November 19, 2021
Kleinfelder Project No. 20221930.001A

Mr. Brett Middleton
Caerus Piceance, LLC
1001 17th Street #1600
Denver, Colorado 80202

SUBJECT: Proposed Sampling Plan
Caerus Piceance, LLC
COGCC Remediation Project No. 7966
H29A Former Pit
Garfield County, Colorado

Dear Mr. Middleton:

As requested, enclosed is the proposed sampling plan for the H29A Former Pit.

We appreciate the opportunity to provide environmental services to you on this project. If you have any questions, please contact the undersigned at 303.319.2456.

Respectfully submitted,

KLEINFELDER

Vince DeCianne
VP, Senior Principal Professional

PROPOSED SAMPLING PLAN
CAERUS PICEANCE, LLC
COGCC REMEDIATION PROJECT NO. 7966
H29A FORMER PIT
GARFIELD COUNTY, COLORADO

KLEINFELDER PROJECT NO.20221930.001A

NOVEMBER 19, 2021

A Report Prepared for:

Mr. Brett Middleton
Caerus Piceance, LLC
1001 17th Street #1600
Denver, Colorado 80202

PROPOSED SAMPLING PLAN
CAERUS PICEANCE, LLC
COGCC REMEDIATION PROJECT NO. 7966
H29A FORMER PIT
GARFIELD COUNTY, COLORADO

Prepared by:

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TABLE OF CONTENTS

1.0 INTRODUCTION

Kleinfelder, Inc. was retained by Caerus to review available information associated with the H29A formerly closed produced water pit (Pit) at the H29A Pad in Garfield County, Colorado, and propose a sampling plan for horizontal and vertical delineation to Colorado Oil and Gas Conservation Commission (COGCC) Table 915-1 levels (2 CCR 404-915-1). The Pit was closed in 2012 followed by multiple soil sampling/investigation and remediation efforts from 2012-present.

The H29A Pit was assigned Remediation No. 7966 by the Colorado Oil & Gas Conservation Commission (COGCC) in 2012. Previous submittals to COGCC regarding the H29A Pit include:

- Form 27 (Document No. 21460430)
- Form 19 (Document No. 2231696)
- Form 4 (Document No. 400815683)
- Supplemental Form 27 (Document No. 402583267)

Reports of Work Completed (ROWCs) have also been submitted.

1.1 SITE LOCATION AND HISTORY

A lined produced water storage pit was formerly present at the H29A Pad located in Garfield County (Piceance Basin), Colorado. The H29A Pad is located at Latitude 39.58830, Longitude -108.070600) The H29A Pad location is in a remote area northwest of Parachute, Colorado, as shown on Figure 1. An aerial photo showing the former pit is provided in Figure 2.

Notably, the H29A Pad is in an area where oil shale development activities were conducted by Unocal during the 1980s. Reclamation was performed in the area prior to the natural gas drilling activities associated with the H29A Pit. Encana (the operator of the H29A Pit) made use of existing roads and benches from the previous oil shale development in order to access areas for drilling without introducing additional impacts due to road construction or cutting further into the natural mountainsides.

The H29A Pad is located on a bench atop part of the former oil shale reclamation site. There are visible indications of the earlier oil shale-related reclamation visible, including a terraced slope below the H29A Pad.

The original operator of the H29A Pit was Encana, and Encana closed the pit and conducted subsequent sampling and remediation (bioventing) efforts from 2012-2016. In 2017, Caerus acquired Encana's assets in the Piceance Basin. Caerus continued the remediation efforts and COGCC filings associated with these efforts. A summary of previous investigation and remediation activities is provided below.

In October 2012, Encana closed the H29A Pit, including removal of the liner, soil sampling from the pit bottom after removal of the liner, and subsequent backfill to match surrounding grade at the pad. Total Petroleum Hydrocarbons (TPH) and benzene were detected above COGGC Table 910-1 values; therefore, Encana submitted COGCC Form 19 (Document No. 2231696) and additional sampling was conducted, as described in the paragraphs below. The 2012 initial soil sampling locations were given descriptive names (e.g., "center", "Ebot" for east bottom, etc.) however, the locations were not surveyed and no coordinates are available, so the exact sampling locations are not known. Encana's map attached to the Form 19 submittal (Document No. 2231696) provided approximate locations of these initial soil samples, and based on this map, Kleinfelder has shown approximate 2012 pit bottom soil sampling locations on Figure 3.

In February and April 2013, Encana's consultant, LT Environmental, drilled and sampled 13 soil borings at the H29A Pit area to further characterize the soil. Figure 3 includes the 2013 soil boring locations, SB01 through SB13. Field geographic positioning system (GPS) coordinates were recorded by LT Environmental for these locations and provided to Kleinfelder by Caerus. Kleinfelder used these GPS coordinates to locate the 2013 soil borings on Figure 3. Analytical results are summarized in Tables 2, 3 and 4.

In July 2013, Encana's consultant, LT Environmental, drilled and sampled six additional soil borings at the H29A Pit area. Ten soil vapor extraction (SVE)/bioventing wells were installed around the perimeter of the H29A pit area. Table 1 lists the soil borings and SVE/bioventing wells installed during July 2013. Locations of the 2013 borings and SVE/bioventing wells are shown on Figure 3, based on GPS coordinates provided. Groundwater was not encountered in any of the borings drilled in February, April, or July 2013. The bioventing wells are screened in unsaturated soils for the purpose of soil remediation only. Analytical results are summarized in Tables 2, 3 and 4.

In November 2016, Encana's consultant, Apex Companies, LLC, drilled and sampled four soil borings to supplement the previous site characterization efforts. Soil boring locations are listed on Table 1 and shown on Figure 3 (approximate based on the map in the Apex December 28, 2016 report of work completed). Analytical results are summarized in Tables 2, 3, and 4.

In 2017, Caerus acquired Encana's assets in the Piceance Basin, including the H29A Pad. Caerus continued operation of the existing SVE/bioventing wells for remediation. In addition, Caerus' consultant, Rule Engineering, LLC, conducted drilling and soil sampling within two feet of four of the SVE/bioventing wells (see Table 1) and installed three new bioventing wells in the center, east end, and west end of the former Pit area. The 2017 borings are shown on Figure 3, and the SVE/bioventing wells (installed in 2013 and 2017) are shown on Figure 4. Caerus had the SVE/bioventing wells surveyed in 2017 and provided the coordinates to Kleinfelder for use in locating these features on the site map. The 2017 soil sampling results were inconclusive regarding the SVE/bioventing effectiveness. Episodic operation of the SVE/bioventing wells has continued to the present time.

