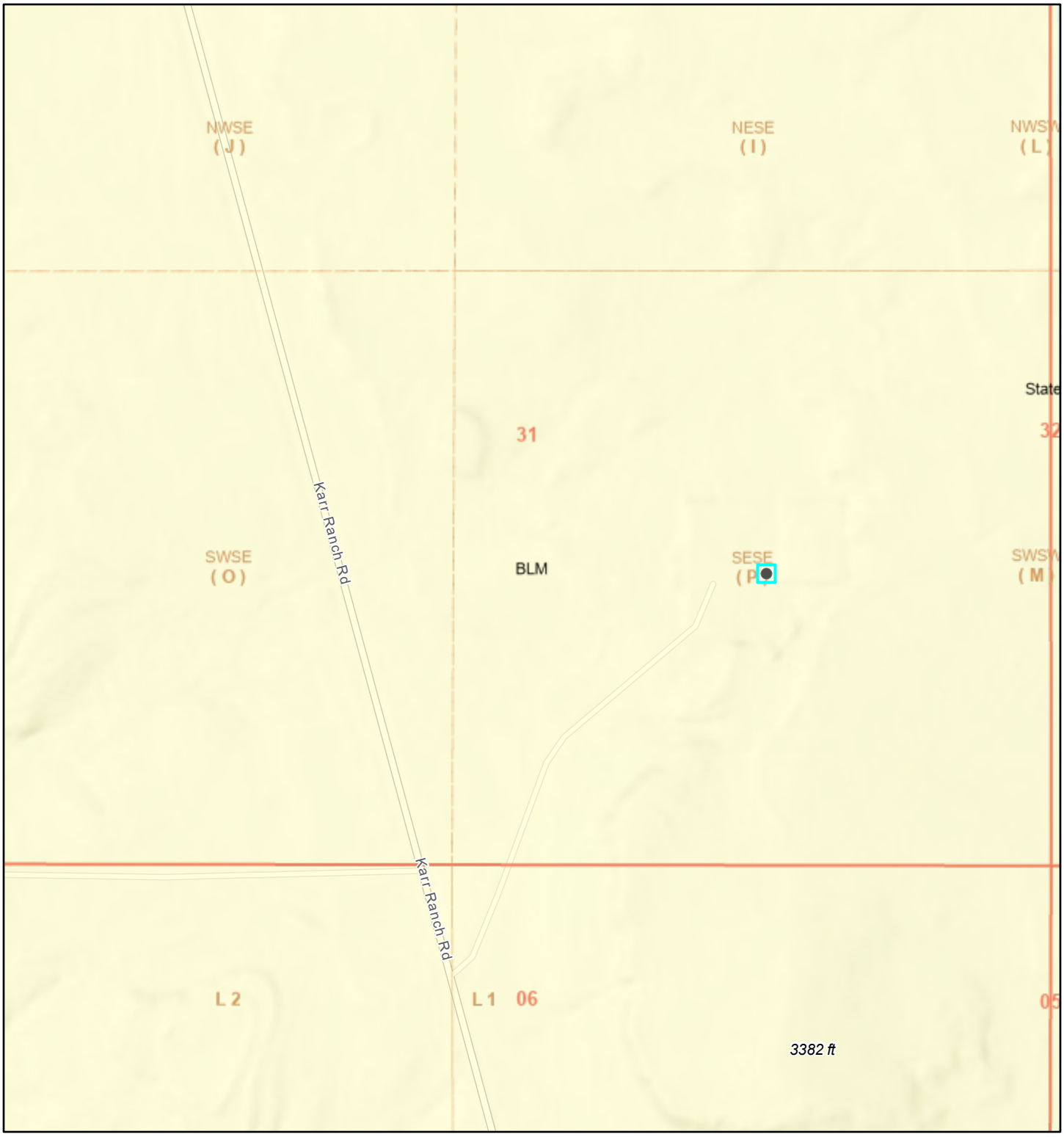
- SGF
- SP
- PLSS Townships

U.S. BLM, Esri, NASA, NGA, USGS, New Mexico State University, Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, BLM

EMNRD MMD GIS Coordinator

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

Riverside 31 Fed Com #001 Mines



10/23/2023, 4:19:24 PM

Land Ownership

BLM

S

PLSS Second Division

PLSS First Division

1:4,514

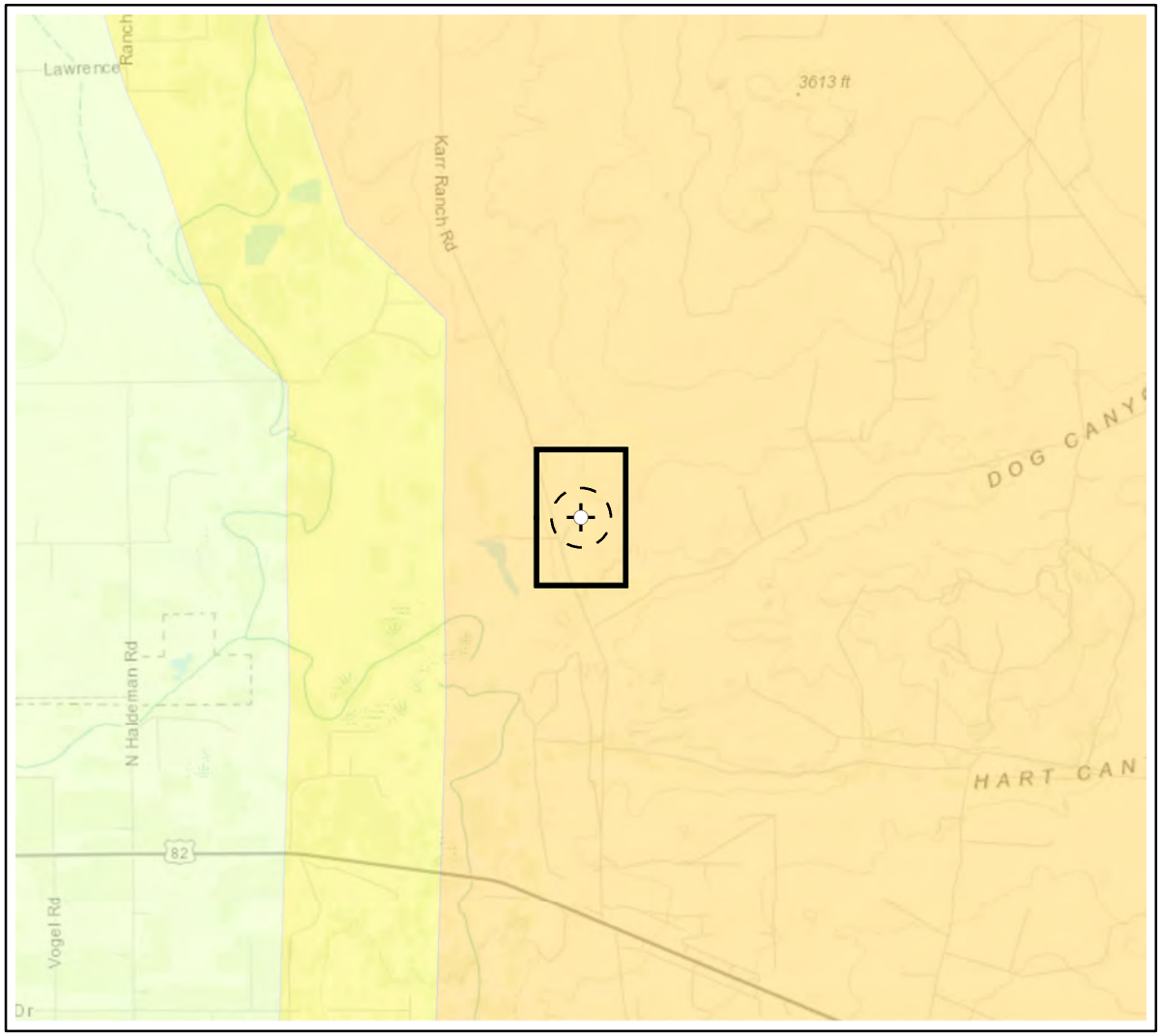
0 0.03 0.06 0.12 mi

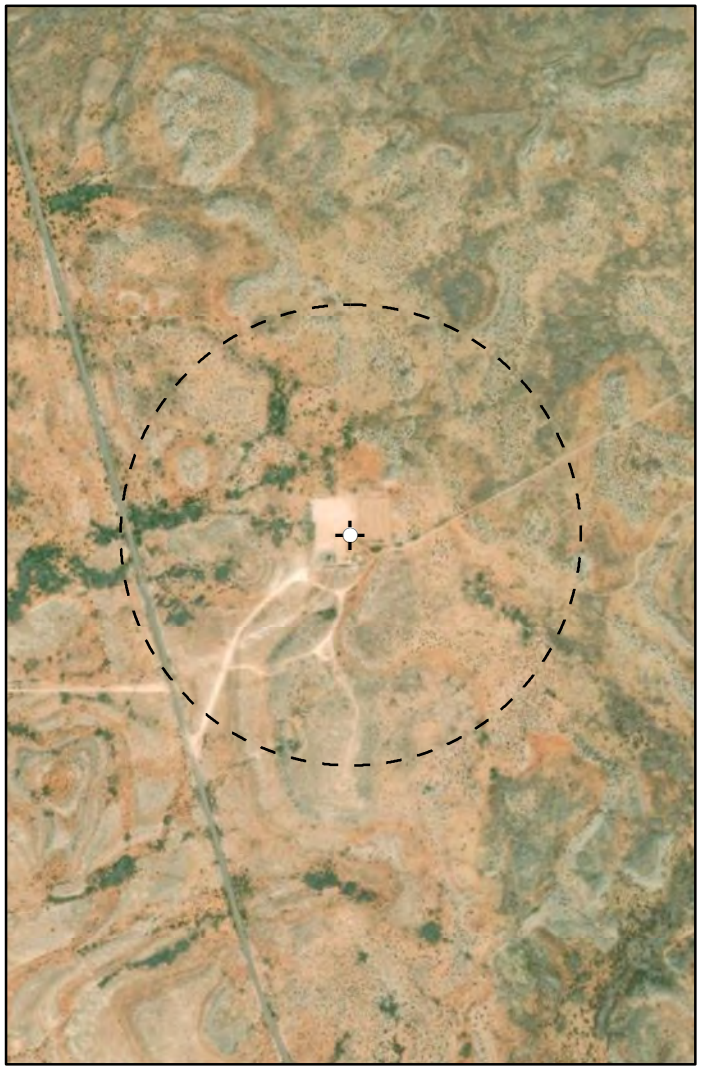
0 0.05 0.1 0.2 km

U.S. BLM, Esri Community Maps Contributors, New Mexico State University, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Sources: Esri, Airbus DS, USGS, NGA, NASA,

EMNRD MMD GIS Coordinator

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





Karst Potential

- Critical
- High
- Medium
- Low

Site Location

Buffer Location (1,000 ft.)

Overview Map

0 0.25 0.5 1 mi

Detail Map

0 150 300 600 ft

VERTEX

Map Center:
32.8736, -104.3115

NAD 1983 UTM Zone 13N
Date: Nov 21/23.

