



Incident Number: nAPP2308529277

Release Assessment and Closure

Cave Lion Booster Pump

N, 05, Township 26 South, Range 35 East

County: Lea

Vertex File Number: 23E-01630

Prepared for:

Solaris Midstream Water Company, LLC

Prepared by:

Vertex Resource Services Inc.

Date:

June 2023

Solaris Midstream Water Company
Cave-Lion Booster Pump

Release Assessment and Closure
June 2023

Release Assessment and Closure
Cave Lion Booster Pump
N Section 05, Township 26 South, Range 35 East
County: Lea

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6/21/2023

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1.0 Introduction

Solaris Midstream Water Company (Solaris) retained Vertex Resource Services Inc. (Vertex) to conduct a release assessment and closure for a produced water release that was discovered on March 29, 2023, at Cave Lion Booster Pump (hereafter referred to as the "Cave Lion Booster"). Solaris submitted an initial C-141 Release Notification (Appendix A) to New Mexico Oil Conservation Division (NMOCD) District II on March 30, 2023. Incident ID number nAPP2308529277 was assigned to this incident.

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

2.0 Incident Description

The release was discovered on March 29, 2023, due to a failure of a 16-inch poly line elbow at the seam connecting to the booster pump. The incident was reported on March 30, 2023, and involved the release of approximately 40 barrels (bbl.) of produced water both on the pad site and off the pad site. Approximately 10 bbl. of free fluid was recovered during the initial clean-up. Additional details relevant to the release are presented in the C-141 Report. Daily Field Report (DFRs), Daily Soil Sampling Reports (DSSs), and site photographs are included in Appendix C.

3.0 Site Characteristics

The site is located approximately 10.12 miles west of Bennett, New Mexico. The legal location for the site is N Section 05, Township 26 South and Range 35 East in Lea County, New Mexico. The release area is located on Bureau of Land Management (BLM) property. An aerial photograph and site schematic are presented in 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 or in proximity to the constructed pad and pipeline right-of-way (Figure 1).

The surrounding landscape is associated with sand dunes and terraces with elevations ranging between 2842 and 4500 feet. The climate is semiarid with average annual precipitation totaling 13 inches. According to the United States Department of Agriculture, grasses with shrubs and half-shrubs 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 primarily comprises Qa – Alluvium from the Holocene to upper Pleistocene ages (New Mexico Bureau of Geology and Mineral Resources, 2023) and the soil at the site is characterized as Kermit-Palomas fine sands. (United States Department of Agriculture, Natural Resources Conservation Service, 2023). Additional soil

characteristics include a drainage class of well drained with a runoff class of low. The karst geology potential for the site is low (Geomatics) (United States Department of the Interior, Bureau of Land Management, 2018).

4.0 Closure Criteria Determination

The nearest active well to the site is a New Mexico Office of the State Engineer (NMOSE) monitoring well located approximately 102 feet north of the location (United States Geological Survey, 2023). Data from 2022 shows the NMOSE borehole was dry at a depth of 100.8 feet bgs. Information pertaining to the depth to groundwater determination is included in Appendix B.

There is no surface water present at the site. The nearest significant watercourse, as defined in Subsection P of 19.15.17.7 NMAC, is a riverine (National Wetlands Inventory) located approximately 2796ft North 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.

Table 1. Closure Criteria Worksheet			
Site Name: Cave Lion Booster			
Spill Coordinates: 32.065421, -103.392744		X: 32.065421	Y: -103.392744
Table 1. Closure Criteria Determination			
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	>100	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	2,796	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	18,742	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	33,845	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	11,923	feet
	ii) Within 1000 feet of any fresh water well or spring	No	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	14,492	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Low	
10	Within a 100-year Floodplain	No	year
11	Soil Type	Kermit-Palomas fine sands/Pyote and Maljamar fine sands	
12	Ecological Classification	Deep sand, loamy sand	
13	Geology	Eolian and piedmont deposits	
NMAC 19.15.29.12 E (Table 1) Closure Criteria		>100'	

The closure criteria determined for the site are associated with the following constituent concentration limits as presented in Table 2.

Minimum depth below any point within the horizontal boundary of the release to groundwater less than 10,000 mg/l TDS	Constituent	Limit
> 100 feet	Chloride	20,000 mg/kg
	TPH (GRO+DRO+MRO)	2,500 mg/kg
	GRO+DRO	1,000 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 April 3, 2023. This initial inspection identified the area of the release specified in the initial C-141 Report and estimated the approximate volume of the release. Samples were collected down to 4 feet bgs for vertical delineation below NMOCD's >100 feet closure criteria. The impacted area was determined to be approximately 154 feet long and 185 feet wide; the total affected area is 10,077 square feet. The DFR associated with the site inspection is included in Appendix C.

Remediation efforts began on April 3, 2023, and were finalized on May 24, 2023. Vertex personnel supervised the excavation of impacted soils. Initial field screening was completed on a total of 36 sample points and consisted of analysis using a Photo Ionization Detector (volatile hydrocarbons), Dextsil Petroflag using EPA SW-846 Method 9074 (extractable hydrocarbons) and Quantabs (chlorides). Field screening results were used to identify areas requiring further remediation. Soils were removed to a depth of 1 to 4 feet bgs. Impacted soil was transported by a licensed waste hauler and disposed of at an approved waste management facility. Field screening results and DFRs documenting various phases of the remediation are presented in Appendix C.

Notification that confirmatory sampling was being conducted was provided to the NMOCD on April 27, 2023, and is included in Appendix D. Confirmatory composite samples were collected from the base and walls of the excavation in 200-square-foot increments. A total of 40 Base samples and 10 Wall samples were collected for laboratory analysis following NMOCD soil sampling procedures. Samples were submitted to Eurofins Xenco under chain-of-custody protocols and analyzed for BTEX (EPA Method 8021B), total petroleum hydrocarbons (GRO, DRO, MRO – EPA Method 8015D), and total chlorides (EPA Method 300.0). Laboratory results are presented in Table 3, and the laboratory data reports are included in Appendix E. All confirmatory samples collected and analyzed were below the closure criteria for the site.

6.0 Closure Request

The release area was fully delineated, remediated, and backfilled with non-waste-containing, uncontaminated, earthen material, sourced locally, and placed to meet the site's existing grade to prevent water ponding and erosion. Laboratory analyses of confirmation samples collected at the site show final confirmatory values below NMOCD closure criteria for areas where depth to groundwater is greater than 100 feet bgs as presented in Table 2. Final confirmatory values also demonstrated that the excavation met NMOCD's strictest closure criteria. There are no anticipated risks to human, ecological, or hydrological receptors at this site.

Based on these findings, Vertex Resource Group recommends no additional action to the site and requests that this incident (nAPP2308529277) be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. Solaris certifies that all information in this report and the appendices are correct, and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NMOCD requirements to obtain closure on the site.

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

7.0 References

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- New Mexico Bureau of Geology and Mineral Resources. (2023). *Interactive Geologic Map*. Retrieved from <https://maps.nmt.edu/>.
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- United States Geological Survey. (2023). *National Water Information System: Web Interface*. Retrieved from <https://waterdata.usgs.gov/nwis>.
- United States Fish and Wildlife Service. (2023). *National Wetland Inventory - Surface Waters and Wetlands*. Retrieved from <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>

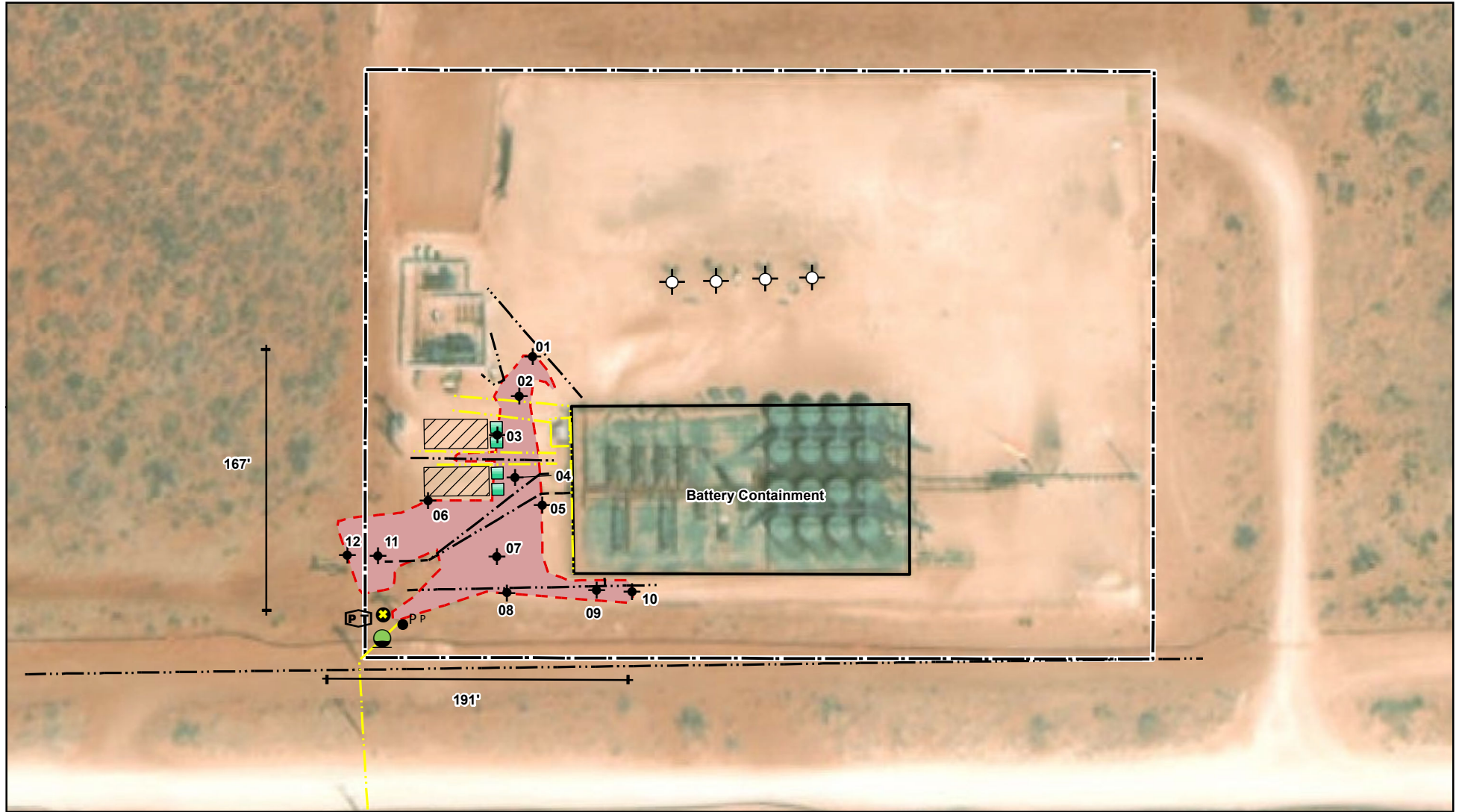
8.0 Limitations

This report has been prepared for the sole benefit of Solaris Water Midstream, LLC. 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 Solaris Water Midstream, LLC. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

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

FIGURES

Document Path: G:\I-Projects\US PROJECTS\Solaris Water Midstream\23E-01630 (Cave Lion Booster)\Figure 1 Characterization Schematic (23E-01630).mxd



- | | | | | |
|----------------------------------|--------------------|------------------------------|-------------------------------|---------------------------------|
| ◆ Borehole (Prefixed by "BH23-") | ⊕ Point of Release | --- Powerline | — Infrastructure (Existing) | ■ Fuel Tank for Compressor |
| ● P Electrical Pole | PT Pump Transfer | - - - Pipeline (Aboveground) | ⊠ Approximated Lease Boundary | ■ Release Area (~10,074 sq.ft.) |
| ● Fuel Tank | ⊙ Well Centre | ⋯ Pipeline (Underground) | ▨ Compressor | |



0 25 50 100 Feet
 Map Center:
 Lat/Long: 32.065638, -103.392160

NAD 1983 UTM Zone 13N
 Date: Apr 19/23



**Characterization Schematic
 Cave-Lion Booster**

FIGURE:

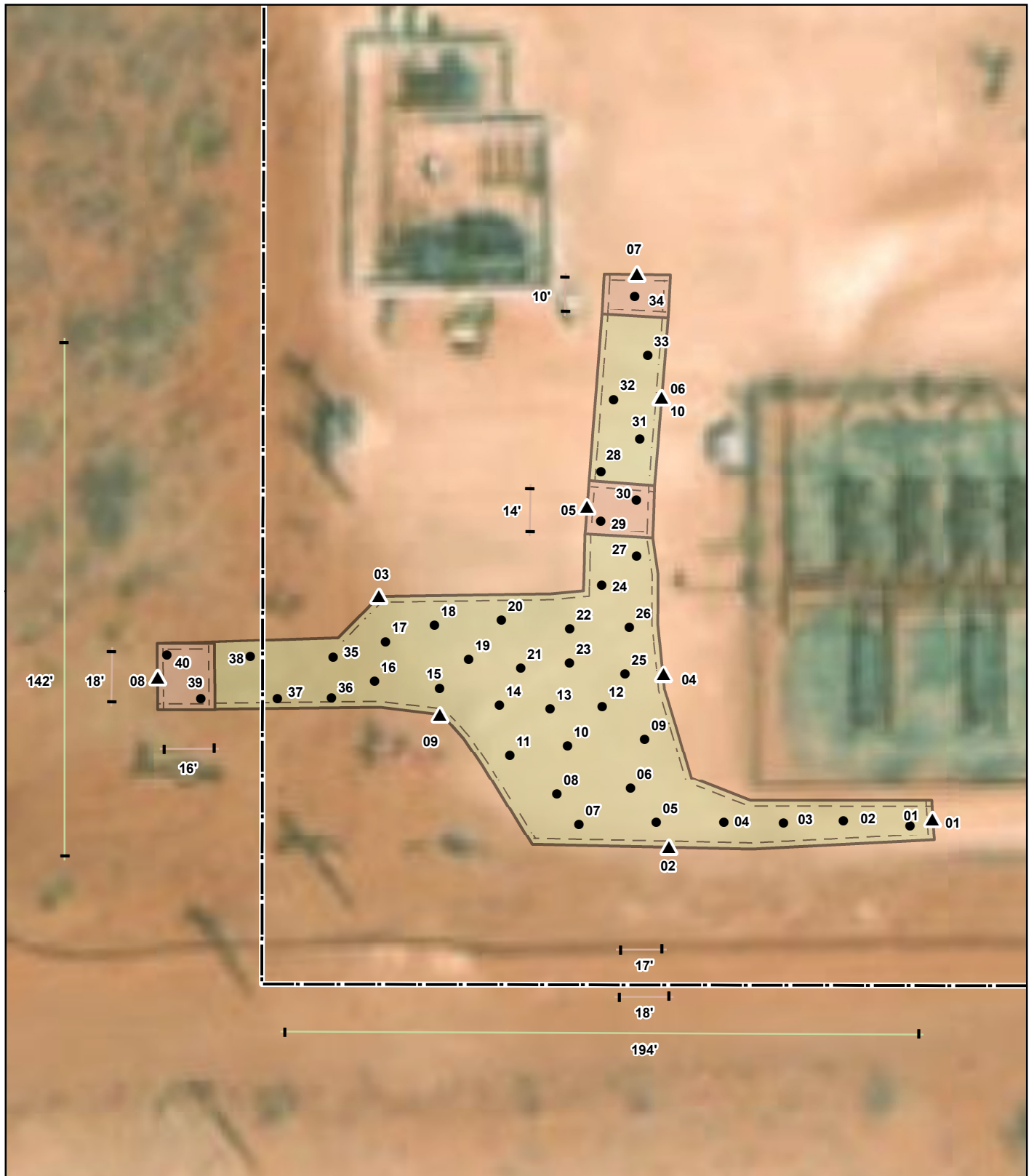
1



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: Esri, 2022; georeferenced by Esri. Point, line and polygon features from GPS. Lease boundary approximated. Vertex Professional Services Ltd., 2023.

VERSATILITY. EXPERTISE.



- Base Sample (Prefixed by "BES23-")
- ▲ Wall Sample (Prefixed by "WES23-")
- ⬜ Approximate Lease Boundary
- Excavation to 4' Depth (726 sq. ft.)
- Excavation to 1.5' Depth (7,842 sq. ft.)

Document Path: G:\1-Projects\US PROJECTS\Solaris Water Midstream\23E-01630 - Cave Lion Booster\Figure 2 Confirmation Schematic (23E-01630).mxd



0 15 30 ft.
 NAD 1983 UTM Zone 13N
 Date: May 24/23

Map Center:
 Lat: 32.065495,
 Long: -103.392695



**Confirmation Schematic
 Cave-Lion Booster**

FIGURE:
2



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: Esri, 2022; georeferenced by Esri. Site features from GPS, Vertex Professional Services Ltd., 2023. Lease boundary approximated. Vertex Professional Services Ltd., 2023.

TABLES

Table 2. Initial Characterization Laboratory Results - Depth to Groundwater >100 feet bgs
Solaris Midstream Water Company
Cave Line Booster
NMOCD Tracking #: nAPP2308529277
Project #: 23E-01630
Lab Reports: 890-4496-1 and 890-4507-1 (Eurofins)

Sample Description			Petroleum Hydrocarbons										Inorganic
Sample ID	Depth (ft)	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	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)	(mg/kg)	(mg/kg)	(mg/kg)
Criteria	NMOCD - NMAC <50 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	-	100	600
	NMOCD - NMAC 51-100 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	1000	2500	10000
	NMOCD - NMAC >100 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	1000	2500	20000
Boreholes													
BH23-01	0	April 11, 2023	ND	ND	ND	ND	ND	ND	517	ND	517	517	207
	2	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	149
	4	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	101
BH23-02	0	April 11, 2023	ND	ND	ND	ND	ND	ND	134	ND	134	134	2220
	2	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
	4	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	125
BH23-03	0	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	73.5
	2	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.6
	4	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	186
BH23-04	0	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	929
	2	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2590
	4	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1000
BH23-05	0	April 11, 2023	ND	ND	ND	ND	ND	ND	91.8	ND	91.8	91.8	62.3
	2	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	61.6
	4	April 11, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	104
BH23-06	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	185
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	85.1
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	111
BH23-07	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3830
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	157
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	124
BH23-08	0	April 12, 2023	ND	ND	ND	ND	ND	69	ND	69	69	69	438
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70.4
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	104
BH23-09	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2110
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	210
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	194
BH23-10	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	62.4
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.6
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	77
BH23-11	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1890
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2380
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2390
BH23-12	0	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69
	2	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	98.4
	4	April 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	88.7

NMAC - New Mexico Administrative Code (Title 19, Chapter 15, Part 29; 2022)

ND - Not Detected at the Reporting Limit

- Denotes no standard/not analyzed

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

Bold and green shaded indicates exceedance outside of NMOCD Reclamation Criteria (off-pad)



Table 4. Initial Characterization/Confirmatory Laboratory Results - Depth to Groundwater >100 feet
 bgs Solaris Midstream Water Company
 Cave Line Booster
 NMOCD Tracking #: nAPP2308529277
 Project #: 23E-01630
 Lab Reports: 890-4599-1, 890-4611-1 and 890-4660-1

Table 01

Sample Description			Petroleum Hydrocarbons										Inorganic
Sample ID	Depth (ft)	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	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)	(mg/kg)	(mg/kg)	(mg/kg)
Criteria	NMOCD - NMAC <50 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	-	100	600
	NMOCD - NMAC 51-100 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	1000	2500	10000
	NMOCD - NMAC >100 ft 19.15.29 (2018)		10	-	-	-	50	-	-	-	1000	2500	20000
2023 Excavation													
BES23-01	1.5	Friday, April 28, 2023	ND	ND	ND	ND	ND	ND	58.3	ND	ND	58.3	78.5
BES23-02	1.5	Friday, April 28, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	212
BES23-03	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	67.3
BES23-04	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	88.3
BES23-05	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	95.7
BES23-06	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	79.5
BES23-07	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84.8
BES23-08	1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	90.6
BES23-09	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	288
BES23-10	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	324
BES23-11	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	126
BES23-12	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60.8
BES23-13	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	57.4
BES23-14	1.5	Monday, May 8, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.2
BES23-15	1.5	Monday, May 8, 2023	ND	0.00218	ND	ND	0.00218	ND	ND	ND	ND	ND	62.3
BES23-16	1.5	Monday, May 8, 2023	ND	0.00790	ND	ND	0.00790	ND	ND	ND	ND	ND	100
BES23-17	1.5	Monday, May 8, 2023	ND	0.00815	ND	ND	0.00815	ND	ND	ND	ND	ND	66.8
BES23-18	1.5	Monday, May 8, 2023	ND	0.0233	ND	ND	0.0233	ND	ND	ND	ND	ND	71.8
BES23-19	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	68.4
BES23-20	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	72.0
BES23-21	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	66.9
BES23-22	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	79.2
BES23-23	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	76.8
BES23-24	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78.2
BES23-25	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	92.7
BES23-26	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	71.3
BES23-27	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	103
BES23-28	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74.2
BES23-29	4	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	167
BES23-30	4	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	81.2
BES23-31	1.5	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	83
BES23-32	1.5	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	181
BES23-33	1.5	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	89.9
BES23-34	4	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	81.2
BES23-35	1.5	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	169
BES23-36	1.5	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	107
BES23-37	1.5	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	104
BES23-38	1.5	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	96.7
BES23-39	4	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	133
BES23-40	4	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80.9
WES23-01	0 - 1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46.8
WES23-02	0 - 1.5	Tuesday, May 2, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	49.1
WES23-03	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.1
WES23-04	1.5	Friday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74.5
WES23-05	0 - 4	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	172
WES23-07	0 - 4	Wednesday, May 12, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	103
WES23-08	0 - 4	Friday, May 19, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	174
WES23-09	0 - 1.5	Wednesday, May 24, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	136
WES23-10	0 - 1.5	Wednesday, May 24, 2023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	106

NMAC - New Mexico Administrative Code (Title 19, Chapter 15, Part 29; 2022)
 ND - Not Detected at the Reporting Limit
 - Denotes no standard/not analyzed



APPENDIX A - NMOCD C-141 Report(s)

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

State of New Mexico
Energy Minerals and Natural
Resources Department

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

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

Incident ID	nAPP2308529277
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party Solaris Water, LLC	OGRID 371643
Contact Name Rob Kirk	Contact Telephone O 575- 300-5155 C 469-978-5620
Contact email rob.kirk@ariswater.com	Incident # (assigned by OCD)
Contact mailing address 3305 Boyd Drive, Carlsbad, NM 88220	

Location of Release Source

Latitude 32.06536 Longitude -103.39291
(NAD 83 in decimal degrees to 5 decimal places)

Site Name Cave Lion Booster Pump	Site Type Booster Pump
Date Release Discovered 03/29/2023	API# (if applicable)

Unit Letter	Section	Township	Range	County
N	05	26S	35E	Lea County

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

Nature and Volume of Release

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

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input checked="" type="checkbox"/> Produced Water	Volume Released (bbls) 40 BBLs	Volume Recovered (bbls) 10 BBLs
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

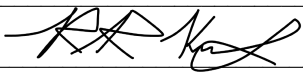
Cause of Release A 16-inch poly line elbow failed at the seam where it connected to the Booster Pump. The section was replaced.

Incident ID	nAPP2308529277
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release? The volume of produce water released.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Rob Kirk notified by NMOCD Web Portal, email to Aretsia office of OCD.	

Initial Response

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

<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why:
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.
Printed Name: <u>Rob Kirk</u> Title: <u>VP & GM, HSE & Compliance</u> Signature: <u></u> Date: <u>03/30/2023</u> email: <u>rob.kirk@ariswater.com</u> Telephone: <u>O 575- 300-5155 C 469-978-5620</u>
<u>OCD Only</u> Received by: _____ Date: _____

Incident ID	NAPP2308529277
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

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

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

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

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

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


If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Page 4

Incident ID	NAPP2308529277
District RP	
Facility ID	
Application ID	

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

Printed Name: Rob Kirk Title: VP & GM, HSE & Compliance
 Signature:  Date: 06/26/2023
 email: rob.kirk@ariswater.com Telephone: O 575- 300-5155 C 469-978-5620

OCD Only

Received by: Shelly Wells Date: 6/27/2023

Incident ID	
District RP	
Facility ID	
Application ID	


Closure

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

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

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

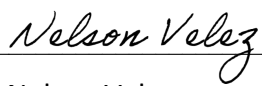
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public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

Printed Name: Rob Kirk Title: VP & GM, HSE & Compliance
 Signature:  Date: 06/26/2023
 email: rob.kirk@ariswater.com Telephone: O 575- 300-5155 C 469-978-5620

OCD Only

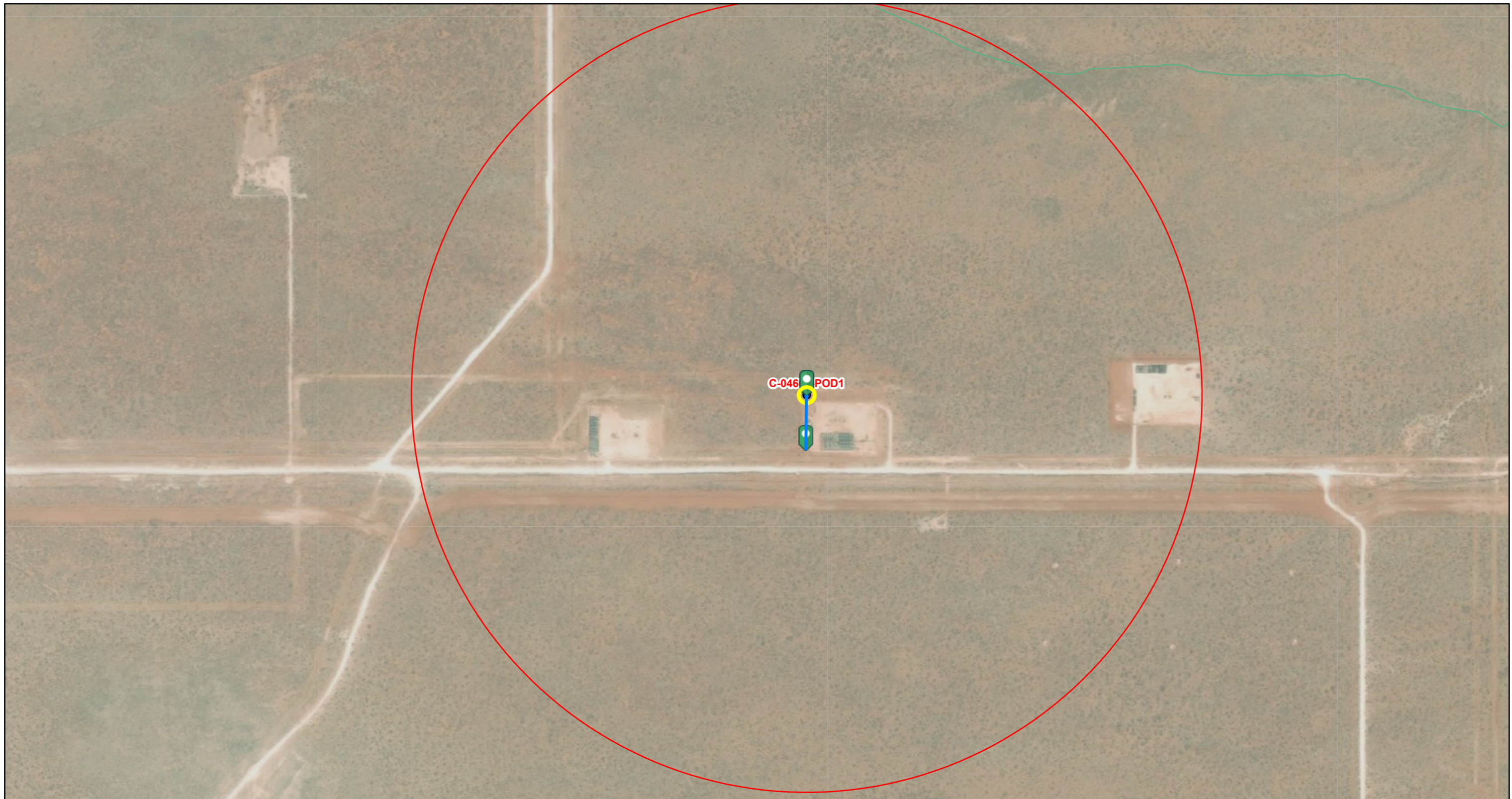
Received by: Shelly Wells Date: 6/27/2023

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

Closure Approved by:  Date: 09/21/2023
 Printed Name: Nelson Velez Title: Environmental Specialist - Adv

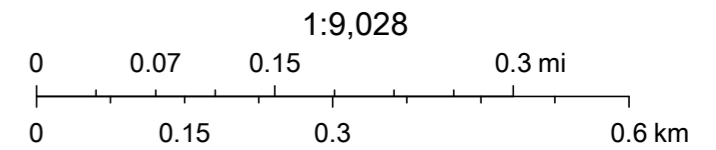
APPENDIX B – Closure Criteria Research Documentation

Cave-Lion DTGW 0.5 Mile Radius



4/20/2023, 3:24:57 PM

- Override 1
- OSE District Boundary
- NHD Flowlines
- Stream River
- Active
- Closure Area
- Site Boundaries



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



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

OSE DTI APR 8 2022 PM 3:16

1. GENERAL AND WELL LOCATION	OSE POD NO. (WELL NO.) POD1 (TW-1)		WELL TAG ID NO.		OSE FILE NO(S). C-4601	
	WELL OWNER NAME(S) Marathon Oil				PHONE (OPTIONAL)	
	WELL OWNER MAILING ADDRESS 4111 S Tidwell Rd.				CITY Carlsbad	STATE NM
					ZIP 88220	
	WELL LOCATION (FROM GPS)	DEGREES 32	MINUTES 3	SECONDS 58	* ACCURACY REQUIRED: ONE TENTH OF A SECOND	
	LATITUDE			* DATUM REQUIRED: WGS 84		
	LONGITUDE	103	23	33	W	
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE SE SE Sw Sec. 05 T26S R35E						

2. DRILLING & CASING INFORMATION	LICENSE NO. 1249	NAME OF LICENSED DRILLER Jackie D. Atkins			NAME OF WELL DRILLING COMPANY Atkins Engineering Associates, Inc.		
	DRILLING STARTED 3/31/2022	DRILLING ENDED 3/31/2022	DEPTH OF COMPLETED WELL (FT) temporary well	BORE HOLE DEPTH (FT) ±100.8	DEPTH WATER FIRST ENCOUNTERED (FT) n/a		
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input checked="" type="checkbox"/> DRY HOLE <input type="checkbox"/> SHALLOW (UNCONFINED)				STATIC WATER LEVEL IN COMPLETED WELL (FT) n/a	DATE STATIC MEASURED 4/6/2022	
	DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD ADDITIVES - SPECIFY:						
	DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger					CHECK HERE IF PITLESS ADAPTER IS INSTALLED <input type="checkbox"/>	
	DEPTH (feet bgl)		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)
	FROM	TO					
	0	100.8	±6.5	Boring	--	--	--

3. ANNULAR MATERIAL	DEPTH (feet bgl)		BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
	FROM	TO				

FOR OSE INTERNAL USE		WR-20 WELL RECORD & LOG (Version 01/28/2022)			
FILE NO.	C-4601-POD 1	POD NO.	1	TRN NO.	721041
LOCATION	26.35.05.343		WELL TAG ID NO.	PAGE 1 OF 2	

	DEPTH (feet bgl)		THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)		ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
	FROM	TO			Y	N	
4. HYDROGEOLOGIC LOG OF WELL	0	4	4	Sand, medium/ fine grained poorly graded, Red	Y	✓ N	
	4	19	15	Sand, medium/ fine grained poorly graded, Tan	Y	✓ N	
	19	101	82	Sand, medium/ fine grained poorly graded, Reddish Brown	Y	✓ N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
					Y	N	
	METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: <input type="checkbox"/> PUMP <input type="checkbox"/> AIR LIFT <input type="checkbox"/> BAILER <input type="checkbox"/> OTHER – SPECIFY:					TOTAL ESTIMATED WELL YIELD (gpm): 0.00	

	WELL TEST	TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.
5. TEST; RIG SUPERVISION	MISCELLANEOUS INFORMATION: <div style="text-align: right; color: blue; font-size: small;">OSE OIT APR 8 2022 PM 3:16</div>	
	PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE: Shane Eldridge, Carmelo Trevino, Cameron Pruitt	

	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 30 DAYS AFTER COMPLETION OF WELL DRILLING:	
6. SIGNATURE		Jackie D. Atkins
	SIGNATURE OF DRILLER / PRINT SIGNEE NAME	DATE 4/7/2022

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 01/28/2022)

FILE NO. C-4601-POD 1	POD NO. 1	TRN NO. 721041	
LOCATION 26.35.05.343	WELL TAG ID NO. _____	PAGE 2 OF 2	

Mike A. Hamman, P.E.
State Engineer



Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

**STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER**

Trn Nbr: 721041
File Nbr: C 04601
Well File Nbr: C 04601 POD1

Apr. 08, 2022

MELODIE SANJARI
MARATHON OIL
4111 S TIDWELL RD
CARLSBAD, NM 88220

Greetings:

The above numbered permit was issued in your name on 03/10/2022.

The Well Record was received in this office on 04/08/2022, stating that it had been completed on 03/31/2022, and was a dry well. The well is to be plugged according to 19.27.4.30 NMAC.

Please note that another well can be drilled under this permit if the well is completed and the well log filed on or before 03/10/2023.

If you have any questions, please feel free to contact us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Maret Amaral".

Maret Amaral
(575) 622-6521

drywell



2904 W 2nd St.
Roswell, NM 88201
voice: 575.624.2420
fax: 575.624.2421
www.atkinseng.com

08/016/2021

DII-NMOSE
1900 W 2nd Street
Roswell, NM 88201

Hand Delivered to the DII Office of the State Engineer

Re: Well Record C-4601 Pod1

To whom it may concern:

Attached please find a well log & record and a plugging record, in duplicate, for a one (1) soil borings, C-4601 Pod1.

If you have any questions, please contact me at 575.499.9244 or lucas@atkinseng.com.

Sincerely,

A handwritten signature in black ink that reads "Lucas Middleton". The signature is written in a cursive style.

Lucas Middleton

Enclosures: as noted above

OSE DII APR 8 2022 PM3:15



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 6	Q 4	Q 3	Sec	Tws	Rng	X	Y	Distance	DepthWell	DepthWater	Water Column
C 04601 POD1		CUB	LE	3	4	3	05	26S	35E	651710	3548919	102			
CP 01305 POD1		CP	LE	1	4	31	25S	37E	655628	3551065	4513	420	230	190	
													Average Depth to Water:		230 feet
													Minimum Depth:		230 feet
													Maximum Depth:		230 feet

Record Count: 2

UTMNAD83 Radius Search (in meters):

Easting (X): 651714.78

Northing (Y): 3548817

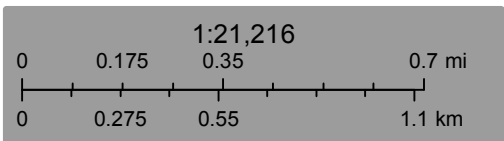
Radius: 5000

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

4/18/23 11:49 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER

Cave Lion Booster Watercourse 2,796 ft



U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov

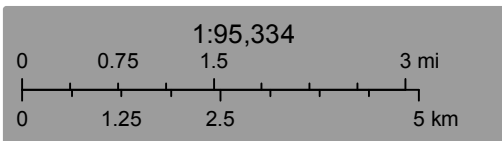
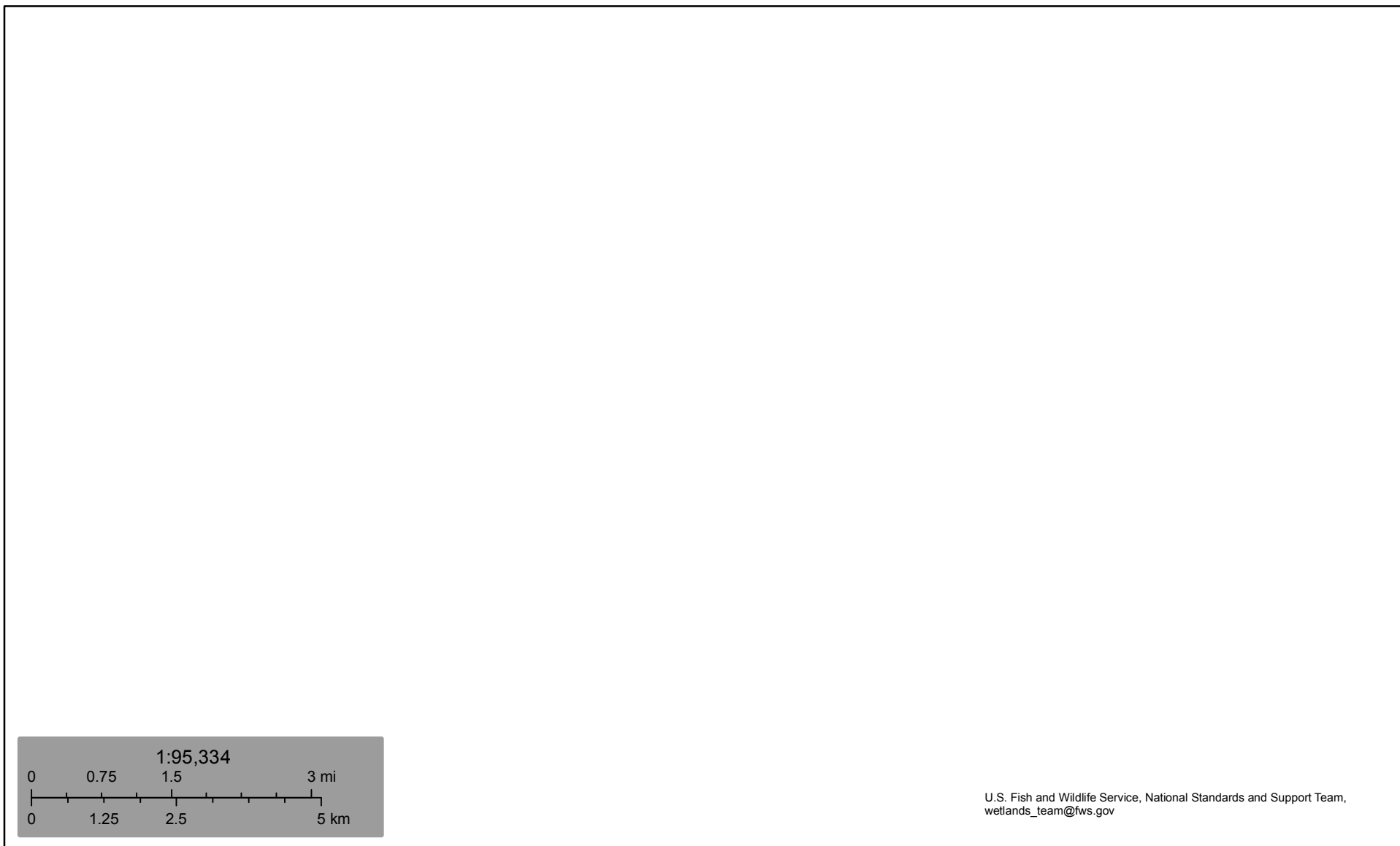
April 18, 2023

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.








Cave Lion Pond 18,742 ft



U.S. Fish and Wildlife Service, National Standards and Support Team,
wetlands_team@fws.gov

April 18, 2023

Wetlands


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

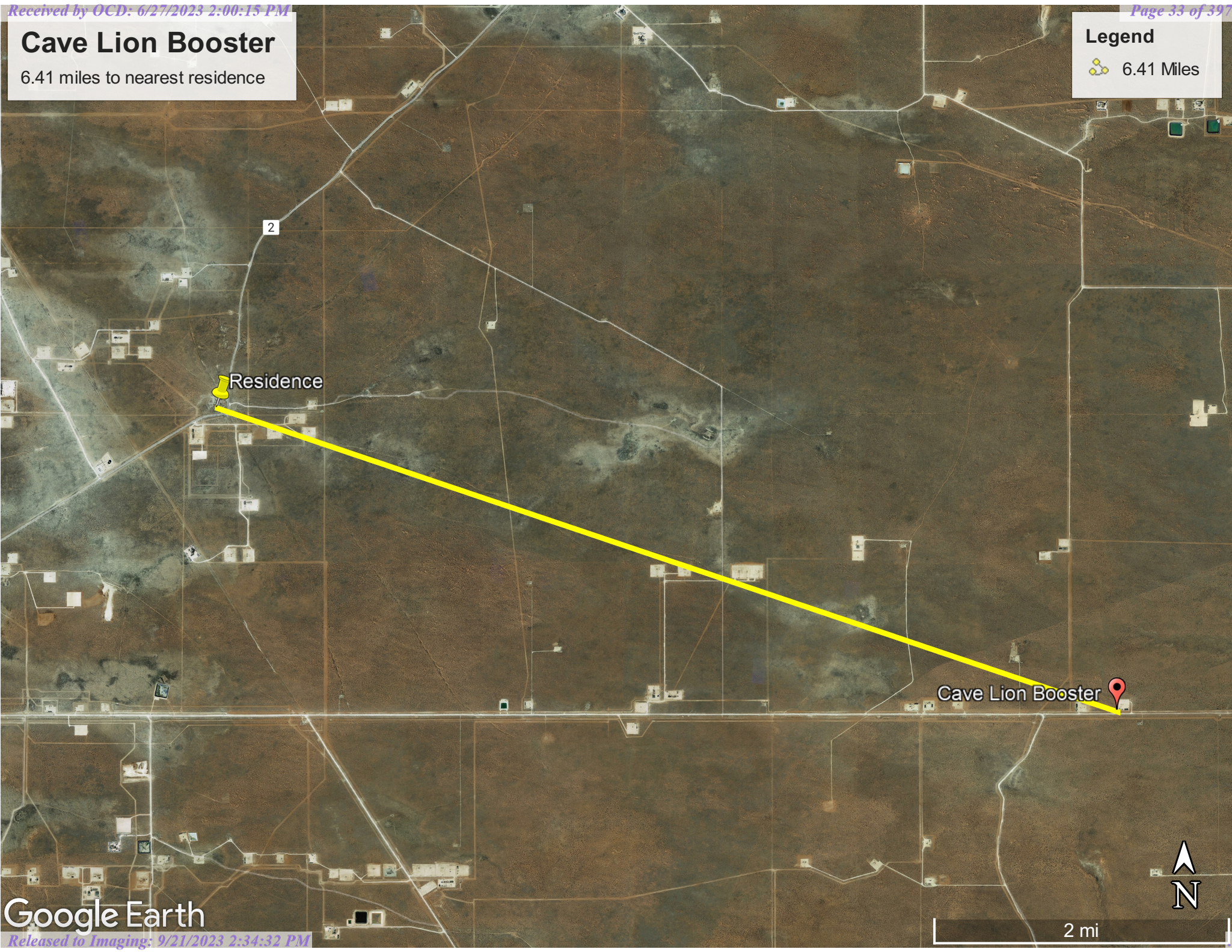
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Cave Lion Booster

6.41 miles to nearest residence

Legend



 6.41 Miles



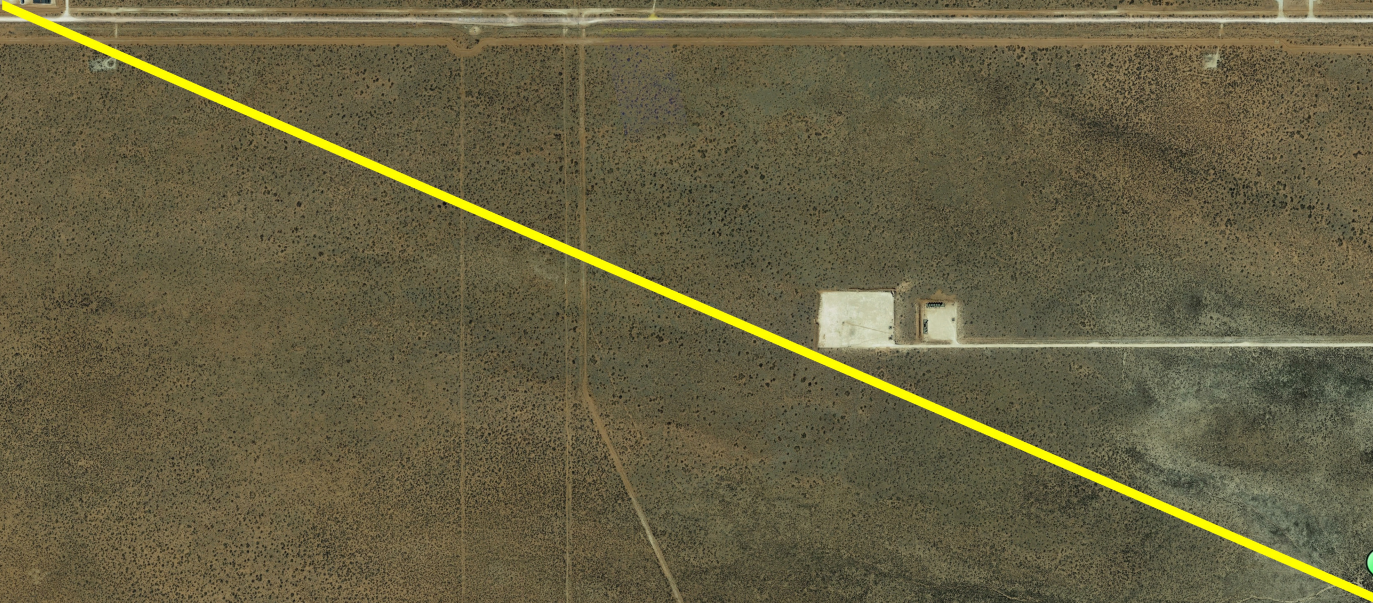
Cave Lion Booster

2.26 miles to livestock well

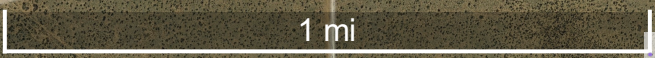
Legend

-  2.26 miles
-  Livestock Well

Cave Lion Booster




Livestock Well

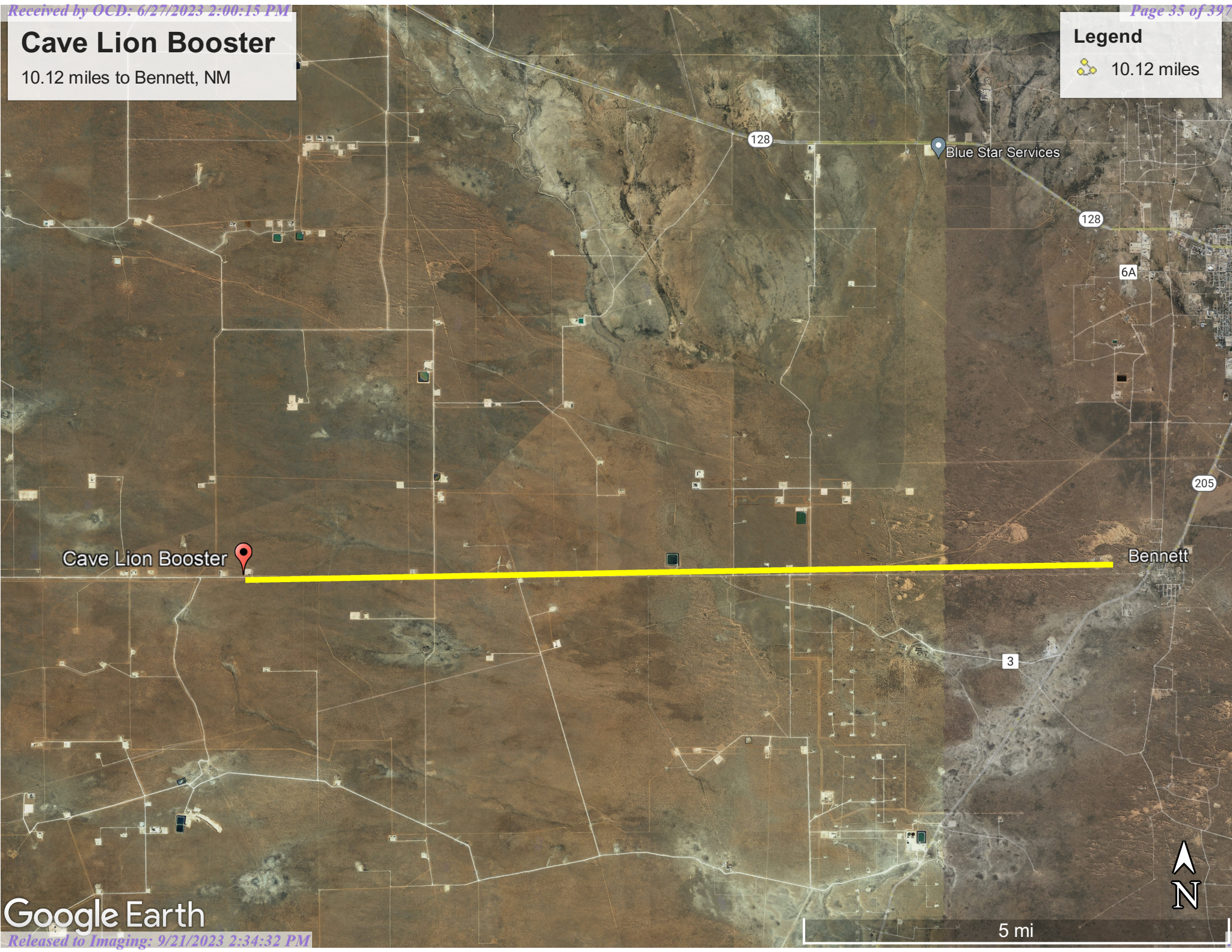



Cave Lion Booster

10.12 miles to Bennett, NM

Legend

 10.12 miles



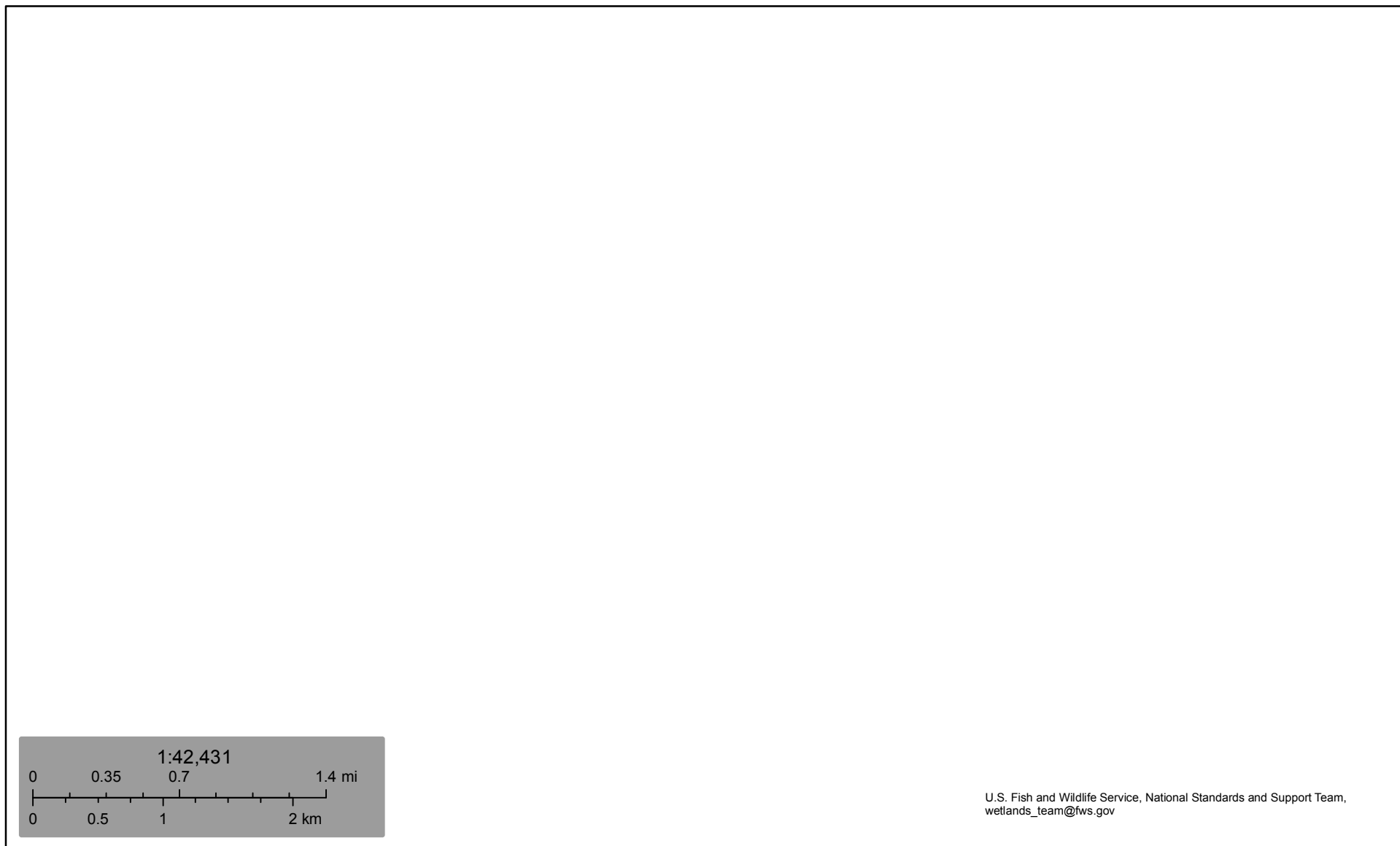
Cave Lion Booster 

 Blue Star Services

Bennett









Cave Lion Wetland 14,492 ft



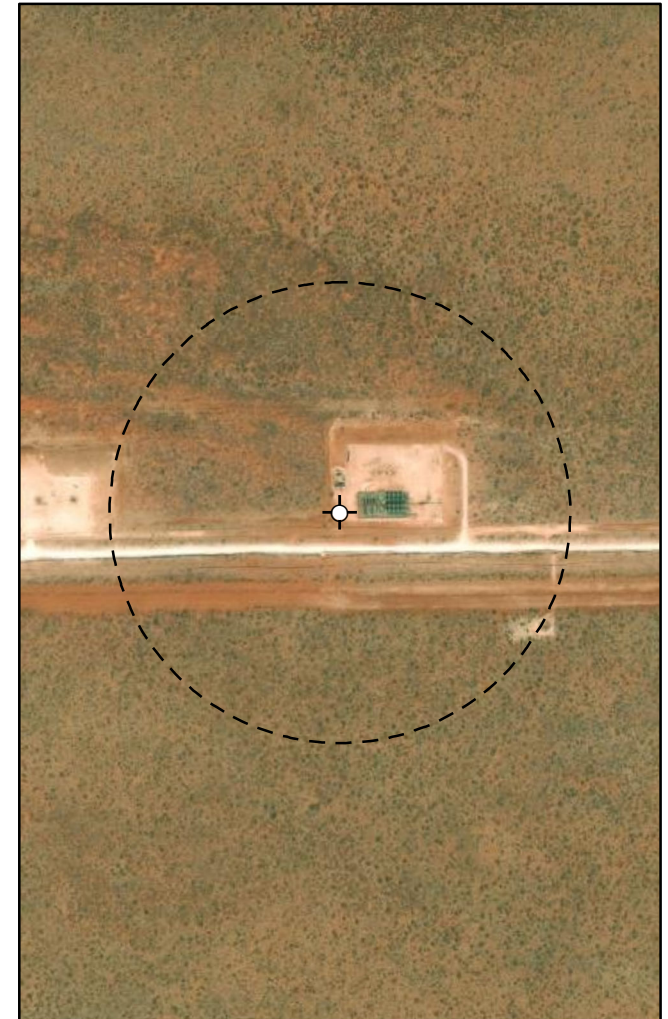
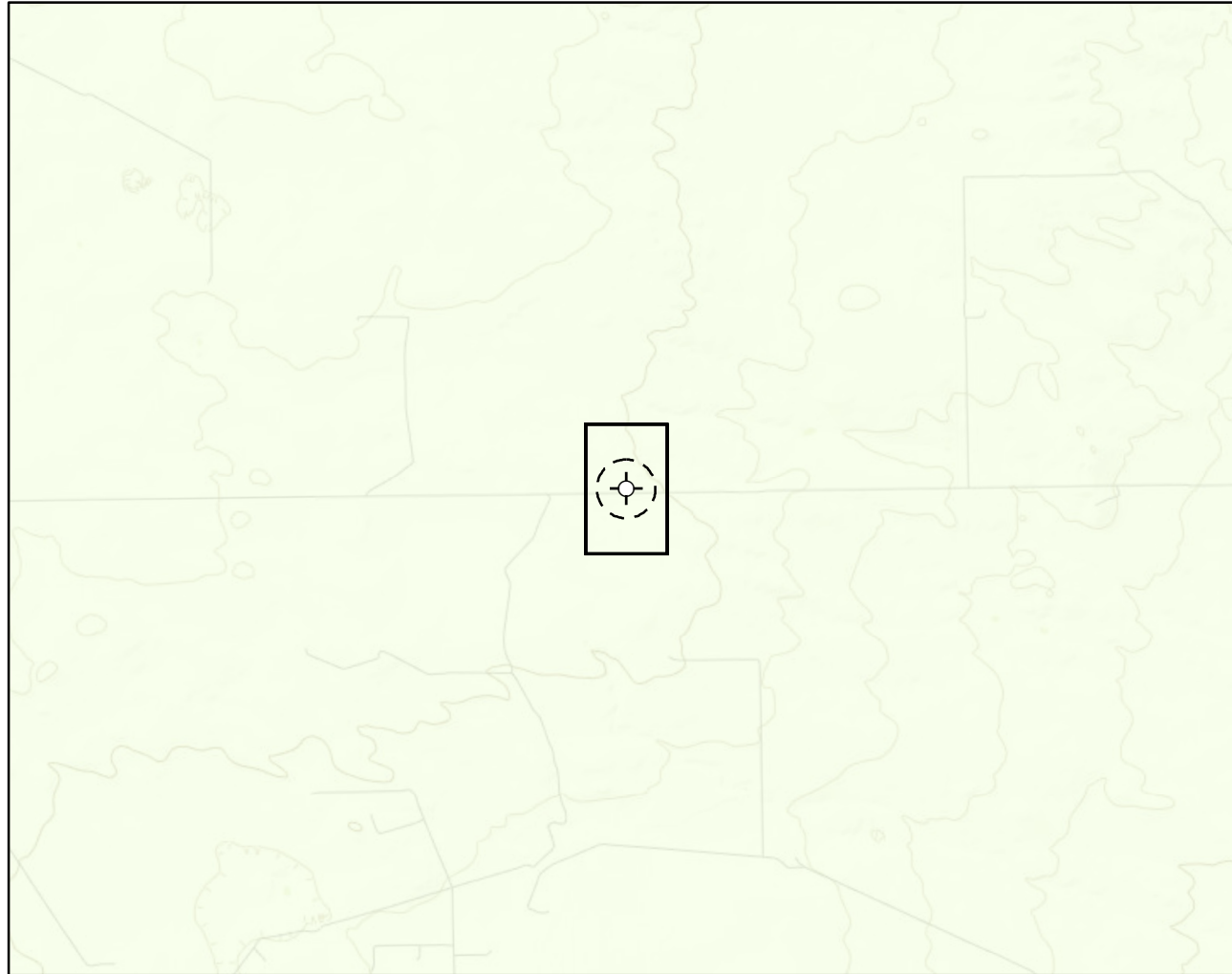
April 18, 2023

Wetlands

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



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

Document Path: G:\I-Projects\US PROJECTS\Solaris Water Midstream\23E-01630 (Cave Lion Booster)\Figure X Karst Potential Schematic - Cave Lion\23E-01630.mxd



Karst Potential

- Critical
- High
- Medium
- Low

-  Site Location
-  Site Buffer (1,000 sq. ft)

Overview Map

0 0.25 0.5 1 mi

Detail Map

0 150 300 600 ft.