2.0 PREVIOUS RESULTS SUMMARY

As described in Section 1, there have been multiple soil sampling/site characterization efforts at the H29A former pit area since it was closed in 2012. Previous sampling occurred prior to promulgation of the COGCC Table 915-1 cleanup levels (2 CCR 404-915-1) and therefore did not include all of the analytes in the current COGCC Table 915-1.

Discussion of Previous Sample Analysis

Soil samples collected to date were analyzed for TPH and benzene, with select samples analyzed for additional constituents including, polynuclear aromatic hydrocarbons (PAHs) and inorganic constituents. Historical soil sample analytical results are summarized in Tables 2, 3 and 4. In reviewing the laboratory reports associated with the 2012-2017 samples, Kleinfelder notes that the laboratory analytical methods used were not consistent from one event to the next. For example, the benzene analysis in 2012-2013 was by United States Environmental Protection Agency (EPA) Method 8020/8015, however, benzene (BTEX) was analyzed by EPA Method 8260 in 2016-2017.

The laboratory reports for total petroleum hydrocarbon (TPH) Low Fraction (TPH-GRO), and High Fraction (TPH-DRO) do not list the associated carbon ranges for the TPH analyses. It is uncertain whether the 2012-2017 TPH results included the full C6-C36 carbon-chain range currently required for comparison to the COGCC Table 915-1 cleanup levels.

The laboratory reports for the TPH High Fraction (TPH-DRO) analysis for the 2012 and February 2013 soil samples included a heated solvent preparation method (Method 3546) prior to extraction. Although the reason for the unusual sample preparation method is not known, there are notes in the laboratory reports mentioning matrix interference/viscosity issues with the extract. Starting with the April 2013 samples and continuing through 2017, the TPH High Fraction (TPH-DRO) analysis was performed by Method 8015D. The same laboratory has been used since 2012 (ESC/Pace National, Mt. Juliet, Tennessee).

Kleinfelder notes that no chain of custody forms are included in the laboratory reports for 2012-2013. Chain of custody forms are included with the 2016-2017 laboratory reports.

Discussion of Previous Sampling Locations/Depths

The exact depth of the former H29A pit is unknown but, typical produced pits in the area are generally no more than about 20 to 25 ft deep. Figure 3 shows the previous soil boring locations and Tables 2, 3 and 4 provides the historical analytical results. Note that tables show the sample depths, which generally ranged from 10 to 75 feet below ground surface (bgs). Many of the borings included samples at 10-foot intervals; however, this is not the case for every boring. In general, the TPH concentrations ranged up to the mid-2000 mg/kg and decreased with depth. There was one unusually high TPH analytical result (20,002 mg/kg) reported for the WWall soil sample collected directly under the liner in 2012. According to Encana's initial Form 27 in 2012, "Any impacted material identified below the liner would be evaluated upon discovery and depending upon severity would be removed using heavy equipment and remediated onsite, or disposed of offsite at a permitted disposal facility."

2.1 VERTICAL DELINEATION DISCUSSION

In general, the highest detections of TPH during the previous investigations were shallower than 30 ft bgs. This is as expected for a shallow source (the produced water storage pit). Most of the borings were drilled to at least 30 ft bgs. The maximum soil boring depth was 75 ft bgs. No groundwater was encountered during drilling activities. Vertical delineation in comparison to COGCC Table 915-1 values has not yet been achieved.

At a few of the borings advanced deeper than 30 ft bgs (e.g., SB01, SBS01 (2013), SVEW03, SVEMID01, and SVEE03), there were elevated TPH detections in intervals below 30 ft bgs. As noted earlier, the H29A Pad is in an area formerly used for oil shale development and processing and the pad itself sits atop spent oil shale. One plausible reason for the unusual vertical distribution of TPH may be that the TPH results in the deeper samples might actually be representative of formerly processed residual oil shale remnants.

2.2 HORIZONTAL DELINEATION DISCUSSION

The former releases at the pit are understood to have been from localized areas within the pit footprint where there was leakage under the liner. The pit was backfilled during pit closure and there is no surface expression of the pit remaining. Previous investigations included a grid approach to boring placement across the former pit area, followed by confirmation borings adjacent to select SVE/bioventing wells. TPH and benzene concentrations were detected in most of the locations sampled, and similar to the vertical delineation discussion above, this is not

surprising considering that the H29A pad itself is on a former oil shale reclamation site. TPH concentrations are generally higher in the area to the east of the former pit. Horizontal delineation in comparison to COGCC Table 915-1 values has not yet been achieved.

2.3 SUMMARY/CONCLUSIONS

Below is a summary of the main take-aways and conclusions based on Kleinfelder's review of available H29A pit investigation results.

- Groundwater was not encountered in the previous borings, including borings advanced as deep as 75 ft bgs.
- Horizontal and vertical delineation is not complete at the H29A pit area.
- TPH analysis may not have included the full C6-C36 range; however, based on available TPH data, detections were generally highest near the east end of former pit.
- Matrix interference was frequently noted on the historical laboratory reports, especially for extractable TPH.
- Laboratory results from the 2012-2013 timeframe are not suitable for use in delineation to the current Table 915-1 cleanup concentrations.
- The BTEX analytical method changed from the earliest sampling in 2012-2013 (EPA Method SW8021/8015 or SW8021B) to the more recent sampling in 2016-2017 (EPA Method SW8260B), so detected BTEX concentrations may not be comparable. Kleinfelder recommends using only the 2016-2017 EPA Method SW8260B BTEX laboratory results and considering results prior to 2016 as qualitative only.
- Benzene results were generally highest on the western side of the former H29A pit (maximum 2.19 mg/kg benzene at SVEW03/15-ft bgs in 2017).
- Vertical distribution of detected constituents follows no clear pattern as would be expected if the source were from leaks in the pit liner (i.e., one would expect a consistent vertical pattern from higher to lower concentration with depth). It is unclear what the source of the deeper TPH detections was in the earlier investigations.

2.4 DATA GAPS

Based on review of the available site characterization information for the H29A former pit, the following data gaps were identified:

- Location coordinates are not available for the 2012 or 2016 soil boring and sampling locations.
- No lithologic logs of the previous soil borings are available, though some field notes from 2013 have brief descriptions.
- Past investigations did not include the current COGCC Table 915-1 suite of analyses.
- Inconsistent laboratory analytical methods were used.
- Some of the past soil borings did not reach vertical delineation at terminal depth, based on available data.

3.0 RECOMMENDED SAMPLING PLAN

The recommended sampling plan is presented below, including sampling objectives, sampling approach, proposed drilling locations and soil sample depths, and proposed analyses.