N

Karst Potential
Riverside 31 Fed Com 001

Figure:
X

MACK Energy Corporation

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

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

Document Path: D:\Vertex\GeoRequests\23E-04708 ID17432\KarstPotential_23E-04708.mxd

National Flood Hazard Layer FIRMette

FEMA

104°19'W 32°52'40"N

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

1:6,000

104°18'23"W 32°52'10"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, AR*
- Regulatory Floodway

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

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

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

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

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

N

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

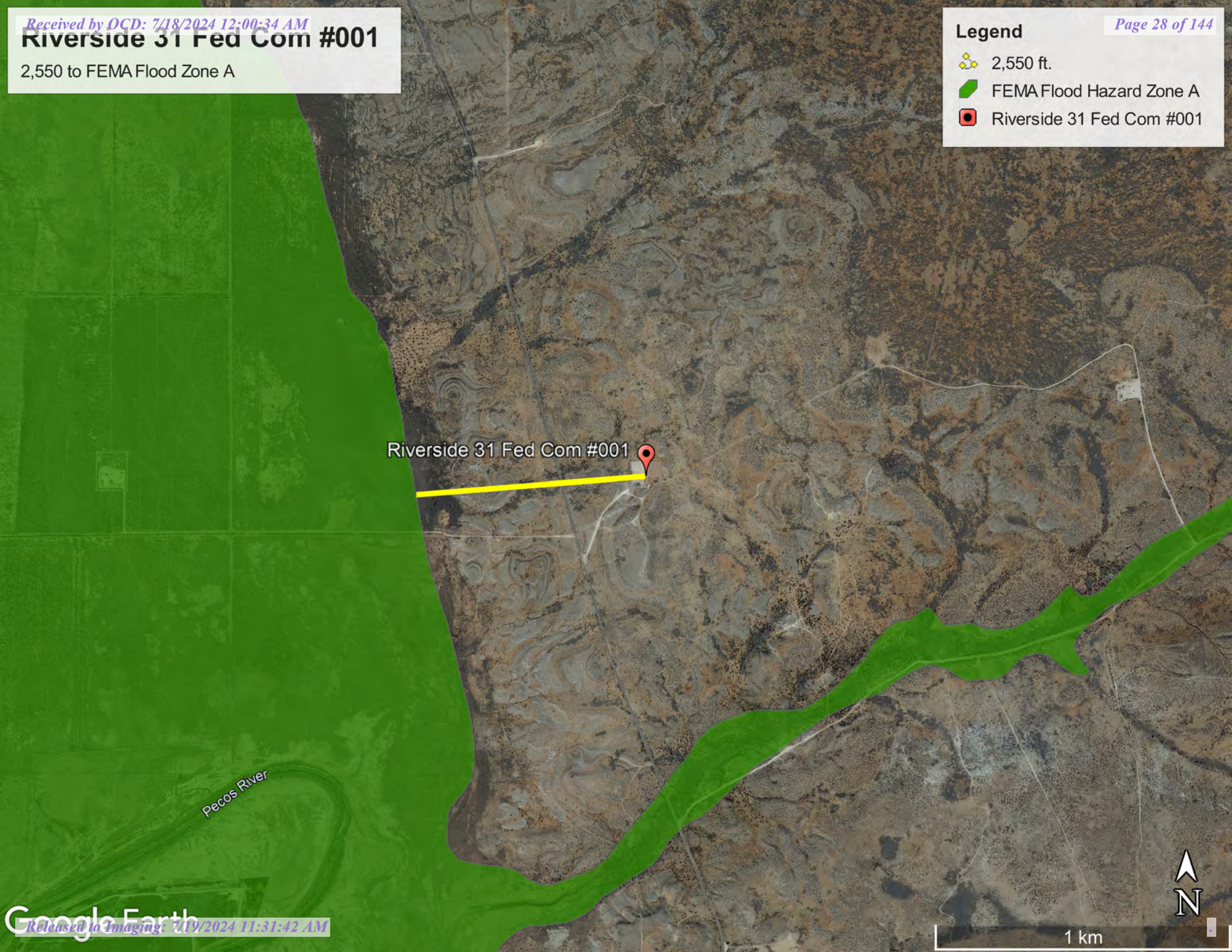
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/23/2023 at 6:25 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.

Riverside 31 Fed Com #001

2,550 to FEMA Flood Zone A



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

October 23, 2023

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 (Riverside 31 Fed Com #001)

Map Scale: 1:589 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 25 50 100 150

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Eddy Area, New Mexico
Survey Area Data: Version 19, Sep 7, 2023

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

Date(s) aerial images were photographed: Nov 12, 2022—Dec 2, 2022

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

Map Unit Legend (Riverside 31 Fed Com #001)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GC	Gypsum land-Cottonwood complex, 0 to 3 percent slopes	1.7	100.0%
Totals for Area of Interest		**1.7**	**100.0%**

Map Unit Descriptions (Riverside 31 Fed Com #001)

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Eddy Area, New Mexico

GC—Gypsum land-Cottonwood complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1w4g
Elevation: 1,250 to 5,000 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 66 degrees F
Frost-free period: 190 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Gypsum land: 60 percent
Cottonwood and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gypsum Land

Setting

Landform: Ridges, plains, hills
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, head slope, nose slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gypsum

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Cottonwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, head slope, nose slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gypsum

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 3 to 12 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 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 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R070BB006NM - Gyp Upland
Hydric soil rating: No

Minor Components

Cottonwood

Percent of map unit: 5 percent
Ecological site: R070BC033NM - Salty Bottomland
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

USDA Natural Resources Conservation Service

Ecological site R070BB006NM
Gyp Upland

Accessed: 10/23/2023

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on valley floors, plains, fan piedmonts, piedmont slopes or relic lakebeds on basins. The parent material consists of mixed alluvium and or eolian deposits derived from sedimentary rock or residuum weathered from gypsum. Slopes range from 0 to 35 percent and average less than 8 percent. The soil does not meet hydric critera, the calcium carbonate equivalent with in the control section is less than 20 percent and gypsum percent greater than 40 percent. Elevations range from 2,800 to 5,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Fan remnant (3) Basin-floor remnant
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	2,800–5,000 ft
Slope	0–35%
Aspect	Aspect is not a significant factor

Climatic features

The frost free season ranges from180 to 221 days between early April and late October. The optimum growing season of the major native warm season plants coincides with the summer rains during June, July, August, and September. However, plants can make some growth at any time during the frost free period when moisture is available and minimum daily temperatures stay above 51 degrees F.

Vegetation on this site will be limited to plants which can take advantage of moisture at the time it falls, since the

soil profiles have large amounts of available water for short periods of time and then rapidly dry. The majority of precipitation comes in the form of high intensity, short duration thunderstorms. Little or no available moisture can be stored in the soil profiles of this site. Strong winds from the southwest blow during January through June which accelerate soil drying within the plant root zone and further discourage cool season plant growth or occupancy of the site.

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 by water from wetlands or streams.

Soil features

Soils are shallow to moderately deep to gypsum material. Surface and subsurface textures range from loam, fine sandy loam or sandy loam. Substratum is a dense layers of soft or cemented gypsum material and gypsiferous earth at various depths. The gypsum materials commonly outcrop to the surface as inclusions of raw gypsumland which are void of vegetation and not part of the ecological site. In the lower part of the profile the semi indurated gypsum and caliche make up about 75 percent of the mass and are restrictive to root development. The plant, soil, air, water relationship is poor. The site has a droughty appearance because of the soils inability to support a dense stand of vegetation. If unprotected by plant cover or organic residue, the soil becomes easily wind blown and water eroded.

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

Characteristic Soils:
Holloman
Alamogordo
Aztec
Cottonwood
McCullough
Malargo
Reeves
Reflection
Yesum

Table 4. Representative soil features

Surface texture	(1) Gypsiferous fine sandy loam (2) Loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate

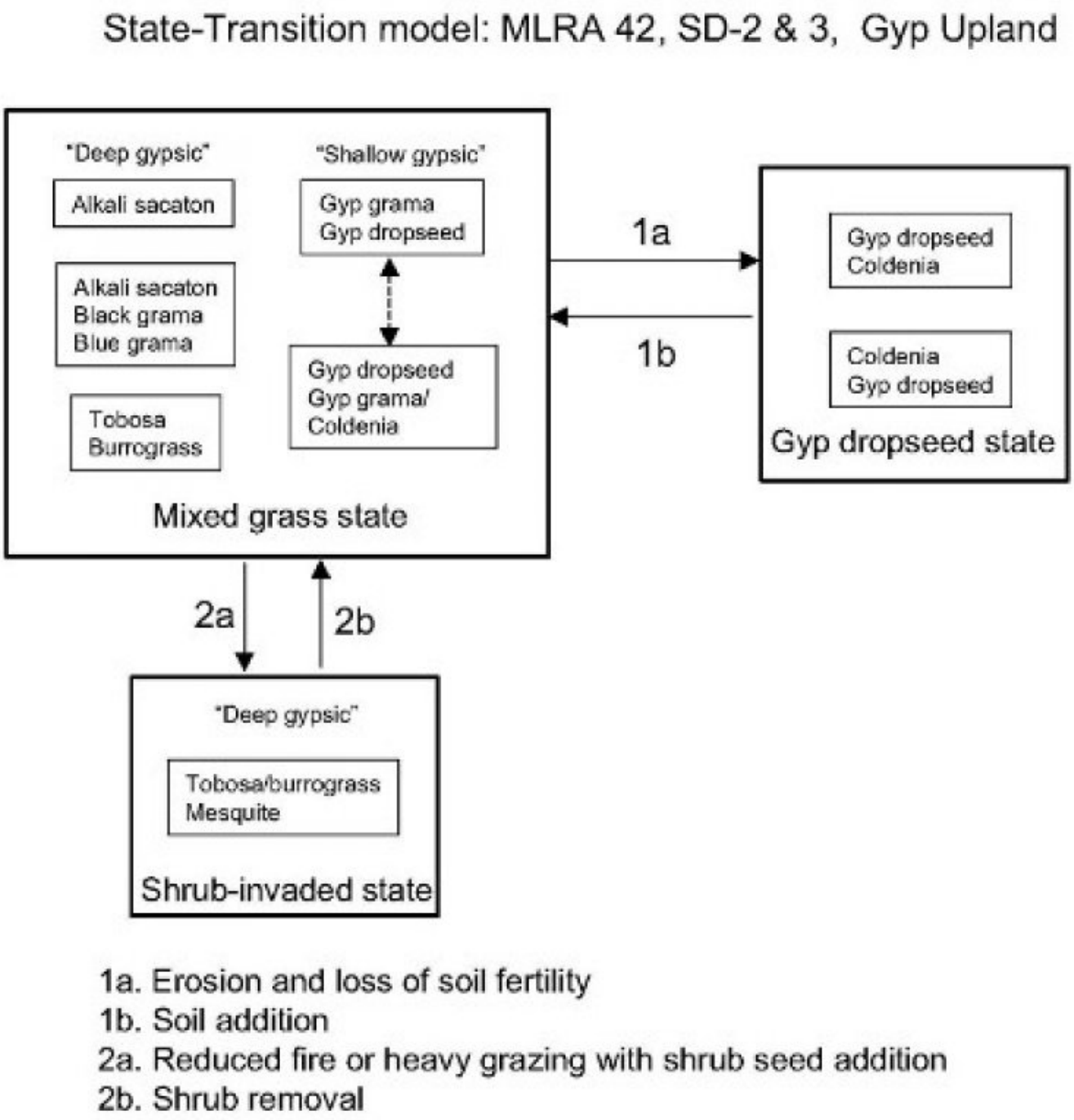
Soil depth	25–72 in
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	4–8 in
Calcium carbonate equivalent (0-40in)	5–30%
Electrical conductivity (0-40in)	2–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	7.4–8.6
Subsurface fragment volume <=3" (Depth not specified)	0–8%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Overview

The vegetation of this site often intergrades with that of Loamy sites, depending on the amounts of gypsum, soil texture, and depths of gypsic horizons. Low-lying areas where run-in water occurs behave like draws. Areas where gypsum outcrops are exposed harbor little vegetation. Gyp Uplands may intergrade with the Salt Flats site depending on salinity levels. Thus, the vegetation of this site is very patchy, variable, and difficult to characterize. The historic plant community types that are likely to be associated with the gyp uplands site include 1) an alkali sacaton (*Sporobolus airoides*) and black grama (*Bouteloua eriopoda*) or blue grama (*B. gracilis*)-dominated community associated with soils having relatively deep (> 10 “) gypsic horizons and 2) a gyp grama (*Bouteloua breviseta*) and gyp dropseed (*Sporobolus nealleyi*)-dominated community on soils with shallow (< 10”) gypsic horizons. Tobosa (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), and/or saltbush (*Atriplex canescens*) may also dominate depending on texture, land-use history, or other features. The subshrub Coldenia (Coldenia spp) increasingly dominates sites with very shallow gypsic horizons as grasses decline. Gyp upland sites are susceptible to erosion when vegetation cover is reduced due to drought and overgrazing. Mesquite (*Prosopis glandulosa*) may invade soils with deeper gypsic horizons within the site that are dominated by tobosa or burrograss. Erosion of A horizons bring gypsic horizons closer to the surface and can shift community composition to dominance by gyp dropseed, coldenia, and bare soil.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed. Mixed grassland State: Alkali sacaton, black grama, and blue grama (only in SD-3) dominate soils that have relatively deep gypsic horizons that are deeper than 10" (e.g. Reeves series). Saltbush may be an abundant shrub. Alkali sacaton cover may be continuous in run-in settings surrounded by sparsely vegetated areas (alkali sacaton community). On fine-silty or fine loamy calcareous gypsid soils (e.g. Milner or Reeves series), tobosa or burrograss may be dominant. Dominance by burrograss or tobosa

might represent grazing-induced retrogression from an alkali sacaton-grama community type on these soils, but this has not been confirmed. In some cases, saltbush may be extremely dominant, (e.g. Malargo series) but it is not clear why. Gyp grama, black grama, and gyp dropseed dominate soils with shallow gypsic horizons and gyp dropseed, mormon tea (Ephedra spp.), and coldenia tend to dominate where the gypsic horizon is shallowest (< 3”). These communities exhibit low production, perhaps due to the comparatively shallow infiltration in gypsic soil and other chemical properties (Campbell and Campbell 1938). Outcrops of gypsum, often revealing a whitish floury mass at the surface, may be devoid of vegetation. Heavy grazing may reduce grama grasses and increase the dominance of gyp dropseed and coldenia, but it is important to recognize that these plants may dominate some patches without heavy grazing. Soil degradation due to surface compaction and reduced infiltration may be important on this site and result in reduced grass cover. Slight variations in the depth to the gypsic horizon, whether human induced or not, exert a powerful control on plant community composition. Where gypsic horizons are deep, soil texture or soil chemistry may govern composition. Diagnosis: Soils with deeper gypsic horizons should have continuous grass cover with a high representation of alkali sacaton and black grama. Shallower soils should have gyp grama and black grama but gyp outcrops will be dominated by gyp dropseeds or coldenia. Depending upon the depths to a gypsic horizon, large (< 1 m) bare patches may be common but they should not be common where the depth to gypsic horizon is greater than 5”. This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	300	470	640
Forb	45	71	96
Shrub/Vine	30	47	64
Total	**375**	**588**	**800**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	25%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	16%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	57%