Map Center:
Lat/Long: 32.065421, -103.392744

NAD 1983 UTM Zone 13N
Date: Apr 27/23



**Karst Potential Schematic
Cave Lion Booster**

FIGURE:

X

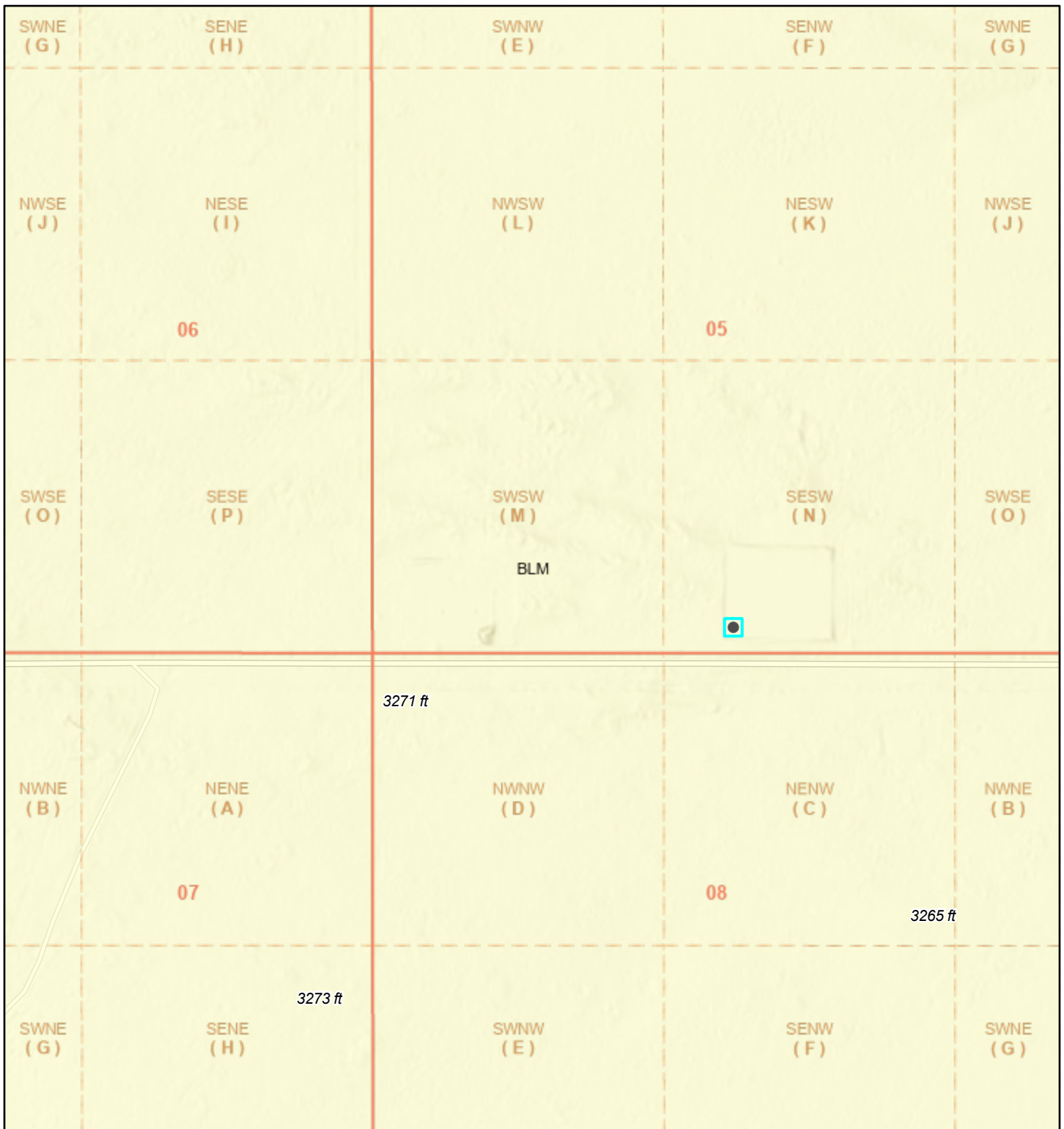


Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

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

VERSATILITY. EXPERTISE.

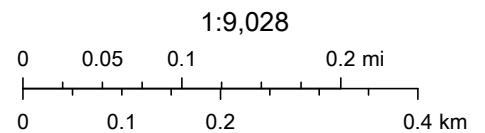
Cave Lion Mines



4/18/2023, 2:09:37 PM

Land Ownership

- BLM
- PLSS Second Division
- PLSS First Division



U.S. BLM, Esri Community Maps Contributors, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, BLM

National Flood Hazard Layer FIRMMette



103°23'53"W 32°4'11"N



Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		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 <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
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



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 **4/18/2023 at 4:18 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.



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

Custom Soil Resource Report for Lea County, New Mexico



April 18, 2023

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

Custom Soil Resource Report

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

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

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

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

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

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

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

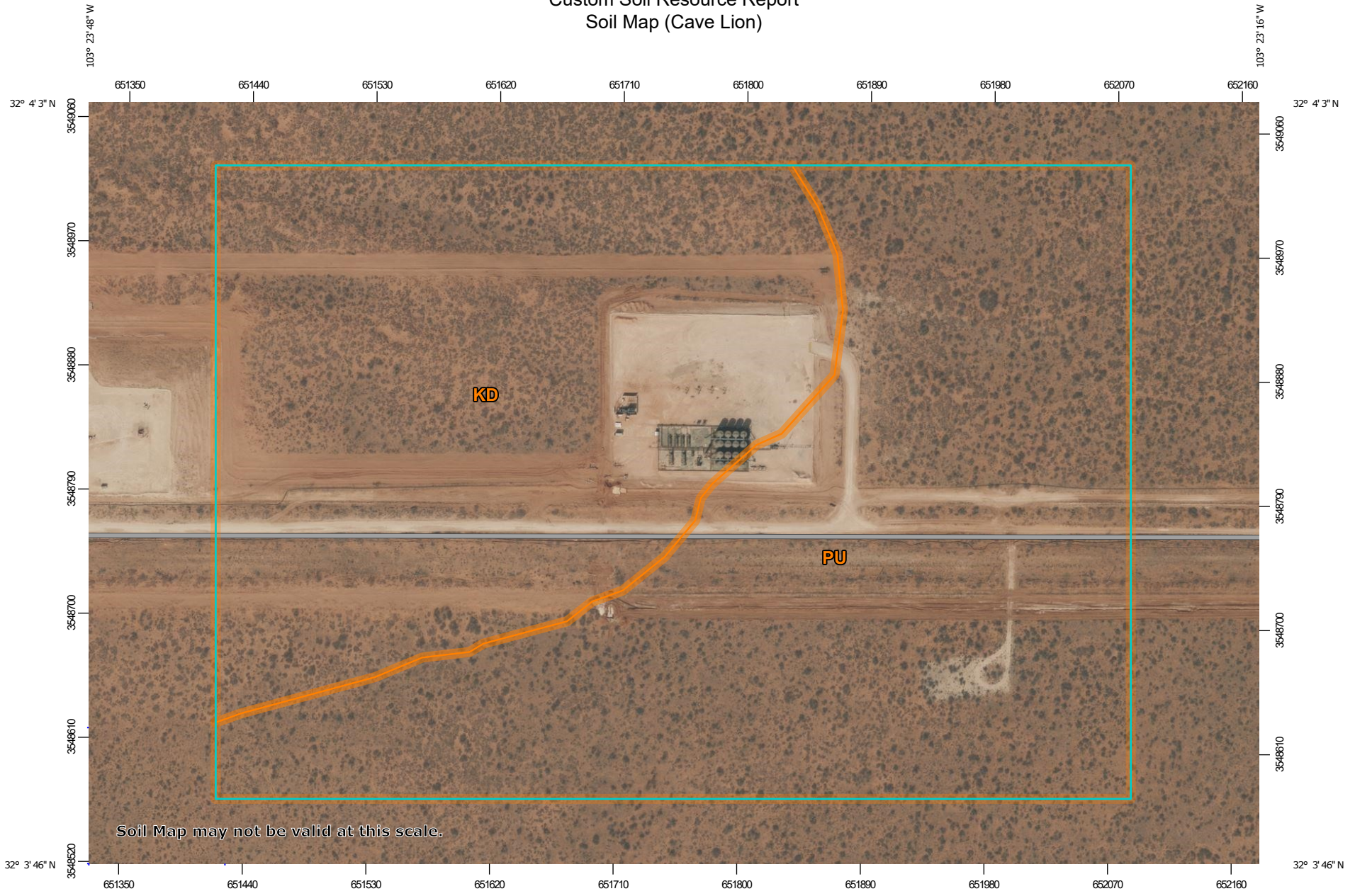
Custom Soil Resource Report

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

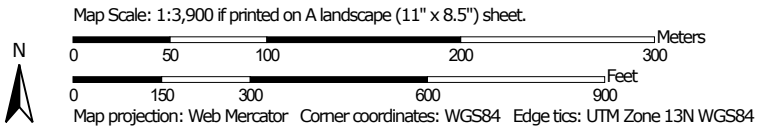
Soil Map

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

Custom Soil Resource Report Soil Map (Cave Lion)




Soil Map may not be valid at this scale.



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)


Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry


 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Lea County, New Mexico
 Survey Area Data: Version 19, Sep 8, 2022

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

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

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

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Map Unit Legend (Cave Lion)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KD	Kermit-Palomas fine sands, 0 to 12 percent slopes	35.1	46.2%
PU	Pyote and Maljamar fine sands	40.8	53.8%
Totals for Area of Interest		75.9	100.0%

Map Unit Descriptions (Cave Lion)

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,

Custom Soil Resource Report

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.

Custom Soil Resource Report

Lea County, New Mexico**KD—Kermit-Palomas fine sands, 0 to 12 percent slopes****Map Unit Setting**

National map unit symbol: dmpv
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Kermit and similar soils: 70 percent
Palomas and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kermit**Setting**

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear, convex
Across-slope shape: Convex
Parent material: Calcareous sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sand
C - 8 to 60 inches: fine sand

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R070BD005NM - Deep Sand
Hydric soil rating: No

Description of Palomas**Setting**

Landform: Dunes

Custom Soil Resource Report

Landform position (two-dimensional): Shoulder, backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear, concave

Across-slope shape: Convex

Parent material: Alluvium derived from sandstone

Typical profile

A - 0 to 16 inches: fine sand

Bt - 16 to 60 inches: sandy clay loam

Bk - 60 to 66 inches: sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 50 percent

Gypsum, maximum content: 1 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0

Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Minor Components**Pyote**

Percent of map unit: 4 percent

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Maljamar

Percent of map unit: 4 percent

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Palomas

Percent of map unit: 1 percent

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Dune land

Percent of map unit: 1 percent

Hydric soil rating: No

Custom Soil Resource Report

PU—Pyote and Maljamar fine sands**Map Unit Setting**

National map unit symbol: dmqq
Elevation: 3,000 to 3,900 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Pyote and similar soils: 46 percent
Maljamar and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pyote**Setting**

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

Typical profile

A - 0 to 30 inches: fine sand
Bt - 30 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Custom Soil Resource Report

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Description of Maljamar**Setting**

Landform: Plains

Landform position (three-dimensional): Rise

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 24 inches: fine sand

Bt - 24 to 50 inches: sandy clay loam

Bkm - 50 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 40 to 60 inches to petrocalcic

Drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Gypsum, maximum content: 1 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0

Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Ecological site: R070BD003NM - Loamy Sand

Hydric soil rating: No

Minor Components**Kermit**

Percent of map unit: 10 percent

Ecological site: R070BC022NM - Sandhills

Hydric soil rating: No

References

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Ecological site R070BD005NM Deep Sand

Accessed: 04/18/2023

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 terraces, Piedmonts, dunes fields, or upland plains. Parent material consists of eolian deposits and alluvium derived from sandstone. Slopes range from 0 to 15 percent, usually less than 5 percent. Low, stabilized hummocks or dunes frequently occur. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Dune (2) Parna dune (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	2,842–4,500 ft
Slope	0–15%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms.

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

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

Both temperature and moisture favor warm season perennial plant growth. During years of abundant winter and early spring moisture, cool season growth and annual forbs, make up an important component of this site. Strong winds blow from the west from January through June, which accelerates soil drying during a critical period for cool

season plant growth.

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

Table 3. Representative climatic features

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

Influencing water features

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

Soil features

Soils are deep or very deep. Surface textures are sand loam, fine sand or loamy fine sand, Underlying material textures are loamy fine sand, fine sand, sand or fine sandy loam. Because of the coarse textures and rapid drying of the surface, the soil, if unprotected by plant cover and organic residue, becomes windblown and low hummocks or dunes are formed around shrubs.

Characteristic soils are:

Anthony
Aguena
Kermit
Likes
Pintura
Bluepoint

Table 4. Representative soil features

Surface texture	(1) Sand (2) Fine sand (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderate to very rapid
Soil depth	60–72 in
Surface fragment cover ≤3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–5 in
Calcium carbonate equivalent (0-40in)	5–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–7.8

Subsurface fragment volume <=3" (Depth not specified)	5–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

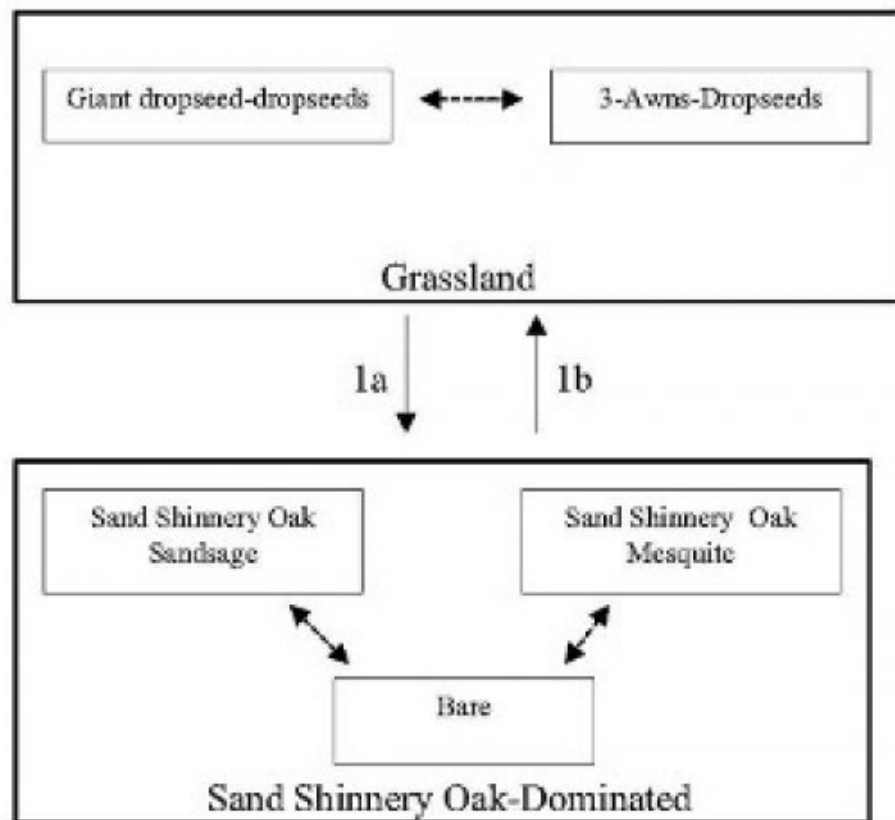
Overview

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

State and transition model

Plant Communities and Transitional Pathways (diagram)

MLRA-42, SD-3, Deep Sand



1.a Climate, fire suppression, competition, over grazing

1.b Brush control, Prescribed grazing

State 1
Historic Climax Plant Community

Community 1.1 Historic Climax Plant Community

State Containing Historic Plant Community Grassland: The historic plant community is dominated by giant dropseed, other dropseeds, threeawns, and bluestems. Dominant woody plants include shinnery oak and soapweed yucca. Forb abundance and distribution varies and is dependent on annual rainfall. The Deep Sand site typically exists in sandy plains and dunes (Sosebee 1983). Grass dominance stabilizes the potentially erosive sandy soils. Historical fire suppression, however, may have contributed to increased woody plant abundance, which has reduced grass species. Further, drought conditions compounded with excessive grazing likely has driven most grass species out of competition with shrubs which has resulted in a shinnery oak dominated state with sand sage and mesquite (Young et al. 1948). Diagnosis: Grassland dominated by dropseeds, threeawns, and bluestems. Small shrubs, such as shinnery oak and soapweed yucca, and subshrubs are dispersed throughout the grassland. Other grasses that could appear on this site would include: flatsedge, almejita signalgrass, big bluestem, Indiangrass, fall witchgrass, hairy grama and red lovegrass Other shrubs include: fourwing saltbush, mesquite, ephedra and broom snakeweed. Other forbs include: wooly and scarlet gaura, wooly dalea, phlox heliotrope, scorpionweed, deerstongue, fleabane, nama, hoffmanseggia, lemon beebalm and stickleaf.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	396	858	1320
Shrub/Vine	108	234	360
Forb	96	208	320
Total	600	1300	2000

Table 6. Ground cover

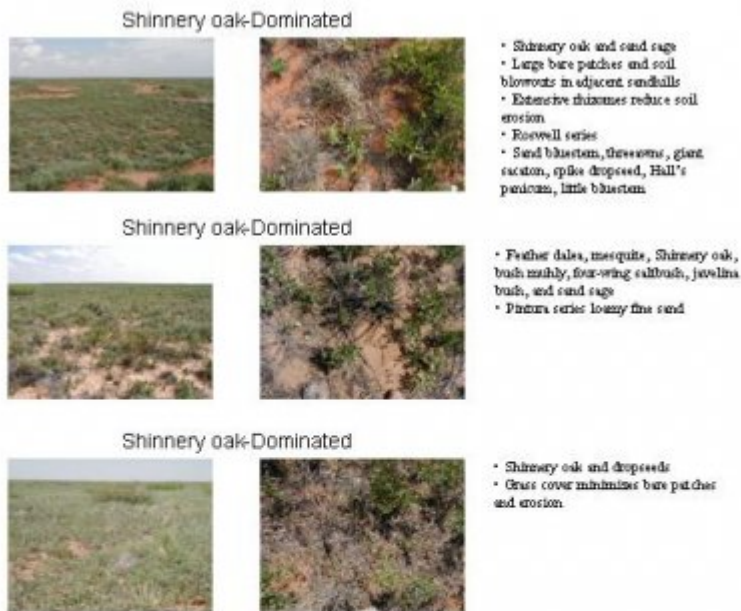
Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	15-20%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	35-40%

Figure 5. Plant community growth curve (percent production by month). NM2805, HCPC. SD-3 Deep Sand - Warm season plant community .

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

State 2 Shinnery Oak Dominated

Community 2.1 Shinnery Oak Dominated



Shinnery Oak Dominated: This state is dominated by shinnery oak with subdominants of sand sage or mesquite. Bare ground is a significant component in this state as well. Shinnery oak is characterized by dense stands in sandy soils; however, as clay percentage increases, shinnery oak decreases. Shinnery oak abundance and distribution increase with disturbances, such as excessive grazing and fire, due to an aggressive rhizome system. As shinnery oak abundance increases, an associated increase of mesquite, sand sage, and soapweed yucca also occurs. Shinnery oak's extensive root system allows the oak to competitively exclude grasses and forbs. Sand sage, however, stabilizes light sandy soils from wind erosion and can co-exist with herbaceous species by protecting them in heavily grazed conditions (Davis and Bonham 1979). Shinnery oak has been found primarily in very deep, excessively drained, and rapidly permeable soils. Shinnery oak is associated with landforms which are gently undulating to rolling uplands, very gently sloping to moderately steep slopes, and upland plains, alluvial fans and valley sideslopes. Shinnery oak and sand sage can be controlled with herbicide if applied in the spring with a subsequent rest from grazing (Herbel et al. 1979, Pettit 1986). In addition, repetitive seasons of goat browsing can also reduce shinnery oak abundance. Patches should be maintained during brush control, however, to prevent erosion and to provide wildlife cover and forage. Further, as shinnery oak and other shrubs increase, bare patches and erosion will increase due to a lack of herbaceous ground cover. **Diagnosis:** Shinnery oak dominated with subdominant sand sage, honey mesquite, and soapweed yucca with increasing frequency and size of bare patches. **Transition to Shinnery oak dominated state (1a):** The historic plant community begins to shift toward the shinnery oak dominated state as drivers such as climate change, fire suppression, interspecific competition, and excessive grazing contribute to alterations in soil properties and herbaceous cover. Cover loss and surface soil erosion are initial indicators of transition followed by an increase of shrub species abundance and bare patch expansion. **Key indicators of approach to transition:** • Loss of grass and forb cover • Surface soil erosion • Bare patch expansion • Increased shrub species abundance and composition **Transition to Historic Plant Community (1b):** The shinnery oak dominated state may transition back toward the historic plant community as new drivers are introduced such as prescribed grazing, brush control, and discontinued drought conditions.

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			450-585	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	450-585	-
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	450-585	-
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	450-585	-
	giant dropseed	SPGI	<i>Sporobolus giganteus</i>	450-585	-
2	Warm Season			65-104	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	65-104	-
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	65-104	-
3	Warm Season			39-91	
	threeawn	ARIST	<i>Aristida</i>	39-91	-
4	Warm Season			13-39	
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	13-39	-
5	Warm Season			13-39	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	13-39	-
6	Warm Season			13-39	
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	13-39	-
7	Warm Season			13-39	
	Havard's panicgrass	PAHA2	<i>Panicum havardii</i>	13-39	-
8	Warm Season			13-65	
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	13-65	-
9	Other Annual Grasses			13-65	
	Grass, annual	2GA	<i>Grass, annual</i>	13-65	-
Shrub/Vine					
10	Shrub			65-130	
	Havard oak	QUHA3	<i>Quercus havardii</i>	65-130	-
11	Shrub			13-39	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	13-39	-
12	Shrub			65-130	
	yucca	YUCCA	<i>Yucca</i>	65-130	-
13	Shrub			13-39	
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	13-39	-
14	Other Shrubs			13-39	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	13-39	-
Forb					
15	Forb			39-91	
	croton	CROTO	<i>Croton</i>	39-91	-
	Indian blanket	GAPU	<i>Gaillardia pulchella</i>	39-91	-
16	Forb			39-91	
	aster	ASTER	<i>Aster</i>	39-91	-
	whitest evening primrose	OEAL	<i>Oenothera albicaulis</i>	39-91	-
	beardtongue	PENST	<i>Penstemon</i>	39-91	-
17	Forb			39-91	
	touristnlant	DIWI2	<i>Dimorphocarna wislizeni</i>	39-91	-

	buckwheat	ERIOG	<i>Eriogonum</i>	39-91	-
	sunflower	HELIA3	<i>Helianthus</i>	39-91	-
	spiny false fiddleleaf	HYSP	<i>Hydrolea spinosa</i>	39-91	-
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus var. flaccidus</i>	39-91	-
18	Other Forbs			13-65	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	13-65	-

Animal community

This site provides habitat which supports a resident animal population characterized by pronghorn, antelope, black-tailed jackrabbit, spotted ground squirrel, Ord's kangaroo rat, northern grasshopper mouse, southern plains woodrat, badger, meadowlark, roadrunner, white-necked raven, cactus wren, lesser prairie chicken, morning dove, scaled quail, Harris hawk, side blotched lizard, marbled whiptail, Texas horned lizard, western diamondback rattlesnake and ornate box turtle. In the area called Mescalero Sands, there are white-tailed and mule deer.

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

Anthony B

Bluepoint A

Kermit A

Aguena A

Likes A

Pintura A

Recreational uses

This site offers limited recreation potential for hiking, horseback riding, nature observation and photography; game bird, predator, antelope, and deer hunting.

Wood products

This site has no potential for wood products.

Other products

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Shinnery oak is toxic in the late bud or early leaf stage. Shinnery oak will increase, as will sand sagebrush following drought. Changes in the fire return interval have also favored an increase in shrub cover. The dropseeds and bluestem will decrease. This site responds very well to brush management and deferment. This site is well suited to a grazing system that rotates the season of use. Nesting habitat for lesser prairie chicken can be improved by providing residual cover that is at least 14 inches high.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM

100 - 76 2.0 – 3.8

75 – 51 3.0 – 6.0

50 – 26 5.0 – 10.0
 25 – 0 10.1 +

Inventory data references

Other References:

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

Other references

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Pettit, Russell D. 1986. Sand shinnery oak: control and management. Management Note 8. Lubbock, TX: Texas Tech University, College of Agricultural Sciences, Department of Range and Wildlife Management. 5 p.

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Young, Vernon A., Anderwald, Frank R., McCully, Wayne G. 1948. Brush problems on Texas ranges. Miscellaneous Publication 21. College Station, TX: Texas Agricultural Experiment Station. 19 p.

Contributors

Don Sylvester
 Quinn Hodgson

Rangeland health reference sheet

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

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

Indicators

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

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

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

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

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

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

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

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

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

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

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

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

Dominant:

Sub-dominant:

Other:

Additional:

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

decadence):

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

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

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

17. Perennial plant reproductive capability:

Ecological site R070BD003NM Loamy Sand

Accessed: 04/18/2023

General information

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

Figure 1. Mapped extent

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

Associated sites

R070BD004NM	Sandy Sandy
R070BD005NM	Deep Sand Deep Sand

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is on uplands, plains, dunes, fan piedmonts and in inter dunal areas. The parent material consists of mixed alluvium and or eolian sands derived from sedimentary rock. Slope range on this site range from 0 to 9 percent with the average of 5 percent.

Low stabilized dunes may occur occasionally on this site. Elevations range from 2,800 to 5,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Alluvial fan (3) Dune
Elevation	2,800–5,000 ft
Slope	0–9%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity-short duration thunderstorms.

Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes.

The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.

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

Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of this site. Strong winds blow from the southwest from January through June, which accelerates soil drying during a critical period for cool season plant growth.

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

Table 3. Representative climatic features

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

Influencing water features

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

Soil features

Soils are moderately deep or very deep. Surface textures are loamy fine sand, fine sandy loam, loamy very fine sand or gravelly sandy loam.

Subsurface is a loamy fine sand, coarse sandy loam, fine sandy loam or loam that averages less than 18 percent clay and less than 15 percent carbonates.

Substratum is a fine sandy loam or gravelly fine sandy loam with less than 15 percent gravel and with less than 40 percent calcium carbonate. Some layers high in lime or with caliche fragments may occur at depths of 20 to 30 inches.

These soils, if unprotected by plant cover and organic residue, become wind blown and low hummocks are formed.

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

Characteristic soils are:

Maljamar
Berino
Parjarito
Palomas
Wink
Pyote

Table 4. Representative soil features

Surface texture	(1) Fine sand (2) Fine sandy loam (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid

Soil depth	40–72 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–7 in
Calcium carbonate equivalent (0-40in)	3–40%
Electrical conductivity (0-40in)	2–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	4–12%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

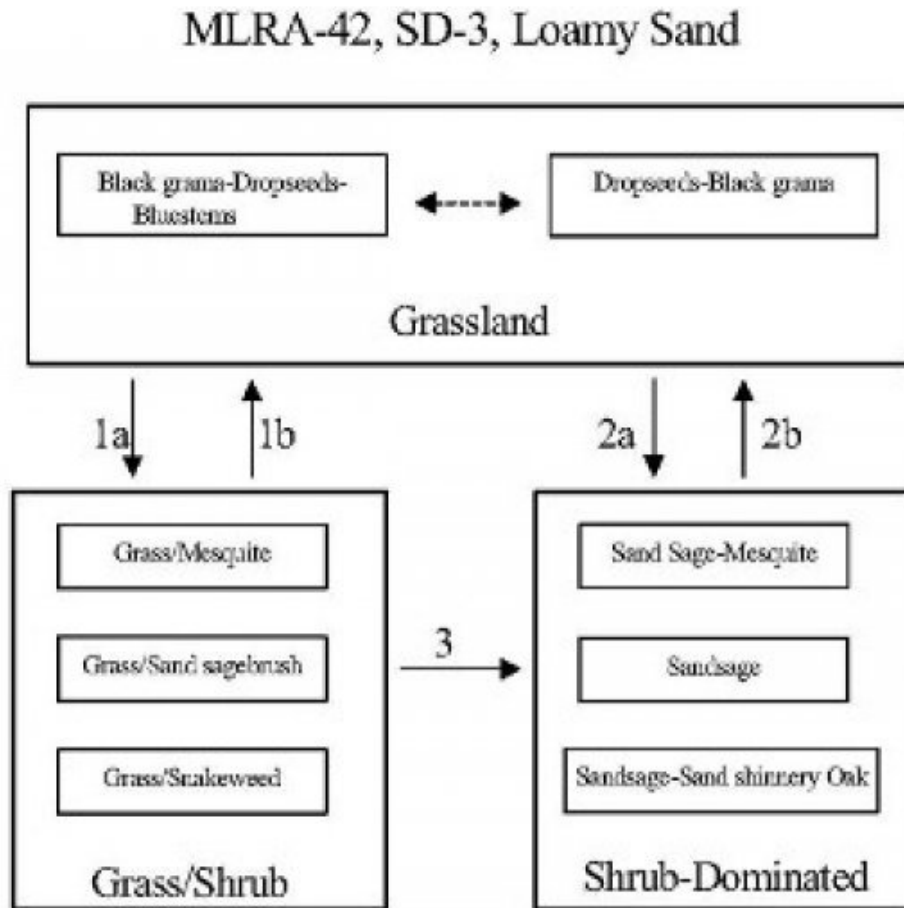
Overview

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

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

State and transition model

Plant Communities and Transitional Pathways (diagram):



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

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

- 3. Continued loss of grass cover, erosion.

**State 1
Historic Climax Plant Community**

**Community 1.1
Historic Climax Plant Community**

Grassland: The historic plant community is a uniformly distributed grassland dominated by black grama, dropseeds, and bluestems. Sand sage and shinnery oak are evenly dispersed throughout the grassland due to the coarse soil

surface texture. Perennial and annual forbs are common but their abundance and distribution are reflective of precipitation. Bluestems initially, followed by black grama, decrease with drought and heavy grazing intensity. Historical fire frequency is unknown but likely occurred enough to remove small shrubs to the competitive advantage of grass species. Fire suppression, drought conditions, and excessive grazing drive most grass species out of competition with shrub species. Diagnosis: Grassland dominated by black grama, dropseeds, and bluestems. Shrubs, such as sand sage, shinnery oak, and mesquite are dispersed throughout the grassland. Forbs are present and populations fluctuate with precipitation variability.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	442	833	1224
Forb	110	208	306
Shrub/Vine	98	184	270
Total	650	1225	1800

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	28%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	22%

Figure 5. Plant community growth curve (percent production by month). NM2803, R042XC003NM-Loamy Sand-HCPC. SD-3 Loamy Sand - Warm season plant community .

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

**State 2
Grass/Shrub**

**Community 2.1
Grass/Shrub**



Grass/Shrub State: The grass/shrub state is dominated by communities of grasses/mesquite, grasses/snakeweed, or grasses/sand sage. Decreases in black grama and bluestem species lead to an increase in bare patches and mesquite which further competes with grass species. An increase of dropseeds and threeawns occurs. Grass distribution becomes more patchy with an absence or severe decrease in black grama and bluestems. Mesquite provides nitrogen and soil organic matter to co-dominant grasses (Ansley and Jacoby 1998, Ansley et al. 1998). Mesquite mortality when exposed to fire is low due to aggressive resprouting abilities. Herbicide application combined with subsequent prescribed fire may be more effective in mesquite reduction (Britton and Wright 1971). **Diagnosis:** This state is dominated by an increased abundance of communities including grass/mesquite, grass/snakeweed, or grass/sand sage. Dropseeds and threeawns have a patchy distribution. **Transition to Grass/Shrub State (1a):** The historic plant community begins to shift toward the grass/shrub state as drivers such as drought, fire suppression, interspecific competition, and excessive grazing contribute to alterations in soil properties and herbaceous cover. Cover loss and surface soil erosion are initial indicators of transition followed by a decrease in black grama with a subsequent increase of dropseeds, threeawns, mesquite, and snakeweed. Snakeweed has been documented to outcompete black grama especially under conditions of fire suppression and drought (McDaniel et al. 1984). Key indicators of approach to transition: • Loss of black grama cover • Surface soil erosion • Bare patch expansion • Increased dropseed/threeawn and mesquite, snakeweed, or sand sage abundances **Transition to Historic Plant Community (1b):** Brush and grazing management may restore the grassland component and reverse shrub or grass/shrub dominated states back toward the historic plant community.

State 3 Shrub Dominated

Community 3.1 Shrub Dominated

Shrub-Dominated State: The shrub-dominated state results from a severe loss of grass cover. This state's primary species is sand sage. Shinnery oak and mesquite also occur; however, grass cover is limited to intershrub distribution. Sand sage stabilizes light sandy soils from wind erosion, which enhances protected grass/forb cover (Davis and Bonham 1979). However, shinnery oak also responds to the sandy soils with dense stands due to an

aggressive rhizome system. Shinnery oak's extensive root system promotes competitive exclusion of grasses and forbs. Sand sage, shinnery oak, and mesquite can be controlled with herbicide (Herbel et al. 1979, Pettit 1986). Transition to Shrub-Dominated (2a): Severe loss of grass species with increased erosion and fire suppression will result in a transition to a shrub-dominated state with sand sage, Shin oak, and honey mesquite directly from the grassland-dominated state. Key indicators of approach to transition: • Severe loss of grass species cover • Surface soil erosion • Bare patch expansion • Increased sand sage, shinnery oak, and mesquite abundance Transition to Historic Plant Community (2b): Brush and grazing management may restore the grassland component and reverse shrub or grass/shrub dominated states back toward the historic plant community. In addition, seeding with native grass species will augment the transition to a grassland-dominated state. Transition to Shrub-Dominated (3): If the grass/shrub site continues to lose grass cover with soil erosion, the site will transition to a shrub-dominated state with sand sage, shinnery oak, and honey mesquite. Key indicators of approach to transition: • Continual loss of dropseeds/threawns cover • Surface soil erosion • Bare patch expansion • Increased sand sage, shinnery oak, and mesquite/dropseed/threawn and mesquite/snakeweed abundance

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			61–123	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	61–123	–
2	Warm Season			37–61	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	37–61	–
3	Warm Season			37–61	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	37–61	–
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	37–61	–
4	Warm Season			123–184	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	123–184	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	123–184	–
5	Warm Season			123–184	
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	123–184	–
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	123–184	–
	fringed signalgrass	URCI	<i>Urochloa ciliatissima</i>	123–184	–
6	Warm Season			123–184	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	123–184	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	123–184	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	123–184	–
7	Warm Season			61–123	
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	61–123	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	61–123	–
9	Other Perennial Grasses			37–61	
	Grass, perennial	2GP	<i>Grass, perennial</i>	37–61	–
Shrub/Vine					
8	Warm Season			37–61	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	37–61	–
	giant dropseed	SPGI	<i>Sporobolus giganteus</i>	37–61	–
10	Shrub			61–123	

	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	61-123	-
	Havard oak	QUHA3	<i>Quercus havardii</i>	61-123	-
11	Shrub			34-61	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	37-61	-
	featherplume	DAFO	<i>Dalea formosa</i>	37-61	-
12	Shrub			37-61	
	jointfir	EPHED	<i>Ephedra</i>	37-61	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	37-61	-
13	Other Shrubs			37-61	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	37-61	-
Forb					
14	Forb			61-123	
	leatherweed	CRPOP	<i>Croton pottsii var. pottsii</i>	61-123	-
	Indian blanket	GAPU	<i>Gaillardia pulchella</i>	61-123	-
	globemallow	SPHAE	<i>Sphaeralcea</i>	61-123	-
15	Forb			12-37	
	woolly groundsel	PACA15	<i>Packera cana</i>	12-37	-
16	Forb			61-123	
	touristplant	DIWI2	<i>Dimorphocarpa wislizeni</i>	61-123	-
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	61-123	-
17	Other Forbs			37-61	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	37-61	-

Animal community

This Ecological Site provides habitat which supports a resident animal community that is characterized by pronghorn antelope, desert cottontail, spotted ground squirrel, black-tailed prairie dog, yellow faced pocket gopher, Ord's kangaroo rat, northern grasshopper mouse, southern plains woodrat, badger, roadrunner, meadowlark, burrowing owl, white necked raven, lesser prairie chicken, morning dove, scaled quail, Harris hawk, side blotched lizard, marbled whiptail, Texas horned lizard, western diamondback rattlesnake, dusty hognose snake and ornate box turtle.

Where mesquite has invaded, most resident birds and scissor-tailed flycatcher, morning dove and Swainson's hawk, nest. Vesper and grasshopper sparrows utilize the site during migration.

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

Berino B

Kinco A

Maljamar B

Pajarito B

Palomas B

Wink B

Pyote A

Recreational uses

This site offers recreation potential for hiking, borseback riding, nature observation, photography and hunting. During years of abundant spring moisture, this site displays a colorful array of wildflowers during May and June.

Wood products

This site has no potential for wood products.

Other products

This site is suitable for grazing by all kinds and classes of livestock at any time of year. In cases where this site has been invaded by brush species it is especially suited for goats. Mismanagement of this site will cause a decrease in species such as the bluestems, black grama, bush muhly, plains bristlegrass, New Mexico feathergrass, Arizona cottontop and fourwing saltbush. A corresponding increase in the dropseeds, windmill grass, fall witchgrass, silver bluestem, sand sagebrush, shinary oak and ephedra will occur. This will also cause an increase in bare ground which will increase soil erodibility. This site will respond well to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM

100 - 76 2.3 – 3.5

75 – 51 3.0 – 4.5

50 – 26 4.6 – 9.0

25 – 0 9.1 +

Inventory data references

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

Other references

Literature Cited:

Ansley, R. J.; Jacoby, P. W. 1998. Manipulation of fire intensity to achieve mesquite management goals in north Texas. In: Pruden, Teresa L.; Brennan, Leonard A., eds. Fire in ecosystem management: shifting the paradigm from suppression to prescription: Proceedings, Tall Timbers fire ecology conference; 1996 May 7-10; Boise, ID. No. 20. Tallahassee, FL: Tall Timbers Research Station: 195-204.

Ansley, R. J.; Jones, D. L.; Tunnell, T. R.; [and others]. 1998. Honey mesquite canopy responses to single winter fires: relation to herbaceous fuel, weather and fire temperature. International Journal of Wildland Fire 8(4):241-252.

Britton, Carlton M.; Wright, Henry A. 1971. Correlation of weather and fuel variables to mesquite damage by fire. Journal of Range Management 24:136-141.

Davis, Joseph H., III and Bonham, Charles D. 1979. Interference of sand sagebrush canopy with needleandthread. Journal of Range Management 32(5):384-386.

Herbel, C. H, Steger, R, Gould, W. L. 1974. Managing semidesert ranges of the Southwest Circular 456. Las Cruces, NM: New Mexico State University, Cooperative Extension Service. 48 p.

McDaniel, Kirk C.; Pieper, Rex D.; Loomis, Lyn E.; Osman, Abdelgader A. 1984. Taxonomy and ecology of perennial snakeweeds in New Mexico. Bulletin 711. Las Cruces, NM: New Mexico State University, Agricultural Experiment Station. 34 p.

McPherson, Guy R. 1995. The role of fire in the desert grasslands. In: McClaran, Mitchel P.; Van Devender, Thomas R., eds. The desert grassland. Tucson, AZ: The University of Arizona Press: 130-151.

Pettit, Russell D. 1986. Sand shinnery oak: control and management. Management Note 8. Lubbock, TX: Texas Tech University, College of Agricultural Sciences, Department of Range and Wildlife Management. 5 p.

Contributors

Don Sylvester
Quinn Hodgson

Rangeland health reference sheet

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

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

Indicators

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

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

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

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

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

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



7. **Amount of litter movement (describe size and distance expected to travel):**
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
-

17. **Perennial plant reproductive capability:**

Cave Lion Booster

Eolian and piedmont deposits:
Interlayered eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits.

Legend

-  deposits
-  Feature 3



APPENDIX C – Daily Field and Sampling Report(s)



Daily Site Visit Report

Client:	Solaris Water Midstream	Inspection Date:	_____
Site Location Name:	Cave Line Booster	Report Run Date:	4/3/2023 10:09 PM
Client Contact Name:	Fernando Carrasco	API #:	_____
Client Contact Phone #:	432-924-9416		
Unique Project ID	_____	Project Owner:	_____
Project Reference #	_____	Project Manager:	_____

Summary of Times

Arrived at Site	_____
Departed Site	4/3/2023 2:30 PM

Daily Site Visit Report



Field Notes

8:04 Arrived on site and filled out safety paperwork.

8:05 Mapped spill extent.

10:25 Met with BDG Crew and Marathon representative and conducted site walkthrough and tailgate safety talk.

10:25 Began hand digging around lines.

Next Steps & Recommendations

1



Daily Site Visit Report

Site Photos

Viewing Direction: South



Descriptive Photo - 1
Viewing Direction: South
Desc: Spill stain looking south from the north.
Created: 4/3/2023 8:08:17 AM
Lat:32.065768, Long:-103.392536

Spill stain looking south from the north.

Viewing Direction: Northeast



Descriptive Photo - 10
Viewing Direction: Northeast
Desc: Lines running through spill.
Created: 4/3/2023 8:18:56 AM
Lat:32.06577, Long:-103.39244

Lines running through spill.

Viewing Direction: East



Descriptive Photo - 11
Viewing Direction: East
Desc: Spill in between compressors.
Created: 4/3/2023 8:17:33 AM
Lat:32.065568, Long:-103.392789

Spill in between compressors.

Viewing Direction: South



Descriptive Photo - 12
Viewing Direction: South
Desc: Hand digging spill area.
Created: 4/3/2023 10:39:53 AM
Lat:32.065337, Long:-103.392444

Hand digging spill area.



Daily Site Visit Report

Viewing Direction: West



Description Photo - 13
Viewing Direction: West
Type: Hand Digging
Created: 4/3/2023 11:35:00 AM
Lat: 32.085351, Long: -103.362441

Hand digging.

Viewing Direction: South



Description Photo - 14
Viewing Direction: South
Type: Scraped vs in scraped areas
Created: 4/3/2023 11:35:00 AM
Lat: 32.085351, Long: -103.362441

Scraped vs in scraped areas.

Viewing Direction: Southwest



Description Photo - 15
Viewing Direction: Southwest
Type: Hand Scraped Area
Created: 4/3/2023 11:35:00 AM
Lat: 32.085351, Long: -103.362441

Hand scraped area.

Viewing Direction: East

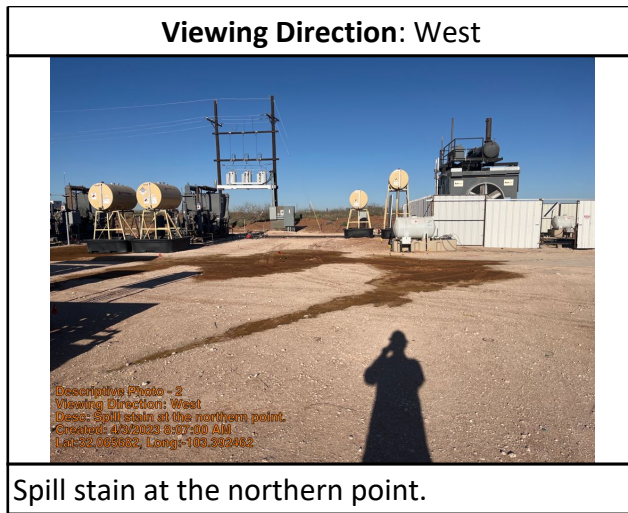


Description Photo - 16
Viewing Direction: East
Type: Hand Scraped Area
Created: 4/3/2023 2:12:11 PM
Lat: 32.085375, Long: -103.362442

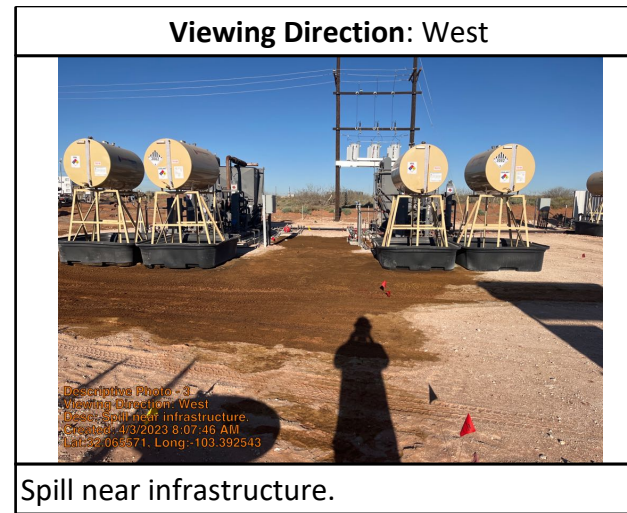
Hand scraped area.



Daily Site Visit Report



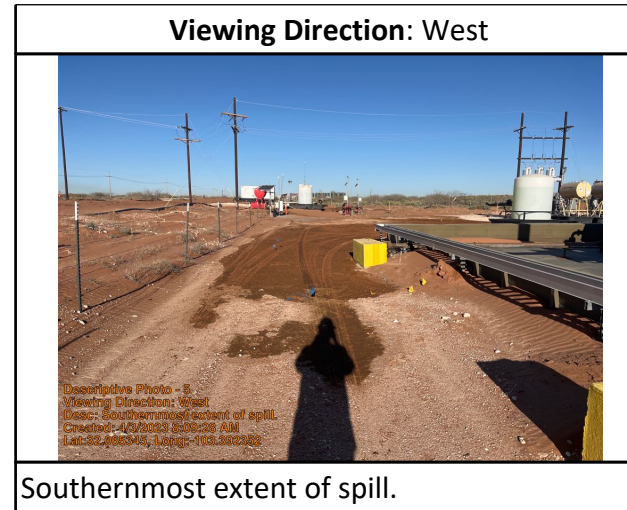
Spill stain at the northern point.