3.1 SAMPLING OBJECTIVES

The primary objective of the proposed sampling is to horizontally and vertically delineate the extent of COGCC Table 915-1 constituents. Although there is no known complete pathway to groundwater at the site (groundwater is at least 100 ft below the H29A Pad) delineation to COGCC Protection of Groundwater Soil Screening Concentrations (GWSSLs) is planned to comply with COGCC requirements. Objectives for this sampling effort are as follows:

- Vertical and horizontal delineation to GWSSLs per COGCC requirement.
- Obtain x, y, z coordinates for all new soil borings as well as the existing SVE/bioventing wells at the H29A Pad.
- Analyze soil samples for the full Table 915-1 list.
- Understand/distinguish between typical oil shale vs potential pit impacts.

3.2 SAMPLING APPROACH

The proposed sampling approach is a grid across the former pit area to confirm past sampling results and provide sufficient horizontal and vertical delineation of Table 915-1 constituents. Borings will be drilled to approximately 60 ft bgs based on the screening level data from past investigations. At each boring, soil will be observed and documented in a soil boring log.

3.3 PROPOSED SAMPLE LOCATIONS AND DEPTHS

Drilling activities will require the use of a hollow stem auger (HSA) drill rig. The proposed HSA drilling locations follow a grid pattern roughly on 50-ft centers, as shown on Figure 4. Soil samples will be collected using a split spoon sampler. Proposed soil sample depths are detailed below. Depths are the top depth: a 2-ft split spoon sampler will be advanced at each depth listed (e.g., 10-12 ft, 20-22 ft, etc.).

- North row (5) – Drill to 60 ft bgs, sample 10 ft, 20 ft, 30 ft, 40 ft, 50 ft, 60 ft
- Middle row (5) – Drill to 60 ft bgs, sample 10 ft, 20 ft, 30 ft, 40 ft, 50 ft, 60 ft South row (5) -- Drill to 60 ft bgs, sample 10 ft, 20 ft, 30 ft, 40 ft, 50 ft, 60 ft
- Southernmost location (1) – Drill to 80 ft bgs, Sample 50 ft, 60 ft, 70 ft, 80 ft

Note: If groundwater is encountered, a groundwater sample will be collected and analyzed for COGCC Table 915-1 analytes.

3.4 SAMPLE IDENTIFICATION

In order to avoid confusion with previous sample location IDs, the proposed soil borings will continue from previous soil boring sequence starting with soil boring 14 (SB14).

- Sample ID Nomenclature = YYYYMMDD-H29A/SB__@__ft.

3.5 LABORATORY ANALYSES

The sample analysis general details are provided below.

- Samples will be sent to Pace National laboratory, Mount Juliet, Tennessee.
- Samples will be placed in coolers with ice and shipped under chain of custody protocol.
- Samples will be analyzed using appropriate U.S. EPA SW-846 methods.
- All soil samples will be analyzed for the full Table 915-1 suite for comparison to GWSSLs.
- Chromatograms will be requested for all TPH results to allow for comparison of the TPH “fingerprint” associated with samples from various areas and depths.
- Site-specific matrix spike/matrix spike duplicate (MS/MSD) analyses will be requested for TPH, volatiles, and semi-volatiles (4 MS/MSD pair, one per row of borings and one at the southernmost boring) to understand if there are potential interference issues, as noted in historical analytical reports.

- At least one equipment blank (laboratory grade water poured through decontaminated split spoon sampler) will be collected for TPH-high fraction (extractables) analysis.

3.6 SPATIAL DATA/SURVEYING

- Latitude/longitude of each soil boring will be measured using a handheld GPS unit and noted on the boring logs, and confirmed with surveying by a State of Colorado licensed professional surveyor.

4.0 LIMITATIONS

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. It should be recognized that definition and evaluation of geologic and environmental conditions are a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service that provide adequate information for their purposes at acceptable levels of risk. More extensive studies, including subsurface studies or field tests, should be performed to reduce uncertainties. Acceptance of this report will indicate that Caerus has reviewed the document and determined that it does not need or want a greater level of service than provided.

During the course of the performance of Kleinfelder's services, hazardous materials may have been discovered. Kleinfelder assumes no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury that results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials. Nothing contained in this report should be construed or interpreted as requiring Kleinfelder to assume the status of an owner, operator, or generator, or person who arranges for disposal, transport, storage, or treatment of hazardous materials within the meaning of any governmental statute, regulation, or order. Caerus is solely responsible for directing notification of all governmental agencies, and the public at large, of the existence, release, treatment, or disposal of any hazardous materials observed at the project site, either before or during performance of Kleinfelder's services. Caerus is responsible for directing all arrangements to lawfully store, treat, recycle, dispose, or otherwise handle hazardous materials, including cuttings and samples resulting from Kleinfelder’s services.

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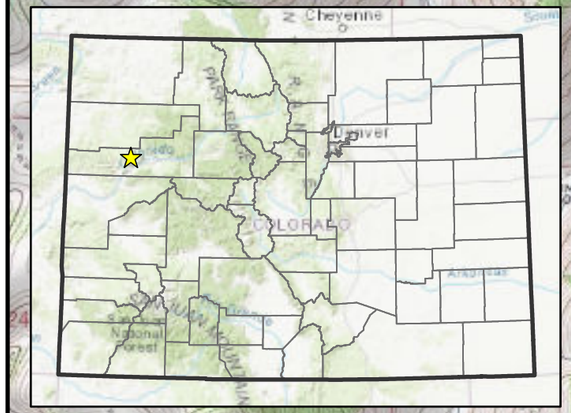
Figures



LEGEND

★ Site Location

0 1,000 2,000 4,000

Feet

N

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CREATED:	11/18/2021
CREATED BY:	ALeonard
CHECKED BY:	KMaestas
FILE NAME:	Figure 1 - Site Location

Site Location Map

H29A Well Pad
Garfield County, Colorado

FIGURE

1

LEGEND

Approximate Former Pit Area

0 25 50 100

Feet

N

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FILE NAME:	Figure 2 - Historic Aerial