Figure 5. Plant community growth curve (percent production by month). NM2806, R042XC006NM Gyp Upland HCPC. R042XC006NM Gyp Upland HCPC Warm Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

State 2
Transition to gyp dropseed

Community 2.1
Transition to gyp dropseed

Transition to gyp dropseed state (1a): Reduced grass cover caused by poor grazing management and/or drought may result in erosion of surface horizons. As the depth to the gypsic horizon decreases, plant communities will become increasingly dominated by gyp dropseed and/or coldenia. Mechanical disturbance of the soil surface and soil degradation may contribute to this effect. Key indicators of approach to transition: Increased bare ground, pedestalling, water flow patterns, blowouts, and eventually the loss of the A horizon.

State 3
Transition to shrub-invaded state

Community 3.1
Transition to shrub-invaded state

Transition to shrub-invaded state (2a): Reduced grass cover in deep gypsic soils may result in mesquite invasion. Key indicators of approach to transition: Increasing bare ground, presence of mesquite seedlings. Shrub-invaded: On deep gypsic soils and soils with less strong gypsic horizons (i.e. have a lower percentage of gypsum) within this site, mesquite may invade and cause some reduction in grass cover due to competition with grasses. These communities are dominated by tobosa or burrograss. Saltbush may also be an important component. It is not known if shrub presence and resulting erosion may result in the loss of dominant perennial grasses across broad areas on gypsic soils. As soil characteristics grade toward those of the loamy ecological site, widespread grass loss may be increasingly probable. Diagnosis: Moderate densities of mesquite, bare ground patches associated with mesquite patches.

State 4
Transition to mixed grassland (2b)

Community 4.1
Transition to mixed grassland (2b)

Transition to mixed grassland (2b): Shrub removal may result in the eventual recovery of perennial grasses. Gyp dropseed: These communities are dominated by gyp dropseed or coldenia, and often exhibit high amounts of bare ground and exposed gypsum at the surface. Gyp grama, black grama, and alkali sacaton may persist in small patches, especially in low-lying spots receiving run-in water and/or in which soils are protected from erosion. The frequency with which these community types represent degradation from mixed grassland due to poor management versus “natural” is unknown. The conditions under which gyp dropseed and coldenia dominate are unknown. Diagnosis: Dominance by gyp dropseed or coldenia, high amounts of bare ground, sometimes associated with a high cover of microbiotic crusts.

State 5
Transition to mixed grassland (1b)

Community 5.1
Transition to mixed grassland (1b)

Transition to mixed grassland (1b): Restoration or recovery of a non-gypsic A horizon would be required. Information sources and theoretical background: Communities, states, and transitions are based upon information in the ecological site description and observations by Brandon Bestelmeyer, Jornada Experimental Range and David Trujillo, NRCS. Information on the the role of gypsum in concert with soil chemical features in determining plant composition is sorely needed.

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**			266–323	
	alkali sacaton	SPAI	*Sporobolus airoides*	266–323	–
2	**Warm Season**			29–88	
	black grama	BOER4	*Bouteloua eriopoda*	29–88	–
3	**Warm Season**			6–59	
	gypsum grama	BOBR	*Bouteloua breviseta*	6–59	–
4	**Warm Season**			18–88	
	bush muhly	MUPO2	*Muhlenbergia porteri*	18–88	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	18–88	–
5	**Warm Season**			6–18	
	gyp dropseed	SPNE	*Sporobolus nealleyi*	6–18	–
6	**Warm Season**			6–18	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6–18	–
7	**Warm Season**			6–18	
	blue grama	BOGR2	*Bouteloua gracilis*	6–18	–
8	**Warm Season**			18–88	
	threeawn	ARIST	*Aristida*	18–88	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	18–88	–
	ear muhly	MUAR	*Muhlenbergia arenacea*	18–88	–
Shrub/Vine					
9	**Shrub**			18–41	
	fourwing saltbush	ATCA2	*Atriplex canescens*	18–41	–
	jointfir	EPHED	*Ephedra*	18–41	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	18–41	–
10	**Shrub**			6–18	
	javelina bush	COER5	*Condalia ericoides*	6–18	–
	knifeleaf condalia	COSP3	*Condalia spathulata*	6–18	–
	crown of thorns	KOSP	*Koeberlinia spinosa*	6–18	–
11	**Cactus**			6–18	
	pricklypear	OPUNT	*Opuntia*	6–18	–
	yucca	YUCCA	*Yucca*	6–18	–
Forb					
12	**Forb**			29–59	
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	29–59	–
13	**Forb**			6–88	
	Forb, annual	2FA	*Forb, annual*	6–88	–
	trailing windmills	ALIN	*Allionia incarnata*	6–88	–
	daisy	CHRYS2	*Chrysanthemum*	6–88	–
	golden tickseed	COTI3	*Coreopsis tinctoria*	6–88	–
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	6–88	–
	Seven River Hills buckwheat	ERGY	*Eriogonum gypsophilum*	6–88	–

	blazingstar	MENTZ	*Mentzelia*	6–88	–
	fiddleleaf	NAMA4	*Nama*	6–88	–
	whitest evening primrose	OEAL	*Oenothera albicaulis*	6–88	–
	beardtongue	PENST	*Penstemon*	6–88	–
	Texan phacelia	PHINT	*Phacelia integrifolia var. texana*	6–88	–
	white milkwort	POAL4	*Polygala alba*	6–88	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	6–88	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	6–88	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	6–88	–
	Hopi tea greenthread	THME	*Thelesperma megapotamicum*	6–88	–

Animal community

This site provides habitats which support a resident animal community that is characterized by coyote, hooded skunk, desert cottontail, whitethroated woodrat, sparrow hawk, cactus wern, scaled quail, logggerhead shrike, mourning dove, and a number of ground nesting birds including, varied bunting, grasshopper sparrow, and Baird's sparrow Texas horned lizard, lesser earless lizard, and western diamondback rattlesnake.

Fourwing saltbush, littleleaf sumac, spiny allthorn, common javilinabush, and knifeleaf condalia provide protective cover for scaled quail. Seed, green herbage and fruit from a variety of grasses, forbs and shrubs provide food for a number of birds and mamals, including scaled and Gambel’s quail, mourning dove and prairie dogs. The fruit of tesajo cactus is relished by quail.

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
Cottonwood C
Holloman C
Yesum B
Alamogordo B
Aztec C
Malargo B
Reeves C
Reflection B

Recreational uses

This site offers recreation potential for hiking, horseback riding, rock, gem, and mineral collecting, nature observation and photography, and quail, dove, and predator hunting.
During years of abundant moisture, a colorful array of wildflowers can be observed from spring through fall.

Wood products

This site provides little or no wood products other than curiosities and small furniture which can be made from the roots and stems of mesquite where it has invaded the site. The woody pods of devils claw are also used in curiosities.

Other products

This site is suitable for grazing during all seasons of the year. Care must be taken to leave enough vegetation cover for soil protection during windy and rainy periods or severe soil erosion will result. About 300 pounds per acre of total vegetation and litter is minimal for soil protection. This site is best suited and most efficiently utilized by cattle. It can also be utilized by small numbers of goats and sheep in combination with cattle where control or protection from predators can be provided. Grazing management that results in a mosaic of use patterns provides diversity for wildlife.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM
100 - 76 5.5 – 8.0
75 – 51 7.5 – 11.0
50 – 26 11.0 – 15.0
25 – 0 25.0 +

Type locality

Location 1: Eddy County, NM	
Township/Range/Section	T26S R24E S27

Other references

Contributors

Don Sylvester
Dr. Brandon Bestelmeyer

Rangeland health reference sheet

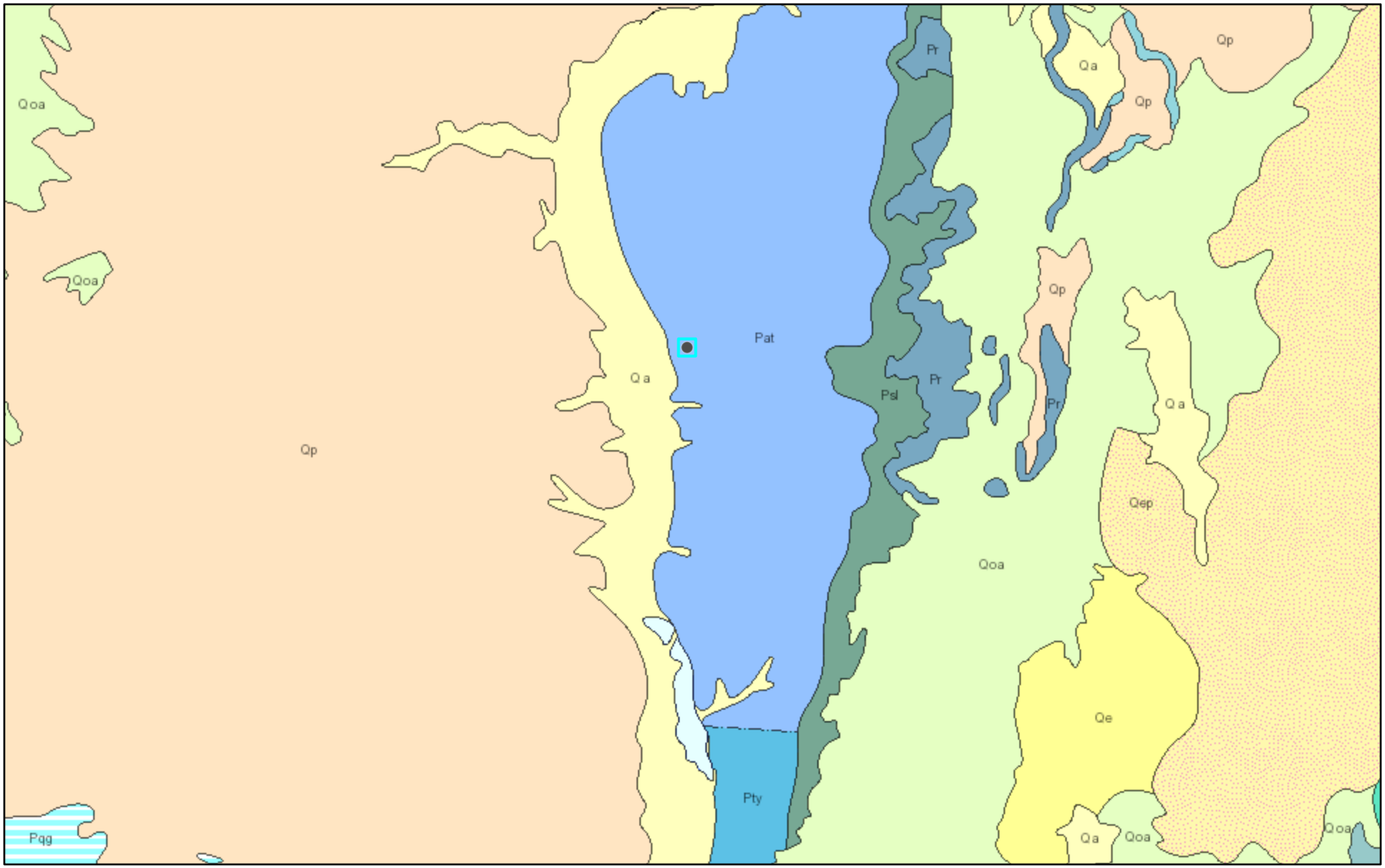
Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative 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:**