Spill near infrastructure.



Spill



Southernmost extent of spill.



Daily Site Visit Report

Viewing Direction: North



Descriptive Photo - 8
Viewing Direction: North
Desc: Southern portion of spill
Created: 4/3/2023 8:11:56 AM
Lat:32.065411, Long:103.392841

Southern portion of spill.

Viewing Direction: Southwest



Descriptive Photo - 8
Viewing Direction: Southwest
Desc: Point of release off pad.
Created: 4/3/2023 8:11:56 AM
Lat:32.065411, Long:103.392841

Point of release off pad.

Viewing Direction: East



Descriptive Photo - 9
Viewing Direction: East
Desc: Westernmost extent of spill
Created: 4/3/2023 8:11:56 AM
Lat:32.065411, Long:103.392841

Westernmost extent of spill.

Viewing Direction: South



Descriptive Photo - 9
Viewing Direction: South
Desc: Point of release
Created: 4/3/2023 8:11:56 AM
Lat:32.065411, Long:103.392841

Point of release.

Daily Site Visit Report



Daily Site Visit Signature

Inspector: Hunter Klein

Signature:

A handwritten signature in black ink, appearing to read 'Hunter Klein', written over a horizontal line.

Signature



Daily Site Visit Report

Client:	<u>Solaris Water Midstream</u>	Inspection Date:	<u>5/19/2023</u>
Site Location Name:	<u>Cave Line Booster</u>	Report Run Date:	<u>5/19/2023 8:06 PM</u>
Client Contact Name:	<u>Fernando Carrasco</u>	API #:	<u></u>
Client Contact Phone #:	<u>432-924-9416</u>		
Unique Project ID	<u></u>	Project Owner:	<u></u>
Project Reference #	<u></u>	Project Manager:	<u></u>

Summary of Times

Arrived at Site	<u>5/19/2023 9:30 AM</u>
Departed Site	<u>5/19/2023 11:00 AM</u>

Field Notes

- 9:27** Arrived on site and filled out safety paperwork.
- 9:27** Conducted site walkthrough and tailgate safety discussion with BDS crew and Marathon representative.
- 10:03** Removed 18 cubic yards of dirty material in a belly dump truck.
- 10:50** Collected and field screened samples BES23-35 though BES23-40 as well as WES23-08. All were clean and jarred to be sent to lab.
- 10:50** Started backfilling hydrovac lines.

Next Steps & Recommendations

1



Daily Site Visit Report

Site Photos

Viewing Direction: West



Descriptive Photo - 7
Viewing Direction: West
Desc: Finished area in northern portion of excavation.
Created: 5/19/2023 9:28:14 AM
Lat:32.065876, Long:-103.362487

Finished area in northern portion of excavation.

Viewing Direction: West



Descriptive Photo - 10
Viewing Direction: West
Desc: Finished southern portion of excavation at 1.5 A
Created: 5/19/2023 9:33:30 AM
Lat:32.065876, Long:-103.362487

Finished southern portion of excavation at 1.5'.

Viewing Direction: North



Descriptive Photo - 11
Viewing Direction: North
Desc: Finished western portion of excavation off pad at 1.5, 4.0 and 4
Created: 5/19/2023 9:35:00 AM
Lat:32.065876, Long:-103.362487

Finished western portion of excavation off pad at 1.5' and 4'.

Viewing Direction: East



Descriptive Photo - 12
Viewing Direction: East
Desc: Finished western portion of excavation at 4.00 off pa
Created: 5/19/2023 9:35:52 AM
Lat:32.065876, Long:-103.362487

Finished western portion of excavation at 4' off pad.



Daily Site Visit Report

Viewing Direction: South



Descriptive Photo - 13
Viewing Direction: South
Desc: Finished western portion of excavation at 1.5' and 4' off pad.
Created: 6/19/2023 9:36:37 AM
Lat:32.065485, Long:-103.392818

Finished western portion of excavation at 1.5' and 4' off pad.

Viewing Direction: South



Descriptive Photo - 14
Viewing Direction: South
Desc: Hydrovaccated lines to be backfilled.
Created: 6/19/2023 10:52:04 AM
Lat:32.065677, Long:-103.392835

Hydrovaccated lines to be backfilled.

Viewing Direction: North



Descriptive Photo - 15
Viewing Direction: North
Desc: Hydrovaccated lines to be filled.
Created: 6/19/2023 10:52:28 AM
Lat:32.065687, Long:-103.392818

Hydrovaccated lines to be filled.

Viewing Direction: South

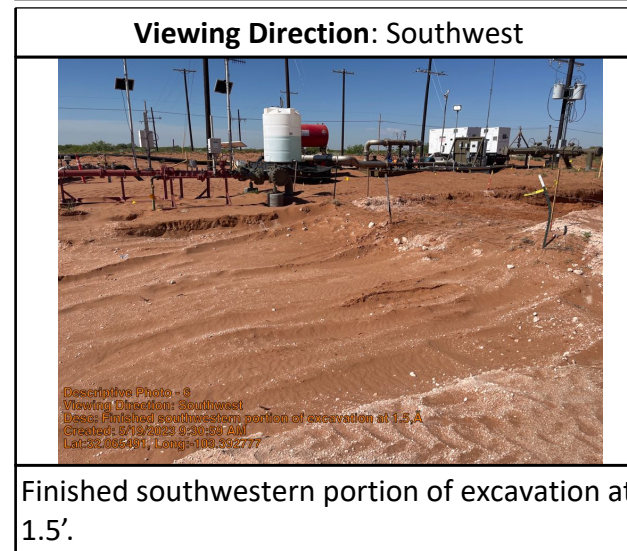
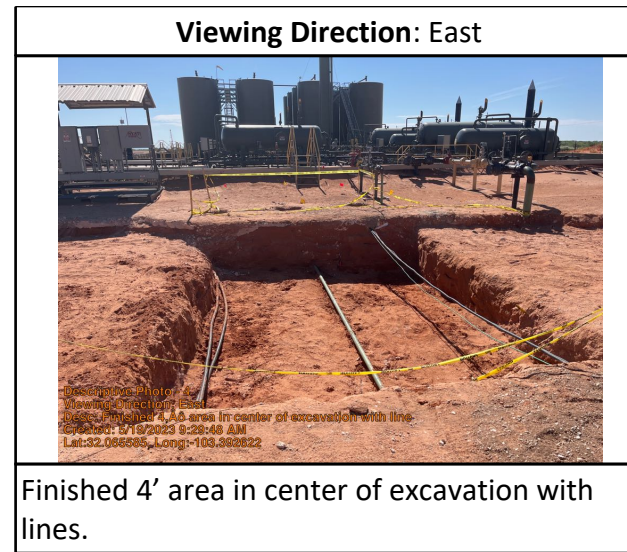
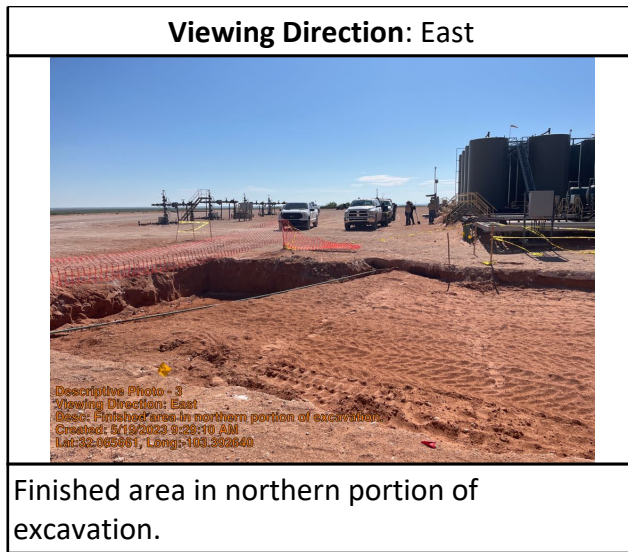


Descriptive Photo - 2
Viewing Direction: South
Desc: Finished area in northern portion of excavation.
Created: 6/19/2023 9:28:45 AM
Lat:32.065786, Long:-103.392849

Finished area in northern portion of excavation.



Daily Site Visit Report





Daily Site Visit Report

Viewing Direction: Northeast



Descriptive Photo - 7
Viewing Direction: Northeast
Desc: Finished southern portion of excavation.
Created: 6/19/2023 9:17:39 AM
Lat:32.065336, Long:-103.222741

Finished southern portion of excavation.

Viewing Direction: East



Descriptive Photo - 8
Viewing Direction: East
Desc: Finished southeastern portion of excavation at 1.5 A
Created: 6/19/2023 9:33:17 AM
Lat:32.065336, Long:-103.222821

Finished southeastern portion of excavation at 1.5'.

Viewing Direction: West



Descriptive Photo - 9
Viewing Direction: West
Desc: Finished southeastern portion of excavation at 1.5 A
Created: 6/19/2023 9:34:17 AM
Lat:32.065336, Long:-103.222828

Finished southeastern portion of excavation at 1.5'.

Daily Site Visit Report



Daily Site Visit Signature

Inspector: Hunter Klein

Signature:

A handwritten signature in black ink, appearing to read 'Hunter Klein', written over a horizontal line.

Signature

APPENDIX D – Notification(s)



Dhugal Hanton <vertexresourcegroupusa@gmail.com>

48-Hour Notification - Cave-Lion Booster

1 message

Dhugal Hanton <vertexresourcegroupusa@gmail.com>

Thu, Apr 20, 2023 at 3:04 PM

To: "Enviro, OCD, EMNRD" <OCD.Enviro@state.nm.us>

Cc: rob.kirk@ariswater.com

Bcc: HKlein@vertex.ca

All,

Please accept this email as notification that Vertex Resource Services has scheduled a sampling event to be conducted at the following release.

nAPP2308529277

On Tuesday, April 25, 2023, Hunter Klein will be on-site to conduct confirmation sampling. The sampling will continue through Friday, April 28, 2023. He can be reached at 575-263-3124. If you need directions to the site, please do not hesitate to contact him. If you have any questions regarding this notification, please call me at 575-988-1472.

Thank you,

Chance Dixon B.Sc.

Project Manager

Vertex Resource Services Inc.

3101 Boyd Drive,

Carlsbad, NM 88220

C 575.988.1472



Dhugal Hanton <vertexresourcegroupusa@gmail.com>

48-Hour Notification - Cave-Lion Booster

1 message

Dhugal Hanton <vertexresourcegroupusa@gmail.com>
To: "Enviro, OCD, EMNRD" <OCD.Enviro@emnrd.nm.gov>
Cc: rob.kirk@ariswater.com
Bcc: HKlein@vertex.ca

Thu, Apr 27, 2023 at 8:47 AM

All,

Please accept this email as notification that Vertex Resource Services has scheduled a sampling event to be conducted at the following release.

nAPP2308529277

On Monday, May 1, 2023, Hunter Klein will be on-site to conduct confirmation sampling. The sampling will continue through Friday, May 5, 2023. He can be reached at 575-263-3124. If you need directions to the site, please do not hesitate to contact him. If you have any questions regarding this notification, please call me at 575-988-1472.

Thank you,

Chance Dixon B.Sc.
Project Manager

Vertex Resource Services Inc.
3101 Boyd Drive,
Carlsbad, NM 88220

C 575.988.1472



Dhugal Hanton <vertexresourcegroupusa@gmail.com>

48-Hour Notification - Cave-Lion Booster

4 messages

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C 575.988.1472

Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
To: Dhugal Hanton <vertexresourcegroupusa@gmail.com>

Fri, Apr 28, 2023 at 2:32 PM

Chance,

Please be aware that notification requirements are **two business days**, per rule. You may proceed on your schedule. This, and all correspondence, should be included in the closure report to insure inclusion in the project file.

JH

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

[http:// www.emnrd.nm.gov](http://www.emnrd.nm.gov)



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Subject: [EXTERNAL] 48-Hour Notification - Cave-Lion Booster

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

[Quoted text hidden]

Dhugal Hanton <vertexresourcegroupusa@gmail.com>
To: "Enviro, OCD, EMNRD" <OCD.Enviro@emnrd.nm.gov>

Fri, May 5, 2023 at 11:10 AM

Good morning,

Vertex respectfully requests that confirmation sampling for this event be extended to Monday, May 8, 2023, through Friday, May 12, 2023.

Thank you,
[Quoted text hidden]

Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
To: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Cc: "Bratcher, Michael, EMNRD" <mike.bratcher@emnrd.nm.gov>, "Nobui, Jennifer, EMNRD" <Jennifer.Nobui@emnrd.nm.gov>

Fri, May 5, 2023 at 12:01 PM

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Thank you,
[Quoted text hidden]

Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
To: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Cc: "Bratcher, Michael, EMNRD" <mike.bratcher@emnrd.nm.gov>, "Nobui, Jennifer, EMNRD" <Jennifer.Nobui@emnrd.nm.gov>

Fri, May 5, 2023 at 12:01 PM

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http:// www.emnrd.nm.gov



From: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Sent: Friday, May 5, 2023 11:10 AM
To: Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
Subject: [EXTERNAL] Re: 48-Hour Notification - Cave-Lion Booster

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

Good morning,

[Quoted text hidden]
[Quoted text hidden]

Dhugal Hanton <vertexresourcegroupusa@gmail.com>
To: "Enviro, OCD, EMNRD" <OCD.Enviro@emnrd.nm.gov>

Thu, May 11, 2023 at 8:17 AM

Good morning,

Vertex respectfully requests that confirmation sampling for this event be extended to Monday, May 15, 2023, at 9:00 a.m. to Friday, May 19, 2023.

Thank you,

Chance Dixon B.Sc.
Project Manager

Vertex Resource Services Inc.
3101 Boyd Drive,
Carlsbad, NM 88220

C 575.988.1472
[Quoted text hidden]

Enviro, OCD, EMNRD <OCD.Enviro@emnrd.nm.gov>
To: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Cc: "Bratcher, Michael, EMNRD" <mike.bratcher@emnrd.nm.gov>

Thu, May 11, 2023 at 10:53 AM

Chance,

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

[Quoted text hidden]

Dhugal Hanton <vertexresourcegroupusa@gmail.com>
To: "Enviro, OCD, EMNRD" <OCD.Enviro@emnrd.nm.gov>

Mon, May 22, 2023 at 9:33 AM

Good morning,

Vertex respectfully requests that confirmation sampling for this event be extended to Wednesday, May 24, 2023 at 12:00 P.M.

Thank you,

Chance Dixon B.Sc.
Project Manager

Vertex Resource Services Inc.
3101 Boyd Drive,
Carlsbad, NM 88220

C 575.988.1472
[Quoted text hidden]

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



Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 4/17/2023 1:53:19 PM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4496-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



Generated
4/17/2023 1:53:19 PM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4496-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Job ID: 890-4496-1

Laboratory: Eurofins Carlsbad**Narrative****Job Narrative
890-4496-1****Receipt**

The samples were received on 4/11/2023 3:47 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 7.0°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BH23-01 0' (890-4496-1), BH23-01 2' (890-4496-2), BH23-01 4' (890-4496-3), BH23-02 0' (890-4496-4), BH23-02 2' (890-4496-5), BH23-02 4' (890-4496-6), BH23-03 0' (890-4496-7), BH23-03 2' (890-4496-8), BH23-03 4' (890-4496-9), BH23-04 0' (890-4496-10), BH23-04 2' (890-4496-11), BH23-04 4' (890-4496-12), BH23-05 0' (890-4496-13), BH23-05 2' (890-4496-14) and BH23-05 4' (890-4496-15).

GC VOA

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-51080 and analytical batch 880-51008 was outside the upper control limits.

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

HPLC/IC

Method 300_ORGFM_28D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-51081 and 880-51081 and analytical batch 880-51169 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits. BH23-01 0' (890-4496-1), BH23-01 2' (890-4496-2), BH23-01 4' (890-4496-3), BH23-02 0' (890-4496-4), BH23-02 2' (890-4496-5), (880-27135-A-11-A), (880-27135-A-11-B MS) and (880-27135-A-11-C MSD)

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



Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-01 0'

Lab Sample ID: 890-4496-1

Date Collected: 04/11/23 08:00

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:02	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:02	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:02	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 13:02	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 13:02	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130	04/13/23 12:06	04/14/23 13:02	1
1,4-Difluorobenzene (Surr)	90		70 - 130	04/13/23 12:06	04/14/23 13:02	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	517		49.9		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 21:31	1
Diesel Range Organics (Over C10-C28)	517		49.9		mg/Kg		04/13/23 13:33	04/13/23 21:31	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 21:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	128		70 - 130	04/13/23 13:33	04/13/23 21:31	1
o-Terphenyl	105		70 - 130	04/13/23 13:33	04/13/23 21:31	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	207		5.01		mg/Kg			04/14/23 02:53	1

Client Sample ID: BH23-01 2'

Lab Sample ID: 890-4496-2

Date Collected: 04/11/23 08:05

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:22	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:22	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:22	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 13:22	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 13:22	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 13:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130	04/13/23 12:06	04/14/23 13:22	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-01 2'

Lab Sample ID: 890-4496-2

Date Collected: 04/11/23 08:05

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	78		70 - 130	04/13/23 12:06	04/14/23 13:22	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:37	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:37	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	113		70 - 130	04/13/23 13:33	04/13/23 22:37	1
o-Terphenyl	91		70 - 130	04/13/23 13:33	04/13/23 22:37	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	149		4.95		mg/Kg			04/14/23 02:58	1

Client Sample ID: BH23-01 4'

Lab Sample ID: 890-4496-3

Date Collected: 04/11/23 08:10

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 13:43	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 13:43	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 13:43	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 13:43	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 13:43	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 13:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130	04/13/23 12:06	04/14/23 13:43	1
1,4-Difluorobenzene (Surr)	99		70 - 130	04/13/23 12:06	04/14/23 13:43	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-01 4'

Lab Sample ID: 890-4496-3

Date Collected: 04/11/23 08:10

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:59	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:59	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/13/23 22:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	110		70 - 130				04/13/23 13:33	04/13/23 22:59	1
o-Terphenyl	91		70 - 130				04/13/23 13:33	04/13/23 22:59	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	101		4.98		mg/Kg			04/14/23 03:03	1

Client Sample ID: BH23-02 0'

Lab Sample ID: 890-4496-4

Date Collected: 04/11/23 08:15

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
Toluene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 14:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130				04/13/23 12:06	04/14/23 14:03	1
1,4-Difluorobenzene (Surr)	78		70 - 130				04/13/23 12:06	04/14/23 14:03	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	134		49.8		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/13/23 23:22	1
Diesel Range Organics (Over C10-C28)	134		49.8		mg/Kg		04/13/23 13:33	04/13/23 23:22	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/13/23 23:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	109		70 - 130				04/13/23 13:33	04/13/23 23:22	1
o-Terphenyl	88		70 - 130				04/13/23 13:33	04/13/23 23:22	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

Client Sample ID: BH23-02 0'

Lab Sample ID: 890-4496-4

Date Collected: 04/11/23 08:15

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2220		25.0		mg/Kg			04/14/23 03:07	5

Client Sample ID: BH23-02 2'

Lab Sample ID: 890-4496-5

Date Collected: 04/11/23 08:20

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 14:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		70 - 130				04/13/23 12:06	04/14/23 14:24	1
1,4-Difluorobenzene (Surr)	96		70 - 130				04/13/23 12:06	04/14/23 14:24	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/13/23 23:45	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/13/23 23:45	1
Oll Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/13/23 23:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	115		70 - 130				04/13/23 13:33	04/13/23 23:45	1
o-Terphenyl	94		70 - 130				04/13/23 13:33	04/13/23 23:45	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	120		5.02		mg/Kg			04/14/23 03:12	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-02 4'

Lab Sample ID: 890-4496-6

Date Collected: 04/11/23 08:25

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 15:51	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 15:51	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 15:51	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 15:51	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 15:51	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 15:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		70 - 130	04/13/23 12:06	04/14/23 15:51	1
1,4-Difluorobenzene (Surr)	94		70 - 130	04/13/23 12:06	04/14/23 15:51	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:07	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:07	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	113		70 - 130	04/13/23 13:33	04/14/23 00:07	1
o-Terphenyl	94		70 - 130	04/13/23 13:33	04/14/23 00:07	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	125		5.01		mg/Kg			04/14/23 18:56	1

Client Sample ID: BH23-03 0'

Lab Sample ID: 890-4496-7

Date Collected: 04/11/23 08:30

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 16:11	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 16:11	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 16:11	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 16:11	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 16:11	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 16:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130	04/13/23 12:06	04/14/23 16:11	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-03 0'

Lab Sample ID: 890-4496-7

Date Collected: 04/11/23 08:30

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	98		70 - 130	04/13/23 12:06	04/14/23 16:11	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:29	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:29	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 00:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	113		70 - 130	04/13/23 13:33	04/14/23 00:29	1
o-Terphenyl	92		70 - 130	04/13/23 13:33	04/14/23 00:29	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	73.5		4.95		mg/Kg			04/14/23 19:10	1

Client Sample ID: BH23-03 2'

Lab Sample ID: 890-4496-8

Date Collected: 04/11/23 08:35

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 16:32	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 16:32	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 16:32	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 16:32	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 16:32	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 16:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130	04/13/23 12:06	04/14/23 16:32	1
1,4-Difluorobenzene (Surr)	90		70 - 130	04/13/23 12:06	04/14/23 16:32	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-03 2'

Lab Sample ID: 890-4496-8

Date Collected: 04/11/23 08:35

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 00:51	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 00:51	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 00:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	112		70 - 130				04/13/23 13:33	04/14/23 00:51	1
o-Terphenyl	92		70 - 130				04/13/23 13:33	04/14/23 00:51	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	86.6		5.03		mg/Kg			04/14/23 19:15	1

Client Sample ID: BH23-03 4'

Lab Sample ID: 890-4496-9

Date Collected: 04/11/23 08:40

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
Toluene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 16:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	119		70 - 130				04/13/23 12:06	04/14/23 16:52	1
1,4-Difluorobenzene (Surr)	107		70 - 130				04/13/23 12:06	04/14/23 16:52	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 01:13	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 01:13	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 01:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	107		70 - 130				04/13/23 13:33	04/14/23 01:13	1
o-Terphenyl	90		70 - 130				04/13/23 13:33	04/14/23 01:13	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-03 4'

Lab Sample ID: 890-4496-9

Date Collected: 04/11/23 08:40

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	186		5.05		mg/Kg			04/14/23 19:20	1

Client Sample ID: BH23-04 0'

Lab Sample ID: 890-4496-10

Date Collected: 04/11/23 08:45

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 17:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	114		70 - 130				04/13/23 12:06	04/14/23 17:13	1
1,4-Difluorobenzene (Surr)	92		70 - 130				04/13/23 12:06	04/14/23 17:13	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/14/23 17:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 01:35	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 01:35	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/14/23 01:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	110		70 - 130				04/13/23 13:33	04/14/23 01:35	1
o-Terphenyl	94		70 - 130				04/13/23 13:33	04/14/23 01:35	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	929		5.02		mg/Kg			04/14/23 19:25	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-04 2'

Lab Sample ID: 890-4496-11

Date Collected: 04/11/23 08:50

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:33	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:33	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:33	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 17:33	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 17:33	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130	04/13/23 12:06	04/14/23 17:33	1
1,4-Difluorobenzene (Surr)	80		70 - 130	04/13/23 12:06	04/14/23 17:33	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/16/23 11:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:19	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:19	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	128		70 - 130	04/13/23 13:33	04/14/23 02:19	1
o-Terphenyl	111		70 - 130	04/13/23 13:33	04/14/23 02:19	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2590		24.9		mg/Kg			04/14/23 19:40	5

Client Sample ID: BH23-04 4'

Lab Sample ID: 890-4496-12

Date Collected: 04/11/23 08:55

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:54	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:54	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:54	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 17:54	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 17:54	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 17:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130	04/13/23 12:06	04/14/23 17:54	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-04 4'

Lab Sample ID: 890-4496-12

Date Collected: 04/11/23 08:55

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	101		70 - 130	04/13/23 12:06	04/14/23 17:54	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/16/23 11:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:41	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:41	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 02:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	125		70 - 130	04/13/23 13:33	04/14/23 02:41	1
o-Terphenyl	108		70 - 130	04/13/23 13:33	04/14/23 02:41	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1000		5.04		mg/Kg			04/14/23 19:44	1

Client Sample ID: BH23-05 0'

Lab Sample ID: 890-4496-13

Date Collected: 04/11/23 09:00

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 18:14	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 18:14	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 18:14	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 18:14	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:06	04/14/23 18:14	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:06	04/14/23 18:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130	04/13/23 12:06	04/14/23 18:14	1
1,4-Difluorobenzene (Surr)	105		70 - 130	04/13/23 12:06	04/14/23 18:14	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/16/23 11:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

Client Sample ID: BH23-05 0'

Lab Sample ID: 890-4496-13

Date Collected: 04/11/23 09:00

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:04	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:04	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	122		70 - 130				04/13/23 13:33	04/14/23 03:04	1
o-Terphenyl	105		70 - 130				04/13/23 13:33	04/14/23 03:04	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	62.3		4.99		mg/Kg			04/14/23 19:49	1

Client Sample ID: BH23-05 2'

Lab Sample ID: 890-4496-14

Date Collected: 04/11/23 09:05

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
Toluene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:06	04/14/23 18:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		70 - 130				04/13/23 12:06	04/14/23 18:35	1
1,4-Difluorobenzene (Surr)	97		70 - 130				04/13/23 12:06	04/14/23 18:35	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			04/16/23 11:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 03:26	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 03:26	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/13/23 13:33	04/14/23 03:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	107		70 - 130				04/13/23 13:33	04/14/23 03:26	1
o-Terphenyl	90		70 - 130				04/13/23 13:33	04/14/23 03:26	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-05 2'

Lab Sample ID: 890-4496-14

Date Collected: 04/11/23 09:05

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 2

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	61.6		4.96		mg/Kg			04/14/23 19:54	1

Client Sample ID: BH23-05 4'

Lab Sample ID: 890-4496-15

Date Collected: 04/11/23 09:10

Matrix: Solid

Date Received: 04/11/23 15:47

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
Toluene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
Xylenes, Total	<0.00404	U	0.00404		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
m-Xylene & p-Xylene	<0.00404	U	0.00404		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:06	04/14/23 18:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130				04/13/23 12:06	04/14/23 18:55	1
1,4-Difluorobenzene (Surr)	96		70 - 130				04/13/23 12:06	04/14/23 18:55	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			04/16/23 11:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/14/23 12:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:49	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:49	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/13/23 13:33	04/14/23 03:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	120		70 - 130				04/13/23 13:33	04/14/23 03:49	1
o-Terphenyl	102		70 - 130				04/13/23 13:33	04/14/23 03:49	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	104		5.05		mg/Kg			04/14/23 19:59	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
880-27132-A-1-A MS	Matrix Spike	90	118
880-27132-A-1-B MSD	Matrix Spike Duplicate	109	111
890-4496-1	BH23-01 0'	89	90
890-4496-2	BH23-01 2'	106	78
890-4496-3	BH23-01 4'	100	99
890-4496-4	BH23-02 0'	103	78
890-4496-5	BH23-02 2'	86	96
890-4496-6	BH23-02 4'	82	94
890-4496-7	BH23-03 0'	72	98
890-4496-8	BH23-03 2'	92	90
890-4496-9	BH23-03 4'	119	107
890-4496-10	BH23-04 0'	114	92
890-4496-11	BH23-04 2'	105	80
890-4496-12	BH23-04 4'	101	101
890-4496-13	BH23-05 0'	103	105
890-4496-14	BH23-05 2'	109	97
890-4496-15	BH23-05 4'	103	96
LCS 880-51069/1-A	Lab Control Sample	108	110
LCSD 880-51069/2-A	Lab Control Sample Dup	88	114
MB 880-51069/5-A	Method Blank	71	73

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
890-4496-1	BH23-01 0'	128	105
890-4496-1 MS	BH23-01 0'	117	85
890-4496-1 MSD	BH23-01 0'	117	85
890-4496-2	BH23-01 2'	113	91
890-4496-3	BH23-01 4'	110	91
890-4496-4	BH23-02 0'	109	88
890-4496-5	BH23-02 2'	115	94
890-4496-6	BH23-02 4'	113	94
890-4496-7	BH23-03 0'	113	92
890-4496-8	BH23-03 2'	112	92
890-4496-9	BH23-03 4'	107	90
890-4496-10	BH23-04 0'	110	94
890-4496-11	BH23-04 2'	128	111
890-4496-12	BH23-04 4'	125	108
890-4496-13	BH23-05 0'	122	105
890-4496-14	BH23-05 2'	107	90
890-4496-15	BH23-05 4'	120	102
LCS 880-51080/2-A	Lab Control Sample	106	87
LCSD 880-51080/3-A	Lab Control Sample Dup	114	86

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Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

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

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	1CO1 (70-130)	OTPH1 (70-130)
MB 880-51080/1-A	Method Blank	132 S1+	114

Surrogate Legend

1CO = 1-Chlorooctane
OTPH = o-Terphenyl

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

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-51069/5-A
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51069

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 10:58	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 10:58	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 10:58	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 10:58	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:06	04/14/23 10:58	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:06	04/14/23 10:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	71		70 - 130	04/13/23 12:06	04/14/23 10:58	1
1,4-Difluorobenzene (Surr)	73		70 - 130	04/13/23 12:06	04/14/23 10:58	1

Lab Sample ID: LCS 880-51069/1-A
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51069

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1115		mg/Kg		111	70 - 130
Ethylbenzene	0.100	0.09875		mg/Kg		99	70 - 130
Toluene	0.100	0.09854		mg/Kg		99	70 - 130
m-Xylene & p-Xylene	0.200	0.2095		mg/Kg		105	70 - 130
o-Xylene	0.100	0.1054		mg/Kg		105	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,4-Difluorobenzene (Surr)	110		70 - 130

Lab Sample ID: LCSD 880-51069/2-A
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51069

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1189		mg/Kg		119	70 - 130	6	35
Ethylbenzene	0.100	0.08992		mg/Kg		90	70 - 130	9	35
Toluene	0.100	0.09780		mg/Kg		98	70 - 130	1	35
m-Xylene & p-Xylene	0.200	0.1802		mg/Kg		90	70 - 130	15	35
o-Xylene	0.100	0.09016		mg/Kg		90	70 - 130	16	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	88		70 - 130
1,4-Difluorobenzene (Surr)	114		70 - 130

Lab Sample ID: 880-27132-A-1-A MS
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 51069

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00198	U	0.0998	0.1045		mg/Kg		105	70 - 130
Ethylbenzene	<0.00198	U	0.0998	0.07800		mg/Kg		78	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

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

Lab Sample ID: 880-27132-A-1-A MS
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 51069

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec
	Result	Qualifier		Result	Qualifier				
Toluene	<0.00198	U	0.0998	0.08433		mg/Kg		85	70 - 130
m-Xylene & p-Xylene	<0.00396	U	0.200	0.1542		mg/Kg		77	70 - 130
o-Xylene	<0.00198	U	0.0998	0.07643		mg/Kg		77	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	90		70 - 130
1,4-Difluorobenzene (Surr)	118		70 - 130

Lab Sample ID: 880-27132-A-1-B MSD
Matrix: Solid
Analysis Batch: 51139

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 51069

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Benzene	<0.00198	U	0.100	0.1041		mg/Kg		104	70 - 130	0		35
Ethylbenzene	<0.00198	U	0.100	0.09603		mg/Kg		96	70 - 130	21		35
Toluene	<0.00198	U	0.100	0.09485		mg/Kg		95	70 - 130	12		35
m-Xylene & p-Xylene	<0.00396	U	0.200	0.2017		mg/Kg		101	70 - 130	27		35
o-Xylene	<0.00198	U	0.100	0.1015		mg/Kg		101	70 - 130	28		35

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	109		70 - 130
1,4-Difluorobenzene (Surr)	111		70 - 130

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

Lab Sample ID: MB 880-51080/1-A
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51080

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/13/23 20:24	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/13/23 20:24	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/13/23 13:33	04/13/23 20:24	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1-Chlorooctane	132	S1+	70 - 130	04/13/23 13:33	04/13/23 20:24	1
o-Terphenyl	114		70 - 130	04/13/23 13:33	04/13/23 20:24	1

Lab Sample ID: LCS 880-51080/2-A
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51080

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
Gasoline Range Organics (GRO)-C6-C10	1000	822.6		mg/Kg		82	70 - 130
Diesel Range Organics (Over C10-C28)	1000	895.5		mg/Kg		90	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-51080/2-A
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51080

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	106		70 - 130
o-Terphenyl	87		70 - 130

Lab Sample ID: LCSD 880-51080/3-A
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51080

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	857.3		mg/Kg		86	70 - 130	4		20
Diesel Range Organics (Over C10-C28)	1000	923.0		mg/Kg		92	70 - 130	3		20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	114		70 - 130
o-Terphenyl	86		70 - 130

Lab Sample ID: 890-4496-1 MS
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: BH23-01 0'
Prep Type: Total/NA
Prep Batch: 51080

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	998	1145		mg/Kg		115	70 - 130	
Diesel Range Organics (Over C10-C28)	517		998	1367		mg/Kg		85	70 - 130	

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	117		70 - 130
o-Terphenyl	85		70 - 130

Lab Sample ID: 890-4496-1 MSD
Matrix: Solid
Analysis Batch: 51008

Client Sample ID: BH23-01 0'
Prep Type: Total/NA
Prep Batch: 51080

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	999	1099		mg/Kg		110	70 - 130	4
Diesel Range Organics (Over C10-C28)	517		999	1380		mg/Kg		86	70 - 130	1

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	117		70 - 130
o-Terphenyl	85		70 - 130

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-51081/1-A
Matrix: Solid
Analysis Batch: 51169

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			04/14/23 00:47	1

Lab Sample ID: LCS 880-51081/2-A
Matrix: Solid
Analysis Batch: 51169

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	240.1		mg/Kg		96	90 - 110

Lab Sample ID: LCSD 880-51081/3-A
Matrix: Solid
Analysis Batch: 51169

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	240.8		mg/Kg		96	90 - 110	0	20

Lab Sample ID: 880-27135-A-11-B MS
Matrix: Solid
Analysis Batch: 51169

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	11400	F1	5040	15730	F1	mg/Kg		87	90 - 110

Lab Sample ID: 880-27135-A-11-C MSD
Matrix: Solid
Analysis Batch: 51169

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	11400	F1	5040	15740	F1	mg/Kg		87	90 - 110	0	20

Lab Sample ID: MB 880-51083/1-A
Matrix: Solid
Analysis Batch: 51215

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			04/14/23 18:42	1

Lab Sample ID: LCS 880-51083/2-A
Matrix: Solid
Analysis Batch: 51215

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	237.5		mg/Kg		95	90 - 110

Lab Sample ID: LCSD 880-51083/3-A
Matrix: Solid
Analysis Batch: 51215

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	239.3		mg/Kg		96	90 - 110	1	20

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QC Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 890-4496-6 MS
 Matrix: Solid
 Analysis Batch: 51215

Client Sample ID: BH23-02 4'
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	125		251	353.0		mg/Kg		91	90 - 110

Lab Sample ID: 890-4496-6 MSD
 Matrix: Solid
 Analysis Batch: 51215

Client Sample ID: BH23-02 4'
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	125		251	355.5		mg/Kg		92	90 - 110	1	20

- 1
- 2
- 3
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- 5
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- 9
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- 11
- 12
- 13
- 14

QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

GC VOA

Prep Batch: 51069

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	5035	
890-4496-2	BH23-01 2'	Total/NA	Solid	5035	
890-4496-3	BH23-01 4'	Total/NA	Solid	5035	
890-4496-4	BH23-02 0'	Total/NA	Solid	5035	
890-4496-5	BH23-02 2'	Total/NA	Solid	5035	
890-4496-6	BH23-02 4'	Total/NA	Solid	5035	
890-4496-7	BH23-03 0'	Total/NA	Solid	5035	
890-4496-8	BH23-03 2'	Total/NA	Solid	5035	
890-4496-9	BH23-03 4'	Total/NA	Solid	5035	
890-4496-10	BH23-04 0'	Total/NA	Solid	5035	
890-4496-11	BH23-04 2'	Total/NA	Solid	5035	
890-4496-12	BH23-04 4'	Total/NA	Solid	5035	
890-4496-13	BH23-05 0'	Total/NA	Solid	5035	
890-4496-14	BH23-05 2'	Total/NA	Solid	5035	
890-4496-15	BH23-05 4'	Total/NA	Solid	5035	
MB 880-51069/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-51069/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCS 880-51069/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-27132-A-1-A MS	Matrix Spike	Total/NA	Solid	5035	
880-27132-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 51139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	8021B	51069
890-4496-2	BH23-01 2'	Total/NA	Solid	8021B	51069
890-4496-3	BH23-01 4'	Total/NA	Solid	8021B	51069
890-4496-4	BH23-02 0'	Total/NA	Solid	8021B	51069
890-4496-5	BH23-02 2'	Total/NA	Solid	8021B	51069
890-4496-6	BH23-02 4'	Total/NA	Solid	8021B	51069
890-4496-7	BH23-03 0'	Total/NA	Solid	8021B	51069
890-4496-8	BH23-03 2'	Total/NA	Solid	8021B	51069
890-4496-9	BH23-03 4'	Total/NA	Solid	8021B	51069
890-4496-10	BH23-04 0'	Total/NA	Solid	8021B	51069
890-4496-11	BH23-04 2'	Total/NA	Solid	8021B	51069
890-4496-12	BH23-04 4'	Total/NA	Solid	8021B	51069
890-4496-13	BH23-05 0'	Total/NA	Solid	8021B	51069
890-4496-14	BH23-05 2'	Total/NA	Solid	8021B	51069
890-4496-15	BH23-05 4'	Total/NA	Solid	8021B	51069
MB 880-51069/5-A	Method Blank	Total/NA	Solid	8021B	51069
LCS 880-51069/1-A	Lab Control Sample	Total/NA	Solid	8021B	51069
LCS 880-51069/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	51069
880-27132-A-1-A MS	Matrix Spike	Total/NA	Solid	8021B	51069
880-27132-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	51069

Analysis Batch: 51225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	Total BTEX	
890-4496-2	BH23-01 2'	Total/NA	Solid	Total BTEX	
890-4496-3	BH23-01 4'	Total/NA	Solid	Total BTEX	
890-4496-4	BH23-02 0'	Total/NA	Solid	Total BTEX	
890-4496-5	BH23-02 2'	Total/NA	Solid	Total BTEX	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

GC VOA (Continued)

Analysis Batch: 51225 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-6	BH23-02 4'	Total/NA	Solid	Total BTEX	
890-4496-7	BH23-03 0'	Total/NA	Solid	Total BTEX	
890-4496-8	BH23-03 2'	Total/NA	Solid	Total BTEX	
890-4496-9	BH23-03 4'	Total/NA	Solid	Total BTEX	
890-4496-10	BH23-04 0'	Total/NA	Solid	Total BTEX	
890-4496-11	BH23-04 2'	Total/NA	Solid	Total BTEX	
890-4496-12	BH23-04 4'	Total/NA	Solid	Total BTEX	
890-4496-13	BH23-05 0'	Total/NA	Solid	Total BTEX	
890-4496-14	BH23-05 2'	Total/NA	Solid	Total BTEX	
890-4496-15	BH23-05 4'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 51008

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	8015B NM	51080
890-4496-2	BH23-01 2'	Total/NA	Solid	8015B NM	51080
890-4496-3	BH23-01 4'	Total/NA	Solid	8015B NM	51080
890-4496-4	BH23-02 0'	Total/NA	Solid	8015B NM	51080
890-4496-5	BH23-02 2'	Total/NA	Solid	8015B NM	51080
890-4496-6	BH23-02 4'	Total/NA	Solid	8015B NM	51080
890-4496-7	BH23-03 0'	Total/NA	Solid	8015B NM	51080
890-4496-8	BH23-03 2'	Total/NA	Solid	8015B NM	51080
890-4496-9	BH23-03 4'	Total/NA	Solid	8015B NM	51080
890-4496-10	BH23-04 0'	Total/NA	Solid	8015B NM	51080
890-4496-11	BH23-04 2'	Total/NA	Solid	8015B NM	51080
890-4496-12	BH23-04 4'	Total/NA	Solid	8015B NM	51080
890-4496-13	BH23-05 0'	Total/NA	Solid	8015B NM	51080
890-4496-14	BH23-05 2'	Total/NA	Solid	8015B NM	51080
890-4496-15	BH23-05 4'	Total/NA	Solid	8015B NM	51080
MB 880-51080/1-A	Method Blank	Total/NA	Solid	8015B NM	51080
LCS 880-51080/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	51080
LCS 880-51080/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	51080
890-4496-1 MS	BH23-01 0'	Total/NA	Solid	8015B NM	51080
890-4496-1 MSD	BH23-01 0'	Total/NA	Solid	8015B NM	51080

Prep Batch: 51080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	8015NM Prep	
890-4496-2	BH23-01 2'	Total/NA	Solid	8015NM Prep	
890-4496-3	BH23-01 4'	Total/NA	Solid	8015NM Prep	
890-4496-4	BH23-02 0'	Total/NA	Solid	8015NM Prep	
890-4496-5	BH23-02 2'	Total/NA	Solid	8015NM Prep	
890-4496-6	BH23-02 4'	Total/NA	Solid	8015NM Prep	
890-4496-7	BH23-03 0'	Total/NA	Solid	8015NM Prep	
890-4496-8	BH23-03 2'	Total/NA	Solid	8015NM Prep	
890-4496-9	BH23-03 4'	Total/NA	Solid	8015NM Prep	
890-4496-10	BH23-04 0'	Total/NA	Solid	8015NM Prep	
890-4496-11	BH23-04 2'	Total/NA	Solid	8015NM Prep	
890-4496-12	BH23-04 4'	Total/NA	Solid	8015NM Prep	
890-4496-13	BH23-05 0'	Total/NA	Solid	8015NM Prep	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

GC Semi VOA (Continued)

Prep Batch: 51080 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-14	BH23-05 2'	Total/NA	Solid	8015NM Prep	
890-4496-15	BH23-05 4'	Total/NA	Solid	8015NM Prep	
MB 880-51080/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-51080/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-51080/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4496-1 MS	BH23-01 0'	Total/NA	Solid	8015NM Prep	
890-4496-1 MSD	BH23-01 0'	Total/NA	Solid	8015NM Prep	

Analysis Batch: 51192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Total/NA	Solid	8015 NM	
890-4496-2	BH23-01 2'	Total/NA	Solid	8015 NM	
890-4496-3	BH23-01 4'	Total/NA	Solid	8015 NM	
890-4496-4	BH23-02 0'	Total/NA	Solid	8015 NM	
890-4496-5	BH23-02 2'	Total/NA	Solid	8015 NM	
890-4496-6	BH23-02 4'	Total/NA	Solid	8015 NM	
890-4496-7	BH23-03 0'	Total/NA	Solid	8015 NM	
890-4496-8	BH23-03 2'	Total/NA	Solid	8015 NM	
890-4496-9	BH23-03 4'	Total/NA	Solid	8015 NM	
890-4496-10	BH23-04 0'	Total/NA	Solid	8015 NM	
890-4496-11	BH23-04 2'	Total/NA	Solid	8015 NM	
890-4496-12	BH23-04 4'	Total/NA	Solid	8015 NM	
890-4496-13	BH23-05 0'	Total/NA	Solid	8015 NM	
890-4496-14	BH23-05 2'	Total/NA	Solid	8015 NM	
890-4496-15	BH23-05 4'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 51081

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Soluble	Solid	DI Leach	
890-4496-2	BH23-01 2'	Soluble	Solid	DI Leach	
890-4496-3	BH23-01 4'	Soluble	Solid	DI Leach	
890-4496-4	BH23-02 0'	Soluble	Solid	DI Leach	
890-4496-5	BH23-02 2'	Soluble	Solid	DI Leach	
MB 880-51081/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-51081/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-51081/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
880-27135-A-11-B MS	Matrix Spike	Soluble	Solid	DI Leach	
880-27135-A-11-C MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Leach Batch: 51083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-6	BH23-02 4'	Soluble	Solid	DI Leach	
890-4496-7	BH23-03 0'	Soluble	Solid	DI Leach	
890-4496-8	BH23-03 2'	Soluble	Solid	DI Leach	
890-4496-9	BH23-03 4'	Soluble	Solid	DI Leach	
890-4496-10	BH23-04 0'	Soluble	Solid	DI Leach	
890-4496-11	BH23-04 2'	Soluble	Solid	DI Leach	
890-4496-12	BH23-04 4'	Soluble	Solid	DI Leach	
890-4496-13	BH23-05 0'	Soluble	Solid	DI Leach	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

HPLC/IC (Continued)

Leach Batch: 51083 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-14	BH23-05 2'	Soluble	Solid	DI Leach	
890-4496-15	BH23-05 4'	Soluble	Solid	DI Leach	
MB 880-51083/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-51083/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-51083/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4496-6 MS	BH23-02 4'	Soluble	Solid	DI Leach	
890-4496-6 MSD	BH23-02 4'	Soluble	Solid	DI Leach	

Analysis Batch: 51169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-1	BH23-01 0'	Soluble	Solid	300.0	51081
890-4496-2	BH23-01 2'	Soluble	Solid	300.0	51081
890-4496-3	BH23-01 4'	Soluble	Solid	300.0	51081
890-4496-4	BH23-02 0'	Soluble	Solid	300.0	51081
890-4496-5	BH23-02 2'	Soluble	Solid	300.0	51081
MB 880-51081/1-A	Method Blank	Soluble	Solid	300.0	51081
LCS 880-51081/2-A	Lab Control Sample	Soluble	Solid	300.0	51081
LCSD 880-51081/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	51081
880-27135-A-11-B MS	Matrix Spike	Soluble	Solid	300.0	51081
880-27135-A-11-C MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	51081

Analysis Batch: 51215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4496-6	BH23-02 4'	Soluble	Solid	300.0	51083
890-4496-7	BH23-03 0'	Soluble	Solid	300.0	51083
890-4496-8	BH23-03 2'	Soluble	Solid	300.0	51083
890-4496-9	BH23-03 4'	Soluble	Solid	300.0	51083
890-4496-10	BH23-04 0'	Soluble	Solid	300.0	51083
890-4496-11	BH23-04 2'	Soluble	Solid	300.0	51083
890-4496-12	BH23-04 4'	Soluble	Solid	300.0	51083
890-4496-13	BH23-05 0'	Soluble	Solid	300.0	51083
890-4496-14	BH23-05 2'	Soluble	Solid	300.0	51083
890-4496-15	BH23-05 4'	Soluble	Solid	300.0	51083
MB 880-51083/1-A	Method Blank	Soluble	Solid	300.0	51083
LCS 880-51083/2-A	Lab Control Sample	Soluble	Solid	300.0	51083
LCSD 880-51083/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	51083
890-4496-6 MS	BH23-02 4'	Soluble	Solid	300.0	51083
890-4496-6 MSD	BH23-02 4'	Soluble	Solid	300.0	51083

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-01 0'

Lab Sample ID: 890-4496-1

Date Collected: 04/11/23 08:00

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 13:02	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/13/23 21:31	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	51081	04/13/23 13:42	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51169	04/14/23 02:53	SMC	EET MID

Client Sample ID: BH23-01 2'

Lab Sample ID: 890-4496-2

Date Collected: 04/11/23 08:05

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 13:22	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/13/23 22:37	SM	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	51081	04/13/23 13:42	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51169	04/14/23 02:58	SMC	EET MID

Client Sample ID: BH23-01 4'

Lab Sample ID: 890-4496-3

Date Collected: 04/11/23 08:10

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 13:43	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/13/23 22:59	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	51081	04/13/23 13:42	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51169	04/14/23 03:03	SMC	EET MID

Client Sample ID: BH23-02 0'

Lab Sample ID: 890-4496-4

Date Collected: 04/11/23 08:15

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 14:03	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-02 0'

Lab Sample ID: 890-4496-4

Date Collected: 04/11/23 08:15

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/13/23 23:22	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	51081	04/13/23 13:42	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51169	04/14/23 03:07	SMC	EET MID

Client Sample ID: BH23-02 2'

Lab Sample ID: 890-4496-5

Date Collected: 04/11/23 08:20

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 14:24	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/13/23 23:45	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	51081	04/13/23 13:42	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51169	04/14/23 03:12	SMC	EET MID

Client Sample ID: BH23-02 4'

Lab Sample ID: 890-4496-6

Date Collected: 04/11/23 08:25

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 15:51	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 00:07	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 18:56	SMC	EET MID

Client Sample ID: BH23-03 0'

Lab Sample ID: 890-4496-7

Date Collected: 04/11/23 08:30

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 16:11	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 00:29	SM	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-03 0'

Lab Sample ID: 890-4496-7

Date Collected: 04/11/23 08:30

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.05 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:10	SMC	EET MID

Client Sample ID: BH23-03 2'

Lab Sample ID: 890-4496-8

Date Collected: 04/11/23 08:35

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 16:32	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 00:51	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:15	SMC	EET MID

Client Sample ID: BH23-03 4'

Lab Sample ID: 890-4496-9

Date Collected: 04/11/23 08:40

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 16:52	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 01:13	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:20	SMC	EET MID

Client Sample ID: BH23-04 0'

Lab Sample ID: 890-4496-10

Date Collected: 04/11/23 08:45

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 17:13	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/14/23 17:29	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 01:35	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:25	SMC	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Client Sample ID: BH23-04 2'

Lab Sample ID: 890-4496-11

Date Collected: 04/11/23 08:50

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 17:33	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/16/23 11:01	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 02:19	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51215	04/14/23 19:40	SMC	EET MID

Client Sample ID: BH23-04 4'

Lab Sample ID: 890-4496-12

Date Collected: 04/11/23 08:55

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 17:54	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/16/23 11:01	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 02:41	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:44	SMC	EET MID

Client Sample ID: BH23-05 0'

Lab Sample ID: 890-4496-13

Date Collected: 04/11/23 09:00

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 18:14	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/16/23 11:01	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 03:04	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:49	SMC	EET MID

Client Sample ID: BH23-05 2'

Lab Sample ID: 890-4496-14

Date Collected: 04/11/23 09:05

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 18:35	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/16/23 11:01	SM	EET MID

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Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

Client Sample ID: BH23-05 2'

Lab Sample ID: 890-4496-14

Date Collected: 04/11/23 09:05

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 03:26	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:54	SMC	EET MID

Client Sample ID: BH23-05 4'

Lab Sample ID: 890-4496-15

Date Collected: 04/11/23 09:10

Matrix: Solid

Date Received: 04/11/23 15:47

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	51069	04/13/23 12:06	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51139	04/14/23 18:55	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51225	04/16/23 11:01	SM	EET MID
Total/NA	Analysis	8015 NM		1			51192	04/14/23 12:19	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51080	04/13/23 13:33	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51008	04/14/23 03:49	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51083	04/13/23 13:50	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51215	04/14/23 19:59	SMC	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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

Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4496-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4496-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4496-1	BH23-01 0'	Solid	04/11/23 08:00	04/11/23 15:47	0
890-4496-2	BH23-01 2'	Solid	04/11/23 08:05	04/11/23 15:47	2
890-4496-3	BH23-01 4'	Solid	04/11/23 08:10	04/11/23 15:47	4
890-4496-4	BH23-02 0'	Solid	04/11/23 08:15	04/11/23 15:47	0
890-4496-5	BH23-02 2'	Solid	04/11/23 08:20	04/11/23 15:47	2
890-4496-6	BH23-02 4'	Solid	04/11/23 08:25	04/11/23 15:47	4
890-4496-7	BH23-03 0'	Solid	04/11/23 08:30	04/11/23 15:47	0
890-4496-8	BH23-03 2'	Solid	04/11/23 08:35	04/11/23 15:47	2
890-4496-9	BH23-03 4'	Solid	04/11/23 08:40	04/11/23 15:47	4
890-4496-10	BH23-04 0'	Solid	04/11/23 08:45	04/11/23 15:47	0
890-4496-11	BH23-04 2'	Solid	04/11/23 08:50	04/11/23 15:47	2
890-4496-12	BH23-04 4'	Solid	04/11/23 08:55	04/11/23 15:47	4
890-4496-13	BH23-05 0'	Solid	04/11/23 09:00	04/11/23 15:47	0
890-4496-14	BH23-05 2'	Solid	04/11/23 09:05	04/11/23 15:47	2
890-4496-15	BH23-05 4'	Solid	04/11/23 09:10	04/11/23 15:47	4

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



Environment Testing
Xenco

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

Chain of Custody

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex Resource Group	Company Name:	Solar's Midstream
Address:	3103 Boyd Br.	Address:	
City, State ZIP:	Carlsbad, NM 88820	City, State ZIP:	
Phone:	(575) 725-5001	Email:	cdixon@vertex.ca

Program:	UST/PST <input type="checkbox"/> PRP <input type="checkbox"/> Brownfields <input type="checkbox"/> RCC <input type="checkbox"/> Superfund <input type="checkbox"/>
State of Project:	
Reporting:	Level II <input type="checkbox"/> Level III <input type="checkbox"/> PST/UST <input type="checkbox"/> TRRP <input type="checkbox"/> Level IV <input type="checkbox"/>
Deliverables:	EDD <input type="checkbox"/> ADAPT <input type="checkbox"/> Other: <input type="checkbox"/>

Project Name:	Cave line Booster	Turn Around	<input checked="" type="checkbox"/> Signature <input type="checkbox"/> Rush	Pres. Code	
Project Number:	83E-01630				
Project location:	Cave-Ling BOOSTER	Due Date:	TAT starts the day received by the lab, if received by 4:30pm		
Sampler's Name:	Hunter Klein				
P.O. #:		Wet Ice:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
SAMPLE RECEIPT		Thermometer ID:	11111111		
Samples Received Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Correction Factor:	-9.5		
Cooler Custody Seals:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Temperature Reading:	7.0		
Sample Custody Seals:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Corrected Temperature:			
Total Containers:	11P Cooling				



890-4496 Chain of Custody

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	ANALYSIS REQUEST	Preservative Codes	Sample Comments
B923-01	Soil	4/11/23	8:00				BTEX	None: NO Cool: Cool HCL: HC H ₂ SO ₄ : H ₂ H ₂ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ O ₂ : NaSO ₃ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SACP	
B923-01			8:05				TPH: 8015D (Prot/No)		
B923-01			8:10				C		
B923-02			8:15						
B923-02			8:20						
B923-02			8:25						
B923-03			8:30						
B923-03			8:35						
B923-03			8:40						
B923-04			8:45						

Total 2007 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn
 Circle Method(s) and Metal(s) to be analyzed: TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

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

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Hunter Klein</i>	<i>Dea Kay</i>	4-11-23 1541			

BH
Not
35

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Work Order No: _____

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Environment Testing Xenco

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Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Chain of Custody

Work Order No: _____

www.xenco.com Page 2 of 2

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex Resource Group	Company Name:	Solaris Midstream
Address:	3103 Boyd Dr.	Address:	
City, State ZIP:	Carlsbad, NM 88220	City, State ZIP:	
Phone:	(575) 735-5001	Email:	cdixon@vertex.ca

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

Project Name:	Carve Line Booster	Turn Around	Pres. Code	ANALYSIS REQUEST	Preservative Codes
Project Number:	23E-01630	<input checked="" type="checkbox"/> Hourly <input type="checkbox"/> Rush			None: NO DI Water: H ₂ O
Project Location:	Carve Line - Booster	Due Date:			Cool: Cool MeOH: Me
Sampler's Name:	Hunter Klein	TAT starts the day received by the lab, if received by 4:30pm			HCL: HC HNO ₃ : HN
PO #:					H ₂ SO ₄ : H ₂ NaOH: Na
SAMPLE RECEIPT		Temp Blank:	Yes No	Wet Ice:	Yes No
Samples Received Intact:		Thermometer ID:	Yes No		H ₃ PO ₄ : HP
Cooler Custody Seals:		Correction factor:	Yes No N/A		NaHSO ₄ : NABIS
Sample Custody Seals:		Temperature Reading:	Yes No N/A		Na ₂ S ₂ O ₃ : NaSO ₃
Total Containers:		Corrected Temperature:			Zn Acetate+NaOH: Zn
					NaOH+Ascorbic Acid: SACP

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters
B23-04	2'	5:1	4:50	8.50		X	BTEX 8021B
B23-04	4'		8:55			X	TPH: 8025D ^{Grat} _{Dro + Mm}
B23-05	0'		9:00			X	CI 300, 0 Anions
B23-05	2'		9:05			X	
B23-05	4'		9:10			X	
H							

Total 2007 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA 5b As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245:1 / 7470 / 7471

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

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Hunter Klein	Joe Coy	4.12.23 15:23			

BH Not BS

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4496-1

SDG Number: 23E-01630

Login Number: 4496

List Number: 1

Creator: Clifton, Cloe

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4496-1

SDG Number: 23E-01630

Login Number: 4496

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 04/13/23 11:07 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

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JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4507-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4507-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Job ID: 890-4507-1

Laboratory: Eurofins Carlsbad

Narrative

**Job Narrative
890-4507-1**

Receipt

The samples were received on 4/13/2023 8:15 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 4.0°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BH23-06 0' (890-4507-1), BH23-06 2' (890-4507-2), BH23-06 4' (890-4507-3), BH23-07 0' (890-4507-4), BH23-07 2' (890-4507-5), BH23-07 4' (890-4507-6), BH23-08 0' (890-4507-7), BH23-08 2' (890-4507-8), BH23-08 4' (890-4507-9), BH23-09 0' (890-4507-10), BH23-09 2' (890-4507-11), BH23-09 4' (890-4507-12), BH23-10 0' (890-4507-13), BH23-10 2' (890-4507-14), BH23-10 4' (890-4507-15), BH23-11 0' (890-4507-16), BH23-11 2' (890-4507-17), BH23-11 4' (890-4507-18), BH23-12 0' (890-4507-19), BH23-12 2' (890-4507-20) and BH23-12 4' (890-4507-21).