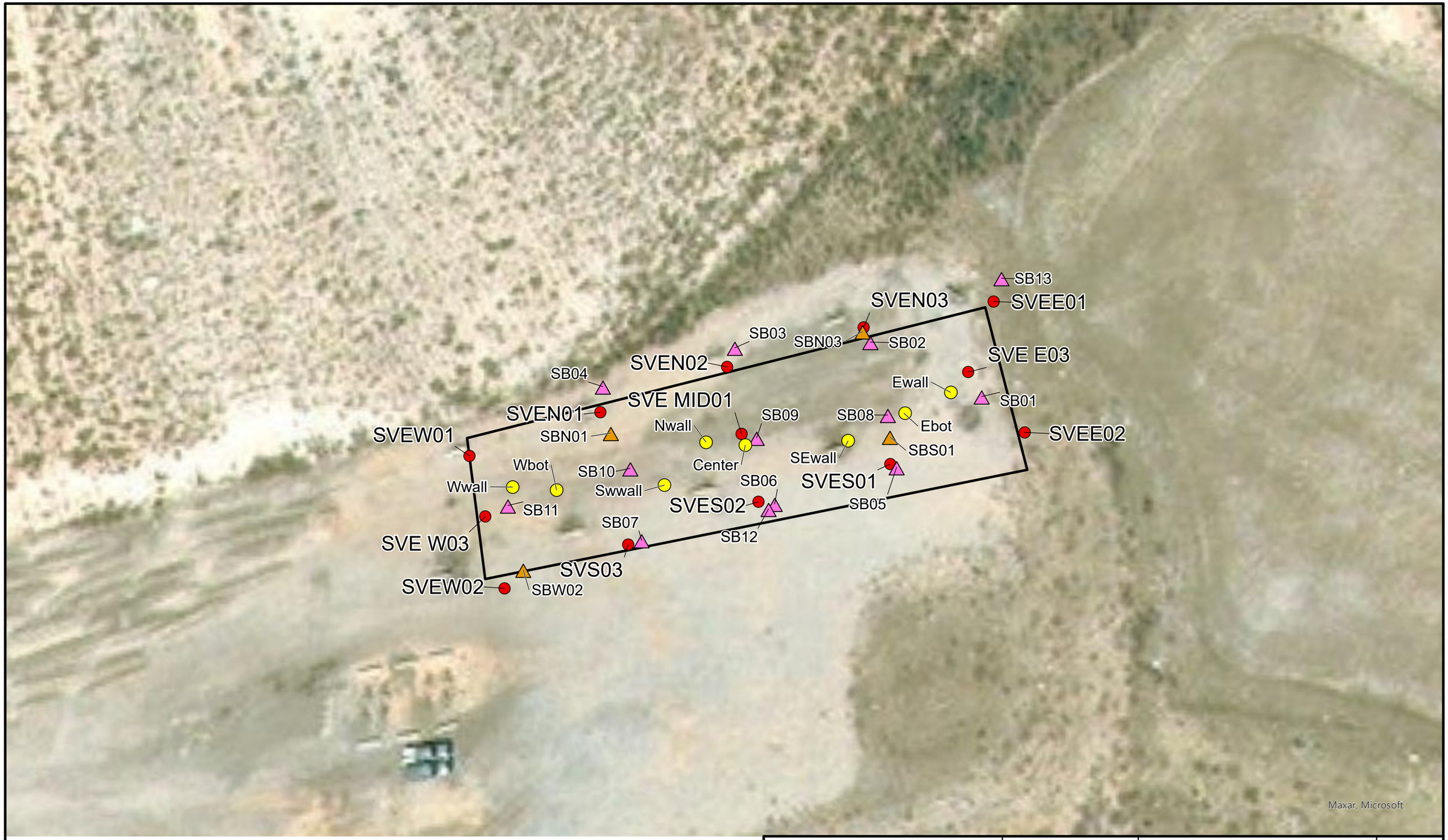
Historical Pit Aerial Photo

H29A Well Pad
Garfield County, Colorado

FIGURE

2

Date: 11/18/2021 User: ALeonard Path: \\azrgisstorp01\GIS_Projects\Client\DenverOffice\Working\H29A\H29A.aprx



LEGEND

- Approximate Former Pit Area
- Soil Boring Location (Wasatch Surveying - July 2017)
- Soil Boring Location (Encana - February 2013)
- Below-Liner Sample Location (2013)
- Soil Boring Location (Apex Companies - November 2016)

Note: All sample locations are approximate.

0 20 40 80
Feet

N

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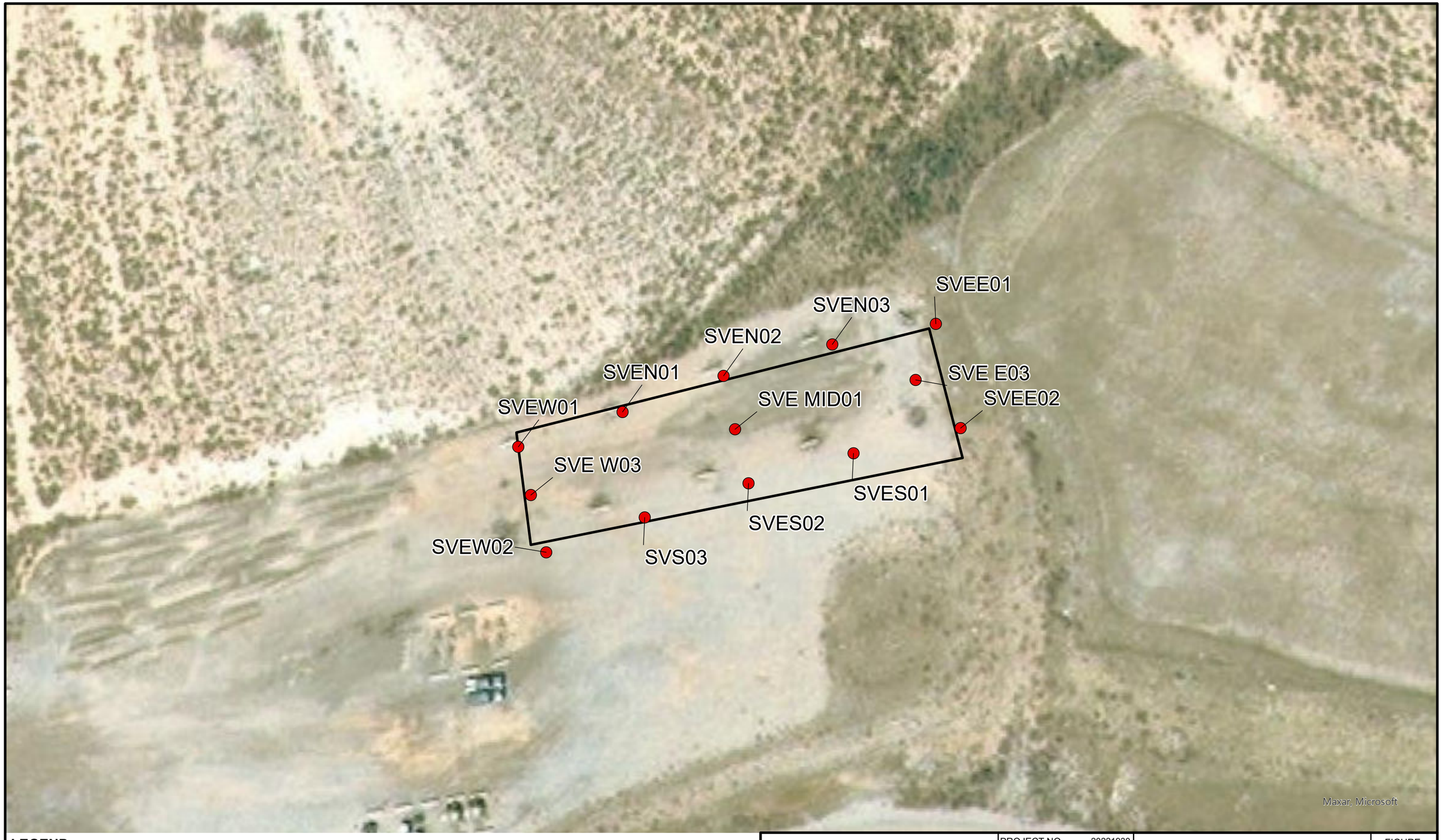
FILE NAME:	Figure 3 - Previous Soil Borings