Riverside 31 Fed Com #001 Geology



10/23/2023, 6:00:08 PM

1:288,895

0 2 4 8 mi

0 3.25 6.5 13 km

Lithologic Units

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

Esri, NASA, NGA, USGS, NMBGMR, USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names

ArcGIS Web AppBuilder

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

APPENDIX B – Daily Field Reports

Daily Site Visit Report

Client:	Mack Energy Corporation	Inspection Date:	10/27/2023
Site Location Name:	Riverside 31 Fed Com #001	Report Run Date:	10/28/2023 12:58 AM
Client Contact Name:	Matt Buckles	API #:	30-015-31351
Client Contact Phone #:	575-748-1288		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times

Arrived at Site	10/27/2023 2:10 PM
Departed Site	10/27/2023 3:00 PM

Daily Site Visit Report

Site Sketch

Site Sketch

Daily Site Visit Report

Field Notes

14:21 On site, completed JSAs

Next Steps & Recommendations

1 Begin delineation

Daily Site Visit Report

Site Photos

Viewing Direction: West

Tank in lined containment

Viewing Direction: East

Equipment

Viewing Direction: Northeast

Meter run in shelter

Viewing Direction: Southeast

Tank in lined containment

Daily Site Visit Report

Viewing Direction: Northeast	**Viewing Direction**: South
	
Site	Well headed with processing equipment
Viewing Direction: East	**Viewing Direction**: North
	
South side of one call area	West side of one call area

Daily Site Visit Report

Viewing Direction: West

Northwest corner of one call area

Viewing Direction: West

North side of one call area

Viewing Direction: South

East side of one call area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Sally Carttar

Signature: 
Signature

Daily Site Visit Report

Client:	Mack Energy Corporation	Inspection Date:	12/9/2023
Site Location Name:	Riverside 31 Fed Com #001	Report Run Date:	12/10/2023 12:44 AM
Client Contact Name:	Matt Buckles	API #:	30-015-31351
Client Contact Phone #:	575-748-1288		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times

Arrived at Site	12/9/2023 8:13 AM
Departed Site	12/9/2023 4:18 PM

Field Notes

8:27 Conducted safety briefing with technicians on site.

11:43 Swept area with magnetic locator before proceeding with ground disturbance.

13:02 Collected boreholes BH23-02 through BH23-10 around point of release at 0', and 2' unless we hit refusal.

16:10 BH23-03 and BH23-05 collected at 0' and 1' due to refusal. We hit refusal at .5' for BH23-09, therefore only collected at 0'.

16:09 Screened all samples for TPH and titrated for CL. All were jarred in accordance to chain of custody protocol for lab testing.

Next Steps & Recommendations

1

Daily Site Visit Report

Site Photos

Viewing Direction: South	**Viewing Direction**: West
	
Location of borehole BH23-02 north from point of release.	Location of BH23-03. East from point of release.
Viewing Direction: West	**Viewing Direction**: Northwest
	
BH23-08 SE of point of release.	BH23-04 south of point of release.

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: East
	
BH23-07 south west of point of release.	BH23-05 west of point of release.
Viewing Direction: East	**Viewing Direction**: East
	
BH23-10 south west from point of release.	BH23-06 south from point of release.

Daily Site Visit Report

Viewing Direction: Northwest

BH23-09 south west from point of release.

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Brenda Almanza

Signature: Brenda Almanza
Signature

Daily Site Visit Report

Client:	Mack Energy Corporation	Inspection Date:	6/3/2024
Site Location Name:	Riverside 31 Fed Com #001	Report Run Date:	6/3/2024 10:08 PM
Client Contact Name:	Matt Buckles	API #:	30-015-31351
Client Contact Phone #:	575-748-1288		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times

Arrived at Site	6/3/2024 7:45 AM
Departed Site	6/3/2024 2:00 PM

Field Notes

12:47 Completed safety meeting with Bullseye equipment operator

12:48 Conducted pin finder sweep of dig area

12:48 On site with mechanical tools to get through rocky material and obtain chloride numbers for closure

12:51 Obtained:
BH23-04 @ 0, 1, 2 and 3’ depth.
BH23-05 @ 0, 1, 2 and 3’ depth.
BH23-06 @ 0, 1, 2, 3 and 3.5’ depth.
BH23-07 @ 0, 1 and 2’ depth.

12:52 All samples hit refusal at their bottom most depth.

13:09 ***Obtained and field screened separate ‘refusal’ depth samples in each borehole pit, that consist of more rocky material for proof of refusal. These samples represented with “R” after the depth to differentiate from others.

12:54 Pad is built into side of hill with a very shallow gypsum bedrock.

12:54 Surrounding landscape shows very large rocks (5-10’ diameter) that are pushed to side from when construction of site took place.

13:10 Only tested for chlorides per project manager instruction.

Daily Site Visit Report

Next Steps & Recommendations

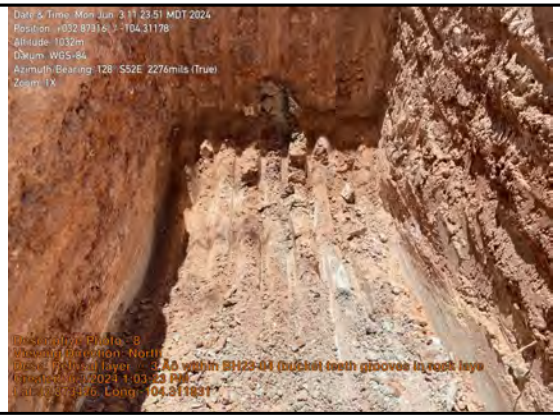
1 Send samples to lab.

Daily Site Visit Report

Site Photos

Viewing Direction: Northeast	**Viewing Direction**: Northeast
	
BH23-04 immediately south of battery	BH23-06 immediately south of BH23-04.
Viewing Direction: East	**Viewing Direction**: East
	
BH23-07 immediately west of BH23-04	BH23-05 immediately west of battery.

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: North
	
Refusal depth @ 3’ within BH23-05 (bucket teeth grooves in rock layer)	Refusal depth layer @ 2’ within BH23-07 (bucket teeth grooves in rock layer)
Viewing Direction: North	**Viewing Direction**: North
	
Refusal layer @ 3’ within BH23-06 (bucket teeth grooves in rock layer)	Refusal layer @ 3’ within BH23-04 (bucket teeth grooves in rock layer)

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: North
	
BH23-05 rock layer sample	BH23-05 rock layer sample
Viewing Direction: North	**Viewing Direction**: North
	
BH23-07 rock layer sample	BH23-07 rock layer sample

Daily Site Visit Report

Viewing Direction: North	**Viewing Direction**: North
	
BH23-06 rock layer sample	BH23-06 rock layer sample
Viewing Direction: North	**Viewing Direction**: North
	
BH23-04 rock layer sample	BH23-04 rock layer sample

Daily Site Visit Report

Viewing Direction: Southwest

Immediate surrounding landscape to Southwest

Viewing Direction: South

Immediate surrounding landscape to south

Viewing Direction: Southeast

Immediate surrounding landscape to southeast

Viewing Direction: Southwest

Rock chunk

Daily Site Visit Report

Viewing Direction: West

Everything backfilled day of

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Austin Harris

Signature: 
Signature

APPENDIX C – Laboratory Data Report and Chain of Custody Forms

eurofins | Environment Testing

Eurofins Environment Testing South Central, LLC
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

January 03, 2024

Michael Moffitt

Vertex Resources Services, Inc.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Riverside 31 Fed Com 001 OrderNo.: 2312631

Dear Michael Moffitt:

Eurofins Environment Testing South Central, LLC received 17 sample(s) on 12/12/2023 for the analyses presented in the following report.