GC VOA

Method 8021B: The laboratory control sample (LCS) associated with preparation batch 880-51145 and analytical batch 880-51138 was outside acceptance criteria. Re-extraction and/or re-analysis could not be performed; therefore, the data have been reported. The batch matrix spike/matrix spike duplicate (MS/MSD) was within acceptance limits and may be used to evaluate matrix performance.

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-51295 recovered above the upper control limit for Ethylbenzene, Toluene, m-Xylene & p-Xylene, o-Xylene and 4-Bromofluorobenzene (Surr). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-51295 recovered above the upper control limit for m-Xylene & p-Xylene and o-Xylene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 8021B: Surrogate recovery for the following sample was outside control limits: BH23-12 2' (890-4507-20). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: Surrogate recovery for the following sample was outside control limits: BH23-07 2' (890-4507-5). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: The laboratory control sample (LCS) associated with preparation batch 880-51072 and analytical batch 880-51295 was outside acceptance criteria. Re-extraction and/or re-analysis could not be performed; therefore, the data have been reported. The batch matrix spike/matrix spike duplicate (MS/MSD) was within acceptance limits and may be used to evaluate matrix performance.

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

GC Semi VOA

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: BH23-08 4' (890-4507-9). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: BH23-06 2' (890-4507-2), BH23-06 4' (890-4507-3) and BH23-07 0' (890-4507-4). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: BH23-07 4' (890-4507-6), BH23-08 0' (890-4507-7) and BH23-08 2' (890-4507-8). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: BH23-10 4' (890-4507-15), BH23-11 0' (890-4507-16) and BH23-11 2' (890-4507-17). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Job ID: 890-4507-1 (Continued)

Laboratory: Eurofins Carlsbad (Continued)

not performed.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: BH23-12 0' (890-4507-19). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: BH23-12 4' (890-4507-21). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

HPLC/IC

Method 300_ORGFM_28D: New analyst prepared LCS at 200ppm.(LCS 880-51312/2-A) and (LCSD 880-51312/3-A)

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

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-06 0'

Lab Sample ID: 890-4507-1

Date Collected: 04/12/23 09:00

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 16:36	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 16:36	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 16:36	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 16:36	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 16:36	1
o-Xylene	<0.00200	U *	0.00200		mg/Kg		04/13/23 12:13	04/17/23 16:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130	04/13/23 12:13	04/17/23 16:36	1
1,4-Difluorobenzene (Surr)	101		70 - 130	04/13/23 12:13	04/17/23 16:36	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 13:14	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 13:14	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 13:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	77		70 - 130	04/14/23 12:00	04/15/23 13:14	1
o-Terphenyl	78		70 - 130	04/14/23 12:00	04/15/23 13:14	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	185		4.97		mg/Kg			04/21/23 09:54	1

Client Sample ID: BH23-06 2'

Lab Sample ID: 890-4507-2

Date Collected: 04/12/23 09:05

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 16:57	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 16:57	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 16:57	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 16:57	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 16:57	1
o-Xylene	<0.00199	U *	0.00199		mg/Kg		04/13/23 12:13	04/17/23 16:57	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	115		70 - 130	04/13/23 12:13	04/17/23 16:57	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-06 2'

Lab Sample ID: 890-4507-2

Date Collected: 04/12/23 09:05

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	101		70 - 130	04/13/23 12:13	04/17/23 16:57	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:35	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:35	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	65	S1-	70 - 130	04/14/23 12:00	04/15/23 13:35	1
o-Terphenyl	68	S1-	70 - 130	04/14/23 12:00	04/15/23 13:35	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	85.1		4.99		mg/Kg			04/21/23 10:09	1

Client Sample ID: BH23-06 4'

Lab Sample ID: 890-4507-3

Date Collected: 04/12/23 09:10

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 17:17	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 17:17	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 17:17	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 17:17	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 17:17	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		04/13/23 12:13	04/17/23 17:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		70 - 130	04/13/23 12:13	04/17/23 17:17	1
1,4-Difluorobenzene (Surr)	78		70 - 130	04/13/23 12:13	04/17/23 17:17	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Client Sample ID: BH23-06 4'

Lab Sample ID: 890-4507-3

Date Collected: 04/12/23 09:10

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:56	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:56	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 13:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	63	S1-	70 - 130				04/14/23 12:00	04/15/23 13:56	1
o-Terphenyl	67	S1-	70 - 130				04/14/23 12:00	04/15/23 13:56	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	111		4.96		mg/Kg			04/21/23 10:13	1

Client Sample ID: BH23-07 0'

Lab Sample ID: 890-4507-4

Date Collected: 04/12/23 09:15

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		04/13/23 12:13	04/17/23 17:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	127		70 - 130				04/13/23 12:13	04/17/23 17:38	1
1,4-Difluorobenzene (Surr)	102		70 - 130				04/13/23 12:13	04/17/23 17:38	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 14:18	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 14:18	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 14:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	66	S1-	70 - 130				04/14/23 12:00	04/15/23 14:18	1
o-Terphenyl	71		70 - 130				04/14/23 12:00	04/15/23 14:18	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Client Sample ID: BH23-07 0'

Lab Sample ID: 890-4507-4

Date Collected: 04/12/23 09:15

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3830		25.1		mg/Kg			04/21/23 10:18	5

Client Sample ID: BH23-07 2'

Lab Sample ID: 890-4507-5

Date Collected: 04/12/23 09:20

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
Toluene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
o-Xylene	<0.00201	U **	0.00201		mg/Kg		04/13/23 12:13	04/17/23 17:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	131	S1+	70 - 130				04/13/23 12:13	04/17/23 17:59	1
1,4-Difluorobenzene (Surr)	104		70 - 130				04/13/23 12:13	04/17/23 17:59	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 14:39	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 14:39	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		04/14/23 12:00	04/15/23 14:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	77		70 - 130				04/14/23 12:00	04/15/23 14:39	1
o-Terphenyl	80		70 - 130				04/14/23 12:00	04/15/23 14:39	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	157		5.00		mg/Kg			04/21/23 10:23	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-07 4'

Lab Sample ID: 890-4507-6

Date Collected: 04/12/23 09:25

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198		mg/Kg		04/13/23 12:13	04/17/23 18:20	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		04/13/23 12:13	04/17/23 18:20	1
Toluene	<0.00198	U	0.00198		mg/Kg		04/13/23 12:13	04/17/23 18:20	1
Xylenes, Total	<0.00396	U	0.00396		mg/Kg		04/13/23 12:13	04/17/23 18:20	1
m-Xylene & p-Xylene	<0.00396	U	0.00396		mg/Kg		04/13/23 12:13	04/17/23 18:20	1
o-Xylene	<0.00198	U *	0.00198		mg/Kg		04/13/23 12:13	04/17/23 18:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	120		70 - 130	04/13/23 12:13	04/17/23 18:20	1
1,4-Difluorobenzene (Surr)	102		70 - 130	04/13/23 12:13	04/17/23 18:20	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 15:00	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 15:00	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 15:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	67	S1-	70 - 130	04/14/23 12:00	04/15/23 15:00	1
o-Terphenyl	69	S1-	70 - 130	04/14/23 12:00	04/15/23 15:00	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	124		5.05		mg/Kg			04/21/23 10:38	1

Client Sample ID: BH23-08 0'

Lab Sample ID: 890-4507-7

Date Collected: 04/12/23 09:30

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 18:40	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 18:40	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 18:40	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 18:40	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 18:40	1
o-Xylene	<0.00199	U *	0.00199		mg/Kg		04/13/23 12:13	04/17/23 18:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121		70 - 130	04/13/23 12:13	04/17/23 18:40	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-08 0'

Lab Sample ID: 890-4507-7

Date Collected: 04/12/23 09:30

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	100		70 - 130	04/13/23 12:13	04/17/23 18:40	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	69.0		49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 15:22	1
Diesel Range Organics (Over C10-C28)	69.0		49.9		mg/Kg		04/14/23 12:00	04/15/23 15:22	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 12:00	04/15/23 15:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	61	S1-	70 - 130	04/14/23 12:00	04/15/23 15:22	1
o-Terphenyl	60	S1-	70 - 130	04/14/23 12:00	04/15/23 15:22	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	438		4.98		mg/Kg			04/21/23 10:42	1

Client Sample ID: BH23-08 2'

Lab Sample ID: 890-4507-8

Date Collected: 04/12/23 09:35

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:01	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:01	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:01	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 19:01	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 19:01	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	128		70 - 130	04/13/23 12:13	04/17/23 19:01	1
1,4-Difluorobenzene (Surr)	94		70 - 130	04/13/23 12:13	04/17/23 19:01	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-08 2'

Lab Sample ID: 890-4507-8

Date Collected: 04/12/23 09:35

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 15:43	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 15:43	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 15:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	64	S1-	70 - 130				04/14/23 12:00	04/15/23 15:43	1
o-Terphenyl	62	S1-	70 - 130				04/14/23 12:00	04/15/23 15:43	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	70.4		4.99		mg/Kg			04/21/23 10:47	1

Client Sample ID: BH23-08 4'

Lab Sample ID: 890-4507-9

Date Collected: 04/12/23 09:40

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
Toluene	<0.00201	U	0.00201		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
o-Xylene	<0.00201	U **	0.00201		mg/Kg		04/13/23 12:13	04/17/23 19:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	119		70 - 130				04/13/23 12:13	04/17/23 19:22	1
1,4-Difluorobenzene (Surr)	102		70 - 130				04/13/23 12:13	04/17/23 19:22	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 12:11	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 12:11	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 12:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	66	S1-	70 - 130				04/14/23 12:00	04/15/23 12:11	1
o-Terphenyl	66	S1-	70 - 130				04/14/23 12:00	04/15/23 12:11	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-08 4'

Lab Sample ID: 890-4507-9

Date Collected: 04/12/23 09:40

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	104		5.05		mg/Kg			04/21/23 10:52	1

Client Sample ID: BH23-09 0'

Lab Sample ID: 890-4507-10

Date Collected: 04/12/23 09:45

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		04/13/23 12:13	04/17/23 19:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130				04/13/23 12:13	04/17/23 19:43	1
1,4-Difluorobenzene (Surr)	103		70 - 130				04/13/23 12:13	04/17/23 19:43	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 21:50	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 21:50	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 21:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	71		70 - 130				04/14/23 14:48	04/15/23 21:50	1
o-Terphenyl	75		70 - 130				04/14/23 14:48	04/15/23 21:50	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2110		25.3		mg/Kg			04/21/23 10:57	5

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-09 2'

Lab Sample ID: 890-4507-11

Date Collected: 04/12/23 09:50

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 21:07	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 21:07	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 21:07	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 21:07	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 21:07	1
o-Xylene	<0.00199	U *	0.00199		mg/Kg		04/13/23 12:13	04/17/23 21:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	116		70 - 130	04/13/23 12:13	04/17/23 21:07	1
1,4-Difluorobenzene (Surr)	101		70 - 130	04/13/23 12:13	04/17/23 21:07	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 22:54	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 22:54	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 22:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	72		70 - 130	04/14/23 14:48	04/15/23 22:54	1
o-Terphenyl	74		70 - 130	04/14/23 14:48	04/15/23 22:54	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	210		5.00		mg/Kg			04/21/23 11:02	1

Client Sample ID: BH23-09 4'

Lab Sample ID: 890-4507-12

Date Collected: 04/12/23 09:55

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:28	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:28	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:28	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 21:28	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 21:28	1
o-Xylene	<0.00200	U *	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130	04/13/23 12:13	04/17/23 21:28	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-09 4'

Lab Sample ID: 890-4507-12

Date Collected: 04/12/23 09:55

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	102		70 - 130	04/13/23 12:13	04/17/23 21:28	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:15	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:15	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	71		70 - 130	04/14/23 14:48	04/15/23 23:15	1
o-Terphenyl	73		70 - 130	04/14/23 14:48	04/15/23 23:15	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	194		5.03		mg/Kg			04/21/23 11:16	1

Client Sample ID: BH23-10 0'

Lab Sample ID: 890-4507-13

Date Collected: 04/12/23 10:00

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:48	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:48	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:48	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 21:48	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 21:48	1
o-Xylene	<0.00200	U**	0.00200		mg/Kg		04/13/23 12:13	04/17/23 21:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	127		70 - 130	04/13/23 12:13	04/17/23 21:48	1
1,4-Difluorobenzene (Surr)	103		70 - 130	04/13/23 12:13	04/17/23 21:48	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-10 0'

Lab Sample ID: 890-4507-13

Date Collected: 04/12/23 10:00

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:36	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:36	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 23:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	72		70 - 130	04/14/23 14:48	04/15/23 23:36	1
o-Terphenyl	75		70 - 130	04/14/23 14:48	04/15/23 23:36	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	62.4		5.00		mg/Kg			04/21/23 11:21	1

Client Sample ID: BH23-10 2'

Lab Sample ID: 890-4507-14

Date Collected: 04/12/23 10:05

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:09	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:09	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:09	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 22:09	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 22:09	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121		70 - 130	04/13/23 12:13	04/17/23 22:09	1
1,4-Difluorobenzene (Surr)	104		70 - 130	04/13/23 12:13	04/17/23 22:09	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 23:56	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 23:56	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/15/23 23:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	79		70 - 130	04/14/23 14:48	04/15/23 23:56	1
o-Terphenyl	83		70 - 130	04/14/23 14:48	04/15/23 23:56	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-10 2'

Lab Sample ID: 890-4507-14

Date Collected: 04/12/23 10:05

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	50.6		5.02		mg/Kg			04/21/23 11:36	1

Client Sample ID: BH23-10 4'

Lab Sample ID: 890-4507-15

Date Collected: 04/12/23 10:10

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		04/13/23 12:13	04/17/23 22:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130				04/13/23 12:13	04/17/23 22:30	1
1,4-Difluorobenzene (Surr)	101		70 - 130				04/13/23 12:13	04/17/23 22:30	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:17	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:17	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	69	S1-	70 - 130				04/14/23 14:48	04/16/23 00:17	1
o-Terphenyl	73		70 - 130				04/14/23 14:48	04/16/23 00:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	77.0		4.98		mg/Kg			04/21/23 11:40	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-11 0'

Lab Sample ID: 890-4507-16

Date Collected: 04/12/23 10:15

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 22:51	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 22:51	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 22:51	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 22:51	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		04/13/23 12:13	04/17/23 22:51	1
o-Xylene	<0.00200	U *	0.00200		mg/Kg		04/13/23 12:13	04/17/23 22:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121		70 - 130	04/13/23 12:13	04/17/23 22:51	1
1,4-Difluorobenzene (Surr)	98		70 - 130	04/13/23 12:13	04/17/23 22:51	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 00:37	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 00:37	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 00:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	69	S1-	70 - 130	04/14/23 14:48	04/16/23 00:37	1
o-Terphenyl	70		70 - 130	04/14/23 14:48	04/16/23 00:37	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1890		25.2		mg/Kg			04/21/23 11:45	5

Client Sample ID: BH23-11 2'

Lab Sample ID: 890-4507-17

Date Collected: 04/12/23 10:20

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 23:11	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 23:11	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 23:11	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 23:11	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		04/13/23 12:13	04/17/23 23:11	1
o-Xylene	<0.00200	U *	0.00200		mg/Kg		04/13/23 12:13	04/17/23 23:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	115		70 - 130	04/13/23 12:13	04/17/23 23:11	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-11 2'

Lab Sample ID: 890-4507-17

Date Collected: 04/12/23 10:20

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	102		70 - 130	04/13/23 12:13	04/17/23 23:11	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:57	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:57	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 00:57	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	69	S1-	70 - 130	04/14/23 14:48	04/16/23 00:57	1
o-Terphenyl	73		70 - 130	04/14/23 14:48	04/16/23 00:57	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2380		24.9		mg/Kg			04/21/23 11:50	5

Client Sample ID: BH23-11 4'

Lab Sample ID: 890-4507-18

Date Collected: 04/12/23 10:25

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 23:32	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 23:32	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/17/23 23:32	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 23:32	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/17/23 23:32	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		04/13/23 12:13	04/17/23 23:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	119		70 - 130	04/13/23 12:13	04/17/23 23:32	1
1,4-Difluorobenzene (Surr)	103		70 - 130	04/13/23 12:13	04/17/23 23:32	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			04/17/23 09:43	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-11 4'

Lab Sample ID: 890-4507-18

Date Collected: 04/12/23 10:25

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 01:17	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 01:17	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		04/14/23 14:48	04/16/23 01:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	71		70 - 130				04/14/23 14:48	04/16/23 01:17	1
o-Terphenyl	76		70 - 130				04/14/23 14:48	04/16/23 01:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2390		25.0		mg/Kg			04/21/23 11:55	5

Client Sample ID: BH23-12 0'

Lab Sample ID: 890-4507-19

Date Collected: 04/12/23 10:30

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
Toluene	<0.00202	U	0.00202		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
Xylenes, Total	<0.00403	U	0.00403		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
m-Xylene & p-Xylene	<0.00403	U	0.00403		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
o-Xylene	<0.00202	U **	0.00202		mg/Kg		04/13/23 12:13	04/17/23 23:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	120		70 - 130				04/13/23 12:13	04/17/23 23:53	1
1,4-Difluorobenzene (Surr)	98		70 - 130				04/13/23 12:13	04/17/23 23:53	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00403	U	0.00403		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 01:37	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 01:37	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 01:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	63	S1-	70 - 130				04/14/23 14:48	04/16/23 01:37	1
o-Terphenyl	65	S1-	70 - 130				04/14/23 14:48	04/16/23 01:37	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-12 0'

Lab Sample ID: 890-4507-19

Date Collected: 04/12/23 10:30

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 0

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	69.0		4.99		mg/Kg			04/21/23 12:00	1

Client Sample ID: BH23-12 2'

Lab Sample ID: 890-4507-20

Date Collected: 04/12/23 10:35

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		04/13/23 12:13	04/18/23 00:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	137	S1+	70 - 130				04/13/23 12:13	04/18/23 00:13	1
1,4-Difluorobenzene (Surr)	102		70 - 130				04/13/23 12:13	04/18/23 00:13	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/18/23 12:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:17	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:17	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	71		70 - 130				04/14/23 14:48	04/16/23 02:17	1
o-Terphenyl	78		70 - 130				04/14/23 14:48	04/16/23 02:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	98.4		5.01		mg/Kg			04/21/23 12:04	1

Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Client Sample ID: BH23-12 4'

Lab Sample ID: 890-4507-21

Date Collected: 04/12/23 10:40

Matrix: Solid

Date Received: 04/13/23 08:15

Sample Depth: 4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		04/14/23 09:33	04/14/23 20:19	1
Ethylbenzene	<0.00199	U *	0.00199		mg/Kg		04/14/23 09:33	04/14/23 20:19	1
Toluene	<0.00199	U	0.00199		mg/Kg		04/14/23 09:33	04/14/23 20:19	1
Xylenes, Total	<0.00398	U *	0.00398		mg/Kg		04/14/23 09:33	04/14/23 20:19	1
m-Xylene & p-Xylene	<0.00398	U *	0.00398		mg/Kg		04/14/23 09:33	04/14/23 20:19	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		04/14/23 09:33	04/14/23 20:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130	04/14/23 09:33	04/14/23 20:19	1
1,4-Difluorobenzene (Surr)	104		70 - 130	04/14/23 09:33	04/14/23 20:19	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			04/16/23 10:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			04/17/23 09:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:37	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:37	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/16/23 02:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	69	S1-	70 - 130	04/14/23 14:48	04/16/23 02:37	1
o-Terphenyl	74		70 - 130	04/14/23 14:48	04/16/23 02:37	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	88.7		5.05		mg/Kg			04/17/23 18:46	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line BoosterJob ID: 890-4507-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
880-27162-A-1-B MS	Matrix Spike	104	108
880-27162-A-1-C MSD	Matrix Spike Duplicate	103	106
890-4507-1	BH23-06 0'	113	101
890-4507-1 MS	BH23-06 0'	112	96
890-4507-1 MSD	BH23-06 0'	100	92
890-4507-2	BH23-06 2'	115	101
890-4507-3	BH23-06 4'	70	78
890-4507-4	BH23-07 0'	127	102
890-4507-5	BH23-07 2'	131 S1+	104
890-4507-6	BH23-07 4'	120	102
890-4507-7	BH23-08 0'	121	100
890-4507-8	BH23-08 2'	128	94
890-4507-9	BH23-08 4'	119	102
890-4507-10	BH23-09 0'	117	103
890-4507-11	BH23-09 2'	116	101
890-4507-12	BH23-09 4'	117	102
890-4507-13	BH23-10 0'	127	103
890-4507-14	BH23-10 2'	121	104
890-4507-15	BH23-10 4'	117	101
890-4507-16	BH23-11 0'	121	98
890-4507-17	BH23-11 2'	115	102
890-4507-18	BH23-11 4'	119	103
890-4507-19	BH23-12 0'	120	98
890-4507-20	BH23-12 2'	137 S1+	102
890-4507-21	BH23-12 4'	107	104
LCS 880-51072/1-A	Lab Control Sample	111	92
LCS 880-51145/1-A	Lab Control Sample	101	106
LCS 880-51072/2-A	Lab Control Sample Dup	112	96
LCS 880-51145/2-A	Lab Control Sample Dup	100	111
MB 880-51072/5-A	Method Blank	102	86
MB 880-51145/5-A	Method Blank	93	100

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
890-4507-1	BH23-06 0'	77	78
890-4507-2	BH23-06 2'	65 S1-	68 S1-
890-4507-3	BH23-06 4'	63 S1-	67 S1-
890-4507-4	BH23-07 0'	66 S1-	71
890-4507-5	BH23-07 2'	77	80
890-4507-6	BH23-07 4'	67 S1-	69 S1-
890-4507-7	BH23-08 0'	61 S1-	60 S1-
890-4507-8	BH23-08 2'	64 S1-	62 S1-

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Surrogate Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
890-4507-9	BH23-08 4'	66 S1-	66 S1-
890-4507-9 MS	BH23-08 4'	77	71
890-4507-9 MSD	BH23-08 4'	78	73
890-4507-10	BH23-09 0'	71	75
890-4507-10 MS	BH23-09 0'	77	74
890-4507-10 MSD	BH23-09 0'	81	77
890-4507-11	BH23-09 2'	72	74
890-4507-12	BH23-09 4'	71	73
890-4507-13	BH23-10 0'	72	75
890-4507-14	BH23-10 2'	79	83
890-4507-15	BH23-10 4'	69 S1-	73
890-4507-16	BH23-11 0'	69 S1-	70
890-4507-17	BH23-11 2'	69 S1-	73
890-4507-18	BH23-11 4'	71	76
890-4507-19	BH23-12 0'	63 S1-	65 S1-
890-4507-20	BH23-12 2'	71	78
890-4507-21	BH23-12 4'	69 S1-	74
LCS 880-51185/2-A	Lab Control Sample	78	80
LCS 880-51210/2-A	Lab Control Sample	75	76
LCSD 880-51185/3-A	Lab Control Sample Dup	77	79
LCSD 880-51210/3-A	Lab Control Sample Dup	76	76
MB 880-51185/1-A	Method Blank	96	106
MB 880-51210/1-A	Method Blank	110	119

Surrogate Legend

1CO = 1-Chlorooctane
 OTPH = o-Terphenyl

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-51072/5-A
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51072

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 15:20	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 15:20	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 15:20	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		04/13/23 12:13	04/17/23 15:20	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		04/13/23 12:13	04/17/23 15:20	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/13/23 12:13	04/17/23 15:20	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130	04/13/23 12:13	04/17/23 15:20	1
1,4-Difluorobenzene (Surr)	86		70 - 130	04/13/23 12:13	04/17/23 15:20	1

Lab Sample ID: LCS 880-51072/1-A
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51072

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1032		mg/Kg		103	70 - 130
Ethylbenzene	0.100	0.1110		mg/Kg		111	70 - 130
Toluene	0.100	0.1123		mg/Kg		112	70 - 130
m-Xylene & p-Xylene	0.200	0.2253		mg/Kg		113	70 - 130
o-Xylene	0.100	0.1270		mg/Kg		127	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,4-Difluorobenzene (Surr)	92		70 - 130

Lab Sample ID: LCSD 880-51072/2-A
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51072

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1086		mg/Kg		109	70 - 130	5	35
Ethylbenzene	0.100	0.1173		mg/Kg		117	70 - 130	6	35
Toluene	0.100	0.1176		mg/Kg		118	70 - 130	5	35
m-Xylene & p-Xylene	0.200	0.2384		mg/Kg		119	70 - 130	6	35
o-Xylene	0.100	0.1349	*+	mg/Kg		135	70 - 130	6	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	112		70 - 130
1,4-Difluorobenzene (Surr)	96		70 - 130

Lab Sample ID: 890-4507-1 MS
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: BH23-06 0'
Prep Type: Total/NA
Prep Batch: 51072

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00200	U	0.0998	0.09435		mg/Kg		95	70 - 130
Ethylbenzene	<0.00200	U	0.0998	0.08656		mg/Kg		87	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

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

Lab Sample ID: 890-4507-1 MS
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: BH23-06 0'
Prep Type: Total/NA
Prep Batch: 51072

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec
	Result	Qualifier		Added	Result				
Toluene	<0.00200	U	0.0998	0.09484		mg/Kg		95	70 - 130
m-Xylene & p-Xylene	<0.00401	U	0.200	0.1734		mg/Kg		87	70 - 130
o-Xylene	<0.00200	U *	0.0998	0.09800		mg/Kg		98	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	112		70 - 130
1,4-Difluorobenzene (Surr)	96		70 - 130

Lab Sample ID: 890-4507-1 MSD
Matrix: Solid
Analysis Batch: 51295

Client Sample ID: BH23-06 0'
Prep Type: Total/NA
Prep Batch: 51072

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier		Added	Result						
Benzene	<0.00200	U	0.0990	0.08295		mg/Kg		84	70 - 130	13	35
Ethylbenzene	<0.00200	U	0.0990	0.07133		mg/Kg		72	70 - 130	19	35
Toluene	<0.00200	U	0.0990	0.08079		mg/Kg		82	70 - 130	16	35
m-Xylene & p-Xylene	<0.00401	U	0.198	0.1413		mg/Kg		71	70 - 130	20	35
o-Xylene	<0.00200	U *	0.0990	0.08145		mg/Kg		82	70 - 130	18	35

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	100		70 - 130
1,4-Difluorobenzene (Surr)	92		70 - 130

Lab Sample ID: MB 880-51145/5-A
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51145

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<0.00200	U	0.00200		mg/Kg		04/14/23 09:33	04/14/23 12:53	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		04/14/23 09:33	04/14/23 12:53	1
Toluene	<0.00200	U	0.00200		mg/Kg		04/14/23 09:33	04/14/23 12:53	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		04/14/23 09:33	04/14/23 12:53	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		04/14/23 09:33	04/14/23 12:53	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		04/14/23 09:33	04/14/23 12:53	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Surr)	93		70 - 130	04/14/23 09:33	04/14/23 12:53	1
1,4-Difluorobenzene (Surr)	100		70 - 130	04/14/23 09:33	04/14/23 12:53	1

Lab Sample ID: LCS 880-51145/1-A
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51145

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
		Added	Result				
Benzene	0.100	0.07915		mg/Kg		79	70 - 130
Ethylbenzene	0.100	0.06842	*	mg/Kg		68	70 - 130
Toluene	0.100	0.07582		mg/Kg		76	70 - 130
m-Xylene & p-Xylene	0.200	0.1359	*	mg/Kg		68	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-51145/1-A
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51145

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
o-Xylene	0.100	0.07189		mg/Kg		72	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		70 - 130
1,4-Difluorobenzene (Surr)	106		70 - 130

Lab Sample ID: LCSD 880-51145/2-A
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51145

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1083		mg/Kg		108	70 - 130	31	35
Ethylbenzene	0.100	0.09740		mg/Kg		97	70 - 130	35	35
Toluene	0.100	0.1065		mg/Kg		106	70 - 130	34	35
m-Xylene & p-Xylene	0.200	0.1940		mg/Kg		97	70 - 130	35	35
o-Xylene	0.100	0.09725		mg/Kg		97	70 - 130	30	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		70 - 130
1,4-Difluorobenzene (Surr)	111		70 - 130

Lab Sample ID: 880-27162-A-1-B MS
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 51145

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00200	U	0.0998	0.09697		mg/Kg		97	70 - 130
Ethylbenzene	<0.00200	U *	0.0998	0.08473		mg/Kg		85	70 - 130
Toluene	<0.00200	U	0.0998	0.09182		mg/Kg		92	70 - 130
m-Xylene & p-Xylene	<0.00401	U *	0.200	0.1666		mg/Kg		83	70 - 130
o-Xylene	<0.00200	U	0.0998	0.08298		mg/Kg		83	70 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	104		70 - 130
1,4-Difluorobenzene (Surr)	108		70 - 130

Lab Sample ID: 880-27162-A-1-C MSD
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 51145

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	<0.00200	U	0.100	0.08679		mg/Kg		86	70 - 130	11	35
Ethylbenzene	<0.00200	U *	0.100	0.07596		mg/Kg		76	70 - 130	11	35
Toluene	<0.00200	U	0.100	0.08457		mg/Kg		84	70 - 130	8	35
m-Xylene & p-Xylene	<0.00401	U *	0.201	0.1492		mg/Kg		74	70 - 130	11	35
o-Xylene	<0.00200	U	0.100	0.07529		mg/Kg		75	70 - 130	10	35

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

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

Lab Sample ID: 880-27162-A-1-C MSD
Matrix: Solid
Analysis Batch: 51138

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 51145

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	103		70 - 130
1,4-Difluorobenzene (Surr)	106		70 - 130

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

Lab Sample ID: MB 880-51185/1-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51185

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 09:44	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 09:44	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 12:00	04/15/23 09:44	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1-Chlorooctane	96		70 - 130	04/14/23 12:00	04/15/23 09:44	1
o-Terphenyl	106		70 - 130	04/14/23 12:00	04/15/23 09:44	1

Lab Sample ID: LCS 880-51185/2-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51185

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Diesel Range Organics (Over C10-C28)	1000	1008		mg/Kg		101	70 - 130

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	78		70 - 130
o-Terphenyl	80		70 - 130

Lab Sample ID: LCSD 880-51185/3-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51185

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Diesel Range Organics (Over C10-C28)	1000	936.6		mg/Kg		94	70 - 130	7	20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	77		70 - 130
o-Terphenyl	79		70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

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

Lab Sample ID: 890-4507-9 MS
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: BH23-08 4'
Prep Type: Total/NA
Prep Batch: 51185

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier						
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	997	1061		mg/Kg		105		70 - 130	
Diesel Range Organics (Over C10-C28)	<50.0	U	997	903.2		mg/Kg		86		70 - 130	
		MS	MS								
Surrogate	%Recovery	Qualifier	Limits								
1-Chlorooctane	77		70 - 130								
o-Terphenyl	71		70 - 130								

Lab Sample ID: 890-4507-9 MSD
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: BH23-08 4'
Prep Type: Total/NA
Prep Batch: 51185

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	1000	1069		mg/Kg		105		70 - 130	1	20
Diesel Range Organics (Over C10-C28)	<50.0	U	1000	936.2		mg/Kg		89		70 - 130	4	20
		MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits									
1-Chlorooctane	78		70 - 130									
o-Terphenyl	73		70 - 130									

Lab Sample ID: MB 880-51210/1-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51210

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 20:46	1	
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 20:46	1	
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		04/14/23 14:48	04/15/23 20:46	1	
		MB	MB							
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac		
1-Chlorooctane	110		70 - 130			04/14/23 14:48	04/15/23 20:46	1		
o-Terphenyl	119		70 - 130			04/14/23 14:48	04/15/23 20:46	1		

Lab Sample ID: LCS 880-51210/2-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51210

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec	Limits
		Result	Qualifier					
Gasoline Range Organics (GRO)-C6-C10	1000	1038		mg/Kg		104		70 - 130
Diesel Range Organics (Over C10-C28)	1000	887.6		mg/Kg		89		70 - 130

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-51210/2-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51210

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	75		70 - 130
o-Terphenyl	76		70 - 130

Lab Sample ID: LCSD 880-51210/3-A
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51210

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	1030		mg/Kg		103	70 - 130	1		20
Diesel Range Organics (Over C10-C28)	1000	872.1		mg/Kg		87	70 - 130	2		20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	76		70 - 130
o-Terphenyl	76		70 - 130

Lab Sample ID: 890-4507-10 MS
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: BH23-09 0'
Prep Type: Total/NA
Prep Batch: 51210

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	998	1138		mg/Kg		114	70 - 130	
Diesel Range Organics (Over C10-C28)	<49.9	U	998	968.0		mg/Kg		94	70 - 130	

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	77		70 - 130
o-Terphenyl	74		70 - 130

Lab Sample ID: 890-4507-10 MSD
Matrix: Solid
Analysis Batch: 51243

Client Sample ID: BH23-09 0'
Prep Type: Total/NA
Prep Batch: 51210

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	999	1118		mg/Kg		112	70 - 130	2
Diesel Range Organics (Over C10-C28)	<49.9	U	999	1018		mg/Kg		99	70 - 130	5

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	81		70 - 130
o-Terphenyl	77		70 - 130

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-51314/1-A
Matrix: Solid
Analysis Batch: 51407

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			04/17/23 16:29	1

Lab Sample ID: LCS 880-51314/2-A
Matrix: Solid
Analysis Batch: 51407

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	234.3		mg/Kg		94	90 - 110

Lab Sample ID: LCSD 880-51314/3-A
Matrix: Solid
Analysis Batch: 51407

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	241.5		mg/Kg		97	90 - 110	3	20

Lab Sample ID: 890-4506-A-2-E MS
Matrix: Solid
Analysis Batch: 51407

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	101		252	339.4		mg/Kg		95	90 - 110

Lab Sample ID: 890-4506-A-2-F MSD
Matrix: Solid
Analysis Batch: 51407

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	101		252	348.9		mg/Kg		98	90 - 110	3	20

Lab Sample ID: MB 880-51312/1-A
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			04/21/23 09:39	1

Lab Sample ID: LCS 880-51312/2-A
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	200	215.2		mg/Kg		108	90 - 110

Lab Sample ID: LCSD 880-51312/3-A
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	200	219.1		mg/Kg		110	90 - 110	2	20

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QC Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 890-4507-1 MS
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: BH23-06 0'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	185		249	442.4		mg/Kg		104	90 - 110

Lab Sample ID: 890-4507-1 MSD
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: BH23-06 0'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	185		249	439.0		mg/Kg		102	90 - 110	1	20

Lab Sample ID: 890-4507-11 MS
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: BH23-09 2'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	210		250	468.4		mg/Kg		104	90 - 110

Lab Sample ID: 890-4507-11 MSD
Matrix: Solid
Analysis Batch: 51412

Client Sample ID: BH23-09 2'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	210		250	466.5		mg/Kg		103	90 - 110	0	20

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

GC VOA

Prep Batch: 51072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	5035	
890-4507-2	BH23-06 2'	Total/NA	Solid	5035	
890-4507-3	BH23-06 4'	Total/NA	Solid	5035	
890-4507-4	BH23-07 0'	Total/NA	Solid	5035	
890-4507-5	BH23-07 2'	Total/NA	Solid	5035	
890-4507-6	BH23-07 4'	Total/NA	Solid	5035	
890-4507-7	BH23-08 0'	Total/NA	Solid	5035	
890-4507-8	BH23-08 2'	Total/NA	Solid	5035	
890-4507-9	BH23-08 4'	Total/NA	Solid	5035	
890-4507-10	BH23-09 0'	Total/NA	Solid	5035	
890-4507-11	BH23-09 2'	Total/NA	Solid	5035	
890-4507-12	BH23-09 4'	Total/NA	Solid	5035	
890-4507-13	BH23-10 0'	Total/NA	Solid	5035	
890-4507-14	BH23-10 2'	Total/NA	Solid	5035	
890-4507-15	BH23-10 4'	Total/NA	Solid	5035	
890-4507-16	BH23-11 0'	Total/NA	Solid	5035	
890-4507-17	BH23-11 2'	Total/NA	Solid	5035	
890-4507-18	BH23-11 4'	Total/NA	Solid	5035	
890-4507-19	BH23-12 0'	Total/NA	Solid	5035	
890-4507-20	BH23-12 2'	Total/NA	Solid	5035	
MB 880-51072/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-51072/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-51072/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4507-1 MS	BH23-06 0'	Total/NA	Solid	5035	
890-4507-1 MSD	BH23-06 0'	Total/NA	Solid	5035	

Analysis Batch: 51138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-21	BH23-12 4'	Total/NA	Solid	8021B	51145
MB 880-51145/5-A	Method Blank	Total/NA	Solid	8021B	51145
LCS 880-51145/1-A	Lab Control Sample	Total/NA	Solid	8021B	51145
LCSD 880-51145/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	51145
880-27162-A-1-B MS	Matrix Spike	Total/NA	Solid	8021B	51145
880-27162-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	51145

Prep Batch: 51145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-21	BH23-12 4'	Total/NA	Solid	5035	
MB 880-51145/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-51145/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-51145/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-27162-A-1-B MS	Matrix Spike	Total/NA	Solid	5035	
880-27162-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 51249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	Total BTEX	
890-4507-2	BH23-06 2'	Total/NA	Solid	Total BTEX	
890-4507-3	BH23-06 4'	Total/NA	Solid	Total BTEX	
890-4507-4	BH23-07 0'	Total/NA	Solid	Total BTEX	
890-4507-5	BH23-07 2'	Total/NA	Solid	Total BTEX	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

GC VOA (Continued)

Analysis Batch: 51249 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-6	BH23-07 4'	Total/NA	Solid	Total BTEX	
890-4507-7	BH23-08 0'	Total/NA	Solid	Total BTEX	
890-4507-8	BH23-08 2'	Total/NA	Solid	Total BTEX	
890-4507-9	BH23-08 4'	Total/NA	Solid	Total BTEX	
890-4507-10	BH23-09 0'	Total/NA	Solid	Total BTEX	
890-4507-11	BH23-09 2'	Total/NA	Solid	Total BTEX	
890-4507-12	BH23-09 4'	Total/NA	Solid	Total BTEX	
890-4507-13	BH23-10 0'	Total/NA	Solid	Total BTEX	
890-4507-14	BH23-10 2'	Total/NA	Solid	Total BTEX	
890-4507-15	BH23-10 4'	Total/NA	Solid	Total BTEX	
890-4507-16	BH23-11 0'	Total/NA	Solid	Total BTEX	
890-4507-17	BH23-11 2'	Total/NA	Solid	Total BTEX	
890-4507-18	BH23-11 4'	Total/NA	Solid	Total BTEX	
890-4507-19	BH23-12 0'	Total/NA	Solid	Total BTEX	
890-4507-20	BH23-12 2'	Total/NA	Solid	Total BTEX	
890-4507-21	BH23-12 4'	Total/NA	Solid	Total BTEX	

Analysis Batch: 51295

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	8021B	51072
890-4507-2	BH23-06 2'	Total/NA	Solid	8021B	51072
890-4507-3	BH23-06 4'	Total/NA	Solid	8021B	51072
890-4507-4	BH23-07 0'	Total/NA	Solid	8021B	51072
890-4507-5	BH23-07 2'	Total/NA	Solid	8021B	51072
890-4507-6	BH23-07 4'	Total/NA	Solid	8021B	51072
890-4507-7	BH23-08 0'	Total/NA	Solid	8021B	51072
890-4507-8	BH23-08 2'	Total/NA	Solid	8021B	51072
890-4507-9	BH23-08 4'	Total/NA	Solid	8021B	51072
890-4507-10	BH23-09 0'	Total/NA	Solid	8021B	51072
890-4507-11	BH23-09 2'	Total/NA	Solid	8021B	51072
890-4507-12	BH23-09 4'	Total/NA	Solid	8021B	51072
890-4507-13	BH23-10 0'	Total/NA	Solid	8021B	51072
890-4507-14	BH23-10 2'	Total/NA	Solid	8021B	51072
890-4507-15	BH23-10 4'	Total/NA	Solid	8021B	51072
890-4507-16	BH23-11 0'	Total/NA	Solid	8021B	51072
890-4507-17	BH23-11 2'	Total/NA	Solid	8021B	51072
890-4507-18	BH23-11 4'	Total/NA	Solid	8021B	51072
890-4507-19	BH23-12 0'	Total/NA	Solid	8021B	51072
890-4507-20	BH23-12 2'	Total/NA	Solid	8021B	51072
MB 880-51072/5-A	Method Blank	Total/NA	Solid	8021B	51072
LCS 880-51072/1-A	Lab Control Sample	Total/NA	Solid	8021B	51072
LCSD 880-51072/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	51072
890-4507-1 MS	BH23-06 0'	Total/NA	Solid	8021B	51072
890-4507-1 MSD	BH23-06 0'	Total/NA	Solid	8021B	51072

GC Semi VOA

Prep Batch: 51185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	8015NM Prep	
890-4507-2	BH23-06 2'	Total/NA	Solid	8015NM Prep	

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

GC Semi VOA (Continued)

Prep Batch: 51185 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-3	BH23-06 4'	Total/NA	Solid	8015NM Prep	
890-4507-4	BH23-07 0'	Total/NA	Solid	8015NM Prep	
890-4507-5	BH23-07 2'	Total/NA	Solid	8015NM Prep	
890-4507-6	BH23-07 4'	Total/NA	Solid	8015NM Prep	
890-4507-7	BH23-08 0'	Total/NA	Solid	8015NM Prep	
890-4507-8	BH23-08 2'	Total/NA	Solid	8015NM Prep	
890-4507-9	BH23-08 4'	Total/NA	Solid	8015NM Prep	
MB 880-51185/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-51185/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-51185/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4507-9 MS	BH23-08 4'	Total/NA	Solid	8015NM Prep	
890-4507-9 MSD	BH23-08 4'	Total/NA	Solid	8015NM Prep	

Prep Batch: 51210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-10	BH23-09 0'	Total/NA	Solid	8015NM Prep	
890-4507-11	BH23-09 2'	Total/NA	Solid	8015NM Prep	
890-4507-12	BH23-09 4'	Total/NA	Solid	8015NM Prep	
890-4507-13	BH23-10 0'	Total/NA	Solid	8015NM Prep	
890-4507-14	BH23-10 2'	Total/NA	Solid	8015NM Prep	
890-4507-15	BH23-10 4'	Total/NA	Solid	8015NM Prep	
890-4507-16	BH23-11 0'	Total/NA	Solid	8015NM Prep	
890-4507-17	BH23-11 2'	Total/NA	Solid	8015NM Prep	
890-4507-18	BH23-11 4'	Total/NA	Solid	8015NM Prep	
890-4507-19	BH23-12 0'	Total/NA	Solid	8015NM Prep	
890-4507-20	BH23-12 2'	Total/NA	Solid	8015NM Prep	
890-4507-21	BH23-12 4'	Total/NA	Solid	8015NM Prep	
MB 880-51210/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-51210/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-51210/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4507-10 MS	BH23-09 0'	Total/NA	Solid	8015NM Prep	
890-4507-10 MSD	BH23-09 0'	Total/NA	Solid	8015NM Prep	

Analysis Batch: 51243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	8015B NM	51185
890-4507-2	BH23-06 2'	Total/NA	Solid	8015B NM	51185
890-4507-3	BH23-06 4'	Total/NA	Solid	8015B NM	51185
890-4507-4	BH23-07 0'	Total/NA	Solid	8015B NM	51185
890-4507-5	BH23-07 2'	Total/NA	Solid	8015B NM	51185
890-4507-6	BH23-07 4'	Total/NA	Solid	8015B NM	51185
890-4507-7	BH23-08 0'	Total/NA	Solid	8015B NM	51185
890-4507-8	BH23-08 2'	Total/NA	Solid	8015B NM	51185
890-4507-9	BH23-08 4'	Total/NA	Solid	8015B NM	51185
890-4507-10	BH23-09 0'	Total/NA	Solid	8015B NM	51210
890-4507-11	BH23-09 2'	Total/NA	Solid	8015B NM	51210
890-4507-12	BH23-09 4'	Total/NA	Solid	8015B NM	51210
890-4507-13	BH23-10 0'	Total/NA	Solid	8015B NM	51210
890-4507-14	BH23-10 2'	Total/NA	Solid	8015B NM	51210
890-4507-15	BH23-10 4'	Total/NA	Solid	8015B NM	51210
890-4507-16	BH23-11 0'	Total/NA	Solid	8015B NM	51210

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

GC Semi VOA (Continued)

Analysis Batch: 51243 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-17	BH23-11 2'	Total/NA	Solid	8015B NM	51210
890-4507-18	BH23-11 4'	Total/NA	Solid	8015B NM	51210
890-4507-19	BH23-12 0'	Total/NA	Solid	8015B NM	51210
890-4507-20	BH23-12 2'	Total/NA	Solid	8015B NM	51210
890-4507-21	BH23-12 4'	Total/NA	Solid	8015B NM	51210
MB 880-51185/1-A	Method Blank	Total/NA	Solid	8015B NM	51185
MB 880-51210/1-A	Method Blank	Total/NA	Solid	8015B NM	51210
LCS 880-51185/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	51185
LCS 880-51210/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	51210
LCS 880-51185/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	51185
LCS 880-51210/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	51210
890-4507-9 MS	BH23-08 4'	Total/NA	Solid	8015B NM	51185
890-4507-9 MSD	BH23-08 4'	Total/NA	Solid	8015B NM	51185
890-4507-10 MS	BH23-09 0'	Total/NA	Solid	8015B NM	51210
890-4507-10 MSD	BH23-09 0'	Total/NA	Solid	8015B NM	51210

Analysis Batch: 51301

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Total/NA	Solid	8015 NM	
890-4507-2	BH23-06 2'	Total/NA	Solid	8015 NM	
890-4507-3	BH23-06 4'	Total/NA	Solid	8015 NM	
890-4507-4	BH23-07 0'	Total/NA	Solid	8015 NM	
890-4507-5	BH23-07 2'	Total/NA	Solid	8015 NM	
890-4507-6	BH23-07 4'	Total/NA	Solid	8015 NM	
890-4507-7	BH23-08 0'	Total/NA	Solid	8015 NM	
890-4507-8	BH23-08 2'	Total/NA	Solid	8015 NM	
890-4507-9	BH23-08 4'	Total/NA	Solid	8015 NM	
890-4507-10	BH23-09 0'	Total/NA	Solid	8015 NM	
890-4507-11	BH23-09 2'	Total/NA	Solid	8015 NM	
890-4507-12	BH23-09 4'	Total/NA	Solid	8015 NM	
890-4507-13	BH23-10 0'	Total/NA	Solid	8015 NM	
890-4507-14	BH23-10 2'	Total/NA	Solid	8015 NM	
890-4507-15	BH23-10 4'	Total/NA	Solid	8015 NM	
890-4507-16	BH23-11 0'	Total/NA	Solid	8015 NM	
890-4507-17	BH23-11 2'	Total/NA	Solid	8015 NM	
890-4507-18	BH23-11 4'	Total/NA	Solid	8015 NM	
890-4507-19	BH23-12 0'	Total/NA	Solid	8015 NM	
890-4507-20	BH23-12 2'	Total/NA	Solid	8015 NM	
890-4507-21	BH23-12 4'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 51312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Soluble	Solid	DI Leach	
890-4507-2	BH23-06 2'	Soluble	Solid	DI Leach	
890-4507-3	BH23-06 4'	Soluble	Solid	DI Leach	
890-4507-4	BH23-07 0'	Soluble	Solid	DI Leach	
890-4507-5	BH23-07 2'	Soluble	Solid	DI Leach	
890-4507-6	BH23-07 4'	Soluble	Solid	DI Leach	
890-4507-7	BH23-08 0'	Soluble	Solid	DI Leach	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