Previous Soil Boring Locations

H29A Well Pad
Garfield County, Colorado

FIGURE
3



LEGEND

- Soil Boring Location (Wasatch Surveying - July 2017)
- Approximate Former Pit Boundary

Note: All sample locations are approximate.

0 25 50 100

Feet

N

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CHECKED BY:	KMaestas
FILE NAME:	Figure 4 - Bioventing Wells

Bioventing Well Locations

H29A Well Pad
Garfield County, Colorado

FIGURE

4

Date: 11/18/2021 User: ALeonard Path: \\azrgisstorp01\GIS_Projects\Client\DenverOffice\Working\H29A\H29A.aprx

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LEGEND

- Proposed Soil Boring Locations
- Approximate Former Pit Area

Note: All sample locations are approximate.

N

0 25 50 100

Feet

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CREATED BY:	ALeonard
CHECKED BY:	KMaestas
FILE NAME:	Figure 5 - Proposed Soil Boring

Proposed Soil Boring Locations

H29A Well Pad
Garfield County, Colorado

FIGURE

5

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Tables

Table 1
Summary of Soil Borings Drilled 2012-2017
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

Area	2012 (soil under liner)	Feb/April 2013 (soil borings)	2013 (soil borings)	2013 (SVE/biovent wells)	2016 (soil borings)	2017 (SVE/biovent wells)	2017 (conf. soil borings)
North	Nwall						
		SB02		SVEN03			
		SB03		SVEN02			SVEN02 (conf)
		SB04		SVEN01			
					SBN01		
					SBN03		
Mid		SB08					
	Center	SB09				SVEMID01	
		SB10					
West	Wwall					SVEW03	
	Wbot	SB11					
			Pit W01	SVEW01			SVEW01 (conf)
			Pit W02	SVEW02			
			SBW01				
					SBW02		
East	Ewall	SB01				SVEE03	
	Ebot						
		SB13	Pit S01	SVEE01			SVEE01 (conf)
			Pit E02	SVEE02			SVEE02 (conf)
			SBE01				
South	SEwall	SB05		SVES01			
		SB06		SVES02			
		SB12			SBS01 (2016)		
	SWwall	SB07		SVES03			SVES03 (conf)
			SBS01 (2013)				

Notes:

conf. = confirmation soil boring adjacent to SVE/bioventing well listed
E = east
SB = soil boring
SE = southeast
SVE = soil vapor extraction/bioventing well
SW = southwest

Table 2
Historical Soil Sample Summary - TPH and BTEX
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