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

Please do not hesitate to contact Eurofins Albuquerque for any additional information or clarifications.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-02 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 9:00:00 AM
Lab ID: 2312631-001 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/16/2023 5:37:51 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/16/2023 5:37:51 AM
Surr: DNOP	86.4	69-147		%Rec	1	12/16/2023 5:37:51 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/16/2023 7:22:29 PM
Surr: BFB	94.6	15-244		%Rec	1	12/16/2023 7:22:29 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/16/2023 7:22:29 PM
Toluene	ND	0.047		mg/Kg	1	12/16/2023 7:22:29 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/16/2023 7:22:29 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/16/2023 7:22:29 PM
Surr: 4-Bromofluorobenzene	95.7	39.1-146		%Rec	1	12/16/2023 7:22:29 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 8:42:13 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-02 2'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 9:25:00 AM
Lab ID: 2312631-002 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/16/2023 5:48:05 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/16/2023 5:48:05 AM
Surr: DNOP	92.1	69-147		%Rec	1	12/16/2023 5:48:05 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	12/16/2023 7:46:18 PM
Surr: BFB	93.6	15-244		%Rec	1	12/16/2023 7:46:18 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.023		mg/Kg	1	12/16/2023 7:46:18 PM
Toluene	ND	0.046		mg/Kg	1	12/16/2023 7:46:18 PM
Ethylbenzene	ND	0.046		mg/Kg	1	12/16/2023 7:46:18 PM
Xylenes, Total	ND	0.092		mg/Kg	1	12/16/2023 7:46:18 PM
Surr: 4-Bromofluorobenzene	95.7	39.1-146		%Rec	1	12/16/2023 7:46:18 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 9:27:41 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-03 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 9:35:00 AM
Lab ID: 2312631-003 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/16/2023 5:58:18 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/16/2023 5:58:18 AM
Surr: DNOP	88.3	69-147		%Rec	1	12/16/2023 5:58:18 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	12/16/2023 8:10:21 PM
Surr: BFB	93.6	15-244		%Rec	1	12/16/2023 8:10:21 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.023		mg/Kg	1	12/16/2023 8:10:21 PM
Toluene	ND	0.046		mg/Kg	1	12/16/2023 8:10:21 PM
Ethylbenzene	ND	0.046		mg/Kg	1	12/16/2023 8:10:21 PM
Xylenes, Total	ND	0.091		mg/Kg	1	12/16/2023 8:10:21 PM
Surr: 4-Bromofluorobenzene	96.0	39.1-146		%Rec	1	12/16/2023 8:10:21 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 9:42:50 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-03 1'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 9:50:00 AM
Lab ID: 2312631-004 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/16/2023 6:08:32 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/16/2023 6:08:32 AM
Surr: DNOP	105	69-147		%Rec	1	12/16/2023 6:08:32 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/16/2023 8:34:15 PM
Surr: BFB	93.5	15-244		%Rec	1	12/16/2023 8:34:15 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/16/2023 8:34:15 PM
Toluene	ND	0.047		mg/Kg	1	12/16/2023 8:34:15 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/16/2023 8:34:15 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/16/2023 8:34:15 PM
Surr: 4-Bromofluorobenzene	94.9	39.1-146		%Rec	1	12/16/2023 8:34:15 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	12/16/2023 9:58:00 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.
Client Sample ID: BH23-04 0'
Project: Riverside 31 Fed Com 001
Collection Date: 12/9/2023 10:15:00 AM
Lab ID: 2312631-005 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	12/16/2023 6:18:48 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	12/16/2023 6:18:48 AM
Surr: DNOP	110	69-147		%Rec	1	12/16/2023 6:18:48 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/16/2023 8:58:06 PM
Surr: BFB	93.2	15-244		%Rec	1	12/16/2023 8:58:06 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/16/2023 8:58:06 PM
Toluene	ND	0.049		mg/Kg	1	12/16/2023 8:58:06 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/16/2023 8:58:06 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/16/2023 8:58:06 PM
Surr: 4-Bromofluorobenzene	94.3	39.1-146		%Rec	1	12/16/2023 8:58:06 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 10:43:26 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-04 2'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:05:00 AM
Lab ID: 2312631-006 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	12/16/2023 6:29:04 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	12/16/2023 6:29:04 AM
Surr: DNOP	104	69-147		%Rec	1	12/16/2023 6:29:04 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/16/2023 9:22:13 PM
Surr: BFB	92.7	15-244		%Rec	1	12/16/2023 9:22:13 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/16/2023 9:22:13 PM
Toluene	ND	0.049		mg/Kg	1	12/16/2023 9:22:13 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/16/2023 9:22:13 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/16/2023 9:22:13 PM
Surr: 4-Bromofluorobenzene	94.7	39.1-146		%Rec	1	12/16/2023 9:22:13 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 10:58:36 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.
Client Sample ID: BH23-05 0'
Project: Riverside 31 Fed Com 001
Collection Date: 12/9/2023 9:00:00 AM
Lab ID: 2312631-007 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	12/16/2023 6:39:20 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/16/2023 6:39:20 AM
Surr: DNOP	106	69-147		%Rec	1	12/16/2023 6:39:20 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/16/2023 9:46:19 PM
Surr: BFB	93.1	15-244		%Rec	1	12/16/2023 9:46:19 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/16/2023 9:46:19 PM
Toluene	ND	0.047		mg/Kg	1	12/16/2023 9:46:19 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/16/2023 9:46:19 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/16/2023 9:46:19 PM
Surr: 4-Bromofluorobenzene	95.9	39.1-146		%Rec	1	12/16/2023 9:46:19 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/16/2023 11:13:45 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.
Client Sample ID: BH23-05 1'
Project: Riverside 31 Fed Com 001
Collection Date: 12/9/2023 9:30:00 AM
Lab ID: 2312631-008 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	12/15/2023 10:21:40 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/15/2023 10:21:40 PM
Surr: DNOP	92.8	69-147		%Rec	1	12/15/2023 10:21:40 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/18/2023 1:30:25 PM
Surr: BFB	98.8	15-244		%Rec	1	12/18/2023 1:30:25 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 1:30:25 PM
Toluene	ND	0.048		mg/Kg	1	12/18/2023 1:30:25 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/18/2023 1:30:25 PM
Xylenes, Total	ND	0.097		mg/Kg	1	12/18/2023 1:30:25 PM
Surr: 4-Bromofluorobenzene	97.9	39.1-146		%Rec	1	12/18/2023 1:30:25 PM
EPA METHOD 300.0: ANIONS						Analyst: **RBC**
Chloride	ND	60		mg/Kg	20	12/18/2023 7:23:54 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-06 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:15:00 AM
Lab ID: 2312631-009 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	12/15/2023 10:32:19 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/15/2023 10:32:19 PM
Surr: DNOP	90.3	69-147		%Rec	1	12/15/2023 10:32:19 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/18/2023 1:54:21 PM
Surr: BFB	97.4	15-244		%Rec	1	12/18/2023 1:54:21 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 1:54:21 PM
Toluene	ND	0.049		mg/Kg	1	12/18/2023 1:54:21 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/18/2023 1:54:21 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/18/2023 1:54:21 PM
Surr: 4-Bromofluorobenzene	98.1	39.1-146		%Rec	1	12/18/2023 1:54:21 PM
EPA METHOD 300.0: ANIONS						Analyst: **RBC**
Chloride	190	60		mg/Kg	20	12/18/2023 7:39:03 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-06 2'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:30:00 AM
Lab ID: 2312631-010 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	12/15/2023 10:42:58 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/15/2023 10:42:58 PM
Surr: DNOP	85.3	69-147		%Rec	1	12/15/2023 10:42:58 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/18/2023 2:18:20 PM
Surr: BFB	96.5	15-244		%Rec	1	12/18/2023 2:18:20 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.023		mg/Kg	1	12/18/2023 2:18:20 PM
Toluene	ND	0.047		mg/Kg	1	12/18/2023 2:18:20 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/18/2023 2:18:20 PM
Xylenes, Total	ND	0.094		mg/Kg	1	12/18/2023 2:18:20 PM
Surr: 4-Bromofluorobenzene	97.1	39.1-146		%Rec	1	12/18/2023 2:18:20 PM
EPA METHOD 300.0: ANIONS						Analyst: **RBC**
Chloride	260	60		mg/Kg	20	12/18/2023 7:54:13 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-07 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 9:40:00 AM
Lab ID: 2312631-011 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/15/2023 10:53:35 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/15/2023 10:53:35 PM
Surr: DNOP	89.5	69-147		%Rec	1	12/15/2023 10:53:35 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/18/2023 2:42:17 PM
Surr: BFB	100	15-244		%Rec	1	12/18/2023 2:42:17 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.025		mg/Kg	1	12/18/2023 2:42:17 PM
Toluene	ND	0.049		mg/Kg	1	12/18/2023 2:42:17 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/18/2023 2:42:17 PM
Xylenes, Total	ND	0.098		mg/Kg	1	12/18/2023 2:42:17 PM
Surr: 4-Bromofluorobenzene	100	39.1-146		%Rec	1	12/18/2023 2:42:17 PM
EPA METHOD 300.0: ANIONS						Analyst: **RBC**
Chloride	ND	60		mg/Kg	20	12/18/2023 8:09:23 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.
Client Sample ID: BH23-07 2'
Project: Riverside 31 Fed Com 001
Collection Date: 12/9/2023 10:10:00 AM
Lab ID: 2312631-012 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	12/15/2023 11:04:11 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/15/2023 11:04:11 PM
Surr: DNOP	84.6	69-147		%Rec	1	12/15/2023 11:04:11 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	12/18/2023 4:42:06 PM
Surr: BFB	94.5	15-244		%Rec	1	12/18/2023 4:42:06 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.025		mg/Kg	1	12/18/2023 4:42:06 PM
Toluene	ND	0.050		mg/Kg	1	12/18/2023 4:42:06 PM
Ethylbenzene	ND	0.050		mg/Kg	1	12/18/2023 4:42:06 PM
Xylenes, Total	ND	0.10		mg/Kg	1	12/18/2023 4:42:06 PM
Surr: 4-Bromofluorobenzene	96.1	39.1-146		%Rec	1	12/18/2023 4:42:06 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/18/2023 2:35:01 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.
Client Sample ID: BH23-08 0'
Project: Riverside 31 Fed Com 001
Collection Date: 12/9/2023 10:10:00 AM
Lab ID: 2312631-013 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/15/2023 11:14:45 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/15/2023 11:14:45 PM
Surr: DNOP	91.3	69-147		%Rec	1	12/15/2023 11:14:45 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/18/2023 5:05:55 PM
Surr: BFB	95.6	15-244		%Rec	1	12/18/2023 5:05:55 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 5:05:55 PM
Toluene	ND	0.048		mg/Kg	1	12/18/2023 5:05:55 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/18/2023 5:05:55 PM
Xylenes, Total	ND	0.097		mg/Kg	1	12/18/2023 5:05:55 PM
Surr: 4-Bromofluorobenzene	95.5	39.1-146		%Rec	1	12/18/2023 5:05:55 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/18/2023 3:12:15 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-08 1'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 10:50:00 AM
Lab ID: 2312631-014 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	12/15/2023 11:25:19 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/15/2023 11:25:19 PM
Surr: DNOP	89.6	69-147		%Rec	1	12/15/2023 11:25:19 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	12/18/2023 6:17:27 PM
Surr: BFB	88.0	15-244		%Rec	1	12/18/2023 6:17:27 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 6:17:27 PM
Toluene	ND	0.047		mg/Kg	1	12/18/2023 6:17:27 PM
Ethylbenzene	ND	0.047		mg/Kg	1	12/18/2023 6:17:27 PM
Xylenes, Total	ND	0.095		mg/Kg	1	12/18/2023 6:17:27 PM
Surr: 4-Bromofluorobenzene	89.1	39.1-146		%Rec	1	12/18/2023 6:17:27 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/18/2023 3:49:28 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-09 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:05:00 AM
Lab ID: 2312631-015 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.1		mg/Kg	1	12/15/2023 11:35:51 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	12/15/2023 11:35:51 PM
Surr: DNOP	90.3	69-147		%Rec	1	12/15/2023 11:35:51 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	12/18/2023 6:41:12 PM
Surr: BFB	92.0	15-244		%Rec	1	12/18/2023 6:41:12 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 6:41:12 PM
Toluene	ND	0.048		mg/Kg	1	12/18/2023 6:41:12 PM
Ethylbenzene	ND	0.048		mg/Kg	1	12/18/2023 6:41:12 PM
Xylenes, Total	ND	0.096		mg/Kg	1	12/18/2023 6:41:12 PM
Surr: 4-Bromofluorobenzene	91.9	39.1-146		%Rec	1	12/18/2023 6:41:12 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	12/18/2023 4:01:52 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-10 0'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:25:00 AM
Lab ID: 2312631-016 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	12/15/2023 11:46:23 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	12/15/2023 11:46:23 PM
Surr: DNOP	93.5	69-147		%Rec	1	12/15/2023 11:46:23 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	12/18/2023 7:04:56 PM
Surr: BFB	92.9	15-244		%Rec	1	12/18/2023 7:04:56 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.024		mg/Kg	1	12/18/2023 7:04:56 PM
Toluene	ND	0.049		mg/Kg	1	12/18/2023 7:04:56 PM
Ethylbenzene	ND	0.049		mg/Kg	1	12/18/2023 7:04:56 PM
Xylenes, Total	ND	0.097		mg/Kg	1	12/18/2023 7:04:56 PM
Surr: 4-Bromofluorobenzene	94.3	39.1-146		%Rec	1	12/18/2023 7:04:56 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	12/18/2023 4:39:06 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report
Lab Order **2312631**
Date Reported: **1/3/2024**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc. **Client Sample ID:** BH23-10 2'
Project: Riverside 31 Fed Com 001 **Collection Date:** 12/9/2023 11:40:00 AM
Lab ID: 2312631-017 **Matrix:** SOIL **Received Date:** 12/12/2023 7:25:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **PRD**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	12/15/2023 11:56:52 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	12/15/2023 11:56:52 PM
Surr: DNOP	86.1	69-147		%Rec	1	12/15/2023 11:56:52 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **JJP**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	12/18/2023 7:29:16 PM
Surr: BFB	93.1	15-244		%Rec	1	12/18/2023 7:29:16 PM
EPA METHOD 8021B: VOLATILES						Analyst: **JJP**
Benzene	ND	0.023		mg/Kg	1	12/18/2023 7:29:16 PM
Toluene	ND	0.046		mg/Kg	1	12/18/2023 7:29:16 PM
Ethylbenzene	ND	0.046		mg/Kg	1	12/18/2023 7:29:16 PM
Xylenes, Total	ND	0.092		mg/Kg	1	12/18/2023 7:29:16 PM
Surr: 4-Bromofluorobenzene	93.8	39.1-146		%Rec	1	12/18/2023 7:29:16 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	68	60		mg/Kg	20	12/18/2023 4:51:31 PM

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **LCS-79428** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **79428** RunNo: **101901**
Prep Date: **12/16/2023** Analysis Date: **12/16/2023** SeqNo: **3758054** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.9	90	110			

Sample ID: **MB-79428** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **79428** RunNo: **101901**
Prep Date: **12/16/2023** Analysis Date: **12/16/2023** SeqNo: **3758055** Units: **mg/Kg**

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

Sample ID: **MB-79462** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **79462** RunNo: **101929**
Prep Date: **12/18/2023** Analysis Date: **12/18/2023** SeqNo: **3759960** Units: **mg/Kg**

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

Sample ID: **LCS-79462** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **79462** RunNo: **101929**
Prep Date: **12/18/2023** Analysis Date: **12/18/2023** SeqNo: **3759961** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.8	90	110			

Sample ID: **MB-79454** SampType: **MBLK** TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS** Batch ID: **79454** RunNo: **101932**
Prep Date: **12/18/2023** Analysis Date: **12/18/2023** SeqNo: **3760123** Units: **mg/Kg**

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

Sample ID: **LCS-79454** SampType: **LCS** TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS** Batch ID: **79454** RunNo: **101932**
Prep Date: **12/18/2023** Analysis Date: **12/18/2023** SeqNo: **3760124** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.5	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.
B	Analyte detected in the associated Method Blank
E	Above Quantitation Range/Estimated Value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **2312631-007AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH23-05 0'**	Batch ID: **79419**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/16/2023**	SeqNo: **3756875** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	9.4	46.90	0	101	54.2	135			
Surr: DNOP	4.8		4.690		103	69	147			

Sample ID: **2312631-007AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **BH23-05 0'**	Batch ID: **79419**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/16/2023**	SeqNo: **3756876** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	9.6	47.89	0	91.9	54.2	135	7.66	29.2	
Surr: DNOP	4.4		4.789		90.9	69	147	0	0	

Sample ID: **LCS-79419**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **79419**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/16/2023**	SeqNo: **3756900** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	10	50.00	0	94.6	61.9	130			
Surr: DNOP	4.7		5.000		94.9	69	147			