HPLC/IC (Continued)

Leach Batch: 51312 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-8	BH23-08 2'	Soluble	Solid	DI Leach	
890-4507-9	BH23-08 4'	Soluble	Solid	DI Leach	
890-4507-10	BH23-09 0'	Soluble	Solid	DI Leach	
890-4507-11	BH23-09 2'	Soluble	Solid	DI Leach	
890-4507-12	BH23-09 4'	Soluble	Solid	DI Leach	
890-4507-13	BH23-10 0'	Soluble	Solid	DI Leach	
890-4507-14	BH23-10 2'	Soluble	Solid	DI Leach	
890-4507-15	BH23-10 4'	Soluble	Solid	DI Leach	
890-4507-16	BH23-11 0'	Soluble	Solid	DI Leach	
890-4507-17	BH23-11 2'	Soluble	Solid	DI Leach	
890-4507-18	BH23-11 4'	Soluble	Solid	DI Leach	
890-4507-19	BH23-12 0'	Soluble	Solid	DI Leach	
890-4507-20	BH23-12 2'	Soluble	Solid	DI Leach	
MB 880-51312/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-51312/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-51312/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4507-1 MS	BH23-06 0'	Soluble	Solid	DI Leach	
890-4507-1 MSD	BH23-06 0'	Soluble	Solid	DI Leach	
890-4507-11 MS	BH23-09 2'	Soluble	Solid	DI Leach	
890-4507-11 MSD	BH23-09 2'	Soluble	Solid	DI Leach	

Leach Batch: 51314

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-21	BH23-12 4'	Soluble	Solid	DI Leach	
MB 880-51314/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-51314/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-51314/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4506-A-2-E MS	Matrix Spike	Soluble	Solid	DI Leach	
890-4506-A-2-F MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 51407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-21	BH23-12 4'	Soluble	Solid	300.0	51314
MB 880-51314/1-A	Method Blank	Soluble	Solid	300.0	51314
LCS 880-51314/2-A	Lab Control Sample	Soluble	Solid	300.0	51314
LCSD 880-51314/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	51314
890-4506-A-2-E MS	Matrix Spike	Soluble	Solid	300.0	51314
890-4506-A-2-F MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	51314

Analysis Batch: 51412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-1	BH23-06 0'	Soluble	Solid	300.0	51312
890-4507-2	BH23-06 2'	Soluble	Solid	300.0	51312
890-4507-3	BH23-06 4'	Soluble	Solid	300.0	51312
890-4507-4	BH23-07 0'	Soluble	Solid	300.0	51312
890-4507-5	BH23-07 2'	Soluble	Solid	300.0	51312
890-4507-6	BH23-07 4'	Soluble	Solid	300.0	51312
890-4507-7	BH23-08 0'	Soluble	Solid	300.0	51312
890-4507-8	BH23-08 2'	Soluble	Solid	300.0	51312
890-4507-9	BH23-08 4'	Soluble	Solid	300.0	51312
890-4507-10	BH23-09 0'	Soluble	Solid	300.0	51312

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

HPLC/IC (Continued)

Analysis Batch: 51412 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4507-11	BH23-09 2'	Soluble	Solid	300.0	51312
890-4507-12	BH23-09 4'	Soluble	Solid	300.0	51312
890-4507-13	BH23-10 0'	Soluble	Solid	300.0	51312
890-4507-14	BH23-10 2'	Soluble	Solid	300.0	51312
890-4507-15	BH23-10 4'	Soluble	Solid	300.0	51312
890-4507-16	BH23-11 0'	Soluble	Solid	300.0	51312
890-4507-17	BH23-11 2'	Soluble	Solid	300.0	51312
890-4507-18	BH23-11 4'	Soluble	Solid	300.0	51312
890-4507-19	BH23-12 0'	Soluble	Solid	300.0	51312
890-4507-20	BH23-12 2'	Soluble	Solid	300.0	51312
MB 880-51312/1-A	Method Blank	Soluble	Solid	300.0	51312
LCS 880-51312/2-A	Lab Control Sample	Soluble	Solid	300.0	51312
LCSD 880-51312/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	51312
890-4507-1 MS	BH23-06 0'	Soluble	Solid	300.0	51312
890-4507-1 MSD	BH23-06 0'	Soluble	Solid	300.0	51312
890-4507-11 MS	BH23-09 2'	Soluble	Solid	300.0	51312
890-4507-11 MSD	BH23-09 2'	Soluble	Solid	300.0	51312

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-06 0'

Lab Sample ID: 890-4507-1

Date Collected: 04/12/23 09:00

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 16:36	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 13:14	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 09:54	SMC	EET MID

Client Sample ID: BH23-06 2'

Lab Sample ID: 890-4507-2

Date Collected: 04/12/23 09:05

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 16:57	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 13:35	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:09	SMC	EET MID

Client Sample ID: BH23-06 4'

Lab Sample ID: 890-4507-3

Date Collected: 04/12/23 09:10

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 17:17	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 13:56	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:13	SMC	EET MID

Client Sample ID: BH23-07 0'

Lab Sample ID: 890-4507-4

Date Collected: 04/12/23 09:15

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 17:38	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-07 0'

Lab Sample ID: 890-4507-4

Date Collected: 04/12/23 09:15

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 14:18	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51412	04/21/23 10:18	SMC	EET MID

Client Sample ID: BH23-07 2'

Lab Sample ID: 890-4507-5

Date Collected: 04/12/23 09:20

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.98 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 17:59	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 14:39	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:23	SMC	EET MID

Client Sample ID: BH23-07 4'

Lab Sample ID: 890-4507-6

Date Collected: 04/12/23 09:25

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 18:20	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 15:00	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:38	SMC	EET MID

Client Sample ID: BH23-08 0'

Lab Sample ID: 890-4507-7

Date Collected: 04/12/23 09:30

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 18:40	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 15:22	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-08 0'

Lab Sample ID: 890-4507-7

Date Collected: 04/12/23 09:30

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.02 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:42	SMC	EET MID

Client Sample ID: BH23-08 2'

Lab Sample ID: 890-4507-8

Date Collected: 04/12/23 09:35

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 19:01	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 15:43	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:47	SMC	EET MID

Client Sample ID: BH23-08 4'

Lab Sample ID: 890-4507-9

Date Collected: 04/12/23 09:40

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 19:22	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51185	04/14/23 12:00	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 12:11	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 10:52	SMC	EET MID

Client Sample ID: BH23-09 0'

Lab Sample ID: 890-4507-10

Date Collected: 04/12/23 09:45

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 19:43	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 21:50	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51412	04/21/23 10:57	SMC	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-09 2'

Lab Sample ID: 890-4507-11

Date Collected: 04/12/23 09:50

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 21:07	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 22:54	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 11:02	SMC	EET MID

Client Sample ID: BH23-09 4'

Lab Sample ID: 890-4507-12

Date Collected: 04/12/23 09:55

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 21:28	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 23:15	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 11:16	SMC	EET MID

Client Sample ID: BH23-10 0'

Lab Sample ID: 890-4507-13

Date Collected: 04/12/23 10:00

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 21:48	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 23:36	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 11:21	SMC	EET MID

Client Sample ID: BH23-10 2'

Lab Sample ID: 890-4507-14

Date Collected: 04/12/23 10:05

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 22:09	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-10 2'

Lab Sample ID: 890-4507-14

Date Collected: 04/12/23 10:05

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/15/23 23:56	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 11:36	SMC	EET MID

Client Sample ID: BH23-10 4'

Lab Sample ID: 890-4507-15

Date Collected: 04/12/23 10:10

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 22:30	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 00:17	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 11:40	SMC	EET MID

Client Sample ID: BH23-11 0'

Lab Sample ID: 890-4507-16

Date Collected: 04/12/23 10:15

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 22:51	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 00:37	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51412	04/21/23 11:45	SMC	EET MID

Client Sample ID: BH23-11 2'

Lab Sample ID: 890-4507-17

Date Collected: 04/12/23 10:20

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 23:11	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 00:57	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Client Sample ID: BH23-11 2'

Lab Sample ID: 890-4507-17

Date Collected: 04/12/23 10:20

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.03 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51412	04/21/23 11:50	SMC	EET MID

Client Sample ID: BH23-11 4'

Lab Sample ID: 890-4507-18

Date Collected: 04/12/23 10:25

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 23:32	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 01:17	SM	EET MID
Soluble	Leach	DI Leach			5.00 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		5	50 mL	50 mL	51412	04/21/23 11:55	SMC	EET MID

Client Sample ID: BH23-12 0'

Lab Sample ID: 890-4507-19

Date Collected: 04/12/23 10:30

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/17/23 23:53	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 01:37	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 12:00	SMC	EET MID

Client Sample ID: BH23-12 2'

Lab Sample ID: 890-4507-20

Date Collected: 04/12/23 10:35

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	51072	04/13/23 12:13	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51295	04/18/23 00:13	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/18/23 12:12	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 02:17	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	51312	04/17/23 12:14	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51412	04/21/23 12:04	SMC	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Client Sample ID: BH23-12 4'

Lab Sample ID: 890-4507-21

Date Collected: 04/12/23 10:40

Matrix: Solid

Date Received: 04/13/23 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	51145	04/14/23 09:33	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	51138	04/14/23 20:19	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			51249	04/16/23 10:56	AJ	EET MID
Total/NA	Analysis	8015 NM		1			51301	04/17/23 09:43	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	51210	04/14/23 14:48	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	51243	04/16/23 02:37	SM	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	51314	04/17/23 12:16	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	51407	04/17/23 18:46	SMC	EET MID

Laboratory References:

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

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4507-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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

Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4507-1
 SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4507-1	BH23-06 0'	Solid	04/12/23 09:00	04/13/23 08:15	0
890-4507-2	BH23-06 2'	Solid	04/12/23 09:05	04/13/23 08:15	2
890-4507-3	BH23-06 4'	Solid	04/12/23 09:10	04/13/23 08:15	4
890-4507-4	BH23-07 0'	Solid	04/12/23 09:15	04/13/23 08:15	0
890-4507-5	BH23-07 2'	Solid	04/12/23 09:20	04/13/23 08:15	2
890-4507-6	BH23-07 4'	Solid	04/12/23 09:25	04/13/23 08:15	4
890-4507-7	BH23-08 0'	Solid	04/12/23 09:30	04/13/23 08:15	0
890-4507-8	BH23-08 2'	Solid	04/12/23 09:35	04/13/23 08:15	2
890-4507-9	BH23-08 4'	Solid	04/12/23 09:40	04/13/23 08:15	4
890-4507-10	BH23-09 0'	Solid	04/12/23 09:45	04/13/23 08:15	0
890-4507-11	BH23-09 2'	Solid	04/12/23 09:50	04/13/23 08:15	2
890-4507-12	BH23-09 4'	Solid	04/12/23 09:55	04/13/23 08:15	4
890-4507-13	BH23-10 0'	Solid	04/12/23 10:00	04/13/23 08:15	0
890-4507-14	BH23-10 2'	Solid	04/12/23 10:05	04/13/23 08:15	2
890-4507-15	BH23-10 4'	Solid	04/12/23 10:10	04/13/23 08:15	4
890-4507-16	BH23-11 0'	Solid	04/12/23 10:15	04/13/23 08:15	0
890-4507-17	BH23-11 2'	Solid	04/12/23 10:20	04/13/23 08:15	2
890-4507-18	BH23-11 4'	Solid	04/12/23 10:25	04/13/23 08:15	4
890-4507-19	BH23-12 0'	Solid	04/12/23 10:30	04/13/23 08:15	0
890-4507-20	BH23-12 2'	Solid	04/12/23 10:35	04/13/23 08:15	2
890-4507-21	BH23-12 4'	Solid	04/12/23 10:40	04/13/23 08:15	4

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Environment Testing
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Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Chain of Custody

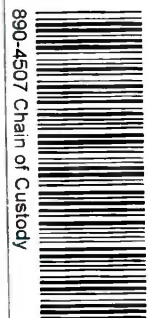
Work Order No: _____

www.xenco.com Page 1 of 3

Project Manager:	Chance Dixon	Bill to: (if different)	
Company Name:	Vertex	Company Name:	Rob Kirk
Address:	3103 Boyd Dr	Address:	Solaris Midstream
City, State ZIP:	Carlsbad, NM 88220	City, State ZIP:	
Phone:	(575) 725-5001	Email:	cdixon@vertex.ca

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

Project Name:	Cave Line Booster	Turn Around	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> Rush	Post Code	
Project Number:	23E-01630	Due Date:			
Project Location:	Hunter Mine	TAT starts the day received by the lab, if received by 4:30pm			
Sampler's Name:	Hunter Mine	Temperature Reading:			
P.O. #:		Corrected Temperature:			
SAMPLE RECEIPT	Temp Blank: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Thermometer ID:	7100037		
Samples Received Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Correction Factor:	-0.2		
Cooler Custody Seals:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Temperature Reading:	71.0		
Sample Custody Seals:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Corrected Temperature:	71.0		
Total Containers:					



Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	ANALYSIS REQUEST	Preservative Codes	Sample Comments
BH23-06	Soil	9/12/23	9:00				BTEX	None: NO DI Water: H ₂ O	
BH23-06			9:05				TPH: 80150	Cool: Cool MeOH: Me	
BH23-06			9:10				CI	HCL: HC HNO ₃ : HN	
BH23-07			9:15					H ₂ SO ₄ : H ₂	
BH23-07			9:20					H ₃ PO ₄ : HP	
BH23-07			9:25					NaHSO ₄ : NABIS	
BH23-08			9:30					Na ₂ S ₂ O ₃ : NaSO ₃	
BH23-08			9:35					Zn Acetate+NaOH: Zn	
BH23-08			9:40					NaOH+Ascorbic Acid: SAPC	
BH23-09			9:45						

Total 2007 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Tl Sn U V Zn
Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl U Hg: 1631 / 245.1 / 7470 / 7471

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>[Signature]</i>	<i>[Signature]</i>	4.13.23 815			

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Environment Testing

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 Hobbs, NM (575) 392-7550, Carlsbad, NM (575) 988-3199

Chain of Custody

Work Order No: _____

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Page 2 of 3

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex	Company Name:	Solaris Midstream
Address:		Address:	
City, State ZIP:		City, State ZIP:	
Phone:		Email:	

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

Project Name:	Cave Line Booster	Turn Around	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> Rush	Pres. Code
Project Number:	83E-01630	Due Date:		
Project Location:	Hunter Klein	TAT starts the day received by the lab, if received by 4:30pm		
Sampler's Name:	Hunter Klein			
PO #:				

Sample Identification	Mark	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters	ANALYSIS REQUEST	Preservative Codes	Sample Comments
BH23-09	2'	6/1 4/22/23	9:50				BTEX		None: NO DI Water: H ₂ O Cool: Cool MeOH: Me HCL: HC HNO ₃ : HN H ₂ SO ₄ : H ₂ NaOH: Na H ₃ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ O ₂ : NaSO ₂ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SAPC	
BH23-09	4'									
BH23-10	0'						TPH: 8015D			
BH23-10	2'									
BH23-10	4'									
BH23-11	0'									
BH23-11	2'									
BH23-11	4'									
BH23-12	0'									
BH23-12	2'									

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

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Hunter Klein</i>	<i>Rob Kirk</i>				

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Environment Testing
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Project Manager:	Chance Dixon	Vertex	Bill to: (if different)	Rob Kirby
Company Name:	Solaris	Vertex	Company Name:	Solaris Midstream
Address:			Address:	
City, State ZIP:			City, State ZIP:	
Phone:			Email:	

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

Project Name:	Project Number:	Project Location:	Sampler's Name:	P.O. #:	Turn Around				Pres. Code	ANALYSIS REQUEST	Preservative Codes											
					Blank	Thermometer	Wet Ice	Turn Around				Rush										
Care Line Booster	23E-DI63D		Hunter Klein		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	None: NO Cool: Cool HCL: HC H ₂ SO ₄ : H ₂ H ₃ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ S ₂ O ₃ : NASO ₃ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SANC												
SAMPLE RECEIPT Samples Received Intact: Yes No Cooler Custody Seals: Yes No N/A Sample Custody Seals: Yes No N/A Total Containers: _____ Corrected Temperature: _____																						
Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters															
BH23-12 4'	Soil	4/12/23	10:40				BTEX	TPH: 8015D	CI													

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

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Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Hunter Klein</i>	<i>Rob Kirby</i>				

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4507-1

SDG Number: 23E-01630

Login Number: 4507

List Number: 1

Creator: Clifton, Cloe

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4507-1

SDG Number: 23E-01630

Login Number: 4507

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 04/14/23 10:11 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

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JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4599-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4599-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Job ID: 890-4599-1

Laboratory: Eurofins Carlsbad**Narrative****Job Narrative
890-4599-1****Receipt**

The samples were received on 4/28/2023 3:49 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 15.3°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BES23-01 1.5' (890-4599-1) and BES23-02 1.5' (890-4599-2).

GC VOA

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

GC Semi VOA

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (LCS 880-52400/2-A) and (LCSD 880-52400/3-A). Evidence of matrix interferences is not obvious.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (890-4592-A-5-D MS) and (890-4592-A-5-E MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: BES23-01 1.5' (890-4599-1) and BES23-02 1.5' (890-4599-2). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-52400 and analytical batch 880-52354 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

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

HPLC/IC

Method 300_ORGFM_28D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-52486 and 880-52486 and analytical batch 880-52596 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits. The associated samples are: BES23-01 1.5' (890-4599-1), BES23-02 1.5' (890-4599-2), (890-4597-A-1-F), (890-4597-A-1-G MS) and (890-4597-A-1-H MSD).

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



Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Client Sample ID: BES23-01 1.5'

Lab Sample ID: 890-4599-1

Date Collected: 04/28/23 09:00

Matrix: Solid

Date Received: 04/28/23 15:49

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/02/23 09:11	05/03/23 19:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130				05/02/23 09:11	05/03/23 19:15	1
1,4-Difluorobenzene (Surr)	121		70 - 130				05/02/23 09:11	05/03/23 19:15	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/04/23 12:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	58.3		49.8		mg/Kg			05/03/23 09:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		05/02/23 11:49	05/02/23 18:53	1
Diesel Range Organics (Over C10-C28)	58.3		49.8		mg/Kg		05/02/23 11:49	05/02/23 18:53	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/02/23 11:49	05/02/23 18:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	74		70 - 130				05/02/23 11:49	05/02/23 18:53	1
o-Terphenyl	56	S1-	70 - 130				05/02/23 11:49	05/02/23 18:53	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	78.5		5.00		mg/Kg			05/04/23 05:16	1

Client Sample ID: BES23-02 1.5'

Lab Sample ID: 890-4599-2

Date Collected: 04/28/23 09:30

Matrix: Solid

Date Received: 04/28/23 15:49

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 19:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	114		70 - 130				05/02/23 09:11	05/03/23 19:36	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4599-1
 SDG: 23E-01630

Client Sample ID: BES23-02 1.5'

Lab Sample ID: 890-4599-2

Date Collected: 04/28/23 09:30

Matrix: Solid

Date Received: 04/28/23 15:49

Sample Depth: 1.5'

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	117		70 - 130	05/02/23 09:11	05/03/23 19:36	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/04/23 12:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/03/23 09:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/02/23 11:49	05/02/23 19:15	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/02/23 11:49	05/02/23 19:15	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/02/23 11:49	05/02/23 19:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	80		70 - 130	05/02/23 11:49	05/02/23 19:15	1
o-Terphenyl	62	S1-	70 - 130	05/02/23 11:49	05/02/23 19:15	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	212		5.01		mg/Kg			05/04/23 05:21	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB1	DFBZ1
		(70-130)	(70-130)
890-4590-A-11-F MS	Matrix Spike	105	105
890-4590-A-11-G MSD	Matrix Spike Duplicate	99	101
890-4599-1	BES23-01 1.5'	110	121
890-4599-2	BES23-02 1.5'	114	117
LCS 880-52364/1-A	Lab Control Sample	93	95
LCSD 880-52364/2-A	Lab Control Sample Dup	103	110
MB 880-52364/5-A	Method Blank	89	125

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	1CO1	OTPH1
		(70-130)	(70-130)
890-4592-A-5-D MS	Matrix Spike	84	62 S1-
890-4592-A-5-E MSD	Matrix Spike Duplicate	85	62 S1-
890-4599-1	BES23-01 1.5'	74	56 S1-
890-4599-2	BES23-02 1.5'	80	62 S1-
LCS 880-52400/2-A	Lab Control Sample	82	63 S1-
LCSD 880-52400/3-A	Lab Control Sample Dup	87	66 S1-
MB 880-52400/1-A	Method Blank	112	92

Surrogate Legend

1CO = 1-Chlorooctane

OTPH = o-Terphenyl

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-52364/5-A
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 52364

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 11:26	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 11:26	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 11:26	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/02/23 09:11	05/03/23 11:26	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/02/23 09:11	05/03/23 11:26	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/02/23 09:11	05/03/23 11:26	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130	05/02/23 09:11	05/03/23 11:26	1
1,4-Difluorobenzene (Surr)	125		70 - 130	05/02/23 09:11	05/03/23 11:26	1

Lab Sample ID: LCS 880-52364/1-A
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 52364

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.09521		mg/Kg		95	70 - 130
Ethylbenzene	0.100	0.07738		mg/Kg		77	70 - 130
Toluene	0.100	0.09767		mg/Kg		98	70 - 130
m-Xylene & p-Xylene	0.200	0.1738		mg/Kg		87	70 - 130
o-Xylene	0.100	0.08612		mg/Kg		86	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	93		70 - 130
1,4-Difluorobenzene (Surr)	95		70 - 130

Lab Sample ID: LCSD 880-52364/2-A
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 52364

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1071		mg/Kg		107	70 - 130	12	35
Ethylbenzene	0.100	0.08302		mg/Kg		83	70 - 130	7	35
Toluene	0.100	0.1056		mg/Kg		106	70 - 130	8	35
m-Xylene & p-Xylene	0.200	0.1909		mg/Kg		95	70 - 130	9	35
o-Xylene	0.100	0.09567		mg/Kg		96	70 - 130	11	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		70 - 130
1,4-Difluorobenzene (Surr)	110		70 - 130

Lab Sample ID: 890-4590-A-11-F MS
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 52364

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00202	U	0.0998	0.1146		mg/Kg		115	70 - 130
Ethylbenzene	<0.00202	U	0.0998	0.09152		mg/Kg		92	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

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

Lab Sample ID: 890-4590-A-11-F MS
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 52364

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier		Result	Qualifier					Limits
Toluene	<0.00202	U	0.0998	0.1113		mg/Kg		111	70 - 130	
m-Xylene & p-Xylene	<0.00403	U	0.200	0.2071		mg/Kg		104	70 - 130	
o-Xylene	<0.00202	U	0.0998	0.1003		mg/Kg		100	70 - 130	
		MS	MS							
Surrogate	%Recovery	Qualifier	Limits							
4-Bromofluorobenzene (Surr)	105		70 - 130							
1,4-Difluorobenzene (Surr)	105		70 - 130							

Lab Sample ID: 890-4590-A-11-G MSD
Matrix: Solid
Analysis Batch: 52442

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 52364

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Benzene	<0.00202	U	0.0990	0.1085		mg/Kg		110	70 - 130	5	35
Ethylbenzene	<0.00202	U	0.0990	0.08578		mg/Kg		87	70 - 130	6	35
Toluene	<0.00202	U	0.0990	0.1052		mg/Kg		106	70 - 130	6	35
m-Xylene & p-Xylene	<0.00403	U	0.198	0.2005		mg/Kg		101	70 - 130	3	35
o-Xylene	<0.00202	U	0.0990	0.09889		mg/Kg		100	70 - 130	1	35
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
4-Bromofluorobenzene (Surr)	99		70 - 130								
1,4-Difluorobenzene (Surr)	101		70 - 130								

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

Lab Sample ID: MB 880-52400/1-A
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 52400

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/02/23 08:49	05/02/23 09:01	1	
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/02/23 08:49	05/02/23 09:01	1	
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/02/23 08:49	05/02/23 09:01	1	
		MB	MB							
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
1-Chlorooctane	112		70 - 130	05/02/23 08:49	05/02/23 09:01	1				
o-Terphenyl	92		70 - 130	05/02/23 08:49	05/02/23 09:01	1				

Lab Sample ID: LCS 880-52400/2-A
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 52400

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
Gasoline Range Organics (GRO)-C6-C10	1000	1037		mg/Kg		104	70 - 130
Diesel Range Organics (Over C10-C28)	1000	939.7		mg/Kg		94	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-52400/2-A
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 52400

Surrogate	LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	82		70 - 130
o-Terphenyl	63	S1-	70 - 130

Lab Sample ID: LCSD 880-52400/3-A
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 52400

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	1024		mg/Kg		102	70 - 130	1		20
Diesel Range Organics (Over C10-C28)	1000	986.2		mg/Kg		99	70 - 130	5		20

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	87		70 - 130
o-Terphenyl	66	S1-	70 - 130

Lab Sample ID: 890-4592-A-5-D MS
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 52400

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	998	1281		mg/Kg		124	70 - 130			
Diesel Range Organics (Over C10-C28)	<49.9	U F1	998	580.6	F1	mg/Kg		54	70 - 130			

Surrogate	MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	84		70 - 130
o-Terphenyl	62	S1-	70 - 130

Lab Sample ID: 890-4592-A-5-E MSD
Matrix: Solid
Analysis Batch: 52354

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 52400

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	997	1283		mg/Kg		124	70 - 130	0		20
Diesel Range Organics (Over C10-C28)	<49.9	U F1	997	586.4	F1	mg/Kg		55	70 - 130	1		20

Surrogate	MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	85		70 - 130
o-Terphenyl	62	S1-	70 - 130

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-52486/1-A
Matrix: Solid
Analysis Batch: 52596

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/04/23 04:06	1

Lab Sample ID: LCS 880-52486/2-A
Matrix: Solid
Analysis Batch: 52596

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	235.8		mg/Kg		94	90 - 110

Lab Sample ID: LCSD 880-52486/3-A
Matrix: Solid
Analysis Batch: 52596

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	236.8		mg/Kg		95	90 - 110	0	20

Lab Sample ID: 890-4597-A-1-G MS
Matrix: Solid
Analysis Batch: 52596

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	72.7	F1	252	294.2	F1	mg/Kg		88	90 - 110

Lab Sample ID: 890-4597-A-1-H MSD
Matrix: Solid
Analysis Batch: 52596

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	72.7	F1	252	294.7	F1	mg/Kg		88	90 - 110	0	20

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

GC VOA

Prep Batch: 52364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	5035	
890-4599-2	BES23-02 1.5'	Total/NA	Solid	5035	
MB 880-52364/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-52364/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-52364/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4590-A-11-F MS	Matrix Spike	Total/NA	Solid	5035	
890-4590-A-11-G MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 52442

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	8021B	52364
890-4599-2	BES23-02 1.5'	Total/NA	Solid	8021B	52364
MB 880-52364/5-A	Method Blank	Total/NA	Solid	8021B	52364
LCS 880-52364/1-A	Lab Control Sample	Total/NA	Solid	8021B	52364
LCSD 880-52364/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	52364
890-4590-A-11-F MS	Matrix Spike	Total/NA	Solid	8021B	52364
890-4590-A-11-G MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	52364

Analysis Batch: 52611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	Total BTEX	
890-4599-2	BES23-02 1.5'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 52354

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	8015B NM	52400
890-4599-2	BES23-02 1.5'	Total/NA	Solid	8015B NM	52400
MB 880-52400/1-A	Method Blank	Total/NA	Solid	8015B NM	52400
LCS 880-52400/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	52400
LCSD 880-52400/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	52400
890-4592-A-5-D MS	Matrix Spike	Total/NA	Solid	8015B NM	52400
890-4592-A-5-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	52400

Prep Batch: 52400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	8015NM Prep	
890-4599-2	BES23-02 1.5'	Total/NA	Solid	8015NM Prep	
MB 880-52400/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-52400/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-52400/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4592-A-5-D MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
890-4592-A-5-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Analysis Batch: 52468

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Total/NA	Solid	8015 NM	
890-4599-2	BES23-02 1.5'	Total/NA	Solid	8015 NM	

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4599-1
 SDG: 23E-01630

HPLC/IC

Leach Batch: 52486

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Soluble	Solid	DI Leach	
890-4599-2	BES23-02 1.5'	Soluble	Solid	DI Leach	
MB 880-52486/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-52486/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-52486/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4597-A-1-G MS	Matrix Spike	Soluble	Solid	DI Leach	
890-4597-A-1-H MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 52596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4599-1	BES23-01 1.5'	Soluble	Solid	300.0	52486
890-4599-2	BES23-02 1.5'	Soluble	Solid	300.0	52486
MB 880-52486/1-A	Method Blank	Soluble	Solid	300.0	52486
LCS 880-52486/2-A	Lab Control Sample	Soluble	Solid	300.0	52486
LCSD 880-52486/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	52486
890-4597-A-1-G MS	Matrix Spike	Soluble	Solid	300.0	52486
890-4597-A-1-H MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	52486

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4599-1
 SDG: 23E-01630

Client Sample ID: BES23-01 1.5'

Lab Sample ID: 890-4599-1

Date Collected: 04/28/23 09:00

Matrix: Solid

Date Received: 04/28/23 15:49

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	52364	05/02/23 09:11	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52442	05/03/23 19:15	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52611	05/04/23 12:48	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52468	05/03/23 09:18	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	52400	05/02/23 11:49	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52354	05/02/23 18:53	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	52486	05/03/23 10:38	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52596	05/04/23 05:16	SMC	EET MID

Client Sample ID: BES23-02 1.5'

Lab Sample ID: 890-4599-2

Date Collected: 04/28/23 09:30

Matrix: Solid

Date Received: 04/28/23 15:49

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	52364	05/02/23 09:11	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52442	05/03/23 19:36	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52611	05/04/23 12:48	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52468	05/03/23 09:18	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	52400	05/02/23 11:49	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52354	05/02/23 19:15	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	52486	05/03/23 10:38	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52596	05/04/23 05:21	SMC	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

- 1
- 2
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Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4599-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4599-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4599-1	BES23-01 1.5'	Solid	04/28/23 09:00	04/28/23 15:49	1.5'
890-4599-2	BES23-02 1.5'	Solid	04/28/23 09:30	04/28/23 15:49	1.5'

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Environment Testing Xenco

Chain of Custody

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

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager: Chance Dixon
Company Name: Vertex
Address:
City, State ZIP:
Phone:
Email: cdixon@vertex.ca

Work Order Comments:
Program: UST/PST [] PRP [] Brownfields [] RRC [] Superfund []
State of Project:
Reporting: Level II [] Level III [] PST/UST [] TRRP [] Level IV []
Deliverables: EDD [] ADAPT [] Other: []

Project Name: Cave Line Booster
Project Number: 23E-01630
Project Location:
Sampler's Name:
P.O. #:
SAMPLE RECEIPT
Temp Blank: Yes (No)
Samples Received Intact: Yes (No)
Cooler Custody Seals: Yes (No)
Sample Custody Seals: Yes (No)
Total Containers:
Parameters: Turn Around (Sprint/Flash), Due Date, TAT starts the day received by the lab, if received by 4:30pm, Wet Ice: Yes (No)



890-4599 Chain of Custody

Table with columns: Sample Identification, Matrix, Date Sampled, Time Sampled, Depth, Grab/Comp, # of Cont, and Sample Comments. Includes handwritten entries like 'BES03-01', 'BES03-02', '4/28/23', '9:00', '1.5', '5', 'BTEX', 'TPH: 8015D', 'C'.

Total 2007 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr Ti Sn U V Zn
Circle Method(s) and Metal(s) to be analyzed TCLP/SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Eurofins Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Eurofins Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Eurofins Xenco. A minimum charge of \$95.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature) Received by: (Signature) Date/Time
1. [Signature] [Signature] 4/28/23 15:49
3. [Signature] [Signature]
5. [Signature] [Signature]

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4599-1

SDG Number: 23E-01630

Login Number: 4599

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4599-1

SDG Number: 23E-01630

Login Number: 4599

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/02/23 10:54 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/9/2023 8:08:07 AM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4611-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



Generated
5/9/2023 8:08:07 AM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4611-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Qualifiers

GC VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Job ID: 890-4611-1

Laboratory: Eurofins Carlsbad**Narrative****Job Narrative
890-4611-1****Receipt**

The samples were received on 5/2/2023 4:46 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 14.0°C

GC VOA

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-52692 recovered above the upper control limit for Ethylbenzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: (CCV 880-52692/33), (CCV 880-52692/51) and (CCV 880-52692/64).

Method 8021B: The laboratory control sample (LCS) associated with preparation batch 880-52520 and analytical batch 880-52692 was outside acceptance criteria. Re-extraction and/or re-analysis could not be performed; therefore, the data have been reported. The batch matrix spike/matrix spike duplicate (MS/MSD) was within acceptance limits and may be used to evaluate matrix performance.

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-52692 recovered above the upper control limit for Benzene, m-Xylene & p-Xylene and o-Xylene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

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

GC Semi VOA

Method 8015MOD_NM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-52638 and analytical batch 880-52587 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (880-27975-A-1-C MS) and (880-27975-A-1-D MSD). Evidence of matrix interferences is not obvious.

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

HPLC/IC

Method 300_ORGFM_28D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-52551 and analytical batch 880-52877 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits. The associated samples are: WES23-01 0-1.5' (890-4611-7), WES23-02 0-1.5' (890-4611-8), (890-4611-A-7-B MS) and (890-4611-A-7-C MSD).

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



Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BFS23-03 1.5'

Lab Sample ID: 890-4611-1

Date Collected: 05/02/23 09:10

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 19:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		70 - 130				05/04/23 08:24	05/06/23 19:55	1
1,4-Difluorobenzene (Surr)	106		70 - 130				05/04/23 08:24	05/06/23 19:55	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:21	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:21	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	102		70 - 130				05/04/23 15:40	05/05/23 03:21	1
o-Terphenyl	78		70 - 130				05/04/23 15:40	05/05/23 03:21	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	67.3		5.04		mg/Kg			05/08/23 15:59	1

Client Sample ID: BES23-04 1.5'

Lab Sample ID: 890-4611-2

Date Collected: 05/02/23 09:15

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/04/23 08:24	05/06/23 20:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130				05/04/23 08:24	05/06/23 20:15	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BES23-04 1.5'

Lab Sample ID: 890-4611-2

Date Collected: 05/02/23 09:15

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	103		70 - 130	05/04/23 08:24	05/06/23 20:15	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:42	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:42	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 03:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	92		70 - 130	05/04/23 15:40	05/05/23 03:42	1
o-Terphenyl	71		70 - 130	05/04/23 15:40	05/05/23 03:42	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	88.3		5.03		mg/Kg			05/08/23 16:14	1

Client Sample ID: BES23-05 1.5'

Lab Sample ID: 890-4611-3

Date Collected: 05/02/23 09:20

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U *	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:35	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:35	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:35	1
Xylenes, Total	<0.00404	U	0.00404		mg/Kg		05/04/23 08:24	05/06/23 20:35	1
m-Xylene & p-Xylene	<0.00404	U	0.00404		mg/Kg		05/04/23 08:24	05/06/23 20:35	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130	05/04/23 08:24	05/06/23 20:35	1
1,4-Difluorobenzene (Surr)	99		70 - 130	05/04/23 08:24	05/06/23 20:35	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BES23-05 1.5'

Lab Sample ID: 890-4611-3

Date Collected: 05/02/23 09:20

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:04	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:04	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	93		70 - 130				05/04/23 15:40	05/05/23 04:04	1
o-Terphenyl	71		70 - 130				05/04/23 15:40	05/05/23 04:04	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	95.7		4.98		mg/Kg			05/08/23 16:19	1

Client Sample ID: BES23-06 1.5'

Lab Sample ID: 890-4611-4

Date Collected: 05/02/23 09:25

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U**	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
Xylenes, Total	<0.00403	U	0.00403		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
m-Xylene & p-Xylene	<0.00403	U	0.00403		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/04/23 08:24	05/06/23 20:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130				05/04/23 08:24	05/06/23 20:56	1
1,4-Difluorobenzene (Surr)	101		70 - 130				05/04/23 08:24	05/06/23 20:56	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00403	U	0.00403		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:25	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:25	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 04:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	111		70 - 130				05/04/23 15:40	05/05/23 04:25	1
o-Terphenyl	85		70 - 130				05/04/23 15:40	05/05/23 04:25	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

Client Sample ID: BES23-06 1.5'

Lab Sample ID: 890-4611-4

Date Collected: 05/02/23 09:25

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	79.5		5.05		mg/Kg			05/08/23 16:24	1

Client Sample ID: BES23-07 1.5'

Lab Sample ID: 890-4611-5

Date Collected: 05/02/23 09:30

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U **	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
Toluene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
Xylenes, Total	<0.00396	U	0.00396		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
m-Xylene & p-Xylene	<0.00396	U	0.00396		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
o-Xylene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108		70 - 130				05/04/23 08:24	05/06/23 21:16	1
1,4-Difluorobenzene (Surr)	99		70 - 130				05/04/23 08:24	05/06/23 21:16	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 04:47	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 04:47	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 04:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	103		70 - 130				05/04/23 15:40	05/05/23 04:47	1
o-Terphenyl	80		70 - 130				05/04/23 15:40	05/05/23 04:47	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	84.8		4.95		mg/Kg			05/08/23 16:28	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BES23-08 1.5'

Lab Sample ID: 890-4611-6

Date Collected: 05/02/23 09:34

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 21:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	121		70 - 130				05/04/23 08:24	05/06/23 21:37	1
1,4-Difluorobenzene (Surr)	92		70 - 130				05/04/23 08:24	05/06/23 21:37	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:09	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:09	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	94		70 - 130				05/04/23 15:40	05/05/23 05:09	1
o-Terphenyl	73		70 - 130				05/04/23 15:40	05/05/23 05:09	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	90.6		5.00		mg/Kg			05/08/23 16:33	1

Client Sample ID: WES23-01 0-1.5'

Lab Sample ID: 890-4611-7

Date Collected: 05/02/23 09:00

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 0 - 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U **	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
Toluene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
Xylenes, Total	<0.00397	U	0.00397		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
m-Xylene & p-Xylene	<0.00397	U	0.00397		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
o-Xylene	<0.00198	U	0.00198		mg/Kg		05/04/23 08:24	05/06/23 21:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130				05/04/23 08:24	05/06/23 21:57	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: WES23-01 0-1.5'

Lab Sample ID: 890-4611-7

Date Collected: 05/02/23 09:00

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 0 - 1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	91		70 - 130	05/04/23 08:24	05/06/23 21:57	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00397	U	0.00397		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/05/23 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 05:31	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 05:31	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/05/23 05:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	101		70 - 130	05/04/23 15:40	05/05/23 05:31	1
o-Terphenyl	78		70 - 130	05/04/23 15:40	05/05/23 05:31	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	46.8	F1	4.96		mg/Kg			05/08/23 16:38	1

Client Sample ID: WES23-02 0-1.5'

Lab Sample ID: 890-4611-8

Date Collected: 05/02/23 09:05

Matrix: Solid

Date Received: 05/02/23 16:46

Sample Depth: 0 - 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/04/23 08:24	05/06/23 22:18	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 22:18	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 22:18	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		05/04/23 08:24	05/06/23 22:18	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		05/04/23 08:24	05/06/23 22:18	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/04/23 08:24	05/06/23 22:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	120		70 - 130	05/04/23 08:24	05/06/23 22:18	1
1,4-Difluorobenzene (Surr)	102		70 - 130	05/04/23 08:24	05/06/23 22:18	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			05/08/23 16:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/05/23 15:27	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

Client Sample ID: WES23-02 0-1.5'
 Date Collected: 05/02/23 09:05
 Date Received: 05/02/23 16:46
 Sample Depth: 0 - 1.5

Lab Sample ID: 890-4611-8
 Matrix: Solid

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:52	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:52	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/04/23 15:40	05/05/23 05:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	102		70 - 130				05/04/23 15:40	05/05/23 05:52	1
o-Terphenyl	79		70 - 130				05/04/23 15:40	05/05/23 05:52	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	49.1		4.98		mg/Kg			05/08/23 16:52	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
890-4607-A-81-A MS	Matrix Spike	119	95
890-4607-A-81-B MSD	Matrix Spike Duplicate	119	95
890-4611-1	BFS23-03 1.5'	109	106
890-4611-2	BES23-04 1.5'	101	103
890-4611-3	BES23-05 1.5'	110	99
890-4611-4	BES23-06 1.5'	106	101
890-4611-5	BES23-07 1.5'	108	99
890-4611-6	BES23-08 1.5'	121	92
890-4611-7	WES23-01 0-1.5'	117	91
890-4611-8	WES23-02 0-1.5'	120	102
LCS 880-52520/1-A	Lab Control Sample	103	111
LCSD 880-52520/2-A	Lab Control Sample Dup	118	108
MB 880-52520/5-A	Method Blank	101	93

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
880-27975-A-1-C MS	Matrix Spike	91	64 S1-
880-27975-A-1-D MSD	Matrix Spike Duplicate	90	62 S1-
890-4611-1	BFS23-03 1.5'	102	78
890-4611-2	BES23-04 1.5'	92	71
890-4611-3	BES23-05 1.5'	93	71
890-4611-4	BES23-06 1.5'	111	85
890-4611-5	BES23-07 1.5'	103	80
890-4611-6	BES23-08 1.5'	94	73
890-4611-7	WES23-01 0-1.5'	101	78
890-4611-8	WES23-02 0-1.5'	102	79
LCS 880-52638/2-A	Lab Control Sample	101	77
LCSD 880-52638/3-A	Lab Control Sample Dup	107	82
MB 880-52638/1-A	Method Blank	132 S1+	115

Surrogate Legend

1CO = 1-Chlorooctane
OTPH = o-Terphenyl

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-52520/5-A
Matrix: Solid
Analysis Batch: 52692

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 52520

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/03/23 13:24	05/06/23 13:50	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/03/23 13:24	05/06/23 13:50	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/03/23 13:24	05/06/23 13:50	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/03/23 13:24	05/06/23 13:50	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/03/23 13:24	05/06/23 13:50	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/03/23 13:24	05/06/23 13:50	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130	05/03/23 13:24	05/06/23 13:50	1
1,4-Difluorobenzene (Surr)	93		70 - 130	05/03/23 13:24	05/06/23 13:50	1

Lab Sample ID: LCS 880-52520/1-A
Matrix: Solid
Analysis Batch: 52692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 52520

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1459	*+	mg/Kg		146	70 - 130
Ethylbenzene	0.100	0.09294		mg/Kg		93	70 - 130
Toluene	0.100	0.1108		mg/Kg		111	70 - 130
m-Xylene & p-Xylene	0.200	0.2048		mg/Kg		102	70 - 130
o-Xylene	0.100	0.1012		mg/Kg		101	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		70 - 130
1,4-Difluorobenzene (Surr)	111		70 - 130

Lab Sample ID: LCSD 880-52520/2-A
Matrix: Solid
Analysis Batch: 52692

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 52520

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	0.100	0.1478	*+	mg/Kg		148	70 - 130	1	35
Ethylbenzene	0.100	0.1020		mg/Kg		102	70 - 130	9	35
Toluene	0.100	0.1148		mg/Kg		115	70 - 130	4	35
m-Xylene & p-Xylene	0.200	0.2380		mg/Kg		119	70 - 130	15	35
o-Xylene	0.100	0.1191		mg/Kg		119	70 - 130	16	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	118		70 - 130
1,4-Difluorobenzene (Surr)	108		70 - 130

Lab Sample ID: 890-4607-A-81-A MS
Matrix: Solid
Analysis Batch: 52692

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 52520

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00200	U *+	0.100	0.09315		mg/Kg		93	70 - 130
Ethylbenzene	<0.00200	U	0.100	0.08286		mg/Kg		82	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

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

Lab Sample ID: 890-4607-A-81-A MS

Client Sample ID: Matrix Spike

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 52692

Prep Batch: 52520

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec
	Result	Qualifier		Added	Result				
Toluene	<0.00200	U	0.100	0.08735		mg/Kg		87	70 - 130
m-Xylene & p-Xylene	<0.00399	U	0.201	0.1954		mg/Kg		97	70 - 130
o-Xylene	<0.00200	U	0.100	0.1011		mg/Kg		101	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	119		70 - 130
1,4-Difluorobenzene (Surr)	95		70 - 130

Lab Sample ID: 890-4607-A-81-B MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 52692

Prep Batch: 52520

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier		Added	Result						
Benzene	<0.00200	U **	0.0990	0.1011		mg/Kg		102	70 - 130	8	35
Ethylbenzene	<0.00200	U	0.0990	0.08900		mg/Kg		89	70 - 130	7	35
Toluene	<0.00200	U	0.0990	0.09689		mg/Kg		98	70 - 130	10	35
m-Xylene & p-Xylene	<0.00399	U	0.198	0.2054		mg/Kg		104	70 - 130	5	35
o-Xylene	<0.00200	U	0.0990	0.1052		mg/Kg		106	70 - 130	4	35

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	119		70 - 130
1,4-Difluorobenzene (Surr)	95		70 - 130

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

Lab Sample ID: MB 880-52638/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 52587

Prep Batch: 52638

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/04/23 20:52	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/04/23 20:52	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/04/23 15:40	05/04/23 20:52	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1-Chlorooctane	132	S1+	70 - 130	05/04/23 15:40	05/04/23 20:52	1
o-Terphenyl	115		70 - 130	05/04/23 15:40	05/04/23 20:52	1

Lab Sample ID: LCS 880-52638/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 52587

Prep Batch: 52638

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
		Added	Result				
Gasoline Range Organics (GRO)-C6-C10	1000	1050		mg/Kg		105	70 - 130
Diesel Range Organics (Over C10-C28)	1000	1046		mg/Kg		105	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-52638/2-A
Matrix: Solid
Analysis Batch: 52587

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 52638

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	101		70 - 130
o-Terphenyl	77		70 - 130

Lab Sample ID: LCSD 880-52638/3-A
Matrix: Solid
Analysis Batch: 52587

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 52638

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	1124		mg/Kg		112	70 - 130	7		20
Diesel Range Organics (Over C10-C28)	1000	1063		mg/Kg		106	70 - 130	2		20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	107		70 - 130
o-Terphenyl	82		70 - 130

Lab Sample ID: 880-27975-A-1-C MS
Matrix: Solid
Analysis Batch: 52587

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 52638

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	997	745.3		mg/Kg		75	70 - 130	
Diesel Range Organics (Over C10-C28)	240	F1	997	537.0	F1	mg/Kg		30	70 - 130	

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	91		70 - 130
o-Terphenyl	64	S1-	70 - 130

Lab Sample ID: 880-27975-A-1-D MSD
Matrix: Solid
Analysis Batch: 52587

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 52638

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	999	749.4		mg/Kg		75	70 - 130	1		20
Diesel Range Organics (Over C10-C28)	240	F1	999	540.8	F1	mg/Kg		30	70 - 130	1		20

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	90		70 - 130
o-Terphenyl	62	S1-	70 - 130

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QC Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-52551/1-A
 Matrix: Solid
 Analysis Batch: 52877

Client Sample ID: Method Blank
 Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/08/23 15:16	1

Lab Sample ID: LCS 880-52551/2-A
 Matrix: Solid
 Analysis Batch: 52877

Client Sample ID: Lab Control Sample
 Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	265.4		mg/Kg		106	90 - 110

Lab Sample ID: LCSD 880-52551/3-A
 Matrix: Solid
 Analysis Batch: 52877

Client Sample ID: Lab Control Sample Dup
 Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	255.6		mg/Kg		102	90 - 110	4	20

Lab Sample ID: 890-4611-7 MS
 Matrix: Solid
 Analysis Batch: 52877

Client Sample ID: WES23-01 0-1.5'
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	46.8	F1	248	342.4	F1	mg/Kg		119	90 - 110

Lab Sample ID: 890-4611-7 MSD
 Matrix: Solid
 Analysis Batch: 52877

Client Sample ID: WES23-01 0-1.5'
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	46.8	F1	248	336.4	F1	mg/Kg		117	90 - 110	2	20

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

GC VOA

Prep Batch: 52520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	5035	
890-4611-2	BES23-04 1.5'	Total/NA	Solid	5035	
890-4611-3	BES23-05 1.5'	Total/NA	Solid	5035	
890-4611-4	BES23-06 1.5'	Total/NA	Solid	5035	
890-4611-5	BES23-07 1.5'	Total/NA	Solid	5035	
890-4611-6	BES23-08 1.5'	Total/NA	Solid	5035	
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	5035	
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	5035	
MB 880-52520/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-52520/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-52520/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4607-A-81-A MS	Matrix Spike	Total/NA	Solid	5035	
890-4607-A-81-B MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 52692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	8021B	52520
890-4611-2	BES23-04 1.5'	Total/NA	Solid	8021B	52520
890-4611-3	BES23-05 1.5'	Total/NA	Solid	8021B	52520
890-4611-4	BES23-06 1.5'	Total/NA	Solid	8021B	52520
890-4611-5	BES23-07 1.5'	Total/NA	Solid	8021B	52520
890-4611-6	BES23-08 1.5'	Total/NA	Solid	8021B	52520
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	8021B	52520
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	8021B	52520
MB 880-52520/5-A	Method Blank	Total/NA	Solid	8021B	52520
LCS 880-52520/1-A	Lab Control Sample	Total/NA	Solid	8021B	52520
LCSD 880-52520/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	52520
890-4607-A-81-A MS	Matrix Spike	Total/NA	Solid	8021B	52520
890-4607-A-81-B MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	52520

Analysis Batch: 52875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	Total BTEX	
890-4611-2	BES23-04 1.5'	Total/NA	Solid	Total BTEX	
890-4611-3	BES23-05 1.5'	Total/NA	Solid	Total BTEX	
890-4611-4	BES23-06 1.5'	Total/NA	Solid	Total BTEX	
890-4611-5	BES23-07 1.5'	Total/NA	Solid	Total BTEX	
890-4611-6	BES23-08 1.5'	Total/NA	Solid	Total BTEX	
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	Total BTEX	
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 52587

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	8015B NM	52638
890-4611-2	BES23-04 1.5'	Total/NA	Solid	8015B NM	52638
890-4611-3	BES23-05 1.5'	Total/NA	Solid	8015B NM	52638
890-4611-4	BES23-06 1.5'	Total/NA	Solid	8015B NM	52638
890-4611-5	BES23-07 1.5'	Total/NA	Solid	8015B NM	52638
890-4611-6	BES23-08 1.5'	Total/NA	Solid	8015B NM	52638

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

GC Semi VOA (Continued)

Analysis Batch: 52587 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	8015B NM	52638
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	8015B NM	52638
MB 880-52638/1-A	Method Blank	Total/NA	Solid	8015B NM	52638
LCS 880-52638/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	52638
LCSD 880-52638/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	52638
880-27975-A-1-C MS	Matrix Spike	Total/NA	Solid	8015B NM	52638
880-27975-A-1-D MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	52638

Prep Batch: 52638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-2	BES23-04 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-3	BES23-05 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-4	BES23-06 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-5	BES23-07 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-6	BES23-08 1.5'	Total/NA	Solid	8015NM Prep	
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	8015NM Prep	
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	8015NM Prep	
MB 880-52638/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-52638/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-52638/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
880-27975-A-1-C MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
880-27975-A-1-D MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Analysis Batch: 52725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Total/NA	Solid	8015 NM	
890-4611-2	BES23-04 1.5'	Total/NA	Solid	8015 NM	
890-4611-3	BES23-05 1.5'	Total/NA	Solid	8015 NM	
890-4611-4	BES23-06 1.5'	Total/NA	Solid	8015 NM	
890-4611-5	BES23-07 1.5'	Total/NA	Solid	8015 NM	
890-4611-6	BES23-08 1.5'	Total/NA	Solid	8015 NM	
890-4611-7	WES23-01 0-1.5'	Total/NA	Solid	8015 NM	
890-4611-8	WES23-02 0-1.5'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 52551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Soluble	Solid	DI Leach	
890-4611-2	BES23-04 1.5'	Soluble	Solid	DI Leach	
890-4611-3	BES23-05 1.5'	Soluble	Solid	DI Leach	
890-4611-4	BES23-06 1.5'	Soluble	Solid	DI Leach	
890-4611-5	BES23-07 1.5'	Soluble	Solid	DI Leach	
890-4611-6	BES23-08 1.5'	Soluble	Solid	DI Leach	
890-4611-7	WES23-01 0-1.5'	Soluble	Solid	DI Leach	
890-4611-8	WES23-02 0-1.5'	Soluble	Solid	DI Leach	
MB 880-52551/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-52551/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-52551/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4611-7 MS	WES23-01 0-1.5'	Soluble	Solid	DI Leach	

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

HPLC/IC (Continued)

Leach Batch: 52551 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-7 MSD	WES23-01 0-1.5'	Soluble	Solid	DI Leach	

Analysis Batch: 52877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4611-1	BFS23-03 1.5'	Soluble	Solid	300.0	52551
890-4611-2	BES23-04 1.5'	Soluble	Solid	300.0	52551
890-4611-3	BES23-05 1.5'	Soluble	Solid	300.0	52551
890-4611-4	BES23-06 1.5'	Soluble	Solid	300.0	52551
890-4611-5	BES23-07 1.5'	Soluble	Solid	300.0	52551
890-4611-6	BES23-08 1.5'	Soluble	Solid	300.0	52551
890-4611-7	WES23-01 0-1.5'	Soluble	Solid	300.0	52551
890-4611-8	WES23-02 0-1.5'	Soluble	Solid	300.0	52551
MB 880-52551/1-A	Method Blank	Soluble	Solid	300.0	52551
LCS 880-52551/2-A	Lab Control Sample	Soluble	Solid	300.0	52551
LCSD 880-52551/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	52551
890-4611-7 MS	WES23-01 0-1.5'	Soluble	Solid	300.0	52551
890-4611-7 MSD	WES23-01 0-1.5'	Soluble	Solid	300.0	52551

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BFS23-03 1.5'

Lab Sample ID: 890-4611-1

Date Collected: 05/02/23 09:10

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 19:55	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 03:21	AJ	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 15:59	SMC	EET MID

Client Sample ID: BES23-04 1.5'

Lab Sample ID: 890-4611-2

Date Collected: 05/02/23 09:15

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 20:15	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 03:42	AJ	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:14	SMC	EET MID

Client Sample ID: BES23-05 1.5'

Lab Sample ID: 890-4611-3

Date Collected: 05/02/23 09:20

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 20:35	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 04:04	AJ	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:19	SMC	EET MID

Client Sample ID: BES23-06 1.5'

Lab Sample ID: 890-4611-4

Date Collected: 05/02/23 09:25

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 20:56	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Client Sample ID: BES23-06 1.5'

Lab Sample ID: 890-4611-4

Date Collected: 05/02/23 09:25

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 04:25	AJ	EET MID
Soluble	Leach	DI Leach			4.95 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:24	SMC	EET MID

Client Sample ID: BES23-07 1.5'

Lab Sample ID: 890-4611-5

Date Collected: 05/02/23 09:30

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 21:16	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 04:47	AJ	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:28	SMC	EET MID

Client Sample ID: BES23-08 1.5'

Lab Sample ID: 890-4611-6

Date Collected: 05/02/23 09:34

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 21:37	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 05:09	AJ	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:33	SMC	EET MID

Client Sample ID: WES23-01 0-1.5'

Lab Sample ID: 890-4611-7

Date Collected: 05/02/23 09:00

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.04 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 21:57	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 05:31	AJ	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

Client Sample ID: WES23-01 0-1.5'

Lab Sample ID: 890-4611-7

Date Collected: 05/02/23 09:00

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:38	SMC	EET MID

Client Sample ID: WES23-02 0-1.5'

Lab Sample ID: 890-4611-8

Date Collected: 05/02/23 09:05

Matrix: Solid

Date Received: 05/02/23 16:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	52520	05/04/23 08:24	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	52692	05/06/23 22:18	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			52875	05/08/23 16:09	AJ	EET MID
Total/NA	Analysis	8015 NM		1			52725	05/05/23 15:27	AJ	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	52638	05/04/23 15:40	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52587	05/05/23 05:52	AJ	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	52551	05/03/23 14:55	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	52877	05/08/23 16:52	SMC	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

- 1
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Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4611-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4611-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4611-1	BFS23-03 1.5'	Solid	05/02/23 09:10	05/02/23 16:46	1.5
890-4611-2	BES23-04 1.5'	Solid	05/02/23 09:15	05/02/23 16:46	1.5
890-4611-3	BES23-05 1.5'	Solid	05/02/23 09:20	05/02/23 16:46	1.5
890-4611-4	BES23-06 1.5'	Solid	05/02/23 09:25	05/02/23 16:46	1.5
890-4611-5	BES23-07 1.5'	Solid	05/02/23 09:30	05/02/23 16:46	1.5
890-4611-6	BES23-08 1.5'	Solid	05/02/23 09:34	05/02/23 16:46	1.5
890-4611-7	WES23-01 0-1.5'	Solid	05/02/23 09:00	05/02/23 16:46	0 - 1.5
890-4611-8	WES23-02 0-1.5'	Solid	05/02/23 09:05	05/02/23 16:46	0 - 1.5

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Environment Testing
Xenco

Houston, TX (281) 240-4200, Dallas, TX (214) 902-0300
Midland, TX (432) 704-5440, San Antonio, TX (210) 509-3334
El Paso, TX (915) 585-3443, Lubbock, TX (806) 794-1296
Hobbs, NM (575) 392-7590, Carlsbad, NM (575) 988-3199

Chain of Custody

Project Manager:	Chance Dixon	Bill to: (if different)	Solaris Midstream
Company Name:	Vertex	Company Name:	Rob Kirk
Address:		Address:	
City, State ZIP:		City, State ZIP:	cdixon@vertex.ca
Phone:		Email:	

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

Project Name:	Cave Line Booster	Turn Around	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Rush	Pres. Code
Project Number:	83E-01630	Due Date:			
Project Location:	Hunter Run	TAT starts the day received by the lab, if received by 4:30pm			
Sampler's Name:		Well:	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	
P.O. #:		Wells:			
SAMPLE RECEIPT	Temp Blank: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Thermometer ID:			
Samples Received Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Correction Factor:			
Cooler Custody Seals:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Temperature Reading:			
Sample Custody Seals:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Corrected Temperature:			
Total Containers:					



890-4811 Chain of Custody

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters	Sample Comments
BE523-03	1.5'	5.01	9:10	5	5	5	BTEX	
BE523-04	1.5'	5.123	9:15	5	5	5	TPH	80150
BE523-05	1.5'		9:20	5	5	5	CI	
BE523-06	1.5'		9:25	5	5	5		
BE523-07	1.5'		9:30	5	5	5		
BE523-08	1.5'		9:34	5	5	5		
WE523-01	0-1.5'		9:00	5	5	5		
WE523-02	0-1.5'		9:05	5	5	5		

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

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

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Manda Blain</i>	<i>Manda Blain</i>	5/2/23 10:46			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4611-1

SDG Number: 23E-01630

Login Number: 4611

List Number: 1

Creator: Clifton, Cloe

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4611-1

SDG Number: 23E-01630

Login Number: 4611

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/04/23 10:52 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/10/2023 7:43:16 PM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4633-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



Generated
5/10/2023 7:43:16 PM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4633-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Job ID: 890-4633-1

Laboratory: Eurofins Carlsbad**Narrative****Job Narrative
890-4633-1****Receipt**

The samples were received on 5/8/2023 4:41 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 10.0°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BES23-09 1.5' (890-4633-1), BES23-10 1.5' (890-4633-2), BES23-11 1.5' (890-4633-3), BES23-12 1.5' (890-4633-4), BES23-13 1.5' (890-4633-5), BES23-14 1.5' (890-4633-6), BES23-15 1.5' (890-4633-7), BES23-16 1.5' (890-4633-8), BES23-17 1.5' (890-4633-9) and BES23-18 1.5' (890-4633-10).