					TPH			Organic Compounds in Soil - BTEX			
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					500 (mg/kg)			0.0026	0.69	0.78	9.9
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)								1.2	190	5.8	58
Location	ESC Lab Report #	Sample Date	Start Depth (ft bgs)	Sample ID	TPH (Total Volatile and Extractable Hydrocarbons)	TPH Low Fraction (GRO)	TPH High Fraction (DRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes
H29A	L602402	10/22/12	below liner	Center	**679.8**	9.8	**670**	**0.091**	<0.025	0.041	0.38
H29A	L602402	10/22/12	below liner	Ebot	**3902**	2	**3900**	**0.0032**	<0.025	<0.0025	0.022
H29A	L602402	10/22/12	below liner	Ewall	220	<0.50	220	<0.0025	<0.025	<0.0025	<0.0075
H29A	L602402	10/22/12	below liner	Nwall	290	<0.50	290	<0.0025	<0.025	<0.0025	<0.0075
H29A	L602402	10/22/12	below liner	SEwall	480	<0.50	480	<0.0025	<0.025	<0.0025	<0.0075
H29A	L602402	10/22/12	below liner	Swwall	**920**	<0.50	**920**	<0.0025	<0.025	<0.0025	<0.0075
H29A	L602402	10/22/12	below liner	Wbot	**1200**	300	**900**	**0.22**	**2.3**	**1.2**	**9.9**
H29A	L602402	10/22/12	below liner	WWall	**20002.3**	2.3	**20000**	<0.0025	<0.025	<0.0025	0.045
H29A	L618662	02/04/13	10	boring 1 [10-10.5']	21	--	21	<0.0025	--	--	--
H29A	L618662	02/04/13	15	boring 1 [15-17.5']	**2300**	--	**2300**	**0.012**	--	--	--
H29A	L618662	02/04/13	20	boring 1 [20-22.5']	**2100**	--	**2100**	**0.035**	--	--	--
H29A	L618662	02/04/13	25	boring 1 [25-27.5']	**1900**	--	**1900**	**0.047**	--	--	--
H29A	L618662	02/04/13	30	boring 1 [30-32.5']	**1800**	--	**1800**	**0.044**	--	--	--
H29A	L619008	02/05/13	35	boring 1 [35-37']	<400	--	<400	**0.046**	--	--	--
H29A	L619008	02/05/13	40	boring 1 [40-42']	**1200**	--	**1200**	**0.15**	--	--	--
H29A	L619008	02/05/13	45	boring 1 [45-47']	**2000**	--	**2000**	**0.16**	--	--	--
H29A	L619008	02/05/13	50	boring 1 [50-52']	**1600**	--	**1600**	**0.16**	--	--	--
H29A	L619086	02/05/13	10	boring 2 [10-12']	83	--	83	<0.0025	--	--	--
H29A	L619086	02/05/13	15	boring 2 [15-17']	310	--	310	**0.021**	--	--	--
H29A	L619086	02/05/13	20	boring 2 [20-22']	**660**	--	**660**	**0.035**	--	--	--
H29A	L619086	02/05/13	25	boring 2 [25-26.5']	**600**	--	**600**	**0.034**	--	--	--
H29A	L619086	02/05/13	30	boring 2 [30-32']	**730**	--	**730**	**0.048**	--	--	--
H29A	L619086	02/05/13	35	boring 2 [35-37']	102	--	102	**0.024**	--	--	--
H29A	L619086	02/05/13	40	boring 2 [40-42']	12	--	12	<0.0025	--	--	--
H29A	L619090	02/06/13	30	boring 3 [30-32']	4.7	--	4.7	<0.0025	--	--	--
H29A	L619090	02/06/13	10	boring 3 [10-12']	<400	--	<400	<0.0025	--	--	--
H29A	L619090	02/06/13	15	boring 3 [15-17']	**1300**	--	**1300**	**0.0042**	--	--	--
H29A	L619090	02/06/13	20	boring 3 [20-22']	**870**	--	**870**	<0.0025	--	--	--
H29A	L619090	02/06/13	25	boring 3 [25-27']	<400	--	<400	<0.0025	--	--	--
H29A	L619211	02/06/13	10	boring 4 [10-12']	28	--	28	<0.0025	--	--	--
H29A	L619211	02/06/13	15	boring 4 [15-17.5']	31	--	31	<0.0025	--	--	--
H29A	L619211	02/06/13	20	boring 4 [20-22']	20	--	20	<0.0025	--	--	--
H29A	L619211	02/06/13	25	boring 4 [25-25.5']	85	--	85	<0.0025	--	--	--
H29A	L619213	02/06/13	10	boring 5 [10-12']	<400	--	<400	<0.0025	--	--	--
H29A	L619213	02/06/13	15	boring 5 [15-17']	**1900**	--	**1900**	**0.057**	--	--	--
H29A	L619213	02/06/13	20	boring 5 [20-22']	**2300**	--	**2300**	**0.063**	--	--	--
H29A	L619213	02/06/13	25	boring 5 [25-27']	**1000**	--	**1000**	**0.057**	--	--	--
H29A	L619213	02/06/13	30	boring 5 [30-32']	**1300**	--	**1300**	**0.054**	--	--	--
H29A	L619214	02/06/13	10	boring 6 [10-12']	**710**	--	**710**	<0.0025	--	--	--
H29A	L619214	02/06/13	15	boring 6 [15-17']	**1700**	--	**1700**	**0.012**	--	--	--
H29A	L619214	02/06/13	20	boring 6 [20-22']	**1600**	--	**1600**	**0.061**	--	--	--
H29A	L619214	02/06/13	25	boring 6 [25-27']	**540**	--	**540**	**0.12**	--	--	--
H29A	L619214	02/06/13	30	boring 6 [30-32']	**650**	--	**650**	**0.072**	--	--	--
H29A	L619642	02/07/13	10	boring 7 [10-12']	<200	--	<200	**0.0064**	--	--	--
H29A	L619642	02/07/13	15	boring 7 [15-17']	**870**	--	**870**	**0.019**	--	--	--
H29A	L619642	02/07/13	20	boring 7 [20-22']	**620**	--	**620**	**0.069**	--	--	--
H29A	L619642	02/07/13	25	boring 7 [25-27']	220	--	220	**0.095**	--	--	--
H29A	L619642	02/07/13	30	boring 7 [30-32']	500	--	500	**0.082**	--	--	--
H29A	L619643	02/07/13	10	boring 8 [10-12']	76	--	76	**0.0049**	--	--	--
H29A	L619643	02/07/13	12	boring 8 [12-14']	480	--	480	<0.0025	--	--	--
H29A	L619643	02/07/13	15	boring 8 [15-17']	**780**	--	**780**	**0.07**	--	--	--
H29A	L619643	02/07/13	20	boring 8 [20-22']	**600**	--	**600**	**0.088**	--	--	--
H29A	L619644	02/07/13	10	boring 9 [10-12']	23	--	23	**0.0064**	--	--	--
H29A	L619644	02/07/13	12	boring 9 [12-14']	<20	--	<20	**0.016**	--	--	--
H29A	L619644	02/07/13	15	boring 9 [15-17']	**1300**	--	**1300**	**0.096**	--	--	--
H29A	L619644	02/07/13	20	boring 9 [20-22']	**720**	--	**720**	**0.086**	--	--	--
H29A	L619645	02/07/13	10	boring 10 [10-12']	65	--	65	**0.0053**	--	--	--
H29A	L619645	02/07/13	12	boring 10 [12-14']	140	--	140	**0.0037**	--	--	--
H29A	L619645	02/07/13	15	boring 10 [15-17']	**730**	--	**730**	**1.1**	--	--	--
H29A	L619645	02/07/13	20	boring 10 [20-22']	**550**	--	**550**	**0.021**	--	--	--
H29A	L619511	02/08/13	10	boring 11 [10-12']	**660**	--	**660**	<0.0025	--	--	--

Table 2
Historical Soil Sample Summary - TPH and BTEX
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