Sample ID: **LCS-79420**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **79420**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/15/2023**	SeqNo: **3756901** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	10	50.00	0	97.0	61.9	130			
Surr: DNOP	5.0		5.000		99.8	69	147			

Sample ID: **MB-79419**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **79419**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/16/2023**	SeqNo: **3756903** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.6		10.00		86.1	69	147			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **MB-79420**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **79420**	RunNo: **101872**
Prep Date: **12/15/2023**	Analysis Date: **12/15/2023**	SeqNo: **3756904** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		113	69	147			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **lcs-79394**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **79394**	RunNo: **101869**
Prep Date: **12/14/2023**	Analysis Date: **12/16/2023**	SeqNo: **3757525** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	92.4	70	130			
Surr: BFB	2000		1000		204	15	244			

Sample ID: **mb-79394**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **79394**	RunNo: **101869**
Prep Date: **12/14/2023**	Analysis Date: **12/16/2023**	SeqNo: **3757527** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	950		1000		95.2	15	244			

Sample ID: **lcs-79400**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/18/2023**	SeqNo: **3759511** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	98.0	70	130			
Surr: BFB	2100		1000		206	15	244			

Sample ID: **mb-79400**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/18/2023**	SeqNo: **3759512** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		98.6	15	244			

Sample ID: **2312631-008ams**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BH23-05 1'**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/19/2023**	SeqNo: **3759514** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	4.9	24.30	0	96.1	70	130			
Surr: BFB	1900		971.8		200	15	244			

Sample ID: **2312631-008amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BH23-05 1'**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/19/2023**	SeqNo: **3759515** Units: **mg/Kg**

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.
B	Analyte detected in the associated Method Blank
E	Above Quantitation Range/Estimated Value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **2312631-008amsd**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **BH23-05 1'**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/19/2023**	SeqNo: **3759515** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	4.8	24.08	0	85.8	70	130	12.3	20	
Surr: BFB	1900		963.4		201	15	244	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.
B	Analyte detected in the associated Method Blank
E	Above Quantitation Range/Estimated Value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **LCS-79394**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **79394**	RunNo: **101869**
Prep Date: **12/14/2023**	Analysis Date: **12/16/2023**	SeqNo: **3757657** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.94	0.025	1.000	0	94.3	70	130			
Toluene	0.96	0.050	1.000	0	95.6	70	130			
Ethylbenzene	0.96	0.050	1.000	0	95.9	70	130			
Xylenes, Total	2.9	0.10	3.000	0	95.9	70	130			
Surr: 4-Bromofluorobenzene	0.99		1.000		98.8	39.1	146			

Sample ID: **mb-79394**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **79394**	RunNo: **101869**
Prep Date: **12/14/2023**	Analysis Date: **12/16/2023**	SeqNo: **3757659** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.97		1.000		97.1	39.1	146			

Sample ID: **LCS-79400**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/18/2023**	SeqNo: **3759538** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.96	0.025	1.000	0	95.9	70	130			
Toluene	0.97	0.050	1.000	0	96.6	70	130			
Ethylbenzene	0.98	0.050	1.000	0	97.9	70	130			
Xylenes, Total	2.9	0.10	3.000	0	98.3	70	130			
Surr: 4-Bromofluorobenzene	1.0		1.000		100	39.1	146			

Sample ID: **mb-79400**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **79400**	RunNo: **101914**
Prep Date: **12/14/2023**	Analysis Date: **12/18/2023**	SeqNo: **3759539** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.99		1.000		98.7	39.1	146			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2312631**

03-Jan-24

Client: Vertex Resources Services, Inc.

Project: Riverside 31 Fed Com 001

Sample ID: **2312631-009ams** SampType: **MS** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BH23-06 0'** Batch ID: **79400** RunNo: **101914**

Prep Date: **12/14/2023** Analysis Date: **12/19/2023** SeqNo: **3759542** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.024	0.9747	0	92.9	70	130			
Toluene	0.94	0.049	0.9747	0	96.7	70	130			
Ethylbenzene	0.97	0.049	0.9747	0	99.1	70	130			
Xylenes, Total	2.9	0.097	2.924	0	99.4	70	130			
Surr: 4-Bromofluorobenzene	0.95		0.9747		97.1	39.1	146			

Sample ID: **2312631-009amsd** SampType: **MSD** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **BH23-06 0'** Batch ID: **79400** RunNo: **101914**

Prep Date: **12/14/2023** Analysis Date: **12/19/2023** SeqNo: **3759543** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.92	0.024	0.9766	0	93.7	70	130	1.01	20	
Toluene	0.95	0.049	0.9766	0	97.3	70	130	0.752	20	
Ethylbenzene	0.97	0.049	0.9766	0	98.9	70	130	0.0473	20	
Xylenes, Total	2.9	0.098	2.930	0	99.3	70	130	0.0710	20	
Surr: 4-Bromofluorobenzene	0.95		0.9766		97.1	39.1	146	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of standard limits. If undiluted results may be estimated.
B	Analyte detected in the associated Method Blank
E	Above Quantitation Range/Estimated Value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

eurofins | Environment Testin

Eurofins Environment Testing South Central, LLC
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Vertex Resources | Work Order Number: 2312631 | RcptNo: 1

Received By: Juan Rojas 12/12/2023 7:25:00 AM

Completed By: Cheyenne Cason 12/12/2023 9:33:20 AM

Reviewed By: JR 12/12/23

Chain of Custody

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

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: JR 12/12/23

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.5	Good	Not Present	Morty		

Chain-of-Custody Record

Client: Vertex (Mack)

Mailing Address: On file

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☑ Rush 5 Day

Project Name: Riverside 31 Fed Com #001

Project #: 23E-04708

Project Manager: Michael Moffitt

Sampler: SPC BA

On Ice: ☑ Yes ☐ No

# of Coolers: 1 Yeti

Cooler Temp (including CF): 2.5-0=2.5 (°C)

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

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2312C31	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
12/9/23	0900	Soil	BH23-02 0'	4oz jar	ice	001	✓	✓					✓			
	0925		BH23-02 2'			002										
	0935		BH23-03 0'			003										
	0950		BH23-03 1'			004										
	1015		BH23-04 0'			005										
	1105		BH23-04 2'			006										
	0900		BH23-05 0'			007										
	0930		BH23-05 1'			008										
	1115		BH23-06 0'			009										
	1130		BH23-06 2'			010										
	0940		BH23-07 0'			011										
	1010		BH23-07 2'			012										

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
12/10/23	1455	Sally Carrillo				
12/11/23	1900				12/11/23	1030
				Courier	12/12/23	7:25

Remarks: page 1/2
Mack Energy Corporation
cc mmoffitt@vertex.ca, scarrillo@vertex.ca with Final

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

Chain-of-Custody Record

Client: Vertex (Mack)

Mailing Address: on file

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☑ Rush 5 Day

Project Name: Riverside 31 Fed Com #001

Project #: 23E-04708

Project Manager: Michael Moffitt

Sampler: SPC BA

On Ice: ☑ Yes ☐ No

# of Coolers: 1 Yoyi

Cooler Temp (including CF): 2.5-0=2.5 (°C)

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

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 7312631	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
12/9/23	1010	Soil	BH23-08 0'	4 oz jar	ice	~~013~~	✓	✓					✓			
	1050		BH23-08 1'			014										
	1105		BH23-09 0'			015										
	1125		BH23-10 0'			016										
	1140		BH23-10 2'			017										

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
12/10/23	1455	Stacy Carter				
12/11/23	900				12/11/23	1080
					12/12/23	7:25

Remarks: page 2/2
Mack Energy Corporation
cc mmoffitt@vertex.ca, scarthar@vertex.ca with Final

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

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Ms. Sally Carttar
Vertex
3101 Boyd Dr
Carlsbad, New Mexico 88220

Generated 6/17/2024 4:48:26 PM

JOB DESCRIPTION

Riverside 31 Fed Com #001

JOB NUMBER

885-5589-1

Eurofins Albuquerque
4901 Hawkins NE
Albuquerque NM 87109

See page two for job notes and contact information.

Eurofins Albuquerque

Job Notes

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing South Central, LLC Project Manager.

Authorization

Generated
6/17/2024 4:48:26 PM

Authorized for release by
Andy Freeman, Business Unit Manager
andy.freeman@et.eurofinsus.com
(505)345-3975

Client: Vertex
Project/Site: Riverside 31 Fed Com #001

Laboratory Job ID: 885-5589-1

Table of Contents

Definitions/Glossary

Client: Vertex Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

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 Job ID: 885-5589-1
Project: Riverside 31 Fed Com #001

Job ID: 885-5589-1 Eurofins Albuquerque

Job Narrative
885-5589-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 6/5/2024 7:50 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 3.9°C.

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
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-04 0.0'
Lab Sample ID: 885-5589-1
Date Collected: 06/03/24 09:00
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 18:01	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-04 1.0'
Lab Sample ID: 885-5589-2
Date Collected: 06/03/24 09:10
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 18:38	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-04 2.0'
Lab Sample ID: 885-5589-3
Date Collected: 06/03/24 09:20
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 19:15	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-04 3.0'
Lab Sample ID: 885-5589-4
Date Collected: 06/03/24 09:30
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 19:27	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 0.0'
Lab Sample ID: 885-5589-5
Date Collected: 06/03/24 09:40
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 19:40	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 1.0'
Lab Sample ID: 885-5589-6
Date Collected: 06/03/24 09:50
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 19:52	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 2.0'
Lab Sample ID: 885-5589-7
Date Collected: 06/03/24 10:00
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 20:04	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 3.0'
Lab Sample ID: 885-5589-8
Date Collected: 06/03/24 10:10
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 20:17	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 0.0'
Lab Sample ID: 885-5589-9
Date Collected: 06/03/24 10:20
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	250		61		mg/Kg		06/05/24 15:17	06/05/24 20:29	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 1.0'
Lab Sample ID: 885-5589-10
Date Collected: 06/03/24 10:30
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	260		60		mg/Kg		06/05/24 15:17	06/05/24 20:41	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 2.0'
Lab Sample ID: 885-5589-11
Date Collected: 06/03/24 10:40
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	250		60		mg/Kg		06/05/24 15:17	06/05/24 20:54	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 3.0'
Lab Sample ID: 885-5589-12
Date Collected: 06/03/24 10:50
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	230		60		mg/Kg		06/05/24 15:17	06/05/24 21:06	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 3.5'
Lab Sample ID: 885-5589-13
Date Collected: 06/03/24 11:00
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130		61		mg/Kg		06/05/24 15:17	06/05/24 22:08	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-07 0.0'
Lab Sample ID: 885-5589-14
Date Collected: 06/03/24 11:10
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 22:20	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-07 1.0'
Lab Sample ID: 885-5589-15
Date Collected: 06/03/24 11:20
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 22:32	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-07 2.0'
Lab Sample ID: 885-5589-16
Date Collected: 06/03/24 11:30
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 22:45	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-04 3.0R'
Lab Sample ID: 885-5589-17
Date Collected: 06/03/24 11:40
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 22:57	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 3.0R'
Lab Sample ID: 885-5589-18
Date Collected: 06/03/24 11:50
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 23:09	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 3.5R'
Lab Sample ID: 885-5589-19
Date Collected: 06/03/24 12:00
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	120		60		mg/Kg		06/05/24 15:17	06/05/24 23:22	20

Client Sample Results

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-07 2.0R'
Lab Sample ID: 885-5589-20
Date Collected: 06/03/24 12:10
Matrix: Solid
Date Received: 06/05/24 07:50

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		60		mg/Kg		06/05/24 15:17	06/05/24 23:34	20

QC Sample Results

Client: Vertex
Project/Site: Riverside 31 Fed Com #001

Job ID: 885-5589-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 885-6179/1-A
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 6179

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5		mg/Kg		06/05/24 15:17	06/05/24 16:57	1

Lab Sample ID: LCS 885-6179/2-A
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 6179

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			15.0	14.2		mg/Kg		94	90 - 110		

Lab Sample ID: 885-5589-1 MS
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: BH23-04 0.0'
Prep Type: Total/NA
Prep Batch: 6179

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride	ND		30.2	ND		mg/Kg		NC	50 - 150		

Lab Sample ID: 885-5589-1 MSD
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: BH23-04 0.0'
Prep Type: Total/NA
Prep Batch: 6179

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	ND		30.1	ND		mg/Kg		NC	50 - 150	NC	20