GC VOA

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-53006 recovered above the upper control limit for Benzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 8021B: Surrogate recovery for the following sample was outside control limits: (MB 880-53010/5-A). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-53010 and analytical batch 880-53006 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-53015 and analytical batch 880-52997 was outside the upper control limits.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: BES23-17 1.5' (890-4633-9). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

HPLC/IC

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



Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4633-1
 SDG: 23E-01630

Client Sample ID: BES23-09 1.5'

Lab Sample ID: 890-4633-1

Date Collected: 05/08/23 10:00

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 13:51	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 13:51	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 13:51	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 13:51	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 13:51	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 13:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130	05/10/23 08:58	05/10/23 13:51	1
1,4-Difluorobenzene (Surr)	94		70 - 130	05/10/23 08:58	05/10/23 13:51	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:24	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:24	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	105		70 - 130	05/10/23 10:09	05/10/23 13:24	1
o-Terphenyl	77		70 - 130	05/10/23 10:09	05/10/23 13:24	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	288		5.03		mg/Kg			05/10/23 11:54	1

Client Sample ID: BES23-10 1.5'

Lab Sample ID: 890-4633-2

Date Collected: 05/08/23 10:05

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 14:12	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 14:12	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 14:12	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/10/23 08:58	05/10/23 14:12	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/10/23 08:58	05/10/23 14:12	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 14:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130	05/10/23 08:58	05/10/23 14:12	1
1,4-Difluorobenzene (Surr)	103		70 - 130	05/10/23 08:58	05/10/23 14:12	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-10 1.5'

Lab Sample ID: 890-4633-2

Date Collected: 05/08/23 10:05

Matrix: Solid

Date Received: 05/08/23 16:41

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:46	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:46	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 13:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	104		70 - 130				05/10/23 10:09	05/10/23 13:46	1
o-Terphenyl	75		70 - 130				05/10/23 10:09	05/10/23 13:46	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	324		5.01		mg/Kg			05/10/23 12:20	1

Client Sample ID: BES23-11 1.5'

Lab Sample ID: 890-4633-3

Date Collected: 05/08/23 10:10

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
Toluene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:58	05/10/23 14:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		70 - 130				05/10/23 08:58	05/10/23 14:32	1
1,4-Difluorobenzene (Surr)	88		70 - 130				05/10/23 08:58	05/10/23 14:32	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 14:08	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 14:08	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-11 1.5'

Lab Sample ID: 890-4633-3

Date Collected: 05/08/23 10:10

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 14:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	112		70 - 130				05/10/23 10:09	05/10/23 14:08	1
o-Terphenyl	83		70 - 130				05/10/23 10:09	05/10/23 14:08	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	126		4.97		mg/Kg			05/10/23 12:25	1

Client Sample ID: BES23-12 1.5'

Lab Sample ID: 890-4633-4

Date Collected: 05/08/23 10:15

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
Xylenes, Total	<0.00403	U	0.00403		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
m-Xylene & p-Xylene	<0.00403	U	0.00403		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/10/23 08:58	05/10/23 14:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		70 - 130				05/10/23 08:58	05/10/23 14:53	1
1,4-Difluorobenzene (Surr)	87		70 - 130				05/10/23 08:58	05/10/23 14:53	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00403	U	0.00403		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:29	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:29	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	104		70 - 130				05/10/23 10:09	05/10/23 14:29	1
o-Terphenyl	75		70 - 130				05/10/23 10:09	05/10/23 14:29	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	60.8		4.96		mg/Kg			05/10/23 12:39	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line BoosterJob ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-13 1.5'

Lab Sample ID: 890-4633-5

Date Collected: 05/08/23 10:20

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:13	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:13	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:13	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 15:13	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 15:13	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130	05/10/23 08:58	05/10/23 15:13	1
1,4-Difluorobenzene (Surr)	96		70 - 130	05/10/23 08:58	05/10/23 15:13	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:51	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:51	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 14:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	104		70 - 130	05/10/23 10:09	05/10/23 14:51	1
o-Terphenyl	75		70 - 130	05/10/23 10:09	05/10/23 14:51	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	57.4		5.03		mg/Kg			05/10/23 12:44	1

Client Sample ID: BES23-14 1.5'

Lab Sample ID: 890-4633-6

Date Collected: 05/08/23 10:25

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:34	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:34	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:34	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 15:34	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/10/23 08:58	05/10/23 15:34	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:58	05/10/23 15:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130	05/10/23 08:58	05/10/23 15:34	1
1,4-Difluorobenzene (Surr)	78		70 - 130	05/10/23 08:58	05/10/23 15:34	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-14 1.5'

Lab Sample ID: 890-4633-6

Date Collected: 05/08/23 10:25

Matrix: Solid

Date Received: 05/08/23 16:41

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 15:13	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 15:13	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/10/23 10:09	05/10/23 15:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	110		70 - 130				05/10/23 10:09	05/10/23 15:13	1
o-Terphenyl	81		70 - 130				05/10/23 10:09	05/10/23 15:13	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	86.2		5.02		mg/Kg			05/10/23 12:49	1

Client Sample ID: BES23-15 1.5'

Lab Sample ID: 890-4633-7

Date Collected: 05/08/23 10:30

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
Toluene	0.00218		0.00200		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 15:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130				05/10/23 08:58	05/10/23 15:54	1
1,4-Difluorobenzene (Surr)	95		70 - 130				05/10/23 08:58	05/10/23 15:54	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/10/23 16:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 15:34	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 15:34	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-15 1.5'

Lab Sample ID: 890-4633-7

Date Collected: 05/08/23 10:30

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 15:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	106		70 - 130				05/10/23 10:09	05/10/23 15:34	1
o-Terphenyl	76		70 - 130				05/10/23 10:09	05/10/23 15:34	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	62.3		4.99		mg/Kg			05/10/23 12:54	1

Client Sample ID: BES23-16 1.5'

Lab Sample ID: 890-4633-8

Date Collected: 05/08/23 10:35

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U *	0.00201		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
Toluene	0.00790		0.00201		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		05/10/23 08:56	05/10/23 14:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130				05/10/23 08:56	05/10/23 14:58	1
1,4-Difluorobenzene (Surr)	113		70 - 130				05/10/23 08:56	05/10/23 14:58	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	0.00790		0.00402		mg/Kg			05/10/23 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 16:17	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 16:17	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/10/23 10:09	05/10/23 16:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	115		70 - 130				05/10/23 10:09	05/10/23 16:17	1
o-Terphenyl	86		70 - 130				05/10/23 10:09	05/10/23 16:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	100		4.98		mg/Kg			05/10/23 12:59	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-17 1.5'

Lab Sample ID: 890-4633-9

Date Collected: 05/08/23 10:40

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
Toluene	0.00815		0.00200		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:56	05/10/23 15:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130				05/10/23 08:56	05/10/23 15:19	1
1,4-Difluorobenzene (Surr)	114		70 - 130				05/10/23 08:56	05/10/23 15:19	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	0.00815		0.00401		mg/Kg			05/10/23 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 16:38	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 16:38	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 16:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	93		70 - 130				05/10/23 10:09	05/10/23 16:38	1
o-Terphenyl	67	S1-	70 - 130				05/10/23 10:09	05/10/23 16:38	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	66.8		5.00		mg/Kg			05/10/23 13:04	1

Client Sample ID: BES23-18 1.5'

Lab Sample ID: 890-4633-10

Date Collected: 05/08/23 10:45

Matrix: Solid

Date Received: 05/08/23 16:41

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
Toluene	0.0233		0.00199		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/10/23 08:56	05/10/23 15:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130				05/10/23 08:56	05/10/23 15:40	1
1,4-Difluorobenzene (Surr)	111		70 - 130				05/10/23 08:56	05/10/23 15:40	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4633-1
 SDG: 23E-01630

Client Sample ID: BES23-18 1.5'

Lab Sample ID: 890-4633-10

Date Collected: 05/08/23 10:45

Matrix: Solid

Date Received: 05/08/23 16:41

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	0.0233		0.00398		mg/Kg			05/10/23 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/10/23 19:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 17:00	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 17:00	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 10:09	05/10/23 17:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	108		70 - 130				05/10/23 10:09	05/10/23 17:00	1
o-Terphenyl	77		70 - 130				05/10/23 10:09	05/10/23 17:00	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	71.8		5.04		mg/Kg			05/10/23 13:08	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
880-28227-A-4-A MS	Matrix Spike	99	115
880-28227-A-4-B MSD	Matrix Spike Duplicate	102	105
890-4633-1	BES23-09 1.5'	91	94
890-4633-2	BES23-10 1.5'	94	103
890-4633-3	BES23-11 1.5'	86	88
890-4633-4	BES23-12 1.5'	83	87
890-4633-5	BES23-13 1.5'	85	96
890-4633-6	BES23-14 1.5'	87	78
890-4633-7	BES23-15 1.5'	93	95
890-4633-8	BES23-16 1.5'	95	113
890-4633-9	BES23-17 1.5'	92	114
890-4633-10	BES23-18 1.5'	107	111
LCS 880-53010/1-A	Lab Control Sample	108	104
LCSD 880-53010/2-A	Lab Control Sample Dup	108	106
MB 880-53010/5-A	Method Blank	66 S1-	77

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)
DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
890-4629-A-1-E MS	Matrix Spike	107	77
890-4629-A-1-F MSD	Matrix Spike Duplicate	101	74
890-4633-1	BES23-09 1.5'	105	77
890-4633-2	BES23-10 1.5'	104	75
890-4633-3	BES23-11 1.5'	112	83
890-4633-4	BES23-12 1.5'	104	75
890-4633-5	BES23-13 1.5'	104	75
890-4633-6	BES23-14 1.5'	110	81
890-4633-7	BES23-15 1.5'	106	76
890-4633-8	BES23-16 1.5'	115	86
890-4633-9	BES23-17 1.5'	93	67 S1-
890-4633-10	BES23-18 1.5'	108	77
LCS 880-53015/2-A	Lab Control Sample	106	82
LCSD 880-53015/3-A	Lab Control Sample Dup	119	91
MB 880-53015/1-A	Method Blank	137 S1+	110

Surrogate Legend
1CO = 1-Chlorooctane
OTPH = o-Terphenyl

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-53010/5-A
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53010

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 12:28	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 12:28	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 12:28	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/10/23 08:58	05/10/23 12:28	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/10/23 08:58	05/10/23 12:28	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/10/23 08:58	05/10/23 12:28	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	66	S1-	70 - 130	05/10/23 08:58	05/10/23 12:28	1
1,4-Difluorobenzene (Surr)	77		70 - 130	05/10/23 08:58	05/10/23 12:28	1

Lab Sample ID: LCS 880-53010/1-A
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53010

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1261		mg/Kg		126	70 - 130
Ethylbenzene	0.100	0.1252		mg/Kg		125	70 - 130
Toluene	0.100	0.1265		mg/Kg		126	70 - 130
m-Xylene & p-Xylene	0.200	0.2570		mg/Kg		129	70 - 130
o-Xylene	0.100	0.1257		mg/Kg		126	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,4-Difluorobenzene (Surr)	104		70 - 130

Lab Sample ID: LCSD 880-53010/2-A
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53010

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1188		mg/Kg		119	70 - 130	6	35
Ethylbenzene	0.100	0.1102		mg/Kg		110	70 - 130	13	35
Toluene	0.100	0.1175		mg/Kg		118	70 - 130	7	35
m-Xylene & p-Xylene	0.200	0.2280		mg/Kg		114	70 - 130	12	35
o-Xylene	0.100	0.1113		mg/Kg		111	70 - 130	12	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,4-Difluorobenzene (Surr)	106		70 - 130

Lab Sample ID: 880-28227-A-4-A MS
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53010

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00201	U F1	0.100	0.1289		mg/Kg		128	70 - 130
Ethylbenzene	<0.00201	U	0.100	0.1121		mg/Kg		112	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

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

Lab Sample ID: 880-28227-A-4-A MS
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53010

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec
	Result	Qualifier		Result	Qualifier				
Toluene	<0.00201	U	0.100	0.1203		mg/Kg		119	70 - 130
m-Xylene & p-Xylene	<0.00402	U	0.201	0.2240		mg/Kg		112	70 - 130
o-Xylene	<0.00201	U	0.100	0.1087		mg/Kg		108	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	99		70 - 130
1,4-Difluorobenzene (Surr)	115		70 - 130

Lab Sample ID: 880-28227-A-4-B MSD
Matrix: Solid
Analysis Batch: 53006

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 53010

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Benzene	<0.00201	U F1	0.0990	0.1349	F1	mg/Kg		136	70 - 130	5	35
Ethylbenzene	<0.00201	U	0.0990	0.1085		mg/Kg		110	70 - 130	3	35
Toluene	<0.00201	U	0.0990	0.1177		mg/Kg		118	70 - 130	2	35
m-Xylene & p-Xylene	<0.00402	U	0.198	0.2191		mg/Kg		111	70 - 130	2	35
o-Xylene	<0.00201	U	0.0990	0.1068		mg/Kg		108	70 - 130	2	35

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	102		70 - 130
1,4-Difluorobenzene (Surr)	105		70 - 130

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

Lab Sample ID: MB 880-53015/1-A
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53015

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/10/23 08:09	05/10/23 09:04	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/10/23 08:09	05/10/23 09:04	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/10/23 08:09	05/10/23 09:04	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1-Chlorooctane	137	S1+	70 - 130	05/10/23 08:09	05/10/23 09:04	1
o-Terphenyl	110		70 - 130	05/10/23 08:09	05/10/23 09:04	1

Lab Sample ID: LCS 880-53015/2-A
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53015

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
Gasoline Range Organics (GRO)-C6-C10	1000	982.4		mg/Kg		98	70 - 130
Diesel Range Organics (Over C10-C28)	1000	1028		mg/Kg		103	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-53015/2-A
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53015

Surrogate	LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	106		70 - 130
o-Terphenyl	82		70 - 130

Lab Sample ID: LCSD 880-53015/3-A
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53015

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	1012		mg/Kg		101	70 - 130	3		20
Diesel Range Organics (Over C10-C28)	1000	1085		mg/Kg		109	70 - 130	5		20

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	119		70 - 130
o-Terphenyl	91		70 - 130

Lab Sample ID: 890-4629-A-1-E MS
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53015

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	996	870.1		mg/Kg		87	70 - 130	
Diesel Range Organics (Over C10-C28)	<49.9	U	996	780.5		mg/Kg		76	70 - 130	

Surrogate	MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	107		70 - 130
o-Terphenyl	77		70 - 130

Lab Sample ID: 890-4629-A-1-F MSD
Matrix: Solid
Analysis Batch: 52997

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 53015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	%Rec	
				Result	Qualifier				Limits	RPD
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	996	830.0		mg/Kg		83	70 - 130	5
Diesel Range Organics (Over C10-C28)	<49.9	U	996	745.3		mg/Kg		72	70 - 130	5

Surrogate	MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	101		70 - 130
o-Terphenyl	74		70 - 130

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-53012/1-A
Matrix: Solid
Analysis Batch: 53026

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/10/23 10:32	1

Lab Sample ID: LCS 880-53012/2-A
Matrix: Solid
Analysis Batch: 53026

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	252.5		mg/Kg		101	90 - 110

Lab Sample ID: LCSD 880-53012/3-A
Matrix: Solid
Analysis Batch: 53026

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	257.1		mg/Kg		103	90 - 110	2	20

Lab Sample ID: 890-4633-1 MS
Matrix: Solid
Analysis Batch: 53026

Client Sample ID: BES23-09 1.5'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	288		252	530.4		mg/Kg		97	90 - 110

Lab Sample ID: 890-4633-1 MSD
Matrix: Solid
Analysis Batch: 53026

Client Sample ID: BES23-09 1.5'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	288		252	534.3		mg/Kg		98	90 - 110	1	20

QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4633-1
 SDG: 23E-01630

GC VOA

Analysis Batch: 53006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	8021B	53010
890-4633-2	BES23-10 1.5'	Total/NA	Solid	8021B	53010
890-4633-3	BES23-11 1.5'	Total/NA	Solid	8021B	53010
890-4633-4	BES23-12 1.5'	Total/NA	Solid	8021B	53010
890-4633-5	BES23-13 1.5'	Total/NA	Solid	8021B	53010
890-4633-6	BES23-14 1.5'	Total/NA	Solid	8021B	53010
890-4633-7	BES23-15 1.5'	Total/NA	Solid	8021B	53010
MB 880-53010/5-A	Method Blank	Total/NA	Solid	8021B	53010
LCS 880-53010/1-A	Lab Control Sample	Total/NA	Solid	8021B	53010
LCSD 880-53010/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	53010
880-28227-A-4-A MS	Matrix Spike	Total/NA	Solid	8021B	53010
880-28227-A-4-B MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	53010

Analysis Batch: 53007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-8	BES23-16 1.5'	Total/NA	Solid	8021B	53009
890-4633-9	BES23-17 1.5'	Total/NA	Solid	8021B	53009
890-4633-10	BES23-18 1.5'	Total/NA	Solid	8021B	53009

Prep Batch: 53009

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-8	BES23-16 1.5'	Total/NA	Solid	5035	
890-4633-9	BES23-17 1.5'	Total/NA	Solid	5035	
890-4633-10	BES23-18 1.5'	Total/NA	Solid	5035	

Prep Batch: 53010

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	5035	
890-4633-2	BES23-10 1.5'	Total/NA	Solid	5035	
890-4633-3	BES23-11 1.5'	Total/NA	Solid	5035	
890-4633-4	BES23-12 1.5'	Total/NA	Solid	5035	
890-4633-5	BES23-13 1.5'	Total/NA	Solid	5035	
890-4633-6	BES23-14 1.5'	Total/NA	Solid	5035	
890-4633-7	BES23-15 1.5'	Total/NA	Solid	5035	
MB 880-53010/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-53010/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-53010/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-28227-A-4-A MS	Matrix Spike	Total/NA	Solid	5035	
880-28227-A-4-B MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 53062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	Total BTEX	
890-4633-2	BES23-10 1.5'	Total/NA	Solid	Total BTEX	
890-4633-3	BES23-11 1.5'	Total/NA	Solid	Total BTEX	
890-4633-4	BES23-12 1.5'	Total/NA	Solid	Total BTEX	
890-4633-5	BES23-13 1.5'	Total/NA	Solid	Total BTEX	
890-4633-6	BES23-14 1.5'	Total/NA	Solid	Total BTEX	
890-4633-7	BES23-15 1.5'	Total/NA	Solid	Total BTEX	
890-4633-8	BES23-16 1.5'	Total/NA	Solid	Total BTEX	
890-4633-9	BES23-17 1.5'	Total/NA	Solid	Total BTEX	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

GC VOA (Continued)

Analysis Batch: 53062 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-10	BES23-18 1.5'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 52997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-2	BES23-10 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-3	BES23-11 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-4	BES23-12 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-5	BES23-13 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-6	BES23-14 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-7	BES23-15 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-8	BES23-16 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-9	BES23-17 1.5'	Total/NA	Solid	8015B NM	53015
890-4633-10	BES23-18 1.5'	Total/NA	Solid	8015B NM	53015
MB 880-53015/1-A	Method Blank	Total/NA	Solid	8015B NM	53015
LCS 880-53015/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	53015
LCSD 880-53015/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	53015
890-4629-A-1-E MS	Matrix Spike	Total/NA	Solid	8015B NM	53015
890-4629-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	53015

Prep Batch: 53015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-2	BES23-10 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-3	BES23-11 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-4	BES23-12 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-5	BES23-13 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-6	BES23-14 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-7	BES23-15 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-8	BES23-16 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-9	BES23-17 1.5'	Total/NA	Solid	8015NM Prep	
890-4633-10	BES23-18 1.5'	Total/NA	Solid	8015NM Prep	
MB 880-53015/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-53015/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-53015/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4629-A-1-E MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
890-4629-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Analysis Batch: 53070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Total/NA	Solid	8015 NM	
890-4633-2	BES23-10 1.5'	Total/NA	Solid	8015 NM	
890-4633-3	BES23-11 1.5'	Total/NA	Solid	8015 NM	
890-4633-4	BES23-12 1.5'	Total/NA	Solid	8015 NM	
890-4633-5	BES23-13 1.5'	Total/NA	Solid	8015 NM	
890-4633-6	BES23-14 1.5'	Total/NA	Solid	8015 NM	
890-4633-7	BES23-15 1.5'	Total/NA	Solid	8015 NM	
890-4633-8	BES23-16 1.5'	Total/NA	Solid	8015 NM	
890-4633-9	BES23-17 1.5'	Total/NA	Solid	8015 NM	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

GC Semi VOA (Continued)

Analysis Batch: 53070 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-10	BES23-18 1.5'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 53012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Soluble	Solid	DI Leach	
890-4633-2	BES23-10 1.5'	Soluble	Solid	DI Leach	
890-4633-3	BES23-11 1.5'	Soluble	Solid	DI Leach	
890-4633-4	BES23-12 1.5'	Soluble	Solid	DI Leach	
890-4633-5	BES23-13 1.5'	Soluble	Solid	DI Leach	
890-4633-6	BES23-14 1.5'	Soluble	Solid	DI Leach	
890-4633-7	BES23-15 1.5'	Soluble	Solid	DI Leach	
890-4633-8	BES23-16 1.5'	Soluble	Solid	DI Leach	
890-4633-9	BES23-17 1.5'	Soluble	Solid	DI Leach	
890-4633-10	BES23-18 1.5'	Soluble	Solid	DI Leach	
MB 880-53012/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-53012/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-53012/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4633-1 MS	BES23-09 1.5'	Soluble	Solid	DI Leach	
890-4633-1 MSD	BES23-09 1.5'	Soluble	Solid	DI Leach	

Analysis Batch: 53026

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4633-1	BES23-09 1.5'	Soluble	Solid	300.0	53012
890-4633-2	BES23-10 1.5'	Soluble	Solid	300.0	53012
890-4633-3	BES23-11 1.5'	Soluble	Solid	300.0	53012
890-4633-4	BES23-12 1.5'	Soluble	Solid	300.0	53012
890-4633-5	BES23-13 1.5'	Soluble	Solid	300.0	53012
890-4633-6	BES23-14 1.5'	Soluble	Solid	300.0	53012
890-4633-7	BES23-15 1.5'	Soluble	Solid	300.0	53012
890-4633-8	BES23-16 1.5'	Soluble	Solid	300.0	53012
890-4633-9	BES23-17 1.5'	Soluble	Solid	300.0	53012
890-4633-10	BES23-18 1.5'	Soluble	Solid	300.0	53012
MB 880-53012/1-A	Method Blank	Soluble	Solid	300.0	53012
LCS 880-53012/2-A	Lab Control Sample	Soluble	Solid	300.0	53012
LCSD 880-53012/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	53012
890-4633-1 MS	BES23-09 1.5'	Soluble	Solid	300.0	53012
890-4633-1 MSD	BES23-09 1.5'	Soluble	Solid	300.0	53012

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-09 1.5'

Lab Sample ID: 890-4633-1

Date Collected: 05/08/23 10:00

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 13:51	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 13:24	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 11:54	SMC	EET MID

Client Sample ID: BES23-10 1.5'

Lab Sample ID: 890-4633-2

Date Collected: 05/08/23 10:05

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 14:12	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 13:46	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:20	SMC	EET MID

Client Sample ID: BES23-11 1.5'

Lab Sample ID: 890-4633-3

Date Collected: 05/08/23 10:10

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 14:32	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 14:08	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:25	SMC	EET MID

Client Sample ID: BES23-12 1.5'

Lab Sample ID: 890-4633-4

Date Collected: 05/08/23 10:15

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 14:53	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4633-1
 SDG: 23E-01630

Client Sample ID: BES23-12 1.5'

Lab Sample ID: 890-4633-4

Date Collected: 05/08/23 10:15

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 14:29	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:39	SMC	EET MID

Client Sample ID: BES23-13 1.5'

Lab Sample ID: 890-4633-5

Date Collected: 05/08/23 10:20

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 15:13	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 14:51	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:44	SMC	EET MID

Client Sample ID: BES23-14 1.5'

Lab Sample ID: 890-4633-6

Date Collected: 05/08/23 10:25

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 15:34	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 15:13	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:49	SMC	EET MID

Client Sample ID: BES23-15 1.5'

Lab Sample ID: 890-4633-7

Date Collected: 05/08/23 10:30

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53010	05/10/23 08:58	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53006	05/10/23 15:54	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:44	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 15:34	SM	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Client Sample ID: BES23-15 1.5'

Lab Sample ID: 890-4633-7

Date Collected: 05/08/23 10:30

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.01 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:54	SMC	EET MID

Client Sample ID: BES23-16 1.5'

Lab Sample ID: 890-4633-8

Date Collected: 05/08/23 10:35

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	53009	05/10/23 08:56	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53007	05/10/23 14:58	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:42	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 16:17	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 12:59	SMC	EET MID

Client Sample ID: BES23-17 1.5'

Lab Sample ID: 890-4633-9

Date Collected: 05/08/23 10:40

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	53009	05/10/23 08:56	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53007	05/10/23 15:19	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:42	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 16:38	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 13:04	SMC	EET MID

Client Sample ID: BES23-18 1.5'

Lab Sample ID: 890-4633-10

Date Collected: 05/08/23 10:45

Matrix: Solid

Date Received: 05/08/23 16:41

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53009	05/10/23 08:56	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53007	05/10/23 15:40	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53062	05/10/23 16:42	SM	EET MID
Total/NA	Analysis	8015 NM		1			53070	05/10/23 19:11	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53015	05/10/23 10:09	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	52997	05/10/23 17:00	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	53012	05/10/23 10:52	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53026	05/10/23 13:08	SMC	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Laboratory References:

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

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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

Method Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

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

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4633-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
890-4633-1	BES23-09 1.5'	Solid	05/08/23 10:00	05/08/23 16:41
890-4633-2	BES23-10 1.5'	Solid	05/08/23 10:05	05/08/23 16:41
890-4633-3	BES23-11 1.5'	Solid	05/08/23 10:10	05/08/23 16:41
890-4633-4	BES23-12 1.5'	Solid	05/08/23 10:15	05/08/23 16:41
890-4633-5	BES23-13 1.5'	Solid	05/08/23 10:20	05/08/23 16:41
890-4633-6	BES23-14 1.5'	Solid	05/08/23 10:25	05/08/23 16:41
890-4633-7	BES23-15 1.5'	Solid	05/08/23 10:30	05/08/23 16:41
890-4633-8	BES23-16 1.5'	Solid	05/08/23 10:35	05/08/23 16:41
890-4633-9	BES23-17 1.5'	Solid	05/08/23 10:40	05/08/23 16:41
890-4633-10	BES23-18 1.5'	Solid	05/08/23 10:45	05/08/23 16:41

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Environment Testing
Xenco

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

Chain of Custody

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex	Company Name:	Solaris Midstream
Address:	On Fire	Address:	
City, State ZIP:	↓	City, State ZIP:	
Phone:		Email:	dixon@vertex.ca

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

Project Name:	Project Number:	Project Location:	Sampler's Name:	P.O. #:	Turn Around		Pres. Code	ANALYSIS REQUEST	Preservative Codes
					<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Rush			
Cave Live Booster	23E-D1630	Hunter Klein							None: NO Cool: Cool HCL: HC H ₂ SO ₄ : H ₂ H ₂ PO ₄ : HP NaHSO ₄ : NABS Na ₂ S ₂ O ₃ : NASO Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SACP
SAMPLE RECEIPT					Temp Blank:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Thermometer ID:	Parameters	
Samples Received Intact:					Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Correction Factor:	7.2	BTEX	
Cooler Custody Seals:					Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Temperature Reading:	10.2	TPH: 8015D	
Sample Custody Seals:					Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Corrected Temperature:	10.0	CI	
Total Containers:									
Sample Identification		Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont		
RES23-09	1.5'	Soil	5/16/23	10:00		5	5	+ BTEX	
RES23-10	1.5'			10:05		5	5	/	
RES23-11	1.5'			10:10		5	5	/	
RES23-12	1.5'			10:15		5	5	/	
RES23-13	1.5'			10:20		5	5	/	
RES23-14	1.5'			10:25		5	5	/	
RES23-15	1.5'			10:30		5	5	/	
RES23-16	1.5'			10:35		5	5	/	
RES23-17	1.5'			10:40		5	5	/	
RES23-18	1.5'			10:45		5	5	/	



Total 200.7 / 6010 200.8 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Tl U Hg: 1631 / 245.1 / 7470 / 7471

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Hunter Klein	Amarala Staff	5/16/23 1:41P			

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

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4633-1

SDG Number: 23E-01630

Login Number: 4633

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4633-1

SDG Number: 23E-01630

Login Number: 4633

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/10/23 11:08 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/18/2023 2:59:04 PM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4660-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4660-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Job ID: 890-4660-1

Laboratory: Eurofins Carlsbad

Narrative

**Job Narrative
890-4660-1**

Receipt

The samples were received on 5/12/2023 3:52 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 8.6°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: WES23-03 (890-4660-1), BES23-19 (890-4660-2), BES23-20 (890-4660-3), BES23-21 (890-4660-4), BES23-22 (890-4660-5), BES23-23 (890-4660-6), BES23-24 (890-4660-7), BES23-25 (890-4660-8), BES23-26 (890-4660-9), BES23-27 (890-4660-10), BES23-28 (890-4660-11) and WES23-04 (890-4660-12).

GC VOA

Method 8021B: The continuing calibration verification (CCV) associated with batch 880-53588 recovered above the upper control limit for Benzene, Ethylbenzene, Toluene, Xylenes, Total, m-Xylene & p-Xylene and o-Xylene. The samples associated with this CCV were non-detects for the affected analytes

Method 8021B: Surrogate recovery for the following samples were outside control limits: BES23-28 (890-4660-11) and WES23-04 (890-4660-12). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: Surrogate recovery for the following samples were outside control limits: (CCV 880-53588/2), (CCV 880-53588/20), (CCV 880-53588/33), (CCV 880-53588/51), (LCS 880-53497/1-A) and (LCSD 880-53497/2-A). Evidence of matrix interferences is not obvious.

Method 8021B: Surrogate recovery for the following samples were outside control limits: WES23-03 (890-4660-1), BES23-19 (890-4660-2), BES23-20 (890-4660-3), BES23-21 (890-4660-4), BES23-22 (890-4660-5), BES23-23 (890-4660-6), BES23-24 (890-4660-7), BES23-25 (890-4660-8), BES23-26 (890-4660-9) and BES23-27 (890-4660-10). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: Surrogate recovery for the following samples were outside control limits: (890-4660-A-1-G MS) and (890-4660-A-1-H MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 880-53497 and analytical batch 880-53588 recovered outside control limits for the following analytes: Benzene, Ethylbenzene, Toluene, Xylenes, Total, m-Xylene & p-Xylene and o-Xylene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method 8021B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 880-53497 and analytical batch 880-53588 were outside control limits for one or more analytes. These analytes were biased high and were not detected in the associated samples; therefore, the data have been reported.

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-53468 and analytical batch 880-53448 was outside the upper control limits.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: BES23-24 (890-4660-7). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

HPLC/IC

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Job ID: 890-4660-1 (Continued)

Laboratory: Eurofins Carlsbad (Continued)

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: WES23-03

Lab Sample ID: 890-4660-1

Date Collected: 05/12/23 09:00

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U ** F1	0.00202		mg/Kg		05/16/23 15:29	05/18/23 04:37	1
Ethylbenzene	<0.00202	U **	0.00202		mg/Kg		05/16/23 15:29	05/18/23 04:37	1
Toluene	<0.00202	U ** F1	0.00202		mg/Kg		05/16/23 15:29	05/18/23 04:37	1
Xylenes, Total	<0.00404	U ** F1	0.00404		mg/Kg		05/16/23 15:29	05/18/23 04:37	1
m-Xylene & p-Xylene	<0.00404	U ** F1	0.00404		mg/Kg		05/16/23 15:29	05/18/23 04:37	1
o-Xylene	<0.00202	U ** F1	0.00202		mg/Kg		05/16/23 15:29	05/18/23 04:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	196	S1+	70 - 130	05/16/23 15:29	05/18/23 04:37	1
1,4-Difluorobenzene (Surr)	72		70 - 130	05/16/23 15:29	05/18/23 04:37	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 20:53	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 20:53	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 20:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	127		70 - 130	05/16/23 11:44	05/16/23 20:53	1
o-Terphenyl	96		70 - 130	05/16/23 11:44	05/16/23 20:53	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	86.1		4.96		mg/Kg			05/17/23 09:55	1

Client Sample ID: BES23-19

Lab Sample ID: 890-4660-2

Date Collected: 05/12/23 09:05

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:02	1
Ethylbenzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:02	1
Toluene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:02	1
Xylenes, Total	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 05:02	1
m-Xylene & p-Xylene	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 05:02	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	197	S1+	70 - 130	05/16/23 15:29	05/18/23 05:02	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-19

Lab Sample ID: 890-4660-2

Date Collected: 05/12/23 09:05

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	80		70 - 130	05/16/23 15:29	05/18/23 05:02	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 21:56	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 21:56	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 21:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	124		70 - 130	05/16/23 11:44	05/16/23 21:56	1
o-Terphenyl	93		70 - 130	05/16/23 11:44	05/16/23 21:56	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	68.4		5.03		mg/Kg			05/17/23 10:11	1

Client Sample ID: BES23-20

Lab Sample ID: 890-4660-3

Date Collected: 05/12/23 09:10

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:28	1
Ethylbenzene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:28	1
Toluene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:28	1
Xylenes, Total	<0.00398	U *	0.00398		mg/Kg		05/16/23 15:29	05/18/23 05:28	1
m-Xylene & p-Xylene	<0.00398	U *	0.00398		mg/Kg		05/16/23 15:29	05/18/23 05:28	1
o-Xylene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 05:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	182	S1+	70 - 130	05/16/23 15:29	05/18/23 05:28	1
1,4-Difluorobenzene (Surr)	74		70 - 130	05/16/23 15:29	05/18/23 05:28	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-20

Lab Sample ID: 890-4660-3

Date Collected: 05/12/23 09:10

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:17	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:17	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	122		70 - 130				05/16/23 11:44	05/16/23 22:17	1
o-Terphenyl	91		70 - 130				05/16/23 11:44	05/16/23 22:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	72.0		4.97		mg/Kg			05/17/23 10:16	1

Client Sample ID: BES23-21

Lab Sample ID: 890-4660-4

Date Collected: 05/12/23 09:15

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
Ethylbenzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
Toluene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
Xylenes, Total	<0.00399	U **	0.00399		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
m-Xylene & p-Xylene	<0.00399	U **	0.00399		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 05:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	195	S1+	70 - 130				05/16/23 15:29	05/18/23 05:54	1
1,4-Difluorobenzene (Surr)	69	S1-	70 - 130				05/16/23 15:29	05/18/23 05:54	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 22:39	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 22:39	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/16/23 22:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	126		70 - 130				05/16/23 11:44	05/16/23 22:39	1
o-Terphenyl	94		70 - 130				05/16/23 11:44	05/16/23 22:39	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-21

Lab Sample ID: 890-4660-4

Date Collected: 05/12/23 09:15

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	66.9		5.02		mg/Kg			05/17/23 10:22	1

Client Sample ID: BES23-22

Lab Sample ID: 890-4660-5

Date Collected: 05/12/23 09:20

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
Ethylbenzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
Toluene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
Xylenes, Total	<0.00401	U **	0.00401		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
m-Xylene & p-Xylene	<0.00401	U **	0.00401		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 06:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	214	S1+	70 - 130				05/16/23 15:29	05/18/23 06:19	1
1,4-Difluorobenzene (Surr)	77		70 - 130				05/16/23 15:29	05/18/23 06:19	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:59	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:59	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 22:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	124		70 - 130				05/16/23 11:44	05/16/23 22:59	1
o-Terphenyl	92		70 - 130				05/16/23 11:44	05/16/23 22:59	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	79.2		5.04		mg/Kg			05/17/23 10:27	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-23

Lab Sample ID: 890-4660-6

Date Collected: 05/12/23 09:25

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 06:45	1
Ethylbenzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 06:45	1
Toluene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 06:45	1
Xylenes, Total	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 06:45	1
m-Xylene & p-Xylene	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 06:45	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 06:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	209	S1+	70 - 130	05/16/23 15:29	05/18/23 06:45	1
1,4-Difluorobenzene (Surr)	86		70 - 130	05/16/23 15:29	05/18/23 06:45	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:20	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:20	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	129		70 - 130	05/16/23 11:44	05/16/23 23:20	1
o-Terphenyl	96		70 - 130	05/16/23 11:44	05/16/23 23:20	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	76.8		4.98		mg/Kg			05/17/23 10:43	1

Client Sample ID: BES23-24

Lab Sample ID: 890-4660-7

Date Collected: 05/12/23 09:30

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U **	0.00198		mg/Kg		05/16/23 15:29	05/18/23 07:11	1
Ethylbenzene	<0.00198	U **	0.00198		mg/Kg		05/16/23 15:29	05/18/23 07:11	1
Toluene	<0.00198	U **	0.00198		mg/Kg		05/16/23 15:29	05/18/23 07:11	1
Xylenes, Total	<0.00396	U **	0.00396		mg/Kg		05/16/23 15:29	05/18/23 07:11	1
m-Xylene & p-Xylene	<0.00396	U **	0.00396		mg/Kg		05/16/23 15:29	05/18/23 07:11	1
o-Xylene	<0.00198	U **	0.00198		mg/Kg		05/16/23 15:29	05/18/23 07:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	192	S1+	70 - 130	05/16/23 15:29	05/18/23 07:11	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-24

Lab Sample ID: 890-4660-7

Date Collected: 05/12/23 09:30

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	74		70 - 130	05/16/23 15:29	05/18/23 07:11	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:42	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:42	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 23:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	139	S1+	70 - 130	05/16/23 11:44	05/16/23 23:42	1
o-Terphenyl	104		70 - 130	05/16/23 11:44	05/16/23 23:42	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	78.2		4.96		mg/Kg			05/17/23 10:48	1

Client Sample ID: BES23-25

Lab Sample ID: 890-4660-8

Date Collected: 05/12/23 09:35

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 07:37	1
Ethylbenzene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 07:37	1
Toluene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 07:37	1
Xylenes, Total	<0.00398	U *	0.00398		mg/Kg		05/16/23 15:29	05/18/23 07:37	1
m-Xylene & p-Xylene	<0.00398	U *	0.00398		mg/Kg		05/16/23 15:29	05/18/23 07:37	1
o-Xylene	<0.00199	U *	0.00199		mg/Kg		05/16/23 15:29	05/18/23 07:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	201	S1+	70 - 130	05/16/23 15:29	05/18/23 07:37	1
1,4-Difluorobenzene (Surr)	78		70 - 130	05/16/23 15:29	05/18/23 07:37	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/17/23 11:56	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

Client Sample ID: BES23-25

Lab Sample ID: 890-4660-8

Date Collected: 05/12/23 09:35

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 00:03	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 00:03	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 00:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	128		70 - 130				05/16/23 11:44	05/17/23 00:03	1
o-Terphenyl	95		70 - 130				05/16/23 11:44	05/17/23 00:03	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	92.7		4.97		mg/Kg			05/17/23 10:54	1

Client Sample ID: BES23-26

Lab Sample ID: 890-4660-9

Date Collected: 05/12/23 09:40

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
Ethylbenzene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
Toluene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
Xylenes, Total	<0.00399	U **	0.00399		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
m-Xylene & p-Xylene	<0.00399	U **	0.00399		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
o-Xylene	<0.00200	U **	0.00200		mg/Kg		05/16/23 15:29	05/18/23 08:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	216	S1+	70 - 130				05/16/23 15:29	05/18/23 08:03	1
1,4-Difluorobenzene (Surr)	77		70 - 130				05/16/23 15:29	05/18/23 08:03	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:25	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:25	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	127		70 - 130				05/16/23 11:44	05/17/23 00:25	1
o-Terphenyl	96		70 - 130				05/16/23 11:44	05/17/23 00:25	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-26

Lab Sample ID: 890-4660-9

Date Collected: 05/12/23 09:40
Date Received: 05/12/23 15:52
Sample Depth: 1.5

Matrix: Solid

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	71.3		5.01		mg/Kg			05/17/23 10:59	1

Client Sample ID: BES23-27

Lab Sample ID: 890-4660-10

Date Collected: 05/12/23 09:45
Date Received: 05/12/23 15:52
Sample Depth: 1.5

Matrix: Solid

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U **	0.00201		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
Ethylbenzene	<0.00201	U **	0.00201		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
Toluene	<0.00201	U **	0.00201		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
Xylenes, Total	<0.00402	U **	0.00402		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
m-Xylene & p-Xylene	<0.00402	U **	0.00402		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
o-Xylene	<0.00201	U **	0.00201		mg/Kg		05/16/23 15:29	05/18/23 08:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	220	S1+	70 - 130				05/16/23 15:29	05/18/23 08:29	1
1,4-Difluorobenzene (Surr)	82		70 - 130				05/16/23 15:29	05/18/23 08:29	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:46	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:46	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 00:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	130		70 - 130				05/16/23 11:44	05/17/23 00:46	1
o-Terphenyl	100		70 - 130				05/16/23 11:44	05/17/23 00:46	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	103		5.04		mg/Kg			05/17/23 11:04	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-28

Lab Sample ID: 890-4660-11

Date Collected: 05/12/23 09:50

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U **	0.00202		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
Ethylbenzene	<0.00202	U **	0.00202		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
Toluene	<0.00202	U **	0.00202		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
Xylenes, Total	<0.00404	U **	0.00404		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
m-Xylene & p-Xylene	<0.00404	U **	0.00404		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
o-Xylene	<0.00202	U **	0.00202		mg/Kg		05/16/23 15:29	05/18/23 10:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	167	S1+	70 - 130				05/16/23 15:29	05/18/23 10:12	1
1,4-Difluorobenzene (Surr)	77		70 - 130				05/16/23 15:29	05/18/23 10:12	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 01:27	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 01:27	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/17/23 01:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	125		70 - 130				05/16/23 11:44	05/17/23 01:27	1
o-Terphenyl	94		70 - 130				05/16/23 11:44	05/17/23 01:27	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	74.2		4.99		mg/Kg			05/17/23 11:10	1

Client Sample ID: WES23-04

Lab Sample ID: 890-4660-12

Date Collected: 05/12/23 09:55

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
Ethylbenzene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
Toluene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
Xylenes, Total	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
m-Xylene & p-Xylene	<0.00398	U **	0.00398		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
o-Xylene	<0.00199	U **	0.00199		mg/Kg		05/16/23 15:29	05/18/23 10:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	193	S1+	70 - 130				05/16/23 15:29	05/18/23 10:38	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

Client Sample ID: WES23-04

Lab Sample ID: 890-4660-12

Date Collected: 05/12/23 09:55

Matrix: Solid

Date Received: 05/12/23 15:52

Sample Depth: 1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	72		70 - 130	05/16/23 15:29	05/18/23 10:38	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/18/23 15:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/17/23 11:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 01:49	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 01:49	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/16/23 11:44	05/17/23 01:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	128		70 - 130	05/16/23 11:44	05/17/23 01:49	1
o-Terphenyl	96		70 - 130	05/16/23 11:44	05/17/23 01:49	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	74.5		4.95		mg/Kg			05/17/23 11:26	1

Surrogate Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
890-4660-1	WES23-03	196 S1+	72
890-4660-1 MS	WES23-03	203 S1+	103
890-4660-1 MSD	WES23-03	173 S1+	91
890-4660-2	BES23-19	197 S1+	80
890-4660-3	BES23-20	182 S1+	74
890-4660-4	BES23-21	195 S1+	69 S1-
890-4660-5	BES23-22	214 S1+	77
890-4660-6	BES23-23	209 S1+	86
890-4660-7	BES23-24	192 S1+	74
890-4660-8	BES23-25	201 S1+	78
890-4660-9	BES23-26	216 S1+	77
890-4660-10	BES23-27	220 S1+	82
890-4660-11	BES23-28	167 S1+	77
890-4660-12	WES23-04	193 S1+	72
LCS 880-53497/1-A	Lab Control Sample	196 S1+	93
LCSD 880-53497/2-A	Lab Control Sample Dup	198 S1+	88
MB 880-53497/5-A	Method Blank	106	76
MB 880-53508/5-A	Method Blank	102	80

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
890-4660-1	WES23-03	127	96
890-4660-1 MS	WES23-03	119	82
890-4660-1 MSD	WES23-03	118	82
890-4660-2	BES23-19	124	93
890-4660-3	BES23-20	122	91
890-4660-4	BES23-21	126	94
890-4660-5	BES23-22	124	92
890-4660-6	BES23-23	129	96
890-4660-7	BES23-24	139 S1+	104
890-4660-8	BES23-25	128	95
890-4660-9	BES23-26	127	96
890-4660-10	BES23-27	130	100
890-4660-11	BES23-28	125	94
890-4660-12	WES23-04	128	96
LCS 880-53468/2-A	Lab Control Sample	104	83
LCSD 880-53468/3-A	Lab Control Sample Dup	103	79
MB 880-53468/1-A	Method Blank	191 S1+	156 S1+

Surrogate Legend

1CO = 1-Chlorooctane

OTPH = o-Terphenyl

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-53497/5-A
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53497

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/16/23 15:29	05/18/23 04:11	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/16/23 15:29	05/18/23 04:11	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/16/23 15:29	05/18/23 04:11	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/16/23 15:29	05/18/23 04:11	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/16/23 15:29	05/18/23 04:11	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/16/23 15:29	05/18/23 04:11	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130	05/16/23 15:29	05/18/23 04:11	1
1,4-Difluorobenzene (Surr)	76		70 - 130	05/16/23 15:29	05/18/23 04:11	1

Lab Sample ID: LCS 880-53497/1-A
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53497