					TPH			Organic Compounds in Soil - BTEX			
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					500 (mg/kg)			0.0026	0.69	0.78	9.9
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)								1.2	190	5.8	58
Location	ESC Lab Report #	Sample Date	Start Depth (ft bgs)	Sample ID	TPH (Total Volatile and Extractable Hydrocarbons)	TPH Low Fraction (GRO)	TPH High Fraction (DRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes
H29A	L619511	02/08/13	15	boring 11 [15-17']	**1800**	--	**1800**	**1.8**	--	--	--
H29A	L619511	02/08/13	20	boring 11 [20-22']	**1600**	--	**1600**	**0.14**	--	--	--
H29A	L633327	04/29/13	40	boring 12 [40-42']	<200	--	<200	--	--	--	--
H29A	L633327	04/29/13	60	boring 12 [60-62']	<4	--	<4	--	--	--	--
H29A	L633483	04/30/13	70	boring 12 [70-72']	12	--	12	--	--	--	--
H29A	L633483	04/30/13	30	boring 13 [30-32']	**1400**	--	**1400**	--	--	--	--
H29A	L633483	04/30/13	45	boring 13 [45-47']	72	--	72	--	--	--	--
H29A	L633483	04/30/13	55	boring 13 [55-57']	69	--	69	--	--	--	--
H29A	L647320	07/16/13	30	boring W 01 [30-32']	<4	--	<4	<0.0025	<0.025	<0.0025	<0.0075
H29A	L647320	07/16/13	40	boring W 01 [40-42']	27	--	27	<0.0025	<0.025	<0.0025	<0.0075
H29A	L647741	07/18/13	25	boring PitE02 [25-27']	**960**	--	**960**	**0.085**	0.046	0.013	0.16
H29A	L647741	07/18/13	55	boring PitE02 [55-57']	12	--	12	<0.0025	<0.025	<0.0025	<0.0075
H29A	L648148	07/19/13	10	boring PitS01 [10-12']	**700**	--	**700**	**0.091**	<0.025	0.12	1.6
H29A	L648148	07/22/13	65	boring PitS01 [65-67']	25	--	25	<0.0025	<0.025	<0.0025	<0.0075
H29A	L648621	07/24/13	24	boring PitW 02 [24-26	220	--	220	<0.0025	<0.025	<0.0025	<0.0075
H29A	L648621	07/24/13	59	boring PitW 02 [59-61	9.7	--	9.7	**0.21**	**0.76**	0.14	1.4
H29A	L648616	07/24/13	30	boring SBW 01 [30-3	12	<0.50	12	<0.0025	<0.025	<0.0025	<0.0075
H29A	L648911	07/25/13	75	boring SBE01 [75-77']	50	<0.50	50	<0.0025	<0.025	<0.0025	0.0086
H29A	L649481	07/26/13	65	boring SBS01 [65-67']	**2002.2**	2.2	**2000**	**0.11**	0.11	0.016	0.14
H29A	L873893	11/16/16	10	H29A (SVSVEN01) 10	**873.35**	1.35	**872**	**0.0107**	0.0169	0.00321	0.00954
H29A	L873893	11/16/16	25	H29A (SVSVEN01) 25	27.651	0.251	27.4	0.0026	0.00741	0.003	0.00331
H29A	L873893	11/16/16	25	H29A (SBSVES01) 25	**1261.85**	1.85	**1260**	**0.0795**	0.14	0.0278	0.15
H29A	L873893	11/16/16	10	H29A (SVSVES01) 10	**1062.29**	2.29	**1060**	**0.0462**	0.0244	0.00778	0.0272
H29A	L873893	11/16/16	50	H29A (SVSVES01) 50	332.499	0.499	332	**0.024**	0.0368	0.00593	0.0308
H29A	L873893	11/16/16	25	H29A (SBSVEW02) 2	**829.98**	1.98	**828**	**0.0704**	0.151	0.032	0.165
H29A	L873893	11/16/16	35	H29A (SVSVEW02) 3	**926.42**	3.42	**923**	**0.0987**	0.0907	0.01	0.0755
H29A	L873893	11/16/16	60	H29A (SVSVEW02) 6	16.754	0.154	16.6	**0.0033**	0.0118	0.0046	0.0054
H29A	L873863	11/17/16	15	H29ASVEN03 (15-17)	**1253.25**	3.25	**1250**	**0.33**	0.241	0.32	3.15
H29A	L873863	11/17/16	40	H29ASVEN03 (40-42)	149.761	0.761	149	**0.00466**	0.0092	0.00236	0.00791
H29A	L873863	11/17/16	45	H29ASVEN03 (45-47)	24.987	0.487	24.5	0.00252	<0.005	0.00169	0.00402
H29A	L915926	06/13/17	30	SVE E01A [30-32']	**2303.87**	3.87	**2300**	**0.0884**	0.105	0.014	0.0831
H29A	L915926	06/13/17	15	SVE E02 (15-17')	**1891.87**	1.87	**1890**	**0.0185**	0.0471	0.0119	0.0404
H29A	L916700	06/14/17	10	SVE E02 (10')	<18.1	<0.1	18	**0.00571**	0.00805	0.00194	0.00418
H29A	L916700	06/14/17	15	SVE E02 (15')	**2402.24**	2.24	**2400**	**0.039**	0.07	0.0228	0.0635
H29A	L916700	06/14/17	20	SVE E02 (20')	**2552.45**	2.45	**2550**	**0.119**	0.14	0.0382	0.25
H29A	L916700	06/14/17	25	SVE E02 (25')	**2122.69**	2.69	**2120**	**0.155**	0.167	0.0449	0.233
H29A	L916700	06/14/17	30	SVE E02 (30')	**1092.81**	2.81	**1090**	**0.0856**	0.168	0.0282	0.153
H29A	L916700	06/14/17	60	SVE E03 (60')	<33.2	<0.1	33.1	**0.00686**	0.0087	0.00225	0.0043
H29A	L915926	06/13/17	10	SVE E03 [10']	92.777	0.977	91.8	**0.0104**	0.0251	0.00571	0.0174
H29A	L915926	06/13/17	15	SVE E03 [15']	**2122.28**	2.28	**2120**	**0.0126**	0.0212	0.00806	0.0281
H29A	L915926	06/13/17	20	SVE E03 [20']	**2612.74**	2.74	**2610**	**0.0335**	0.0416	0.0132	0.0493
H29A	L915926	06/13/17	25	SVE E03 [25']	**2711.9**	1.9	**2710**	**0.0449**	0.0535	0.0111	0.0612
H29A	L915926	06/13/17	30	SVE E03 [30']	**2283.67**	3.67	**2280**	**0.0911**	0.0993	0.0217	0.138
H29A	L915926	06/13/17	35	SVE E03 [35']	**1822.7**	2.7	**1820**	**0.0506**	0.0859	0.0137	0.076
H29A	L915926	06/13/17	40	SVE E03 [40']	**1633.35**	3.35	**1630**	**0.08**	0.123	0.0148	0.092
H29A	L915926	06/13/17	5	SVE E03 [5']	279.666	0.666	279	**0.00784**	0.0168	0.00395	0.0114
H29A	L916700	06/14/17	15	SVE S03A (15-17)	**1552.9**	2.9	**1550**	**0.0637**	0.128	0.0312	0.15
H29A	L916700	06/14/17	15	SVE MID01 (15')	**1662.27**	2.27	**1660**	**0.0698**	0.0815	0.0221	0.0668
H29A	L916700	06/14/17	20	SVE MID01 (20')	**1462.33**	2.33	**1460**	**0.066**	0.0812	0.0211	0.114
H29A	L916700	06/14/17	25	SVE MID01 (25')	**1633.44**	3.44	**1630**	**0.148**	0.188	0.0211	0.129
H29A	L916700	06/14/17	30	SVE MID01 (30')	<7.49	3.49	<4.0	**0.182**	**3.37**	0.0346	0.234
H29A	L916700	06/14/17	35	SVE MID01 (35')	**847.74**	2.74	**845**	**0.0958**	0.17	0.0235	0.127
H29A	L916700	06/14/17	40	SVE MID01 (40')	**1032.86**	2.86	**1030**	**0.143**	0.183	0.0262	0.172
H29A	L916700	06/15/17	10	SVE W01 (10')	<801.72	1.72	<800	**0.0244**	0.0504	0.0107	0.0325
H29A	L916700	06/15/17	15	SVE W01 (15')	101.216	0.216	101	**0.00264**	0.0109	0.00391	0.0042
H29A	L916700	06/15/17	20	SVE W01 (20')	24.709	0.309	24.4	**0.00266**	0.0109	0.00416	0.00393
H29A	L916700	06/15/17	25	SVE W01 (25')	7.703	0.353	7.35	0.00236	0.00918	0.00404	0.00447
H29A	L916700	06/15/17	30	SVE W01 (30')	30.478	0.778	29.7	**0.00288**	0.0109	0.00376	0.00418
H29A	L916700	06/15/17	10	SVE W01A (10')	**1261.82**	1.82	**1260**	**0.0195**	0.0392	0.007386	0.0234
H29A	L916700	06/15/17	15	SVE W01A (15')	**1131.54**	1.54	**1130**	**0.0177**	0.0339	0.00667	0.0199
H29A	L916700	06/15/17	20	SVE W01A (20')	<4.309	0.309	<4.0	**0.00696**	0.00861	0.00319	0.0035