Lab Sample ID: 885-5589-11 MS
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: BH23-06 2.0'
Prep Type: Total/NA
Prep Batch: 6179

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride	250		30.1	298	4	mg/Kg		177	50 - 150		

Lab Sample ID: 885-5589-11 MSD
Matrix: Solid
Analysis Batch: 6212

Client Sample ID: BH23-06 2.0'
Prep Type: Total/NA
Prep Batch: 6179

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250		30.1	280	4	mg/Kg		116	50 - 150	6	20

QC Association Summary

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

HPLC/IC

Prep Batch: 6179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-5589-1	BH23-04 0.0'	Total/NA	Solid	300_Prep	
885-5589-2	BH23-04 1.0'	Total/NA	Solid	300_Prep	
885-5589-3	BH23-04 2.0'	Total/NA	Solid	300_Prep	
885-5589-4	BH23-04 3.0'	Total/NA	Solid	300_Prep	
885-5589-5	BH23-05 0.0'	Total/NA	Solid	300_Prep	
885-5589-6	BH23-05 1.0'	Total/NA	Solid	300_Prep	
885-5589-7	BH23-05 2.0'	Total/NA	Solid	300_Prep	
885-5589-8	BH23-05 3.0'	Total/NA	Solid	300_Prep	
885-5589-9	BH23-06 0.0'	Total/NA	Solid	300_Prep	
885-5589-10	BH23-06 1.0'	Total/NA	Solid	300_Prep	
885-5589-11	BH23-06 2.0'	Total/NA	Solid	300_Prep	
885-5589-12	BH23-06 3.0'	Total/NA	Solid	300_Prep	
885-5589-13	BH23-06 3.5'	Total/NA	Solid	300_Prep	
885-5589-14	BH23-07 0.0'	Total/NA	Solid	300_Prep	
885-5589-15	BH23-07 1.0'	Total/NA	Solid	300_Prep	
885-5589-16	BH23-07 2.0'	Total/NA	Solid	300_Prep	
885-5589-17	BH23-04 3.0R'	Total/NA	Solid	300_Prep	
885-5589-18	BH23-05 3.0R'	Total/NA	Solid	300_Prep	
885-5589-19	BH23-06 3.5R'	Total/NA	Solid	300_Prep	
885-5589-20	BH23-07 2.0R'	Total/NA	Solid	300_Prep	
MB 885-6179/1-A	Method Blank	Total/NA	Solid	300_Prep	
LCS 885-6179/2-A	Lab Control Sample	Total/NA	Solid	300_Prep	
885-5589-1 MS	BH23-04 0.0'	Total/NA	Solid	300_Prep	
885-5589-1 MSD	BH23-04 0.0'	Total/NA	Solid	300_Prep	
885-5589-11 MS	BH23-06 2.0'	Total/NA	Solid	300_Prep	
885-5589-11 MSD	BH23-06 2.0'	Total/NA	Solid	300_Prep	

Analysis Batch: 6212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-5589-1	BH23-04 0.0'	Total/NA	Solid	300.0	6179
885-5589-2	BH23-04 1.0'	Total/NA	Solid	300.0	6179
885-5589-3	BH23-04 2.0'	Total/NA	Solid	300.0	6179
885-5589-4	BH23-04 3.0'	Total/NA	Solid	300.0	6179
885-5589-5	BH23-05 0.0'	Total/NA	Solid	300.0	6179
885-5589-6	BH23-05 1.0'	Total/NA	Solid	300.0	6179
885-5589-7	BH23-05 2.0'	Total/NA	Solid	300.0	6179
885-5589-8	BH23-05 3.0'	Total/NA	Solid	300.0	6179
885-5589-9	BH23-06 0.0'	Total/NA	Solid	300.0	6179
885-5589-10	BH23-06 1.0'	Total/NA	Solid	300.0	6179
885-5589-11	BH23-06 2.0'	Total/NA	Solid	300.0	6179
885-5589-12	BH23-06 3.0'	Total/NA	Solid	300.0	6179
885-5589-13	BH23-06 3.5'	Total/NA	Solid	300.0	6179
885-5589-14	BH23-07 0.0'	Total/NA	Solid	300.0	6179
885-5589-15	BH23-07 1.0'	Total/NA	Solid	300.0	6179
885-5589-16	BH23-07 2.0'	Total/NA	Solid	300.0	6179
885-5589-17	BH23-04 3.0R'	Total/NA	Solid	300.0	6179
885-5589-18	BH23-05 3.0R'	Total/NA	Solid	300.0	6179
885-5589-19	BH23-06 3.5R'	Total/NA	Solid	300.0	6179
885-5589-20	BH23-07 2.0R'	Total/NA	Solid	300.0	6179
MB 885-6179/1-A	Method Blank	Total/NA	Solid	300.0	6179
LCS 885-6179/2-A	Lab Control Sample	Total/NA	Solid	300.0	6179

QC Association Summary

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

HPLC/IC (Continued)

Analysis Batch: 6212 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
885-5589-1 MS	BH23-04 0.0'	Total/NA	Solid	300.0	6179
885-5589-1 MSD	BH23-04 0.0'	Total/NA	Solid	300.0	6179
885-5589-11 MS	BH23-06 2.0'	Total/NA	Solid	300.0	6179
885-5589-11 MSD	BH23-06 2.0'	Total/NA	Solid	300.0	6179

Lab Chronicle

Client: Vertex
Project/Site: Riverside 31 Fed Com #001

Job ID: 885-5589-1

Client Sample ID: BH23-04 0.0'
Lab Sample ID: 885-5589-1
Date Collected: 06/03/24 09:00
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 18:01

Client Sample ID: BH23-04 1.0'
Lab Sample ID: 885-5589-2
Date Collected: 06/03/24 09:10
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 18:38

Client Sample ID: BH23-04 2.0'
Lab Sample ID: 885-5589-3
Date Collected: 06/03/24 09:20
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 19:15

Client Sample ID: BH23-04 3.0'
Lab Sample ID: 885-5589-4
Date Collected: 06/03/24 09:30
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 19:27

Client Sample ID: BH23-05 0.0'
Lab Sample ID: 885-5589-5
Date Collected: 06/03/24 09:40
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 19:40

Client Sample ID: BH23-05 1.0'
Lab Sample ID: 885-5589-6
Date Collected: 06/03/24 09:50
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 19:52

Lab Chronicle

Client: Vertex Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-05 2.0' Lab Sample ID: 885-5589-7

Date Collected: 06/03/24 10:00 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 20:04

Client Sample ID: BH23-05 3.0' Lab Sample ID: 885-5589-8

Date Collected: 06/03/24 10:10 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 20:17

Client Sample ID: BH23-06 0.0' Lab Sample ID: 885-5589-9

Date Collected: 06/03/24 10:20 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 20:29

Client Sample ID: BH23-06 1.0' Lab Sample ID: 885-5589-10

Date Collected: 06/03/24 10:30 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 20:41

Client Sample ID: BH23-06 2.0' Lab Sample ID: 885-5589-11

Date Collected: 06/03/24 10:40 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 20:54

Client Sample ID: BH23-06 3.0' Lab Sample ID: 885-5589-12

Date Collected: 06/03/24 10:50 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 21:06

Lab Chronicle

Client: Vertex Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 3.5' Lab Sample ID: 885-5589-13

Date Collected: 06/03/24 11:00 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 22:08

Client Sample ID: BH23-07 0.0' Lab Sample ID: 885-5589-14

Date Collected: 06/03/24 11:10 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 22:20

Client Sample ID: BH23-07 1.0' Lab Sample ID: 885-5589-15

Date Collected: 06/03/24 11:20 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 22:32

Client Sample ID: BH23-07 2.0' Lab Sample ID: 885-5589-16

Date Collected: 06/03/24 11:30 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 22:45

Client Sample ID: BH23-04 3.0R' Lab Sample ID: 885-5589-17

Date Collected: 06/03/24 11:40 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 22:57

Client Sample ID: BH23-05 3.0R' Lab Sample ID: 885-5589-18

Date Collected: 06/03/24 11:50 **Matrix: Solid**
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 23:09

Lab Chronicle

Client: Vertex
Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Client Sample ID: BH23-06 3.5R'
Lab Sample ID: 885-5589-19
Date Collected: 06/03/24 12:00
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 23:22

Client Sample ID: BH23-07 2.0R'
Lab Sample ID: 885-5589-20
Date Collected: 06/03/24 12:10
Matrix: Solid
Date Received: 06/05/24 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	300_Prep			6179	SS	EET ALB	06/05/24 15:17
Total/NA	Analysis	300.0		20	6212	JT	EET ALB	06/05/24 23:34

Laboratory References:

EET ALB = Eurofins Albuquerque, 4901 Hawkins NE, Albuquerque, NM 87109, TEL (505)345-3975

Accreditation/Certification Summary

Client: Vertex Job ID: 885-5589-1
Project/Site: Riverside 31 Fed Com #001

Laboratory: Eurofins Albuquerque

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

Authority	Program	Identification Number	Expiration Date
New Mexico	State	NM9425, NM0901	02-26-25

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
300.0	300_Prep	Solid	Chloride

Oregon	NELAP	NM100001	02-26-25

Chain-of-Custody Record

Client: VERTEX

Bill to Mack c/o Matt Buckles

Mailing Address:

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5-DAY
☑ Standard ☑ Rush

Project Name: Riverside 31 Fed Com #001

Project #: 23E-04708

Project Manager: Sally Carthar

Sampler: MT

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 3.9 + 0 = 3.9 (°C)

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

88[illegible]-5589 COC

Analysis Request

Date	Time	Matrix	Sample Name		Container Type and #	Preservative Type	HEAL No.	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	(Cl, F, Br, NO_3, NO_2, PO_4, SO_4)	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
6-3-24	0900	Soil	BH23-04	0.0'	4oz	ICE	1							X			
	0910		BH23-04	1.0'			2										
	0920		BH23-04	2.0'			3										
	0930		BH23-04	3.0'			4										
	0940		BH23-05	0.0'			5										
	0950		BH23-05	1.0'			6										
	1000		BH23-05	2.0'			7										
	1010		BH23-05	3.0'			8										
	1020		BH23-06	0.0'			9										
	1030		BH23-06	1.0'			10										
	1040		BH23-06	2.0'			11										
	1050		BH23-06	3.0'			12										

Date	Time	Relinquished by.	Received by	Via	Date	Time
					6/4/24	830 1000
Date. 6/4/24	Time. 1900	Relinquished by	Received by	Via. courier	Date 6/5/24	Time 7:50

Remarks: API: 30-015-31351

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

Chain-of-Custody Record

Client: VERTEX

Bill to Mack c/o Matt Buckles

Mailing Address:

Phone #:

email or Fax#:

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

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5-DAY
☐ Standard ☐ Rush

Project Name: Riverside 31 Fed Com #001

Project #: 23E-04708

Project Manager: Sally Carttar

Sampler: MH

On Ice: ☑ Yes ☐ No Yoqi

# of Coolers: 1

Cooler Temp(Including CF): 3.9 ± 0 = 3.9 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
6/3/24	1100	Soil	BH23-06 3.5	402	ICE	13										
	1100		BH23-07 0.0			14										
	1120		BH23-07 1.0'			15										
	1130		BH23-07 2.0'			16										
	1140		BH23-04 3.0R			17										
	1150		BH23-05 3.0R			18										
	1200		BH23-06 3.5R			19										
	1210		BH23-07 2.0R			20										

Date	Time	Relinquished by	Received by.	Via	Date	Time
					6/4/24	830
6/4/24	1900			Courier	6/5/24	7.30

Remarks: API: 30-015-31351
* The "R" after the last four samples represents "re flag"

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

Login Sample Receipt Checklist

Client: Vertex Job Number: 885-5589-1

Login Number: 5589 **List Source: Eurofins Albuquerque**
List Number: 1
Creator: Casarrubias, Tracy

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.	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").	True	
TCEQ Mtd 1005 soil sample was frozen/delivered for prep within 48H of sampling.	N/A	

APPENDIX D – Correspondence and Sampling Notification

The Oil Conservation Division (OCD) has rejected the application, Application ID: 346642

OCDOnline@state.nm.us <OCDOnline@state.nm.us>

Thu 5/23/2024 3:35 PM

To:Sally Carttar <SCarttar@vertexresource.com>

To whom it may concern (c/o Sally Carttar for MACK ENERGY CORP),

The OCD has rejected the submitted *Application for administrative approval of a release notification and corrective action* (C-141), for incident ID (n#) nAB1520442349,
for the following reasons:

- **Remediation closure denied. This release is almost 9 years old and in an area of high karst so deeper delineation samples need to be collected. For the following sample points collect samples in 1 foot intervals down to 4 feet: BH23-04, BH23-05, BH23-06 and BH23-07. These samples may be tested for chlorides only. If these samples will be used for closure, a C-141N sampling notification should be submitted at least two business days prior to collection pursuant to 19.15.29.12(D)1(a) NMAC.**
- **Operator failed to provide proper Sampling Notification pursuant to 19.15.29.12.D.(1).(a) NMAC. Failure to provide proper sampling notice is a compliance issue and OCD may pursue compliance actions pursuant to 19.15.5 NMAC. Operator shall ensure future compliance with 19.15.29.12.D.(1).(a) NMAC**
- **Resubmit report to the OCD by 6/22/24.**

The rejected C-141 can be found in the OCD Online: Permitting - Action Status, under the Application ID: 346642.
Please review and make the required correction(s) prior to resubmitting.
If you have any questions why this application was rejected or believe it was rejected in error, please contact me prior to submitting an additional C-141.