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1501	*+	mg/Kg		150	70 - 130
Ethylbenzene	0.100	0.1429	*+	mg/Kg		143	70 - 130
Toluene	0.100	0.1589	*+	mg/Kg		159	70 - 130
m-Xylene & p-Xylene	0.200	0.3204	*+	mg/Kg		160	70 - 130
o-Xylene	0.100	0.1494	*+	mg/Kg		149	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	196	S1+	70 - 130
1,4-Difluorobenzene (Surr)	93		70 - 130

Lab Sample ID: LCSD 880-53497/2-A
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53497

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1376	*+	mg/Kg		138	70 - 130	9	35
Ethylbenzene	0.100	0.1324	*+	mg/Kg		132	70 - 130	8	35
Toluene	0.100	0.1387	*+	mg/Kg		139	70 - 130	14	35
m-Xylene & p-Xylene	0.200	0.2988	*+	mg/Kg		149	70 - 130	7	35
o-Xylene	0.100	0.1354	*+	mg/Kg		135	70 - 130	10	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	198	S1+	70 - 130
1,4-Difluorobenzene (Surr)	88		70 - 130

Lab Sample ID: 890-4660-1 MS
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: WES23-03
Prep Type: Total/NA
Prep Batch: 53497

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00202	U ** F1	0.0998	0.1372	F1	mg/Kg		137	70 - 130
Ethylbenzene	<0.00202	U **	0.0998	0.1191		mg/Kg		119	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

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

Lab Sample ID: 890-4660-1 MS
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: WES23-03
Prep Type: Total/NA
Prep Batch: 53497

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Toluene	<0.00202	U ** F1	0.0998	0.1371	F1	mg/Kg		137	70 - 130
m-Xylene & p-Xylene	<0.00404	U ** F1	0.200	0.2887	F1	mg/Kg		145	70 - 130
o-Xylene	<0.00202	U ** F1	0.0998	0.1356	F1	mg/Kg		136	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	203	S1+	70 - 130
1,4-Difluorobenzene (Surr)	103		70 - 130

Lab Sample ID: 890-4660-1 MSD
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: WES23-03
Prep Type: Total/NA
Prep Batch: 53497

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Benzene	<0.00202	U ** F1	0.0990	0.1284		mg/Kg		130	70 - 130	7	35
Ethylbenzene	<0.00202	U **	0.0990	0.1188		mg/Kg		120	70 - 130	0	35
Toluene	<0.00202	U ** F1	0.0990	0.1357	F1	mg/Kg		137	70 - 130	1	35
m-Xylene & p-Xylene	<0.00404	U ** F1	0.198	0.2600	F1	mg/Kg		131	70 - 130	10	35
o-Xylene	<0.00202	U ** F1	0.0990	0.1225		mg/Kg		124	70 - 130	10	35

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	173	S1+	70 - 130
1,4-Difluorobenzene (Surr)	91		70 - 130

Lab Sample ID: MB 880-53508/5-A
Matrix: Solid
Analysis Batch: 53588

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53508

Analyte	MB	MB	RL	MDL	Unit	D	Prepared		Analyzed		Dil Fac
	Result	Qualifier									
Benzene	<0.00200	U	0.00200		mg/Kg		05/16/23 16:07	05/17/23 14:52			1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/16/23 16:07	05/17/23 14:52			1
Toluene	<0.00200	U	0.00200		mg/Kg		05/16/23 16:07	05/17/23 14:52			1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/16/23 16:07	05/17/23 14:52			1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/16/23 16:07	05/17/23 14:52			1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/16/23 16:07	05/17/23 14:52			1

Surrogate	MB	MB	Limits	Prepared		Analyzed		Dil Fac
	%Recovery	Qualifier						
4-Bromofluorobenzene (Surr)	102		70 - 130	05/16/23 16:07		05/17/23 14:52		1
1,4-Difluorobenzene (Surr)	80		70 - 130	05/16/23 16:07		05/17/23 14:52		1

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

Lab Sample ID: MB 880-53468/1-A
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53468

Analyte	MB	MB	RL	MDL	Unit	D	Prepared		Analyzed		Dil Fac
	Result	Qualifier									
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 19:50			1

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

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

Lab Sample ID: MB 880-53468/1-A
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53468

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 19:50	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/16/23 11:44	05/16/23 19:50	1
Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac			
	%Recovery	Qualifier							
1-Chlorooctane	191	S1+	70 - 130	05/16/23 11:44	05/16/23 19:50	1			
o-Terphenyl	156	S1+	70 - 130	05/16/23 11:44	05/16/23 19:50	1			

Lab Sample ID: LCS 880-53468/2-A
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53468

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Diesel Range Organics (Over C10-C28)	1000	949.6		mg/Kg		95	70 - 130
Surrogate	LCS	LCS	Limits				
	%Recovery	Qualifier					
1-Chlorooctane	104		70 - 130				
o-Terphenyl	83		70 - 130				

Lab Sample ID: LCSD 880-53468/3-A
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53468

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Diesel Range Organics (Over C10-C28)	999	890.3		mg/Kg		89	70 - 130	6	20
Surrogate	LCSD	LCSD	Limits						
	%Recovery	Qualifier							
1-Chlorooctane	103		70 - 130						
o-Terphenyl	79		70 - 130						

Lab Sample ID: 890-4660-1 MS
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: WES23-03
Prep Type: Total/NA
Prep Batch: 53468

Analyte	Sample	Sample	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	998	1043		mg/Kg		102	70 - 130
Diesel Range Organics (Over C10-C28)	<50.0	U	998	900.3		mg/Kg		90	70 - 130
Surrogate	MS	MS	Limits						
	%Recovery	Qualifier							
1-Chlorooctane	119		70 - 130						
o-Terphenyl	82		70 - 130						

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

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

Lab Sample ID: 890-4660-1 MSD
Matrix: Solid
Analysis Batch: 53448

Client Sample ID: WES23-03
Prep Type: Total/NA
Prep Batch: 53468

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	998	1006		mg/Kg		99	70 - 130	4	20
Diesel Range Organics (Over C10-C28)	<50.0	U	998	891.8		mg/Kg		89	70 - 130	1	20
Surrogate	%Recovery	MSD Qualifier	MSD	Limits							
1-Chlorooctane	118			70 - 130							
o-Terphenyl	82			70 - 130							

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-53477/1-A
Matrix: Solid
Analysis Batch: 53571

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/17/23 09:39	1

Lab Sample ID: LCS 880-53477/2-A
Matrix: Solid
Analysis Batch: 53571

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	250.8		mg/Kg		100	90 - 110

Lab Sample ID: LCSD 880-53477/3-A
Matrix: Solid
Analysis Batch: 53571

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	253.0		mg/Kg		101	90 - 110	1	20

Lab Sample ID: 890-4660-1 MS
Matrix: Solid
Analysis Batch: 53571

Client Sample ID: WES23-03
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	86.1		248	329.1		mg/Kg		98	90 - 110

Lab Sample ID: 890-4660-1 MSD
Matrix: Solid
Analysis Batch: 53571

Client Sample ID: WES23-03
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	86.1		248	329.4		mg/Kg		98	90 - 110	0	20

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QC Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 890-4660-11 MS
 Matrix: Solid
 Analysis Batch: 53571

Client Sample ID: BES23-28
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	74.2		250	335.7		mg/Kg		105	90 - 110

Lab Sample ID: 890-4660-11 MSD
 Matrix: Solid
 Analysis Batch: 53571

Client Sample ID: BES23-28
 Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	74.2		250	333.3		mg/Kg		104	90 - 110	1	20

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

GC VOA

Prep Batch: 53497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	5035	
890-4660-2	BES23-19	Total/NA	Solid	5035	
890-4660-3	BES23-20	Total/NA	Solid	5035	
890-4660-4	BES23-21	Total/NA	Solid	5035	
890-4660-5	BES23-22	Total/NA	Solid	5035	
890-4660-6	BES23-23	Total/NA	Solid	5035	
890-4660-7	BES23-24	Total/NA	Solid	5035	
890-4660-8	BES23-25	Total/NA	Solid	5035	
890-4660-9	BES23-26	Total/NA	Solid	5035	
890-4660-10	BES23-27	Total/NA	Solid	5035	
890-4660-11	BES23-28	Total/NA	Solid	5035	
890-4660-12	WES23-04	Total/NA	Solid	5035	
MB 880-53497/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-53497/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-53497/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4660-1 MS	WES23-03	Total/NA	Solid	5035	
890-4660-1 MSD	WES23-03	Total/NA	Solid	5035	

Prep Batch: 53508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 880-53508/5-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 53588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	8021B	53497
890-4660-2	BES23-19	Total/NA	Solid	8021B	53497
890-4660-3	BES23-20	Total/NA	Solid	8021B	53497
890-4660-4	BES23-21	Total/NA	Solid	8021B	53497
890-4660-5	BES23-22	Total/NA	Solid	8021B	53497
890-4660-6	BES23-23	Total/NA	Solid	8021B	53497
890-4660-7	BES23-24	Total/NA	Solid	8021B	53497
890-4660-8	BES23-25	Total/NA	Solid	8021B	53497
890-4660-9	BES23-26	Total/NA	Solid	8021B	53497
890-4660-10	BES23-27	Total/NA	Solid	8021B	53497
890-4660-11	BES23-28	Total/NA	Solid	8021B	53497
890-4660-12	WES23-04	Total/NA	Solid	8021B	53497
MB 880-53497/5-A	Method Blank	Total/NA	Solid	8021B	53497
MB 880-53508/5-A	Method Blank	Total/NA	Solid	8021B	53508
LCS 880-53497/1-A	Lab Control Sample	Total/NA	Solid	8021B	53497
LCSD 880-53497/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	53497
890-4660-1 MS	WES23-03	Total/NA	Solid	8021B	53497
890-4660-1 MSD	WES23-03	Total/NA	Solid	8021B	53497

Analysis Batch: 53695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	Total BTEX	
890-4660-2	BES23-19	Total/NA	Solid	Total BTEX	
890-4660-3	BES23-20	Total/NA	Solid	Total BTEX	
890-4660-4	BES23-21	Total/NA	Solid	Total BTEX	
890-4660-5	BES23-22	Total/NA	Solid	Total BTEX	
890-4660-6	BES23-23	Total/NA	Solid	Total BTEX	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

GC VOA (Continued)

Analysis Batch: 53695 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-7	BES23-24	Total/NA	Solid	Total BTEX	
890-4660-8	BES23-25	Total/NA	Solid	Total BTEX	
890-4660-9	BES23-26	Total/NA	Solid	Total BTEX	
890-4660-10	BES23-27	Total/NA	Solid	Total BTEX	
890-4660-11	BES23-28	Total/NA	Solid	Total BTEX	
890-4660-12	WES23-04	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 53448

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	8015B NM	53468
890-4660-2	BES23-19	Total/NA	Solid	8015B NM	53468
890-4660-3	BES23-20	Total/NA	Solid	8015B NM	53468
890-4660-4	BES23-21	Total/NA	Solid	8015B NM	53468
890-4660-5	BES23-22	Total/NA	Solid	8015B NM	53468
890-4660-6	BES23-23	Total/NA	Solid	8015B NM	53468
890-4660-7	BES23-24	Total/NA	Solid	8015B NM	53468
890-4660-8	BES23-25	Total/NA	Solid	8015B NM	53468
890-4660-9	BES23-26	Total/NA	Solid	8015B NM	53468
890-4660-10	BES23-27	Total/NA	Solid	8015B NM	53468
890-4660-11	BES23-28	Total/NA	Solid	8015B NM	53468
890-4660-12	WES23-04	Total/NA	Solid	8015B NM	53468
MB 880-53468/1-A	Method Blank	Total/NA	Solid	8015B NM	53468
LCS 880-53468/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	53468
LCSD 880-53468/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	53468
890-4660-1 MS	WES23-03	Total/NA	Solid	8015B NM	53468
890-4660-1 MSD	WES23-03	Total/NA	Solid	8015B NM	53468

Prep Batch: 53468

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	8015NM Prep	
890-4660-2	BES23-19	Total/NA	Solid	8015NM Prep	
890-4660-3	BES23-20	Total/NA	Solid	8015NM Prep	
890-4660-4	BES23-21	Total/NA	Solid	8015NM Prep	
890-4660-5	BES23-22	Total/NA	Solid	8015NM Prep	
890-4660-6	BES23-23	Total/NA	Solid	8015NM Prep	
890-4660-7	BES23-24	Total/NA	Solid	8015NM Prep	
890-4660-8	BES23-25	Total/NA	Solid	8015NM Prep	
890-4660-9	BES23-26	Total/NA	Solid	8015NM Prep	
890-4660-10	BES23-27	Total/NA	Solid	8015NM Prep	
890-4660-11	BES23-28	Total/NA	Solid	8015NM Prep	
890-4660-12	WES23-04	Total/NA	Solid	8015NM Prep	
MB 880-53468/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-53468/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-53468/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4660-1 MS	WES23-03	Total/NA	Solid	8015NM Prep	
890-4660-1 MSD	WES23-03	Total/NA	Solid	8015NM Prep	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

GC Semi VOA

Analysis Batch: 53589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Total/NA	Solid	8015 NM	
890-4660-2	BES23-19	Total/NA	Solid	8015 NM	
890-4660-3	BES23-20	Total/NA	Solid	8015 NM	
890-4660-4	BES23-21	Total/NA	Solid	8015 NM	
890-4660-5	BES23-22	Total/NA	Solid	8015 NM	
890-4660-6	BES23-23	Total/NA	Solid	8015 NM	
890-4660-7	BES23-24	Total/NA	Solid	8015 NM	
890-4660-8	BES23-25	Total/NA	Solid	8015 NM	
890-4660-9	BES23-26	Total/NA	Solid	8015 NM	
890-4660-10	BES23-27	Total/NA	Solid	8015 NM	
890-4660-11	BES23-28	Total/NA	Solid	8015 NM	
890-4660-12	WES23-04	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 53477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Soluble	Solid	DI Leach	
890-4660-2	BES23-19	Soluble	Solid	DI Leach	
890-4660-3	BES23-20	Soluble	Solid	DI Leach	
890-4660-4	BES23-21	Soluble	Solid	DI Leach	
890-4660-5	BES23-22	Soluble	Solid	DI Leach	
890-4660-6	BES23-23	Soluble	Solid	DI Leach	
890-4660-7	BES23-24	Soluble	Solid	DI Leach	
890-4660-8	BES23-25	Soluble	Solid	DI Leach	
890-4660-9	BES23-26	Soluble	Solid	DI Leach	
890-4660-10	BES23-27	Soluble	Solid	DI Leach	
890-4660-11	BES23-28	Soluble	Solid	DI Leach	
890-4660-12	WES23-04	Soluble	Solid	DI Leach	
MB 880-53477/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-53477/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCS 880-53477/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4660-1 MS	WES23-03	Soluble	Solid	DI Leach	
890-4660-1 MSD	WES23-03	Soluble	Solid	DI Leach	
890-4660-11 MS	BES23-28	Soluble	Solid	DI Leach	
890-4660-11 MSD	BES23-28	Soluble	Solid	DI Leach	

Analysis Batch: 53571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4660-1	WES23-03	Soluble	Solid	300.0	53477
890-4660-2	BES23-19	Soluble	Solid	300.0	53477
890-4660-3	BES23-20	Soluble	Solid	300.0	53477
890-4660-4	BES23-21	Soluble	Solid	300.0	53477
890-4660-5	BES23-22	Soluble	Solid	300.0	53477
890-4660-6	BES23-23	Soluble	Solid	300.0	53477
890-4660-7	BES23-24	Soluble	Solid	300.0	53477
890-4660-8	BES23-25	Soluble	Solid	300.0	53477
890-4660-9	BES23-26	Soluble	Solid	300.0	53477
890-4660-10	BES23-27	Soluble	Solid	300.0	53477
890-4660-11	BES23-28	Soluble	Solid	300.0	53477
890-4660-12	WES23-04	Soluble	Solid	300.0	53477

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

HPLC/IC (Continued)

Analysis Batch: 53571 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 880-53477/1-A	Method Blank	Soluble	Solid	300.0	53477
LCS 880-53477/2-A	Lab Control Sample	Soluble	Solid	300.0	53477
LCSD 880-53477/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	53477
890-4660-1 MS	WES23-03	Soluble	Solid	300.0	53477
890-4660-1 MSD	WES23-03	Soluble	Solid	300.0	53477
890-4660-11 MS	BES23-28	Soluble	Solid	300.0	53477
890-4660-11 MSD	BES23-28	Soluble	Solid	300.0	53477

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: WES23-03

Lab Sample ID: 890-4660-1

Date Collected: 05/12/23 09:00

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 04:37	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 20:53	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 09:55	CH	EET MID

Client Sample ID: BES23-19

Lab Sample ID: 890-4660-2

Date Collected: 05/12/23 09:05

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 05:02	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 21:56	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:11	CH	EET MID

Client Sample ID: BES23-20

Lab Sample ID: 890-4660-3

Date Collected: 05/12/23 09:10

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 05:28	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 22:17	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:16	CH	EET MID

Client Sample ID: BES23-21

Lab Sample ID: 890-4660-4

Date Collected: 05/12/23 09:15

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 05:54	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-21

Lab Sample ID: 890-4660-4

Date Collected: 05/12/23 09:15

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 22:39	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:22	CH	EET MID

Client Sample ID: BES23-22

Lab Sample ID: 890-4660-5

Date Collected: 05/12/23 09:20

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 06:19	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 22:59	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:27	CH	EET MID

Client Sample ID: BES23-23

Lab Sample ID: 890-4660-6

Date Collected: 05/12/23 09:25

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 06:45	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 23:20	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:43	CH	EET MID

Client Sample ID: BES23-24

Lab Sample ID: 890-4660-7

Date Collected: 05/12/23 09:30

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 07:11	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/16/23 23:42	SM	EET MID

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Client Sample ID: BES23-24

Lab Sample ID: 890-4660-7

Date Collected: 05/12/23 09:30

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:48	CH	EET MID

Client Sample ID: BES23-25

Lab Sample ID: 890-4660-8

Date Collected: 05/12/23 09:35

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 07:37	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/17/23 00:03	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:54	CH	EET MID

Client Sample ID: BES23-26

Lab Sample ID: 890-4660-9

Date Collected: 05/12/23 09:40

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 08:03	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/17/23 00:25	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 10:59	CH	EET MID

Client Sample ID: BES23-27

Lab Sample ID: 890-4660-10

Date Collected: 05/12/23 09:45

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 08:29	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/17/23 00:46	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 11:04	CH	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4660-1
 SDG: 23E-01630

Client Sample ID: BES23-28

Lab Sample ID: 890-4660-11

Date Collected: 05/12/23 09:50

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 10:12	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/17/23 01:27	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 11:10	CH	EET MID

Client Sample ID: WES23-04

Lab Sample ID: 890-4660-12

Date Collected: 05/12/23 09:55

Matrix: Solid

Date Received: 05/12/23 15:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53497	05/16/23 15:29	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53588	05/18/23 10:38	EL	EET MID
Total/NA	Analysis	Total BTEX		1			53695	05/18/23 15:49	SM	EET MID
Total/NA	Analysis	8015 NM		1			53589	05/17/23 11:56	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53468	05/16/23 11:44	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53448	05/17/23 01:49	SM	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	53477	05/16/23 12:03	KS	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53571	05/17/23 11:26	CH	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

- 1
- 2
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Method Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

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

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4660-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4660-1	WES23-03	Solid	05/12/23 09:00	05/12/23 15:52	1.5
890-4660-2	BES23-19	Solid	05/12/23 09:05	05/12/23 15:52	1.5
890-4660-3	BES23-20	Solid	05/12/23 09:10	05/12/23 15:52	1.5
890-4660-4	BES23-21	Solid	05/12/23 09:15	05/12/23 15:52	1.5
890-4660-5	BES23-22	Solid	05/12/23 09:20	05/12/23 15:52	1.5
890-4660-6	BES23-23	Solid	05/12/23 09:25	05/12/23 15:52	1.5
890-4660-7	BES23-24	Solid	05/12/23 09:30	05/12/23 15:52	1.5
890-4660-8	BES23-25	Solid	05/12/23 09:35	05/12/23 15:52	1.5
890-4660-9	BES23-26	Solid	05/12/23 09:40	05/12/23 15:52	1.5
890-4660-10	BES23-27	Solid	05/12/23 09:45	05/12/23 15:52	1.5
890-4660-11	BES23-28	Solid	05/12/23 09:50	05/12/23 15:52	1.5
890-4660-12	WES23-04	Solid	05/12/23 09:55	05/12/23 15:52	1.5

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Environment Testing
Xenco

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

Chain of Custody

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager:	Chance Dixon	Bill to: (if different)	
Company Name:	Vertex	Company Name:	Solaris Midstream
Address:	On File	Address:	
City, State ZIP:		City, State ZIP:	
Phone:		Email:	

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

Project Name:	Cave Line Booster	Turn Around	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Rush	Pres. Code	
Project Number:	235-01630	Due Date:				
Project Location:	Hunter Klein	TAT starts the day received by the lab. If received by 4:30pm				
Sampler's Name:	Hunter Klein	Temp Blank:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Thermometer ID:	TIME 007
PO #:		Cooler Custody Seals:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Correction Factor:	-0.2
SAMPLE RECEIPT		Sample Custody Seals:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Temperature Reading:	8.8
Samples Received Intact:	<input checked="" type="checkbox"/> Yes				Corrected Temperature:	8.0
Cooler Custody Seals:	<input checked="" type="checkbox"/> Yes					
Sample Custody Seals:	<input checked="" type="checkbox"/> Yes					
Total Containers:						



Sample Identification	Matrix	Date Sampled	Time	Depth	Grab/Comp	# of Cont	Parameters
WES23-03	0-1.5' Soil	5/12/23	9:05	2.5'	5		BTEX
BE523-19	1.5'						TPH: 6015D
BE523-20	1.5'						
BE523-21	1.5'						
BE523-22	1.5'						
BE523-23	1.5'						
BE523-24	1.5'						
BE523-25	1.5'						
BE523-26	1.5'						
BE523-27	1.5'						
BE523-28	1.5'						
Total	200.8 / 6020:						

Circle Method(s) and Metal(s) to be analyzed: 8RCRA 13 PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn
TC1P / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Hunter Klein</i>	<i>Average Staff</i>	5/12/23 1552			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4660-1

SDG Number: 23E-01630

Login Number: 4660

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4660-1

SDG Number: 23E-01630

Login Number: 4660

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/16/23 10:43 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/22/2023 5:00:44 PM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4678-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



Generated
5/22/2023 5:00:44 PM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4678-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Job ID: 890-4678-1**Laboratory: Eurofins Carlsbad****Narrative**

Job Narrative
890-4678-1

Receipt

The samples were received on 5/17/2023 2:20 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.4°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BES23-29 4' (890-4678-1), BES23-30 4' (890-4678-2), BES23-31 1.5' (890-4678-3), BES23-32 1.5' (890-4678-4), BES23-33 1.5' (890-4678-5), BES23-34 4' (890-4678-6), WES23-05 0-4' (890-4678-7), WES23-06 0-1.5' (890-4678-8) and WES23-07 0-4' (890-4678-9).

GC VOA

Method 8021B: Surrogate recovery for the following sample was outside control limits: (CCV 880-53724/52). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: Surrogate recovery for the following sample was outside control limits: (890-4678-A-1-B MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8021B: Surrogate recovery for the following sample was outside control limits: WES23-05 0-4' (890-4678-7). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-53721 and analytical batch 880-53716 was outside the upper control limits.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (CCV 880-53716/5), (LCS 880-53721/2-A) and (LCSD 880-53721/3-A). Evidence of matrix interferences is not obvious.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (880-28573-A-1-E MS) and (880-28573-A-1-F MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: BES23-32 1.5' (890-4678-4) and BES23-33 1.5' (890-4678-5). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: The laboratory control sample (LCS) associated with preparation batch 880-53721 and analytical batch 880-53716 was outside acceptance criteria. Re-extraction and/or re-analysis could not be performed; therefore, the data have been reported. The batch matrix spike/matrix spike duplicate (MS/MSD) was within acceptance limits and may be used to evaluate matrix performance.

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

HPLC/IC

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

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-29 4'

Lab Sample ID: 890-4678-1

Date Collected: 05/17/23 09:30

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/19/23 22:36	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/19/23 22:36	1
Toluene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/19/23 22:36	1
Xylenes, Total	<0.00396	U	0.00396		mg/Kg		05/19/23 11:17	05/19/23 22:36	1
m-Xylene & p-Xylene	<0.00396	U	0.00396		mg/Kg		05/19/23 11:17	05/19/23 22:36	1
o-Xylene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/19/23 22:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	118		70 - 130	05/19/23 11:17	05/19/23 22:36	1
1,4-Difluorobenzene (Surr)	84		70 - 130	05/19/23 11:17	05/19/23 22:36	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U *	49.9		mg/Kg		05/19/23 08:05	05/19/23 16:18	1
Diesel Range Organics (Over C10-C28)	<49.9	U *	49.9		mg/Kg		05/19/23 08:05	05/19/23 16:18	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/19/23 08:05	05/19/23 16:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	96		70 - 130	05/19/23 08:05	05/19/23 16:18	1
o-Terphenyl	75		70 - 130	05/19/23 08:05	05/19/23 16:18	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	167		4.99		mg/Kg			05/21/23 14:51	1

Client Sample ID: BES23-30 4'

Lab Sample ID: 890-4678-2

Date Collected: 05/17/23 09:35

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/19/23 22:56	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/19/23 22:56	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/19/23 22:56	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/19/23 22:56	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/19/23 22:56	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/19/23 22:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	81		70 - 130	05/19/23 11:17	05/19/23 22:56	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-30 4'

Lab Sample ID: 890-4678-2

Date Collected: 05/17/23 09:35

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 4'

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	76		70 - 130	05/19/23 11:17	05/19/23 22:56	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 16:40	1
Diesel Range Organics (Over C10-C28)	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 16:40	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 16:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	97		70 - 130	05/19/23 08:05	05/19/23 16:40	1
o-Terphenyl	75		70 - 130	05/19/23 08:05	05/19/23 16:40	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	81.2		5.03		mg/Kg			05/21/23 15:07	1

Client Sample ID: BES23-31 1.5'

Lab Sample ID: 890-4678-3

Date Collected: 05/17/23 09:40

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		05/19/23 11:17	05/19/23 23:17	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		05/19/23 11:17	05/19/23 23:17	1
Toluene	<0.00201	U	0.00201		mg/Kg		05/19/23 11:17	05/19/23 23:17	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		05/19/23 11:17	05/19/23 23:17	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		05/19/23 11:17	05/19/23 23:17	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		05/19/23 11:17	05/19/23 23:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130	05/19/23 11:17	05/19/23 23:17	1
1,4-Difluorobenzene (Surr)	72		70 - 130	05/19/23 11:17	05/19/23 23:17	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			05/22/23 09:48	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-31 1.5'

Lab Sample ID: 890-4678-3

Date Collected: 05/17/23 09:40

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U *-	49.8		mg/Kg		05/19/23 08:05	05/19/23 17:02	1
Diesel Range Organics (Over C10-C28)	<49.8	U *-	49.8		mg/Kg		05/19/23 08:05	05/19/23 17:02	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/19/23 08:05	05/19/23 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	102		70 - 130				05/19/23 08:05	05/19/23 17:02	1
o-Terphenyl	80		70 - 130				05/19/23 08:05	05/19/23 17:02	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	83.0		4.97		mg/Kg			05/21/23 15:12	1

Client Sample ID: BES23-32 1.5'

Lab Sample ID: 890-4678-4

Date Collected: 05/17/23 09:45

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
Xylenes, Total	<0.00404	U	0.00404		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
m-Xylene & p-Xylene	<0.00404	U	0.00404		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/19/23 11:17	05/19/23 23:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130				05/19/23 11:17	05/19/23 23:37	1
1,4-Difluorobenzene (Surr)	89		70 - 130				05/19/23 11:17	05/19/23 23:37	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U *-	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:23	1
Diesel Range Organics (Over C10-C28)	<49.9	U *-	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:23	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	79		70 - 130				05/19/23 08:05	05/19/23 17:23	1
o-Terphenyl	62	S1-	70 - 130				05/19/23 08:05	05/19/23 17:23	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-32 1.5'

Lab Sample ID: 890-4678-4

Date Collected: 05/17/23 09:45

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	181		5.02		mg/Kg			05/21/23 15:18	1

Client Sample ID: BES23-33 1.5'

Lab Sample ID: 890-4678-5

Date Collected: 05/17/23 09:50

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 23:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130				05/19/23 11:17	05/19/23 23:58	1
1,4-Difluorobenzene (Surr)	81		70 - 130				05/19/23 11:17	05/19/23 23:58	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U *	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:45	1
Diesel Range Organics (Over C10-C28)	<49.9	U *	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:45	1
Oll Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/19/23 08:05	05/19/23 17:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	85		70 - 130				05/19/23 08:05	05/19/23 17:45	1
o-Terphenyl	66	S1-	70 - 130				05/19/23 08:05	05/19/23 17:45	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	89.9		5.04		mg/Kg			05/21/23 15:23	1

Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-34 4'

Lab Sample ID: 890-4678-6

Date Collected: 05/17/23 09:55

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 1.5'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	112		70 - 130				05/19/23 11:17	05/20/23 00:18	1
1,4-Difluorobenzene (Surr)	95		70 - 130				05/19/23 11:17	05/20/23 00:18	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:06	1
Diesel Range Organics (Over C10-C28)	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:06	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	108		70 - 130				05/19/23 08:05	05/19/23 18:06	1
o-Terphenyl	85		70 - 130				05/19/23 08:05	05/19/23 18:06	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	81.2		4.98		mg/Kg			05/21/23 15:39	1

Client Sample ID: WES23-05 0-4'

Lab Sample ID: 890-4678-7

Date Collected: 05/17/23 10:00

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/19/23 11:17	05/20/23 00:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130				05/19/23 11:17	05/20/23 00:39	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: WES23-05 0-4'

Lab Sample ID: 890-4678-7

Date Collected: 05/17/23 10:00

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 4'

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	69	S1-	70 - 130	05/19/23 11:17	05/20/23 00:39	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:28	1
Diesel Range Organics (Over C10-C28)	<50.0	U *	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:28	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 18:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	111		70 - 130	05/19/23 08:05	05/19/23 18:28	1
o-Terphenyl	87		70 - 130	05/19/23 08:05	05/19/23 18:28	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	172		4.96		mg/Kg			05/21/23 15:44	1

Client Sample ID: WES23-06 0-1.5'

Lab Sample ID: 890-4678-8

Date Collected: 05/17/23 10:05

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 0-4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/20/23 00:59	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/20/23 00:59	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/20/23 00:59	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		05/19/23 11:17	05/20/23 00:59	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		05/19/23 11:17	05/20/23 00:59	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/20/23 00:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130	05/19/23 11:17	05/20/23 00:59	1
1,4-Difluorobenzene (Surr)	87		70 - 130	05/19/23 11:17	05/20/23 00:59	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	163		49.9		mg/Kg			05/22/23 09:48	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: WES23-06 0-1.5'

Lab Sample ID: 890-4678-8

Date Collected: 05/17/23 10:05

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 0-4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U *-	49.9		mg/Kg		05/19/23 08:05	05/20/23 06:51	1
Diesel Range Organics (Over C10-C28)	163	*-	49.9		mg/Kg		05/19/23 08:05	05/20/23 06:51	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/19/23 08:05	05/20/23 06:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	102		70 - 130				05/19/23 08:05	05/20/23 06:51	1
o-Terphenyl	85		70 - 130				05/19/23 08:05	05/20/23 06:51	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	54.4		4.97		mg/Kg			05/21/23 15:50	1

Client Sample ID: WES23-07 0-4'

Lab Sample ID: 890-4678-9

Date Collected: 05/17/23 10:10

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 0-4'

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
Toluene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
Xylenes, Total	<0.00396	U	0.00396		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
m-Xylene & p-Xylene	<0.00396	U	0.00396		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
o-Xylene	<0.00198	U	0.00198		mg/Kg		05/19/23 11:17	05/20/23 01:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	120		70 - 130				05/19/23 11:17	05/20/23 01:19	1
1,4-Difluorobenzene (Surr)	106		70 - 130				05/19/23 11:17	05/20/23 01:19	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00396	U	0.00396		mg/Kg			05/22/23 15:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/22/23 09:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U *-	50.0		mg/Kg		05/19/23 08:05	05/20/23 07:13	1
Diesel Range Organics (Over C10-C28)	<50.0	U *-	50.0		mg/Kg		05/19/23 08:05	05/20/23 07:13	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/20/23 07:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	98		70 - 130				05/19/23 08:05	05/20/23 07:13	1
o-Terphenyl	76		70 - 130				05/19/23 08:05	05/20/23 07:13	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: WES23-07 0-4'

Lab Sample ID: 890-4678-9

Date Collected: 05/17/23 10:10

Matrix: Solid

Date Received: 05/17/23 14:20

Sample Depth: 0-4'

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	103		5.01		mg/Kg			05/21/23 15:55	1

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

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		BFB1 (70-130)	DFBZ1 (70-130)
880-28389-A-7-B MB	Method Blank	71	80
890-4678-1	BES23-29 4'	118	84
890-4678-1 MS	BES23-29 4'	125	109
890-4678-1 MSD	BES23-29 4'	135 S1+	109
890-4678-2	BES23-30 4'	81	76
890-4678-3	BES23-31 1.5'	90	72
890-4678-4	BES23-32 1.5'	102	89
890-4678-5	BES23-33 1.5'	117	81
890-4678-6	BES23-34 4'	112	95
890-4678-7	WES23-05 0-4'	87	69 S1-
890-4678-8	WES23-06 0-1.5'	107	87
890-4678-9	WES23-07 0-4'	120	106
LCS 880-53768/1-A	Lab Control Sample	123	110
LCSD 880-53768/2-A	Lab Control Sample Dup	123	104
MB 880-53768/5-A	Method Blank	90	100

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		1CO1 (70-130)	OTPH1 (70-130)
880-28573-A-1-E MS	Matrix Spike	95	66 S1-
880-28573-A-1-F MSD	Matrix Spike Duplicate	90	63 S1-
890-4678-1	BES23-29 4'	96	75
890-4678-2	BES23-30 4'	97	75
890-4678-3	BES23-31 1.5'	102	80
890-4678-4	BES23-32 1.5'	79	62 S1-
890-4678-5	BES23-33 1.5'	85	66 S1-
890-4678-6	BES23-34 4'	108	85
890-4678-7	WES23-05 0-4'	111	87
890-4678-8	WES23-06 0-1.5'	102	85
890-4678-9	WES23-07 0-4'	98	76
LCS 880-53721/2-A	Lab Control Sample	74	58 S1-
LCSD 880-53721/3-A	Lab Control Sample Dup	79	60 S1-
MB 880-53721/1-A	Method Blank	225 S1+	182 S1+

Surrogate Legend

1CO = 1-Chlorooctane
OTPH = o-Terphenyl

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: 880-28389-A-7-B MB
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53707

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<0.00200	U	0.00200		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/19/23 08:45	05/19/23 19:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	71		70 - 130				05/19/23 08:45	05/19/23 19:52	1
1,4-Difluorobenzene (Surr)	80		70 - 130				05/19/23 08:45	05/19/23 19:52	1

Lab Sample ID: MB 880-53768/5-A
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53768

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/19/23 11:17	05/19/23 22:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130				05/19/23 11:17	05/19/23 22:14	1
1,4-Difluorobenzene (Surr)	100		70 - 130				05/19/23 11:17	05/19/23 22:14	1

Lab Sample ID: LCS 880-53768/1-A
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53768

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	0.100	0.1141		mg/Kg		114	70 - 130
Toluene	0.100	0.1048		mg/Kg		105	70 - 130
m-Xylene & p-Xylene	0.200	0.2436		mg/Kg		122	70 - 130
o-Xylene	0.100	0.1244		mg/Kg		124	70 - 130
Surrogate	%Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	123		70 - 130				
1,4-Difluorobenzene (Surr)	110		70 - 130				

Lab Sample ID: LCSD 880-53768/2-A
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53768

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	
								RPD	Limit
Benzene	0.100	0.1024		mg/Kg		102	70 - 130	8	35

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

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

Lab Sample ID: LCSD 880-53768/2-A
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53768

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Ethylbenzene	0.100	0.1061		mg/Kg		106	70 - 130	7	35	
Toluene	0.100	0.09553		mg/Kg		96	70 - 130	9	35	
m-Xylene & p-Xylene	0.200	0.2225		mg/Kg		111	70 - 130	9	35	
o-Xylene	0.100	0.1143		mg/Kg		114	70 - 130	8	35	
		LCSD	LCSD							
Surrogate	%Recovery	Qualifier	Limits							
4-Bromofluorobenzene (Surr)	123		70 - 130							
1,4-Difluorobenzene (Surr)	104		70 - 130							

Lab Sample ID: 890-4678-1 MS
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: BES23-29 4'
Prep Type: Total/NA
Prep Batch: 53768

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Benzene	<0.00198	U	0.0998	0.1115		mg/Kg		112	70 - 130	7	35	
Ethylbenzene	<0.00198	U	0.0998	0.1175		mg/Kg		118	70 - 130	0	35	
Toluene	<0.00198	U	0.0998	0.1042		mg/Kg		104	70 - 130	3	35	
m-Xylene & p-Xylene	<0.00396	U	0.200	0.2478		mg/Kg		124	70 - 130	1	35	
o-Xylene	<0.00198	U	0.0998	0.1252		mg/Kg		125	70 - 130	1	35	
		MS	MS									
Surrogate	%Recovery	Qualifier	Limits									
4-Bromofluorobenzene (Surr)	125		70 - 130									
1,4-Difluorobenzene (Surr)	109		70 - 130									

Lab Sample ID: 890-4678-1 MSD
Matrix: Solid
Analysis Batch: 53724

Client Sample ID: BES23-29 4'
Prep Type: Total/NA
Prep Batch: 53768

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Benzene	<0.00198	U	0.100	0.1037		mg/Kg		103	70 - 130	7	35	
Ethylbenzene	<0.00198	U	0.100	0.1174		mg/Kg		117	70 - 130	0	35	
Toluene	<0.00198	U	0.100	0.1016		mg/Kg		101	70 - 130	3	35	
m-Xylene & p-Xylene	<0.00396	U	0.201	0.2503		mg/Kg		125	70 - 130	1	35	
o-Xylene	<0.00198	U	0.100	0.1270		mg/Kg		127	70 - 130	1	35	
		MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits									
4-Bromofluorobenzene (Surr)	135	S1+	70 - 130									
1,4-Difluorobenzene (Surr)	109		70 - 130									

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

Lab Sample ID: MB 880-53721/1-A
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53721

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 08:16	1

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

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

Lab Sample ID: MB 880-53721/1-A
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53721

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 08:16	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/19/23 08:05	05/19/23 08:16	1
Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac			
	%Recovery	Qualifier							
1-Chlorooctane	225	S1+	70 - 130	05/19/23 08:05	05/19/23 08:16	1			
o-Terphenyl	182	S1+	70 - 130	05/19/23 08:05	05/19/23 08:16	1			

Lab Sample ID: LCS 880-53721/2-A
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53721

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Diesel Range Organics (Over C10-C28)	1000	656.3	*-	mg/Kg		66	70 - 130
Surrogate	LCS	LCS	Limits				
	%Recovery	Qualifier					
1-Chlorooctane	74		70 - 130				
o-Terphenyl	58	S1-	70 - 130				

Lab Sample ID: LCSD 880-53721/3-A
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53721

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics (Over C10-C28)	1000	675.7	*-	mg/Kg		68	70 - 130	3	20
Surrogate	LCSD	LCSD	Limits						
	%Recovery	Qualifier							
1-Chlorooctane	79		70 - 130						
o-Terphenyl	60	S1-	70 - 130						

Lab Sample ID: 880-28573-A-1-E MS
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53721

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Diesel Range Organics (Over C10-C28)	<49.9	U *-	999	756.2		mg/Kg		76	70 - 130
Surrogate	MS	MS	Limits						
	%Recovery	Qualifier							
1-Chlorooctane	95		70 - 130						
o-Terphenyl	66	S1-	70 - 130						

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

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

Lab Sample ID: 880-28573-A-1-F MSD
Matrix: Solid
Analysis Batch: 53716

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 53721

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics (GRO)-C6-C10	<49.9	U *-	1000	881.0		mg/Kg		86	70 - 130	5	20
Diesel Range Organics (Over C10-C28)	<49.9	U *-	1000	717.5		mg/Kg		72	70 - 130	5	20
Surrogate	%Recovery	MSD Qualifier		MSD							Limits
1-Chlorooctane	90										70 - 130
o-Terphenyl	63	S1-									70 - 130

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-53783/1-A
Matrix: Solid
Analysis Batch: 53792

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/21/23 14:35	1

Lab Sample ID: LCS 880-53783/2-A
Matrix: Solid
Analysis Batch: 53792

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	261.7		mg/Kg		105	90 - 110

Lab Sample ID: LCSD 880-53783/3-A
Matrix: Solid
Analysis Batch: 53792

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	262.8		mg/Kg		105	90 - 110	0	20

Lab Sample ID: 890-4678-1 MS
Matrix: Solid
Analysis Batch: 53792

Client Sample ID: BES23-29 4'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	167		250	407.7		mg/Kg		97	90 - 110

Lab Sample ID: 890-4678-1 MSD
Matrix: Solid
Analysis Batch: 53792

Client Sample ID: BES23-29 4'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	167		250	409.1		mg/Kg		97	90 - 110	0	20

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QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4678-1
 SDG: 23E-01630

GC VOA

Prep Batch: 53707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
880-28389-A-7-B MB	Method Blank	Total/NA	Solid	5030B	

Analysis Batch: 53724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	8021B	53768
890-4678-2	BES23-30 4'	Total/NA	Solid	8021B	53768
890-4678-3	BES23-31 1.5'	Total/NA	Solid	8021B	53768
890-4678-4	BES23-32 1.5'	Total/NA	Solid	8021B	53768
890-4678-5	BES23-33 1.5'	Total/NA	Solid	8021B	53768
890-4678-6	BES23-34 4'	Total/NA	Solid	8021B	53768
890-4678-7	WES23-05 0-4'	Total/NA	Solid	8021B	53768
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	8021B	53768
890-4678-9	WES23-07 0-4'	Total/NA	Solid	8021B	53768
880-28389-A-7-B MB	Method Blank	Total/NA	Solid	8021B	53707
MB 880-53768/5-A	Method Blank	Total/NA	Solid	8021B	53768
LCS 880-53768/1-A	Lab Control Sample	Total/NA	Solid	8021B	53768
LCSD 880-53768/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	53768
890-4678-1 MS	BES23-29 4'	Total/NA	Solid	8021B	53768
890-4678-1 MSD	BES23-29 4'	Total/NA	Solid	8021B	53768

Prep Batch: 53768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	5035	
890-4678-2	BES23-30 4'	Total/NA	Solid	5035	
890-4678-3	BES23-31 1.5'	Total/NA	Solid	5035	
890-4678-4	BES23-32 1.5'	Total/NA	Solid	5035	
890-4678-5	BES23-33 1.5'	Total/NA	Solid	5035	
890-4678-6	BES23-34 4'	Total/NA	Solid	5035	
890-4678-7	WES23-05 0-4'	Total/NA	Solid	5035	
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	5035	
890-4678-9	WES23-07 0-4'	Total/NA	Solid	5035	
MB 880-53768/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-53768/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-53768/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4678-1 MS	BES23-29 4'	Total/NA	Solid	5035	
890-4678-1 MSD	BES23-29 4'	Total/NA	Solid	5035	

Analysis Batch: 53911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	Total BTEX	
890-4678-2	BES23-30 4'	Total/NA	Solid	Total BTEX	
890-4678-3	BES23-31 1.5'	Total/NA	Solid	Total BTEX	
890-4678-4	BES23-32 1.5'	Total/NA	Solid	Total BTEX	
890-4678-5	BES23-33 1.5'	Total/NA	Solid	Total BTEX	
890-4678-6	BES23-34 4'	Total/NA	Solid	Total BTEX	
890-4678-7	WES23-05 0-4'	Total/NA	Solid	Total BTEX	
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	Total BTEX	
890-4678-9	WES23-07 0-4'	Total/NA	Solid	Total BTEX	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

GC Semi VOA

Analysis Batch: 53716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	8015B NM	53721
890-4678-2	BES23-30 4'	Total/NA	Solid	8015B NM	53721
890-4678-3	BES23-31 1.5'	Total/NA	Solid	8015B NM	53721
890-4678-4	BES23-32 1.5'	Total/NA	Solid	8015B NM	53721
890-4678-5	BES23-33 1.5'	Total/NA	Solid	8015B NM	53721
890-4678-6	BES23-34 4'	Total/NA	Solid	8015B NM	53721
890-4678-7	WES23-05 0-4'	Total/NA	Solid	8015B NM	53721
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	8015B NM	53721
890-4678-9	WES23-07 0-4'	Total/NA	Solid	8015B NM	53721
MB 880-53721/1-A	Method Blank	Total/NA	Solid	8015B NM	53721
LCS 880-53721/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	53721
LCS D 880-53721/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	53721
880-28573-A-1-E MS	Matrix Spike	Total/NA	Solid	8015B NM	53721
880-28573-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	53721

Prep Batch: 53721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	8015NM Prep	
890-4678-2	BES23-30 4'	Total/NA	Solid	8015NM Prep	
890-4678-3	BES23-31 1.5'	Total/NA	Solid	8015NM Prep	
890-4678-4	BES23-32 1.5'	Total/NA	Solid	8015NM Prep	
890-4678-5	BES23-33 1.5'	Total/NA	Solid	8015NM Prep	
890-4678-6	BES23-34 4'	Total/NA	Solid	8015NM Prep	
890-4678-7	WES23-05 0-4'	Total/NA	Solid	8015NM Prep	
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	8015NM Prep	
890-4678-9	WES23-07 0-4'	Total/NA	Solid	8015NM Prep	
MB 880-53721/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-53721/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCS D 880-53721/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
880-28573-A-1-E MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
880-28573-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Analysis Batch: 53860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Total/NA	Solid	8015 NM	
890-4678-2	BES23-30 4'	Total/NA	Solid	8015 NM	
890-4678-3	BES23-31 1.5'	Total/NA	Solid	8015 NM	
890-4678-4	BES23-32 1.5'	Total/NA	Solid	8015 NM	
890-4678-5	BES23-33 1.5'	Total/NA	Solid	8015 NM	
890-4678-6	BES23-34 4'	Total/NA	Solid	8015 NM	
890-4678-7	WES23-05 0-4'	Total/NA	Solid	8015 NM	
890-4678-8	WES23-06 0-1.5'	Total/NA	Solid	8015 NM	
890-4678-9	WES23-07 0-4'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 53783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Soluble	Solid	DI Leach	
890-4678-2	BES23-30 4'	Soluble	Solid	DI Leach	
890-4678-3	BES23-31 1.5'	Soluble	Solid	DI Leach	

Eurofins Carlsbad

QC Association Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4678-1
 SDG: 23E-01630

HPLC/IC (Continued)

Leach Batch: 53783 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-4	BES23-32 1.5'	Soluble	Solid	DI Leach	
890-4678-5	BES23-33 1.5'	Soluble	Solid	DI Leach	
890-4678-6	BES23-34 4'	Soluble	Solid	DI Leach	
890-4678-7	WES23-05 0-4'	Soluble	Solid	DI Leach	
890-4678-8	WES23-06 0-1.5'	Soluble	Solid	DI Leach	
890-4678-9	WES23-07 0-4'	Soluble	Solid	DI Leach	
MB 880-53783/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-53783/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-53783/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4678-1 MS	BES23-29 4'	Soluble	Solid	DI Leach	
890-4678-1 MSD	BES23-29 4'	Soluble	Solid	DI Leach	

Analysis Batch: 53792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4678-1	BES23-29 4'	Soluble	Solid	300.0	53783
890-4678-2	BES23-30 4'	Soluble	Solid	300.0	53783
890-4678-3	BES23-31 1.5'	Soluble	Solid	300.0	53783
890-4678-4	BES23-32 1.5'	Soluble	Solid	300.0	53783
890-4678-5	BES23-33 1.5'	Soluble	Solid	300.0	53783
890-4678-6	BES23-34 4'	Soluble	Solid	300.0	53783
890-4678-7	WES23-05 0-4'	Soluble	Solid	300.0	53783
890-4678-8	WES23-06 0-1.5'	Soluble	Solid	300.0	53783
890-4678-9	WES23-07 0-4'	Soluble	Solid	300.0	53783
MB 880-53783/1-A	Method Blank	Soluble	Solid	300.0	53783
LCS 880-53783/2-A	Lab Control Sample	Soluble	Solid	300.0	53783
LCSD 880-53783/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	53783
890-4678-1 MS	BES23-29 4'	Soluble	Solid	300.0	53783
890-4678-1 MSD	BES23-29 4'	Soluble	Solid	300.0	53783

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-29 4'

Lab Sample ID: 890-4678-1

Date Collected: 05/17/23 09:30

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/19/23 22:36	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 16:18	SM	EET MID
Soluble	Leach	DI Leach			5.01 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 14:51	CH	EET MID

Client Sample ID: BES23-30 4'

Lab Sample ID: 890-4678-2

Date Collected: 05/17/23 09:35

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/19/23 22:56	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 16:40	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:07	CH	EET MID

Client Sample ID: BES23-31 1.5'

Lab Sample ID: 890-4678-3

Date Collected: 05/17/23 09:40

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/19/23 23:17	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.04 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 17:02	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:12	CH	EET MID

Client Sample ID: BES23-32 1.5'

Lab Sample ID: 890-4678-4

Date Collected: 05/17/23 09:45

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/19/23 23:37	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: BES23-32 1.5'

Lab Sample ID: 890-4678-4

Date Collected: 05/17/23 09:45

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 17:23	SM	EET MID
Soluble	Leach	DI Leach			4.98 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:18	CH	EET MID

Client Sample ID: BES23-33 1.5'

Lab Sample ID: 890-4678-5

Date Collected: 05/17/23 09:50

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/19/23 23:58	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 17:45	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:23	CH	EET MID

Client Sample ID: BES23-34 4'

Lab Sample ID: 890-4678-6

Date Collected: 05/17/23 09:55

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/20/23 00:18	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 18:06	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:39	CH	EET MID

Client Sample ID: WES23-05 0-4'

Lab Sample ID: 890-4678-7

Date Collected: 05/17/23 10:00

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/20/23 00:39	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/19/23 18:28	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Client Sample ID: WES23-05 0-4'

Lab Sample ID: 890-4678-7

Date Collected: 05/17/23 10:00

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:44	CH	EET MID

Client Sample ID: WES23-06 0-1.5'

Lab Sample ID: 890-4678-8

Date Collected: 05/17/23 10:05

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/20/23 00:59	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.03 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/20/23 06:51	SM	EET MID
Soluble	Leach	DI Leach			5.03 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:50	CH	EET MID

Client Sample ID: WES23-07 0-4'

Lab Sample ID: 890-4678-9

Date Collected: 05/17/23 10:10

Matrix: Solid

Date Received: 05/17/23 14:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.05 g	5 mL	53768	05/19/23 11:17	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53724	05/20/23 01:19	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53911	05/22/23 15:52	SM	EET MID
Total/NA	Analysis	8015 NM		1			53860	05/22/23 09:48	SM	EET MID
Total/NA	Prep	8015NM Prep			10.00 g	10 mL	53721	05/19/23 08:05	AJ	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53716	05/20/23 07:13	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	53783	05/19/23 14:38	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53792	05/21/23 15:55	CH	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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

Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4678-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4678-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4678-1	BES23-29 4'	Solid	05/17/23 09:30	05/17/23 14:20	4'
890-4678-2	BES23-30 4'	Solid	05/17/23 09:35	05/17/23 14:20	4'
890-4678-3	BES23-31 1.5'	Solid	05/17/23 09:40	05/17/23 14:20	1.5'
890-4678-4	BES23-32 1.5'	Solid	05/17/23 09:45	05/17/23 14:20	1.5'
890-4678-5	BES23-33 1.5'	Solid	05/17/23 09:50	05/17/23 14:20	1.5'
890-4678-6	BES23-34 4'	Solid	05/17/23 09:55	05/17/23 14:20	1.5'
890-4678-7	WES23-05 0-4'	Solid	05/17/23 10:00	05/17/23 14:20	4'
890-4678-8	WES23-06 0-1.5'	Solid	05/17/23 10:05	05/17/23 14:20	0-4'
890-4678-9	WES23-07 0-4'	Solid	05/17/23 10:10	05/17/23 14:20	0-4'

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



Environment Testing
Xenco

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

Chain of Custody

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex	Company Name:	Solaris Midstream
Address:	On File	Address:	
City, State ZIP:		City, State ZIP:	
Phone:		Email:	cdixon@vertex.ca

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

Project Name:	Carve Line Booster	Turn Around	Pres. Code	ANALYSIS REQUEST	Preservative Codes
Project Number:	73E-01630	<input type="checkbox"/> Routine <input checked="" type="checkbox"/> Rush			None: NO DI Water: H ₂ O Cool: Cool MeOH: Me HCL: HC HNO ₃ : HN H ₂ SO ₄ : H ₂ H ₃ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ S ₂ O ₅ : NASO ₃ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SABC
Project Location:	Hunter Klein	Due Date:	1 Day		
Sampler's Name:	Hunter Klein	TAT starts the day received by the lab, if received by 4:30pm			
P.O. #:		Wetice:	Yes No		
SAMPLE RECEIPT		Temp Blank:	Yes No		
Samples Received Intact:		Thermometer ID:	Yes No		
Cooler Custody Seals:		Correction Factor:	Yes No N/A		
Sample Custody Seals:		Temperature Reading:	Yes No N/A		
Total Containers:		Corrected Temperature:			

Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Parameters
BES23-09	soil	5/17/23	9:30	4'	5		BTEX
BES23-30	soil	5/17/23	9:35	4'			TPH: 8015D
BES23-31	soil	5/17/23	9:40	1.5'			CI
BES23-32	soil	5/17/23	9:45	1.5'			
BES23-33	soil	5/17/23	9:50	1.5'			
BES23-34	soil	5/17/23	9:55	4'			
BES23-05	soil	5/17/23	10:00	8-4'			
BES23-06	soil	5/17/23	10:05	0-1.5'			
BES23-07	soil	5/17/23	10:10	0-4'			

Total 2007 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn

Circle Method(s) and Metal(s) to be analyzed TCLP/SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

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

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>[Signature]</i>	<i>[Signature]</i>	5/17/23 14:00			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4678-1

SDG Number: 23E-01630

Login Number: 4678

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4678-1

SDG Number: 23E-01630

Login Number: 4678

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/19/23 10:35 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/23/2023 1:27:52 PM

JOB DESCRIPTION

Cave Line Booster
 SDG NUMBER 23E-01630

JOB NUMBER

890-4696-1

Eurofins Carlsbad
 1089 N Canal St.
 Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



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5/23/2023 1:27:52 PM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4696-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Job ID: 890-4696-1

Laboratory: Eurofins Carlsbad**Narrative**

**Job Narrative
890-4696-1**

Receipt

The samples were received on 5/19/2023 2:02 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.9°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: BES23-37 1.5' (890-4696-1), BES23-38 1.5' (890-4696-2), BES23-39 4' (890-4696-3), BES23-40 4' (890-4696-4), WES23-08 0-4' (890-4696-5), BES23-35 1.5' (890-4696-6) and BES23-36 1.5' (890-4696-7).

GC VOA

Method 8021B: Surrogate recovery for the following samples were outside control limits: BES23-39 4' (890-4696-3), WES23-08 0-4' (890-4696-5) and BES23-36 1.5' (890-4696-7). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-53847 and analytical batch 880-53828 was outside the upper control limits.

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

HPLC/IC

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



Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-37 1.5'

Lab Sample ID: 890-4696-1

Date Collected: 05/19/23 09:00

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00201	U	0.00201		mg/Kg		05/22/23 08:42	05/22/23 12:29	1
Ethylbenzene	<0.00201	U	0.00201		mg/Kg		05/22/23 08:42	05/22/23 12:29	1
Toluene	<0.00201	U	0.00201		mg/Kg		05/22/23 08:42	05/22/23 12:29	1
Xylenes, Total	<0.00402	U	0.00402		mg/Kg		05/22/23 08:42	05/22/23 12:29	1
m-Xylene & p-Xylene	<0.00402	U	0.00402		mg/Kg		05/22/23 08:42	05/22/23 12:29	1
o-Xylene	<0.00201	U	0.00201		mg/Kg		05/22/23 08:42	05/22/23 12:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130	05/22/23 08:42	05/22/23 12:29	1
1,4-Difluorobenzene (Surr)	74		70 - 130	05/22/23 08:42	05/22/23 12:29	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00402	U	0.00402		mg/Kg			05/22/23 16:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 15:29	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 15:29	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 15:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	96		70 - 130	05/22/23 09:25	05/22/23 15:29	1
o-Terphenyl	113		70 - 130	05/22/23 09:25	05/22/23 15:29	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	104		5.00		mg/Kg			05/23/23 11:40	1

Client Sample ID: BES23-38 1.5'

Lab Sample ID: 890-4696-2

Date Collected: 05/19/23 09:05

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U	0.00202		mg/Kg		05/22/23 08:42	05/22/23 16:16	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/22/23 08:42	05/22/23 16:16	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/22/23 08:42	05/22/23 16:16	1
Xylenes, Total	<0.00403	U	0.00403		mg/Kg		05/22/23 08:42	05/22/23 16:16	1
m-Xylene & p-Xylene	<0.00403	U	0.00403		mg/Kg		05/22/23 08:42	05/22/23 16:16	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/22/23 08:42	05/22/23 16:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	77		70 - 130	05/22/23 08:42	05/22/23 16:16	1
1,4-Difluorobenzene (Surr)	96		70 - 130	05/22/23 08:42	05/22/23 16:16	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-38 1.5'

Lab Sample ID: 890-4696-2

Date Collected: 05/19/23 09:05

Matrix: Solid

Date Received: 05/19/23 14:02

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00403	U	0.00403		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 16:13	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 16:13	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 16:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	97		70 - 130	05/22/23 09:25	05/22/23 16:13	1
o-Terphenyl	113		70 - 130	05/22/23 09:25	05/22/23 16:13	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	96.7		4.95		mg/Kg			05/23/23 11:46	1

Client Sample ID: BES23-39 4'

Lab Sample ID: 890-4696-3

Date Collected: 05/19/23 09:10

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 16:37	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 16:37	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 16:37	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		05/22/23 08:42	05/22/23 16:37	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		05/22/23 08:42	05/22/23 16:37	1
o-Xylene	0.00212		0.00200		mg/Kg		05/22/23 08:42	05/22/23 16:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130	05/22/23 08:42	05/22/23 16:37	1
1,4-Difluorobenzene (Surr)	69	S1-	70 - 130	05/22/23 08:42	05/22/23 16:37	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 16:34	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 16:34	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-39 4'

Lab Sample ID: 890-4696-3

Date Collected: 05/19/23 09:10

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 16:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	96		70 - 130				05/22/23 09:25	05/22/23 16:34	1
o-Terphenyl	112		70 - 130				05/22/23 09:25	05/22/23 16:34	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	133		5.01		mg/Kg			05/23/23 12:02	1

Client Sample ID: BES23-40 4'

Lab Sample ID: 890-4696-4

Date Collected: 05/19/23 09:15

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 16:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130				05/22/23 08:42	05/22/23 16:57	1
1,4-Difluorobenzene (Surr)	82		70 - 130				05/22/23 08:42	05/22/23 16:57	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 16:56	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 16:56	1
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 16:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	97		70 - 130				05/22/23 09:25	05/22/23 16:56	1
o-Terphenyl	113		70 - 130				05/22/23 09:25	05/22/23 16:56	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	80.9		4.96		mg/Kg			05/23/23 12:07	1

Eurofins Carlsbad

Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4696-1
 SDG: 23E-01630

Client Sample ID: WES23-08 0-4'

Lab Sample ID: 890-4696-5

Date Collected: 05/19/23 09:20

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 17:18	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 17:18	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 17:18	1
Xylenes, Total	<0.00399	U	0.00399		mg/Kg		05/22/23 08:42	05/22/23 17:18	1
m-Xylene & p-Xylene	<0.00399	U	0.00399		mg/Kg		05/22/23 08:42	05/22/23 17:18	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 17:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130	05/22/23 08:42	05/22/23 17:18	1
1,4-Difluorobenzene (Surr)	66	S1-	70 - 130	05/22/23 08:42	05/22/23 17:18	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00399	U	0.00399		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.9	U	49.9		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 17:17	1
Diesel Range Organics (Over C10-C28)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 17:17	1
Oil Range Organics (Over C28-C36)	<49.9	U	49.9		mg/Kg		05/22/23 09:25	05/22/23 17:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	96		70 - 130	05/22/23 09:25	05/22/23 17:17	1
o-Terphenyl	113		70 - 130	05/22/23 09:25	05/22/23 17:17	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	174		5.04		mg/Kg			05/23/23 12:13	1

Client Sample ID: BES23-35 1.5'

Lab Sample ID: 890-4696-6

Date Collected: 05/19/23 09:40

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 17:38	1
Ethylbenzene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 17:38	1
Toluene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 17:38	1
Xylenes, Total	<0.00398	U	0.00398		mg/Kg		05/22/23 08:42	05/22/23 17:38	1
m-Xylene & p-Xylene	<0.00398	U	0.00398		mg/Kg		05/22/23 08:42	05/22/23 17:38	1
o-Xylene	<0.00199	U	0.00199		mg/Kg		05/22/23 08:42	05/22/23 17:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130	05/22/23 08:42	05/22/23 17:38	1
1,4-Difluorobenzene (Surr)	77		70 - 130	05/22/23 08:42	05/22/23 17:38	1

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Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-35 1.5'

Lab Sample ID: 890-4696-6

Date Collected: 05/19/23 09:40

Matrix: Solid

Date Received: 05/19/23 14:02

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00398	U	0.00398		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 17:39	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 17:39	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/22/23 09:25	05/22/23 17:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	104		70 - 130				05/22/23 09:25	05/22/23 17:39	1
o-Terphenyl	117		70 - 130				05/22/23 09:25	05/22/23 17:39	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	169		4.95		mg/Kg			05/23/23 12:18	1

Client Sample ID: BES23-36 1.5'

Lab Sample ID: 890-4696-7

Date Collected: 05/19/23 09:45

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00198	U	0.00198		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
Ethylbenzene	<0.00198	U	0.00198		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
Toluene	<0.00198	U	0.00198		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
Xylenes, Total	<0.00397	U	0.00397		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
m-Xylene & p-Xylene	<0.00397	U	0.00397		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
o-Xylene	<0.00198	U	0.00198		mg/Kg		05/22/23 08:42	05/22/23 17:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130				05/22/23 08:42	05/22/23 17:59	1
1,4-Difluorobenzene (Surr)	69	S1-	70 - 130				05/22/23 08:42	05/22/23 17:59	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00397	U	0.00397		mg/Kg			05/23/23 09:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<49.8	U	49.8		mg/Kg			05/23/23 10:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 18:00	1
Diesel Range Organics (Over C10-C28)	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 18:00	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4696-1
 SDG: 23E-01630

Client Sample ID: BES23-36 1.5'

Lab Sample ID: 890-4696-7

Date Collected: 05/19/23 09:45

Matrix: Solid

Date Received: 05/19/23 14:02

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oil Range Organics (Over C28-C36)	<49.8	U	49.8		mg/Kg		05/22/23 09:25	05/22/23 18:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	96		70 - 130				05/22/23 09:25	05/22/23 18:00	1
o-Terphenyl	109		70 - 130				05/22/23 09:25	05/22/23 18:00	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	107		4.95		mg/Kg			05/23/23 12:23	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB1	DFBZ1
		(70-130)	(70-130)
890-4691-A-1-B MS	Matrix Spike	111	111
890-4691-A-1-C MSD	Matrix Spike Duplicate	109	111
890-4696-1	BES23-37 1.5'	99	74
890-4696-2	BES23-38 1.5'	77	96
890-4696-3	BES23-39 4'	96	69 S1-
890-4696-4	BES23-40 4'	95	82
890-4696-5	WES23-08 0-4'	100	66 S1-
890-4696-6	BES23-35 1.5'	100	77
890-4696-7	BES23-36 1.5'	104	69 S1-
LCS 880-53833/1-A	Lab Control Sample	101	106
LCSD 880-53833/2-A	Lab Control Sample Dup	104	110
MB 880-53833/5-A	Method Blank	71	84

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	1CO1	OTPH1
		(70-130)	(70-130)
890-4682-A-1-D MS	Matrix Spike	121	127
890-4682-A-1-E MSD	Matrix Spike Duplicate	105	115
890-4696-1	BES23-37 1.5'	96	113
890-4696-2	BES23-38 1.5'	97	113
890-4696-3	BES23-39 4'	96	112
890-4696-4	BES23-40 4'	97	113
890-4696-5	WES23-08 0-4'	96	113
890-4696-6	BES23-35 1.5'	104	117
890-4696-7	BES23-36 1.5'	96	109
LCS 880-53847/2-A	Lab Control Sample	96	106
LCSD 880-53847/3-A	Lab Control Sample Dup	111	124
MB 880-53847/1-A	Method Blank	179 S1+	218 S1+

Surrogate Legend

1CO = 1-Chlorooctane

OTPH = o-Terphenyl

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-53833/5-A
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53833

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 11:27	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 11:27	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 11:27	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/22/23 08:42	05/22/23 11:27	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/22/23 08:42	05/22/23 11:27	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/22/23 08:42	05/22/23 11:27	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	71		70 - 130	05/22/23 08:42	05/22/23 11:27	1
1,4-Difluorobenzene (Surr)	84		70 - 130	05/22/23 08:42	05/22/23 11:27	1

Lab Sample ID: LCS 880-53833/1-A
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53833

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	0.100	0.1289		mg/Kg		129	70 - 130
Ethylbenzene	0.100	0.1147		mg/Kg		115	70 - 130
Toluene	0.100	0.1171		mg/Kg		117	70 - 130
m-Xylene & p-Xylene	0.200	0.2438		mg/Kg		122	70 - 130
o-Xylene	0.100	0.1202		mg/Kg		120	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		70 - 130
1,4-Difluorobenzene (Surr)	106		70 - 130

Lab Sample ID: LCSD 880-53833/2-A
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53833

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Benzene	0.100	0.1280		mg/Kg		128	70 - 130	1	35
Ethylbenzene	0.100	0.1082		mg/Kg		108	70 - 130	6	35
Toluene	0.100	0.1090		mg/Kg		109	70 - 130	7	35
m-Xylene & p-Xylene	0.200	0.2299		mg/Kg		115	70 - 130	6	35
o-Xylene	0.100	0.1156		mg/Kg		116	70 - 130	4	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	104		70 - 130
1,4-Difluorobenzene (Surr)	110		70 - 130

Lab Sample ID: 890-4691-A-1-B MS
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53833

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	<0.00200	U	0.0998	0.1244		mg/Kg		125	70 - 130
Ethylbenzene	<0.00200	U	0.0998	0.1047		mg/Kg		105	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

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

Lab Sample ID: 890-4691-A-1-B MS
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53833

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier		Result	Qualifier					Limits
Toluene	<0.00200	U	0.0998	0.1010		mg/Kg		101	70 - 130	
m-Xylene & p-Xylene	<0.00401	U	0.200	0.2188		mg/Kg		110	70 - 130	
o-Xylene	<0.00200	U	0.0998	0.1085		mg/Kg		109	70 - 130	
		MS	MS							
Surrogate	%Recovery	Qualifier	Limits							
4-Bromofluorobenzene (Surr)	111		70 - 130							
1,4-Difluorobenzene (Surr)	111		70 - 130							

Lab Sample ID: 890-4691-A-1-C MSD
Matrix: Solid
Analysis Batch: 53831

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 53833

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Benzene	<0.00200	U	0.0990	0.1235		mg/Kg		125	70 - 130	1	35
Ethylbenzene	<0.00200	U	0.0990	0.1023		mg/Kg		103	70 - 130	2	35
Toluene	<0.00200	U	0.0990	0.1005		mg/Kg		102	70 - 130	1	35
m-Xylene & p-Xylene	<0.00401	U	0.198	0.2171		mg/Kg		110	70 - 130	1	35
o-Xylene	<0.00200	U	0.0990	0.1081		mg/Kg		109	70 - 130	0	35
		MSD	MSD								
Surrogate	%Recovery	Qualifier	Limits								
4-Bromofluorobenzene (Surr)	109		70 - 130								
1,4-Difluorobenzene (Surr)	111		70 - 130								

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

Lab Sample ID: MB 880-53847/1-A
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 53847

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/22/23 08:00	05/22/23 08:26	1	
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/22/23 08:00	05/22/23 08:26	1	
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/22/23 08:00	05/22/23 08:26	1	
		MB	MB							
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
1-Chlorooctane	179	S1+	70 - 130	05/22/23 08:00	05/22/23 08:26	1				
o-Terphenyl	218	S1+	70 - 130	05/22/23 08:00	05/22/23 08:26	1				

Lab Sample ID: LCS 880-53847/2-A
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53847

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
		Result	Qualifier				
Gasoline Range Organics (GRO)-C6-C10	1000	899.0		mg/Kg		90	70 - 130
Diesel Range Organics (Over C10-C28)	1000	884.1		mg/Kg		88	70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

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

Lab Sample ID: LCS 880-53847/2-A
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 53847

Surrogate	LCS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	96		70 - 130
o-Terphenyl	106		70 - 130

Lab Sample ID: LCSD 880-53847/3-A
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 53847

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec		RPD	Limit
		Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	1000	999.0		mg/Kg		100	70 - 130	11		20
Diesel Range Organics (Over C10-C28)	1000	1018		mg/Kg		102	70 - 130	14		20

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	111		70 - 130
o-Terphenyl	124		70 - 130

Lab Sample ID: 890-4682-A-1-D MS
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 53847

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	998	1131		mg/Kg		108	70 - 130			
Diesel Range Organics (Over C10-C28)	104		998	1181		mg/Kg		108	70 - 130			

Surrogate	MS		Limits
	%Recovery	Qualifier	
1-Chlorooctane	121		70 - 130
o-Terphenyl	127		70 - 130

Lab Sample ID: 890-4682-A-1-E MSD
Matrix: Solid
Analysis Batch: 53828

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 53847

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	999	940.5		mg/Kg		89	70 - 130	18		20
Diesel Range Organics (Over C10-C28)	104		999	1032		mg/Kg		93	70 - 130	13		20

Surrogate	MSD		Limits
	%Recovery	Qualifier	
1-Chlorooctane	105		70 - 130
o-Terphenyl	115		70 - 130

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QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-53876/1-A
Matrix: Solid
Analysis Batch: 53953

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/23/23 09:54	1

Lab Sample ID: LCS 880-53876/2-A
Matrix: Solid
Analysis Batch: 53953

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	247.8		mg/Kg		99	90 - 110

Lab Sample ID: LCSD 880-53876/3-A
Matrix: Solid
Analysis Batch: 53953

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	250	249.6		mg/Kg		100	90 - 110	1	20

Lab Sample ID: 890-4692-A-1-E MS
Matrix: Solid
Analysis Batch: 53953

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	69.7		250	321.6		mg/Kg		101	90 - 110

Lab Sample ID: 890-4692-A-1-F MSD
Matrix: Solid
Analysis Batch: 53953

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	69.7		250	323.8		mg/Kg		102	90 - 110	1	20

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

GC VOA

Analysis Batch: 53831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	8021B	53833
890-4696-2	BES23-38 1.5'	Total/NA	Solid	8021B	53833
890-4696-3	BES23-39 4'	Total/NA	Solid	8021B	53833
890-4696-4	BES23-40 4'	Total/NA	Solid	8021B	53833
890-4696-5	WES23-08 0-4'	Total/NA	Solid	8021B	53833
890-4696-6	BES23-35 1.5'	Total/NA	Solid	8021B	53833
890-4696-7	BES23-36 1.5'	Total/NA	Solid	8021B	53833
MB 880-53833/5-A	Method Blank	Total/NA	Solid	8021B	53833
LCS 880-53833/1-A	Lab Control Sample	Total/NA	Solid	8021B	53833
LCSD 880-53833/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	53833
890-4691-A-1-B MS	Matrix Spike	Total/NA	Solid	8021B	53833
890-4691-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	53833

Prep Batch: 53833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	5035	
890-4696-2	BES23-38 1.5'	Total/NA	Solid	5035	
890-4696-3	BES23-39 4'	Total/NA	Solid	5035	
890-4696-4	BES23-40 4'	Total/NA	Solid	5035	
890-4696-5	WES23-08 0-4'	Total/NA	Solid	5035	
890-4696-6	BES23-35 1.5'	Total/NA	Solid	5035	
890-4696-7	BES23-36 1.5'	Total/NA	Solid	5035	
MB 880-53833/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-53833/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-53833/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
890-4691-A-1-B MS	Matrix Spike	Total/NA	Solid	5035	
890-4691-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 53921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	Total BTEX	
890-4696-2	BES23-38 1.5'	Total/NA	Solid	Total BTEX	
890-4696-3	BES23-39 4'	Total/NA	Solid	Total BTEX	
890-4696-4	BES23-40 4'	Total/NA	Solid	Total BTEX	
890-4696-5	WES23-08 0-4'	Total/NA	Solid	Total BTEX	
890-4696-6	BES23-35 1.5'	Total/NA	Solid	Total BTEX	
890-4696-7	BES23-36 1.5'	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 53828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	8015B NM	53847
890-4696-2	BES23-38 1.5'	Total/NA	Solid	8015B NM	53847
890-4696-3	BES23-39 4'	Total/NA	Solid	8015B NM	53847
890-4696-4	BES23-40 4'	Total/NA	Solid	8015B NM	53847
890-4696-5	WES23-08 0-4'	Total/NA	Solid	8015B NM	53847
890-4696-6	BES23-35 1.5'	Total/NA	Solid	8015B NM	53847
890-4696-7	BES23-36 1.5'	Total/NA	Solid	8015B NM	53847
MB 880-53847/1-A	Method Blank	Total/NA	Solid	8015B NM	53847
LCS 880-53847/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	53847

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

GC Semi VOA (Continued)

Analysis Batch: 53828 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 880-53847/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	53847
890-4682-A-1-D MS	Matrix Spike	Total/NA	Solid	8015B NM	53847
890-4682-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8015B NM	53847

Prep Batch: 53847

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	8015NM Prep	
890-4696-2	BES23-38 1.5'	Total/NA	Solid	8015NM Prep	
890-4696-3	BES23-39 4'	Total/NA	Solid	8015NM Prep	
890-4696-4	BES23-40 4'	Total/NA	Solid	8015NM Prep	
890-4696-5	WES23-08 0-4'	Total/NA	Solid	8015NM Prep	
890-4696-6	BES23-35 1.5'	Total/NA	Solid	8015NM Prep	
890-4696-7	BES23-36 1.5'	Total/NA	Solid	8015NM Prep	
MB 880-53847/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-53847/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-53847/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4682-A-1-D MS	Matrix Spike	Total/NA	Solid	8015NM Prep	
890-4682-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8015NM Prep	

Analysis Batch: 53977

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Total/NA	Solid	8015 NM	
890-4696-2	BES23-38 1.5'	Total/NA	Solid	8015 NM	
890-4696-3	BES23-39 4'	Total/NA	Solid	8015 NM	
890-4696-4	BES23-40 4'	Total/NA	Solid	8015 NM	
890-4696-5	WES23-08 0-4'	Total/NA	Solid	8015 NM	
890-4696-6	BES23-35 1.5'	Total/NA	Solid	8015 NM	
890-4696-7	BES23-36 1.5'	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 53876

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Soluble	Solid	DI Leach	
890-4696-2	BES23-38 1.5'	Soluble	Solid	DI Leach	
890-4696-3	BES23-39 4'	Soluble	Solid	DI Leach	
890-4696-4	BES23-40 4'	Soluble	Solid	DI Leach	
890-4696-5	WES23-08 0-4'	Soluble	Solid	DI Leach	
890-4696-6	BES23-35 1.5'	Soluble	Solid	DI Leach	
890-4696-7	BES23-36 1.5'	Soluble	Solid	DI Leach	
MB 880-53876/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-53876/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-53876/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4692-A-1-E MS	Matrix Spike	Soluble	Solid	DI Leach	
890-4692-A-1-F MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 53953

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-1	BES23-37 1.5'	Soluble	Solid	300.0	53876
890-4696-2	BES23-38 1.5'	Soluble	Solid	300.0	53876
890-4696-3	BES23-39 4'	Soluble	Solid	300.0	53876

Eurofins Carlsbad

QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

HPLC/IC (Continued)

Analysis Batch: 53953 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4696-4	BES23-40 4'	Soluble	Solid	300.0	53876
890-4696-5	WES23-08 0-4'	Soluble	Solid	300.0	53876
890-4696-6	BES23-35 1.5'	Soluble	Solid	300.0	53876
890-4696-7	BES23-36 1.5'	Soluble	Solid	300.0	53876
MB 880-53876/1-A	Method Blank	Soluble	Solid	300.0	53876
LCS 880-53876/2-A	Lab Control Sample	Soluble	Solid	300.0	53876
LCSD 880-53876/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	53876
890-4692-A-1-E MS	Matrix Spike	Soluble	Solid	300.0	53876
890-4692-A-1-F MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	53876

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Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-37 1.5'

Lab Sample ID: 890-4696-1

Date Collected: 05/19/23 09:00

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.97 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 12:29	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/22/23 16:30	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 15:29	SM	EET MID
Soluble	Leach	DI Leach			5 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 11:40	CH	EET MID

Client Sample ID: BES23-38 1.5'

Lab Sample ID: 890-4696-2

Date Collected: 05/19/23 09:05

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.96 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 16:16	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 16:13	SM	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 11:46	CH	EET MID

Client Sample ID: BES23-39 4'

Lab Sample ID: 890-4696-3

Date Collected: 05/19/23 09:10

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 16:37	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 16:34	SM	EET MID
Soluble	Leach	DI Leach			4.99 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 12:02	CH	EET MID

Client Sample ID: BES23-40 4'

Lab Sample ID: 890-4696-4

Date Collected: 05/19/23 09:15

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.02 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 16:57	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-40 4'

Lab Sample ID: 890-4696-4

Date Collected: 05/19/23 09:15

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 16:56	SM	EET MID
Soluble	Leach	DI Leach			5.04 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 12:07	CH	EET MID

Client Sample ID: WES23-08 0-4'

Lab Sample ID: 890-4696-5

Date Collected: 05/19/23 09:20

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.01 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 17:18	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.02 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 17:17	SM	EET MID
Soluble	Leach	DI Leach			4.96 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 12:13	CH	EET MID

Client Sample ID: BES23-35 1.5'

Lab Sample ID: 890-4696-6

Date Collected: 05/19/23 09:40

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.03 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 17:38	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 17:39	SM	EET MID
Soluble	Leach	DI Leach			5.05 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 12:18	CH	EET MID

Client Sample ID: BES23-36 1.5'

Lab Sample ID: 890-4696-7

Date Collected: 05/19/23 09:45

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.04 g	5 mL	53833	05/22/23 08:42	MNR	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	53831	05/22/23 17:59	MNR	EET MID
Total/NA	Analysis	Total BTEX		1			53921	05/23/23 09:08	SM	EET MID
Total/NA	Analysis	8015 NM		1			53977	05/23/23 10:13	SM	EET MID
Total/NA	Prep	8015NM Prep			10.05 g	10 mL	53847	05/22/23 09:25	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	53828	05/22/23 18:00	SM	EET MID

Eurofins Carlsbad

Lab Chronicle

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Client Sample ID: BES23-36 1.5'

Lab Sample ID: 890-4696-7

Date Collected: 05/19/23 09:45

Matrix: Solid

Date Received: 05/19/23 14:02

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.05 g	50 mL	53876	05/22/23 12:13	SMC	EET MID
Soluble	Analysis	300.0		1	50 mL	50 mL	53953	05/23/23 12:23	CH	EET MID

Laboratory References:

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

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Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4696-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4696-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
890-4696-1	BES23-37 1.5'	Solid	05/19/23 09:00	05/19/23 14:02
890-4696-2	BES23-38 1.5'	Solid	05/19/23 09:05	05/19/23 14:02
890-4696-3	BES23-39 4'	Solid	05/19/23 09:10	05/19/23 14:02
890-4696-4	BES23-40 4'	Solid	05/19/23 09:15	05/19/23 14:02
890-4696-5	WES23-08 0-4'	Solid	05/19/23 09:20	05/19/23 14:02
890-4696-6	BES23-35 1.5'	Solid	05/19/23 09:40	05/19/23 14:02
890-4696-7	BES23-36 1.5'	Solid	05/19/23 09:45	05/19/23 14:02

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Environment Testing
Xenco

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

Chain of Custody

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex	Company Name:	Solanis Midstream
Address:	On File	Address:	
City, State ZIP:		City, State ZIP:	
Phone:		Email:	cdixon@vertex.ca

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

Project Name:	Cave Line Boost	Turn Around	
Project Number:	23E-01630	<input type="checkbox"/> Routine <input checked="" type="checkbox"/> Rush	Pres. Code
Project Location:	Hunter Klein	Due Date:	48hr
Sampler's Name:		TAT starts the day received by the lab, if received by 4:30pm	
PO #:		Temp Blank:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
SAMPLE RECEIPT		Thermometer ID:	TKM-ED2
Samples Received Intact:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Correction Factor:	0.2
Cooler Custody Seals:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Temperature Reading:	21.9
Sample Custody Seals:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Corrected Temperature:	
Total Containers:		Parameters	BTEX TPH CI



Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Preservative Codes	Sample Comments
BES23-37	Soil	5/14/23	9:00		5	5	None: NO Cool: Cool HCL: HC H ₂ SO ₄ : H ₂ H ₃ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ S ₂ O ₃ : NaSO ₃ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SACP	
BES23-38			9:05		5	5		
BES23-39			9:10		5	5		
BES23-40			9:15		5	5		
BES23-08			9:20		5	5		
BES23-35			9:40		5	5		
BES23-36			9:45		5	5		

Total 200.7 / 6010 2008 / 6020: 8RCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO₂ Na Sr Ti Sn U V Zn
 Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010 : 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag Ti U Hg: 1631 / 245.1 / 7470 / 7471

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

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Marta Klein</i>	<i>Aracela Stief</i>	5/19/23 1400			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4696-1

SDG Number: 23E-01630

Login Number: 4696

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4696-1

SDG Number: 23E-01630

Login Number: 4696

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/22/23 08:42 AM

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

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Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 5/30/2023 12:20:05 PM

JOB DESCRIPTION

Cave Line Booster
SDG NUMBER 23E-01630

JOB NUMBER

890-4734-1

Eurofins Carlsbad
1089 N Canal St.
Carlsbad NM 88220



Eurofins Carlsbad

Job Notes

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

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

Authorization



Generated
5/30/2023 12:20:05 PM

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

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Client: Vertex
Project/Site: Cave Line Booster

Laboratory Job ID: 890-4734-1
SDG: 23E-01630

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Definitions/Glossary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Qualifiers

GC VOA

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

GC Semi VOA

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

HPLC/IC

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

Glossary

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

Case Narrative

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Job ID: 890-4734-1

Laboratory: Eurofins Carlsbad**Narrative****Job Narrative
890-4734-1****Receipt**

The samples were received on 5/24/2023 2:25 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.8°C

Receipt Exceptions

The following samples were received and analyzed from an unpreserved bulk soil jar: WES23-10 0-1.5 (890-4734-1) and WES23-09 0-1.5 (890-4734-2).

GC VOA

Method 8021B: Spike compounds were inadvertently omitted during the extraction process for the matrix spike/matrix spike duplicate (MS/MSD); therefore, matrix spike recoveries are unavailable for preparation batch 880-54263 and analytical batch 880-54207. The associated laboratory control sample (LCS) met acceptance criteria.

Method 8021B: LCS biased high for benzene. Since the method only requires an LCS or LCSD to be acceptable, the data was qualified and reported. (LCS 880-54263/1-A)

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

GC Semi VOA

Method 8015MOD_NM: The surrogate recovery for the blank associated with preparation batch 880-54222 and analytical batch 880-54199 was outside the upper control limits.

Method 8015MOD_NM: Surrogate recovery for the following samples were outside control limits: (LCS 880-54222/2-A) and (LCSD 880-54222/3-A). Evidence of matrix interferences is not obvious.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: (890-4734-A-1-C MS). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8015MOD_NM: Surrogate recovery for the following sample was outside control limits: (CCV 880-54199/20). Evidence of matrix interferences is not obvious.

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

HPLC/IC

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



Client Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Client Sample ID: WES23-10 0-1.5

Lab Sample ID: 890-4734-1

Date Collected: 05/24/23 10:15

Matrix: Solid

Date Received: 05/24/23 14:25

Sample Depth: 0-1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00202	U **	0.00202		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
Ethylbenzene	<0.00202	U	0.00202		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
Toluene	<0.00202	U	0.00202		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
Xylenes, Total	<0.00404	U	0.00404		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
m-Xylene & p-Xylene	<0.00404	U	0.00404		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
o-Xylene	<0.00202	U	0.00202		mg/Kg		05/26/23 15:25	05/27/23 15:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	123		70 - 130				05/26/23 15:25	05/27/23 15:23	1
1,4-Difluorobenzene (Surr)	85		70 - 130				05/26/23 15:25	05/27/23 15:23	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00404	U	0.00404		mg/Kg			05/30/23 13:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/26/23 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 11:01	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 11:01	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 11:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctane	97		70 - 130				05/26/23 09:11	05/26/23 11:01	1
o-Terphenyl	70		70 - 130				05/26/23 09:11	05/26/23 11:01	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	106		5.03		mg/Kg			05/26/23 10:11	1

Client Sample ID: WES23-09 0-1.5

Lab Sample ID: 890-4734-2

Date Collected: 05/24/23 10:20

Matrix: Solid

Date Received: 05/24/23 14:25

Sample Depth: 0-1.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00200	U **	0.00200		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
Xylenes, Total	<0.00401	U	0.00401		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
m-Xylene & p-Xylene	<0.00401	U	0.00401		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 15:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130				05/26/23 15:25	05/27/23 15:44	1

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Client Sample Results

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4734-1
 SDG: 23E-01630

Client Sample ID: WES23-09 0-1.5

Lab Sample ID: 890-4734-2

Date Collected: 05/24/23 10:20

Matrix: Solid

Date Received: 05/24/23 14:25

Sample Depth: 0-1.5

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,4-Difluorobenzene (Surr)	70		70 - 130	05/26/23 15:25	05/27/23 15:44	1

Method: TAL SOP Total BTEX - Total BTEX Calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total BTEX	<0.00401	U	0.00401		mg/Kg			05/30/23 13:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total TPH	<50.0	U	50.0		mg/Kg			05/26/23 16:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 12:38	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 12:38	1
Oil Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/26/23 09:11	05/26/23 12:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctane	98		70 - 130	05/26/23 09:11	05/26/23 12:38	1
o-Terphenyl	72		70 - 130	05/26/23 09:11	05/26/23 12:38	1

Method: EPA 300.0 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	136		4.98		mg/Kg			05/26/23 10:16	1

Surrogate Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB1	DFBZ1
		(70-130)	(70-130)
880-28743-A-5-D MS	Matrix Spike	114	109
880-28743-A-5-E MSD	Matrix Spike Duplicate	67 S1-	97
890-4734-1	WES23-10 0-1.5	123	85
890-4734-2	WES23-09 0-1.5	96	70
LCS 880-54263/1-A	Lab Control Sample	87	114
LCSD 880-54263/2-A	Lab Control Sample Dup	107	112
MB 880-54099/5-A	Method Blank	66 S1-	74
MB 880-54263/5-A	Method Blank	66 S1-	82

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DFBZ = 1,4-Difluorobenzene (Surr)

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

Matrix: Solid

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	1CO1	OTPH1
		(70-130)	(70-130)
890-4734-1	WES23-10 0-1.5	97	70
890-4734-1 MS	WES23-10 0-1.5	98	67 S1-
890-4734-1 MSD	WES23-10 0-1.5	103	70
890-4734-2	WES23-09 0-1.5	98	72
LCS 880-54222/2-A	Lab Control Sample	86	65 S1-
LCSD 880-54222/3-A	Lab Control Sample Dup	89	67 S1-
MB 880-54222/1-A	Method Blank	188 S1+	150 S1+

Surrogate Legend

1CO = 1-Chlorooctane

OTPH = o-Terphenyl

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 880-54099/5-A
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 54099

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<0.00200	U	0.00200		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/24/23 15:37	05/26/23 21:44	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	66	S1-	70 - 130				05/24/23 15:37	05/26/23 21:44	1
1,4-Difluorobenzene (Surr)	74		70 - 130				05/24/23 15:37	05/26/23 21:44	1

Lab Sample ID: MB 880-54263/5-A
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 54263

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
Ethylbenzene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
Toluene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
Xylenes, Total	<0.00400	U	0.00400		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
m-Xylene & p-Xylene	<0.00400	U	0.00400		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
o-Xylene	<0.00200	U	0.00200		mg/Kg		05/26/23 15:25	05/27/23 08:20	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	66	S1-	70 - 130				05/26/23 15:25	05/27/23 08:20	1
1,4-Difluorobenzene (Surr)	82		70 - 130				05/26/23 15:25	05/27/23 08:20	1

Lab Sample ID: LCS 880-54263/1-A
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 54263

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	0.100	0.08723		mg/Kg		87	70 - 130
Toluene	0.100	0.09762		mg/Kg		98	70 - 130
m-Xylene & p-Xylene	0.200	0.1692		mg/Kg		85	70 - 130
o-Xylene	0.100	0.08550		mg/Kg		85	70 - 130
Surrogate	%Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	87		70 - 130				
1,4-Difluorobenzene (Surr)	114		70 - 130				

Lab Sample ID: LCSD 880-54263/2-A
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 54263

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	
								RPD	Limit
Benzene	0.100	0.1265		mg/Kg		127	70 - 130	4	35

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

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

Lab Sample ID: LCSD 880-54263/2-A
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 54263

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Ethylbenzene	0.100	0.1019		mg/Kg		102	70 - 130	15	35	
Toluene	0.100	0.1041		mg/Kg		104	70 - 130	6	35	
m-Xylene & p-Xylene	0.200	0.2115		mg/Kg		106	70 - 130	22	35	
o-Xylene	0.100	0.1078		mg/Kg		108	70 - 130	23	35	
		LCSD	LCSD							
Surrogate		%Recovery	Qualifier	Limits						
4-Bromofluorobenzene (Surr)		107		70 - 130						
1,4-Difluorobenzene (Surr)		112		70 - 130						

Lab Sample ID: 880-28743-A-5-D MS
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 54263

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Benzene	<0.00202	U ** F1	0.101	0.1260		mg/Kg		125	70 - 130			
Ethylbenzene	<0.00202	U F1	0.101	0.1081		mg/Kg		107	70 - 130			
Toluene	<0.00202	U F1 F2	0.101	0.1071		mg/Kg		106	70 - 130			
m-Xylene & p-Xylene	<0.00403	U F1	0.202	0.2268		mg/Kg		112	70 - 130			
o-Xylene	<0.00202	U F1	0.101	0.1153		mg/Kg		114	70 - 130			
		MS	MS									
Surrogate		%Recovery	Qualifier	Limits								
4-Bromofluorobenzene (Surr)		114		70 - 130								
1,4-Difluorobenzene (Surr)		109		70 - 130								

Lab Sample ID: 880-28743-A-5-E MSD
Matrix: Solid
Analysis Batch: 54207

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 54263

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD		
Benzene	<0.00202	U ** F1	0.0994	<0.00199	U F1 F2	mg/Kg		0.8	70 - 130	198	35	
Ethylbenzene	<0.00202	U F1	0.0994	<0.00199	U F1	mg/Kg		0	70 - 130	NC	35	
Toluene	<0.00202	U F1 F2	0.0994	<0.00199	U F1 F2	mg/Kg		0.5	70 - 130	198	35	
m-Xylene & p-Xylene	<0.00403	U F1	0.199	<0.00398	U F1	mg/Kg		0	70 - 130	NC	35	
o-Xylene	<0.00202	U F1	0.0994	<0.00199	U F1	mg/Kg		0	70 - 130	NC	35	
		MSD	MSD									
Surrogate		%Recovery	Qualifier	Limits								
4-Bromofluorobenzene (Surr)		67	S1-	70 - 130								
1,4-Difluorobenzene (Surr)		97		70 - 130								

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

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

Lab Sample ID: MB 880-54222/1-A
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 54222

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	50.0		mg/Kg		05/26/23 08:00	05/26/23 08:25	1
Diesel Range Organics (Over C10-C28)	<50.0	U	50.0		mg/Kg		05/26/23 08:00	05/26/23 08:25	1
Oll Range Organics (Over C28-C36)	<50.0	U	50.0		mg/Kg		05/26/23 08:00	05/26/23 08:25	1
Surrogate	MB MB		Limits			D	Prepared	Analyzed	Dil Fac
%Recovery	Qualifier								
1-Chlorooctane	188	S1+	70 - 130				05/26/23 08:00	05/26/23 08:25	1
o-Terphenyl	150	S1+	70 - 130				05/26/23 08:00	05/26/23 08:25	1

Lab Sample ID: LCS 880-54222/2-A
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 54222

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	
								Gasoline Range Organics (GRO)-C6-C10
Diesel Range Organics (Over C10-C28)	1000	919.3		mg/Kg		92	70 - 130	
Surrogate	LCS LCS		Limits			D	%Rec	%Rec Limits
%Recovery	Qualifier							
1-Chlorooctane	86		70 - 130					
o-Terphenyl	65	S1-	70 - 130					

Lab Sample ID: LCSD 880-54222/3-A
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 54222

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	
								RPD	Limit
Gasoline Range Organics (GRO)-C6-C10	1000	915.8		mg/Kg		92	70 - 130	2	20
Diesel Range Organics (Over C10-C28)	1000	896.6		mg/Kg		90	70 - 130	2	20
Surrogate	LCSD LCSD		Limits			D	%Rec	%Rec Limits	RPD
%Recovery	Qualifier								
1-Chlorooctane	89		70 - 130						
o-Terphenyl	67	S1-	70 - 130						

Lab Sample ID: 890-4734-1 MS
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: WES23-10 0-1.5
Prep Type: Total/NA
Prep Batch: 54222

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Diesel Range Organics (Over C10-C28)	<50.0	U	998	721.0		mg/Kg		71	70 - 130

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

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

Lab Sample ID: 890-4734-1 MS
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: WES23-10 0-1.5
Prep Type: Total/NA
Prep Batch: 54222

Surrogate	%Recovery	MS MS Qualifier	Limits
1-Chlorooctane	98		70 - 130
o-Terphenyl	67	S1-	70 - 130

Lab Sample ID: 890-4734-1 MSD
Matrix: Solid
Analysis Batch: 54199

Client Sample ID: WES23-10 0-1.5
Prep Type: Total/NA
Prep Batch: 54222

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	%Rec		RPD	Limit
				Result	Qualifier				Limits	RPD		
Gasoline Range Organics (GRO)-C6-C10	<50.0	U	999	841.2		mg/Kg		82	70 - 130	3	20	
Diesel Range Organics (Over C10-C28)	<50.0	U	999	765.9		mg/Kg		75	70 - 130	6	20	

Surrogate	%Recovery	MSD MSD Qualifier	Limits
1-Chlorooctane	103		70 - 130
o-Terphenyl	70		70 - 130

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 880-54137/1-A
Matrix: Solid
Analysis Batch: 54182

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00	U	5.00		mg/Kg			05/26/23 08:01	1

Lab Sample ID: LCS 880-54137/2-A
Matrix: Solid
Analysis Batch: 54182

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	250	261.7		mg/Kg		105	90 - 110

Lab Sample ID: LCSD 880-54137/3-A
Matrix: Solid
Analysis Batch: 54182

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Chloride	250	260.3		mg/Kg		104	90 - 110	1	20

Lab Sample ID: 890-4729-A-1-B MS
Matrix: Solid
Analysis Batch: 54182

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	48.6		249	311.8		mg/Kg		106	90 - 110

Eurofins Carlsbad

QC Sample Results

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 890-4729-A-1-C MSD
Matrix: Solid
Analysis Batch: 54182

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	48.6		249	306.7		mg/Kg		104	90 - 110	2	20

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

GC VOA

Prep Batch: 54099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 880-54099/5-A	Method Blank	Total/NA	Solid	5035	

Analysis Batch: 54207

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	8021B	54263
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	8021B	54263
MB 880-54099/5-A	Method Blank	Total/NA	Solid	8021B	54099
MB 880-54263/5-A	Method Blank	Total/NA	Solid	8021B	54263
LCS 880-54263/1-A	Lab Control Sample	Total/NA	Solid	8021B	54263
LCSD 880-54263/2-A	Lab Control Sample Dup	Total/NA	Solid	8021B	54263
880-28743-A-5-D MS	Matrix Spike	Total/NA	Solid	8021B	54263
880-28743-A-5-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8021B	54263

Prep Batch: 54263

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	5035	
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	5035	
MB 880-54263/5-A	Method Blank	Total/NA	Solid	5035	
LCS 880-54263/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 880-54263/2-A	Lab Control Sample Dup	Total/NA	Solid	5035	
880-28743-A-5-D MS	Matrix Spike	Total/NA	Solid	5035	
880-28743-A-5-E MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 54405

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	Total BTEX	
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	Total BTEX	

GC Semi VOA

Analysis Batch: 54199

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	8015B NM	54222
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	8015B NM	54222
MB 880-54222/1-A	Method Blank	Total/NA	Solid	8015B NM	54222
LCS 880-54222/2-A	Lab Control Sample	Total/NA	Solid	8015B NM	54222
LCSD 880-54222/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B NM	54222
890-4734-1 MS	WES23-10 0-1.5	Total/NA	Solid	8015B NM	54222
890-4734-1 MSD	WES23-10 0-1.5	Total/NA	Solid	8015B NM	54222

Prep Batch: 54222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	8015NM Prep	
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	8015NM Prep	
MB 880-54222/1-A	Method Blank	Total/NA	Solid	8015NM Prep	
LCS 880-54222/2-A	Lab Control Sample	Total/NA	Solid	8015NM Prep	
LCSD 880-54222/3-A	Lab Control Sample Dup	Total/NA	Solid	8015NM Prep	
890-4734-1 MS	WES23-10 0-1.5	Total/NA	Solid	8015NM Prep	
890-4734-1 MSD	WES23-10 0-1.5	Total/NA	Solid	8015NM Prep	

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QC Association Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

GC Semi VOA

Analysis Batch: 54274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Total/NA	Solid	8015 NM	
890-4734-2	WES23-09 0-1.5	Total/NA	Solid	8015 NM	

HPLC/IC

Leach Batch: 54137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Soluble	Solid	DI Leach	
890-4734-2	WES23-09 0-1.5	Soluble	Solid	DI Leach	
MB 880-54137/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 880-54137/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 880-54137/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
890-4729-A-1-B MS	Matrix Spike	Soluble	Solid	DI Leach	
890-4729-A-1-C MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 54182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
890-4734-1	WES23-10 0-1.5	Soluble	Solid	300.0	54137
890-4734-2	WES23-09 0-1.5	Soluble	Solid	300.0	54137
MB 880-54137/1-A	Method Blank	Soluble	Solid	300.0	54137
LCS 880-54137/2-A	Lab Control Sample	Soluble	Solid	300.0	54137
LCSD 880-54137/3-A	Lab Control Sample Dup	Soluble	Solid	300.0	54137
890-4729-A-1-B MS	Matrix Spike	Soluble	Solid	300.0	54137
890-4729-A-1-C MSD	Matrix Spike Duplicate	Soluble	Solid	300.0	54137

Lab Chronicle

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4734-1
 SDG: 23E-01630

Client Sample ID: WES23-10 0-1.5

Lab Sample ID: 890-4734-1

Date Collected: 05/24/23 10:15

Matrix: Solid

Date Received: 05/24/23 14:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.95 g	5 mL	54263	05/26/23 15:25	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	54207	05/27/23 15:23	SM	EET MID
Total/NA	Analysis	Total BTEX		1			54405	05/30/23 13:01	AJ	EET MID
Total/NA	Analysis	8015 NM		1			54274	05/26/23 16:42	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	54222	05/26/23 09:11	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	54199	05/26/23 11:01	SM	EET MID
Soluble	Leach	DI Leach			4.97 g	50 mL	54137	05/25/23 10:09	KS	EET MID
Soluble	Analysis	300.0		1			54182	05/26/23 10:11	CH	EET MID

Client Sample ID: WES23-09 0-1.5

Lab Sample ID: 890-4734-2

Date Collected: 05/24/23 10:20

Matrix: Solid

Date Received: 05/24/23 14:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.99 g	5 mL	54263	05/26/23 15:25	EL	EET MID
Total/NA	Analysis	8021B		1	5 mL	5 mL	54207	05/27/23 15:44	SM	EET MID
Total/NA	Analysis	Total BTEX		1			54405	05/30/23 13:01	AJ	EET MID
Total/NA	Analysis	8015 NM		1			54274	05/26/23 16:42	SM	EET MID
Total/NA	Prep	8015NM Prep			10.01 g	10 mL	54222	05/26/23 09:11	AM	EET MID
Total/NA	Analysis	8015B NM		1	1 uL	1 uL	54199	05/26/23 12:38	SM	EET MID
Soluble	Leach	DI Leach			5.02 g	50 mL	54137	05/25/23 10:09	KS	EET MID
Soluble	Analysis	300.0		1			54182	05/26/23 10:16	CH	EET MID

Laboratory References:

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

Accreditation/Certification Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Laboratory: Eurofins Midland

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

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

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

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

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Method Summary

Client: Vertex
 Project/Site: Cave Line Booster

Job ID: 890-4734-1
 SDG: 23E-01630

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

Protocol References:

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

Laboratory References:

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



Sample Summary

Client: Vertex
Project/Site: Cave Line Booster

Job ID: 890-4734-1
SDG: 23E-01630

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Depth
890-4734-1	WES23-10 0-1.5	Solid	05/24/23 10:15	05/24/23 14:25	0-1.5
890-4734-2	WES23-09 0-1.5	Solid	05/24/23 10:20	05/24/23 14:25	0-1.5

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Environment Testing
Xenco

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

Chain of Custody

Work Order No: _____

www.xenco.com Page _____ of _____

Project Manager:	Chance Dixon	Bill to: (if different)	Rob Kirk
Company Name:	Vertex	Company Name:	Solaris
Address:	On File	Address:	
City, State ZIP:	↓	City, State ZIP:	
Phone:		Email:	cdixon@vertex.ca

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

Project Name:	Cave Line Booster	Turn Around	<input type="checkbox"/> Routine <input checked="" type="checkbox"/> Rush	Pres. Code	
Project Number:	23E-01630	Due Date:	4/8/23		
Project Location:	Hunter Klein	TAT starts the day received by the lab, if received by 4:30pm			
Sampler's Name:		Wet Ice:	2/2/23	No	
P.O. #:		Temp Blank:	Yes	No	
SAMPLE RECEIPT		Samples Received Intact:	Yes	No	
		Cooler Custody Seals:	Yes	No	
		Sample Custody Seals:	Yes	No	
		Total Containers:	Corrected Temperature:		



Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Grab/Comp	# of Cont	Analysis Request	Preservative Codes	Sample Comments
WES 23-016	0-4.5' Soil	5/24/23	10:15	0-1.5'	5	1	TPH	DI Water: H ₂ O MeOH: Me HCL: HC HNO ₃ : HN H ₂ SO ₄ : H ₂	
WES 23-019	0-1.5' Soil	5/24/23	10:20	0-1.5'	5	1	BTEX	H ₂ PO ₄ : HP NaHSO ₄ : NABIS Na ₂ S ₂ O ₃ : NASO ₃ Zn Acetate+NaOH: Zn NaOH+Ascorbic Acid: SAPC	

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

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Eurofins Xenco, its affiliates and sub-contractors. It assigns standard terms and conditions of service. Eurofins Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control of Eurofins Xenco. A minimum charge of \$95.00 will be applied to each project and a charge of \$5 for each sample submitted to Eurofins Xenco, but not analyzed. These terms will be enforced unless previously negotiated.

Relinquished by: (Signature)	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Received by: (Signature)	Date/Time
<i>Hunter Klein</i>	<i>Aracelis Lopez</i>	5/24/23 14:55			

Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4734-1

SDG Number: 23E-01630

Login Number: 4734

List Number: 1

Creator: Stutzman, Amanda

List Source: Eurofins Carlsbad

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

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Login Sample Receipt Checklist

Client: Vertex

Job Number: 890-4734-1

SDG Number: 23E-01630

Login Number: 4734

List Number: 2

Creator: Rodriguez, Leticia

List Source: Eurofins Midland

List Creation: 05/25/23 04:09 PM

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

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District I
 1625 N. French Dr., Hobbs, NM 88240
 Phone:(575) 393-6161 Fax:(575) 393-0720

District II
 811 S. First St., Artesia, NM 88210
 Phone:(575) 748-1283 Fax:(575) 748-9720

District III
 1000 Rio Brazos Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170

District IV
 1220 S. St Francis Dr., Santa Fe, NM 87505
 Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 233451

CONDITIONS

Operator: SOLARIS WATER MIDSTREAM, LLC 907 Tradewinds Blvd, Suite B Midland, TX 79706	OGRID: 371643
	Action Number: 233451
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
nvelez	None	9/21/2023