Thank you,
Shelly Wells
Environmental Specialist-A
505-469-7520
Shelly.Wells@emnrd.nm.gov

New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

The Oil Conservation Division (OCD) has accepted the application, Application ID: 347882

OCDOnline@state.nm.us <OCDOnline@state.nm.us>
Fri 5/24/2024 5:23 PM
To:Sally Carttar <SCarttar@vertexresource.com>

To whom it may concern (c/o Sally Carttar for MACK ENERGY CORP),

The OCD has received the submitted *Notification for (Final) Sampling of a Release* (C-141N), for incident ID (n#) nAB1520442349.

The sampling event is expected to take place:

When: 06/03/2024 @ 08:00
Where: G-31-16S-27E Lot: P 660 FSL 660 FEL (32.8735733,-104.31147)

Additional Information: Sally Carttar 575-361-3561

Additional Instructions: Access from CR 200 Karr Ranch Rd

An OCD representative may be available onsite at the date and time reported. In the absence or presence of an OCD representative, sampling pursuant to 19.15.29.12.D NMAC is required. Sampling must be performed following an approved sampling plan or pursuant to 19.15.29.12.D.(1).(c) NMAC. Should there be a change in the scheduled date and time of the sampling event, then another notification should be resubmitted through OCD permitting as soon as possible.

- **Failure to notify the OCD of sampling events including any changes in date/time per the requirements of 19.15.29.12.D.(1).(a) NMAC, may result in the remediation closure samples not being accepted.**

If you have any questions regarding this application, or don't know why you have received this email, please contact us.

New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

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

QUESTIONS

Action 364387

QUESTIONS

Operator: MACK ENERGY CORP P.O. Box 960 Artesia, NM 882110960	OGRID: 13837
	Action Number: 364387
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Prerequisites	
Incident ID (n#)	**nAB1520442349**
Incident Name	**NAB1520442349 RIVERSIDE 31 FEDERAL COM #001 @ 30-015-31351**
Incident Type	**Produced Water Release**
Incident Status	**Remediation Closure Report Received**
Incident Well	**[30-015-31351] RIVERSIDE 31 FEDERAL COM #001**

Location of Release Source	
Please answer all the questions in this group.	
Site Name	RIVERSIDE 31 FEDERAL COM #001
Date Release Discovered	07/19/2015
Surface Owner	Federal

Incident Details	
Please answer all the questions in this group.	
Incident Type	Produced Water Release
Did this release result in a fire or is the result of a fire	No
Did this release result in any injuries	No
Has this release reached or does it have a reasonable probability of reaching a watercourse	No
Has this release endangered or does it have a reasonable probability of endangering public health	No
Has this release substantially damaged or will it substantially damage property or the environment	No
Is this release of a volume that is or may with reasonable probability be detrimental to fresh water	No

Nature and Volume of Release	
Material(s) released, please answer all that apply below. Any calculations or specific justifications for the volumes provided should be attached to the follow-up C-141 submission.	
Crude Oil Released (bbls) Details	*Not answered.*
Produced Water Released (bbls) Details	Cause: Lightning | Tank (Any) | Produced Water | Released: 4 BBL | Recovered: 0 BBL | Lost: 4 BBL.
Is the concentration of chloride in the produced water >10,000 mg/l	Yes
Condensate Released (bbls) Details	*Not answered.*
Natural Gas Vented (Mcf) Details	*Not answered.*
Natural Gas Flared (Mcf) Details	*Not answered.*
Other Released Details	*Not answered.*
Are there additional details for the questions above (i.e. any answer containing Other, Specify, Unknown, and/or Fire, or any negative lost amounts)	*Not answered.*

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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

QUESTIONS (continued)

Operator: MACK ENERGY CORP P.O. Box 960 Artesia, NM 882110960	OGRID: 13837
	Action Number: 364387
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Nature and Volume of Release (continued)	
Is this a gas only submission (i.e. only significant Mcf values reported)	**More info needed to determine if this will be treated as a "gas only" report.**
Was this a major release as defined by Subsection A of 19.15.29.7 NMAC	*Unavailable.*
Reasons why this would be considered a submission for a notification of a major release	*Unavailable.*
With the implementation of the 19.15.27 NMAC (05/25/2021), venting and/or flaring of natural gas (i.e. gas only) are to be submitted on the C-129 form.	

Initial Response	
The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury.	
The source of the release has been stopped	True
The impacted area has been secured to protect human health and the environment	True
Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices	False
All free liquids and recoverable materials have been removed and managed appropriately	True
If all the actions described above have not been undertaken, explain why	Release occurred outside of containment.
Per Paragraph (4) of Subsection B of 19.15.29.8 NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please prepare and attach a narrative of actions to date in the follow-up C-141 submission. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC), please prepare and attach all information needed for closure evaluation in the follow-up C-141 submission.	

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.

I hereby agree and sign off to the above statement	Name: Sally Carttar Title: Consultant Email: scarttar@vertex.ca Date: 07/17/2024

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
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Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

QUESTIONS (continued)

Operator: MACK ENERGY CORP P.O. Box 960 Artesia, NM 882110960	OGRID: 13837
	Action Number: 364387
	Action Type: [C-141] Remediation Closure Request C-141 (C-141-v-Closure)

QUESTIONS

Site Characterization	
Please answer all the questions in this group (only required when seeking remediation plan approval and beyond). 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 in feet below ground surface (ft bgs)	Between 26 and 50 (ft.)
What method was used to determine the depth to ground water	NM OSE iWaters Database Search
Did this release impact groundwater or surface water	No
What is the minimum distance, between the closest lateral extents of the release and the following surface areas:	
A continuously flowing watercourse or any other significant watercourse	Between ½ and 1 (mi.)
Any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)	Between ½ and 1 (mi.)
An occupied permanent residence, school, hospital, institution, or church	Between 1 and 5 (mi.)
A spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes	Between ½ and 1 (mi.)
Any other fresh water well or spring	Between ½ and 1 (mi.)
Incorporated municipal boundaries or a defined municipal fresh water well field	Between 1 and 5 (mi.)
A wetland	Between 1 and 5 (mi.)
A subsurface mine	Greater than 5 (mi.)
An (non-karst) unstable area	Zero feet, overlying, or within area
Categorize the risk of this well / site being in a karst geology	High
A 100-year floodplain	Between 1000 (ft.) and ½ (mi.)
Did the release impact areas not on an exploration, development, production, or storage site	Yes

Remediation Plan	
Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.	
Requesting a remediation plan approval with this submission	Yes
Attach a comprehensive report demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined, pursuant to 19.15.29.11 NMAC and 19.15.29.13 NMAC.	
Have the lateral and vertical extents of contamination been fully delineated	Yes
Was this release entirely contained within a lined containment area	No
Soil Contamination Sampling: (Provide the highest observable value for each, in milligrams per kilograms.)	
Chloride (EPA 300.0 or SM4500 Cl B)	565
TPH (GRO+DRO+MRO) (EPA SW-846 Method 8015M)	0
GRO+DRO (EPA SW-846 Method 8015M)	0
BTEX (EPA SW-846 Method 8021B or 8260B)	0
Benzene (EPA SW-846 Method 8021B or 8260B)	0
Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.	
On what estimated date will the remediation commence	12/09/2023
On what date will (or did) the final sampling or liner inspection occur	06/03/2024
On what date will (or was) the remediation complete(d)	06/03/2024
What is the estimated surface area (in square feet) that will be reclaimed	0
What is the estimated volume (in cubic yards) that will be reclaimed	0
What is the estimated surface area (in square feet) that will be remediated	0
What is the estimated volume (in cubic yards) that will be remediated	0
These estimated dates and measurements are recognized to be the best guess or calculation at the time of submission and may (be) change(d) over time as more remediation efforts are completed.	
The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.	

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QUESTIONS

Remediation Plan (continued)	
Please answer all the questions that apply or are indicated. This information must be provided to the appropriate district office no later than 90 days after the release discovery date.	
This remediation will (or is expected to) utilize the following processes to remediate / reduce contaminants:	
(Select all answers below that apply.)	
(Ex Situ) Excavation and **off-site** disposal (i.e. dig and haul, hydrovac, etc.)	*Not answered.*
(Ex Situ) Excavation and **on-site** remediation (i.e. On-Site Land Farms)	*Not answered.*
(In Situ) Soil Vapor Extraction	*Not answered.*
(In Situ) Chemical processing (i.e. Soil Shredding, Potassium Permanganate, etc.)	*Not answered.*
(In Situ) Biological processing (i.e. Microbes / Fertilizer, etc.)	*Not answered.*
(In Situ) Physical processing (i.e. Soil Washing, Gypsum, Disking, etc.)	*Not answered.*
Ground Water Abatement pursuant to 19.15.30 NMAC	*Not answered.*
OTHER (Non-listed remedial process)	Yes
Other Non-listed Remedial Process. Please specify	No remediation required
Per Subsection B of 19.15.29.11 NMAC unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.	

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.

I hereby agree and sign off to the above statement	Name: Sally Carttar Title: Consultant Email: scarttar@vertex.ca Date: 07/17/2024

The OCD recognizes that proposed remediation measures may have to be minimally adjusted in accordance with the physical realities encountered during remediation. If the responsible party has any need to significantly deviate from the remediation plan proposed, then it should consult with the division to determine if another remediation plan submission is required.

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QUESTIONS (continued)

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	Action Number: 364387
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QUESTIONS

Deferral Requests Only	
Only answer the questions in this group if seeking a deferral upon approval this submission. Each of the following items must be confirmed as part of any request for deferral of remediation.	
Requesting a deferral of the remediation closure due date with the approval of this submission	No

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QUESTIONS

Sampling Event Information	
Last sampling notification (C-141N) recorded	**347882**
Sampling date pursuant to Subparagraph (a) of Paragraph (1) of Subsection D of 19.15.29.12 NMAC	**06/03/2024**
What was the (estimated) number of samples that were to be gathered	**8**
What was the sampling surface area in square feet	**1000**

Remediation Closure Request	
Only answer the questions in this group if seeking remediation closure for this release because all remediation steps have been completed.	
Requesting a remediation closure approval with this submission	Yes
Have the lateral and vertical extents of contamination been fully delineated	**Yes**
Was this release entirely contained within a lined containment area	**No**
All areas reasonably needed for production or subsequent drilling operations have been stabilized, returned to the sites existing grade, and have a soil cover that prevents ponding of water, minimizing dust and erosion	Yes
What was the total surface area (in square feet) remediated	0
What was the total volume (cubic yards) remediated	0
All areas not reasonably needed for production or subsequent drilling operations have been reclaimed to contain a minimum of four feet of non-waste contain earthen material with concentrations less than 600 mg/kg chlorides, 100 mg/kg TPH, 50 mg/kg BTEX, and 10 mg/kg Benzene	Yes
What was the total surface area (in square feet) reclaimed	0
What was the total volume (in cubic yards) reclaimed	0
Summarize any additional remediation activities not included by answers (above)	No remediation required

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 (in .pdf format) 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.

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.

I hereby agree and sign off to the above statement	Name: Sally Carttar Title: Consultant Email: scarttar@vertex.ca Date: 07/17/2024

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QUESTIONS

Reclamation Report	
Only answer the questions in this group if all reclamation steps have been completed.	
Requesting a reclamation approval with this submission	No

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CONDITIONS

Action 364387

CONDITIONS

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CONDITIONS

Created By	Condition	Condition Date
scwells	Remediation closure approved for NAB1520442349. You will need to submit a report for nAB1520538047 separately.	7/19/2024