Table 2
Historical Soil Sample Summary - TPH and BTEX
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

					TPH			Organic Compounds in Soil - BTEX			
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					500 (mg/kg)			0.0026	0.69	0.78	9.9
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)								1.2	190	5.8	58
Location	ESC Lab Report #	Sample Date	Start Depth (ft bgs)	Sample ID	TPH (Total Volatile and Extractable Hydrocarbons)	TPH Low Fraction (GRO)	TPH High Fraction (DRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes
H29A	L916700	06/15/17	15	SVE W03 (15')	**1342.61**	2.61	**1340**	**2.19**	0.109	0.0265	0.112
H29A	L916700	06/15/17	20	SVE W03 (20')	**1843.52**	3.52	**1840**	**0.105**	0.0878	0.0215	0.138
H29A	L916700	06/15/17	25	SVE W03 (25')	**1622.54**	2.54	**1620**	**0.0795**	0.115	0.0224	0.123
H29A	L916700	06/15/17	30	SVE W03 (30')	<802.17	2.17	<800	**0.0495**	0.0799	0.0176	0.0768
H29A	L916700	06/15/17	35	SVE W03 (35')	**1402.78**	2.78	**1400**	**0.13**	0.112	0.0232	0.13
H29A	L916700	06/15/17	40	SVE W03 (40')	**895.85**	2.85	**893**	**0.0926**	0.14	0.0216	0.12

Notes

Greater than COGCC Table 915-1 Protection of Groundwater Soil Screening Level Concentrations (January 15, 2021) (reference: 2 CCR 404-915-1)

< = Not detected at the Reporting Limit (or Method Detection Limit).
Reporting Limits for Chromium (VI), Selenium, Silver, Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene are higher than GWSSLs therefore non-detects are shown as less than Method

-- = Sample not analyzed for this constituent
BTEX = benzene, ethylbenzene, toluene, and total xylenes
COGCC = Colorado Oil and Gas Conservation Commission
DRO = Diesel Range Organics
ft bgs = feet below ground surface
GRO = Gasoline Range Organics
GWSSL = Protection of Groundwater Soil Screening Level Concentration
mg/kg = milligrams per kilogram
TPH = Total Petroleum Hydrocarbons

Table 3
Historical Soil Sample Summary - PAHs
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

					PAHs in Soil														
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					0.55	5.8	0.011	0.3	2.9	0.24	9	0.096	5.9	0.54	0.98	0.006	0.019	0.0038	1.3
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					360	1800	1.1	1.1	11	0.11	110	0.11	240	240	1.1	18	24	2	180
Location	ESC Lab Report #	Sample Date	Start Depth (ft bgs)	Sample ID	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1, 2, 3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Pyrene
H29A	L602402	10/22/12	below liner	Center	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	0.22	<0.12	**0.32**	**0.76**	**0.6**	<0.12
H29A	L648616	07/24/13	30	boring SBW 01 [30-3	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	--	--	<0.020	<0.0060
H29A	L648911	07/25/13	75	boring SBE01 [75-77']	<0.12	0.022	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.12	<0.0060	--	--	**2.6**	<0.0060
H29A	L649481	07/26/13	65	boring SBS01 [65-67']	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	--	--	<2.0	<0.60

Notes

Greater than COGCC Table 915-1 Protection of Groundwater Soil Screening Level Concentrations (January 15, 2021) (reference: 2 CCR 404-915-1)

< = Not detected at the Reporting Limit (or Method Detection Limit).
Reporting Limits for Chromium (VI), Selenium, Silver, Naphthalene, 1-Methylnaphthalene, and 2-

-- = Sample not analyzed for this constituent
COGCC = Colorado Oil and Gas Conservation Commission
ft bgs = feet below ground surface
GWSSL = Protection of Groundwater Soil Screening Level Concentration
mg/kg = milligrams per kilogram
PAHs = polynuclear aromatic hydrocarbons

Table 4
Historical Soil Sample Summary - Inorganics
H29A Pit Assessment
Caerus Piceance, LLC
Parachute, Colorado

					Soil Suitability for Reclamation				Metals in Soil									
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)					<4.0 mmhos/cm	<6	6 - 8.3	2 mg/L	0.29	82	0.38	0.0007	46	14	26	0.26	0.8	370
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS (mg/kg) (COGCC Table 915-1)									0.68	15000	71	0.3	3100	400	1500	390	390	23000
Location	ESC Lab Report #	Sample Date	Start Depth (ft bgs)	Sample ID	Electrical Conductivity (EC) (by saturated paste method)	Sodium Adsorption Ratio (SAR) by saturated paste method)	pH (by saturated paste method)	Boron (hot water soluble soil extract)	Arsenic	Barium	Cadmium	Chromium (VI)	Copper	Lead	Nickel	Selenium	Silver	Zinc
H29A	L602402	10/22/12	below liner	Center	1.2	**26**	8.2	--	**26**	**1900**	<0.25	<2.0	27	**20**	14	**4.2**	<2.5	50.0
H29A	L648616	07/24/13	30	boring SBW 01 [30-3	2.8	1.6	7.8	--	6.8	**310**	<0.25	<0.50	14	7.9	9.7	<1	<0.50	37.0
H29A	L648911	07/25/13	75	boring SBE01 [75-77']	2.2	3.4	8.1	--	**15**	**240**	0.3	<2	24	13	16	**2.5**	<0.50	54.0
H29A	L649481	07/26/13	65	boring SBS01 [65-67']	1.8	2.1	**9.4**	--	**50**	**300**	**0.64**	<2	43	**27**	18	**2.7**	<0.50	54.0

Notes

Greater than COGCC Table 915-1 Protection of Groundwater Soil Screening Level Concentrations (January 15, 2021) (reference: 2 CCR 404-915-1)

< = Not detected at the Reporting Limit (or Method Detection Limit).
Reporting Limits for Chromium (VI), Selenium, Silver, Naphthalene, 1-Methylnaphthalene, and 2-

-- = Sample not analyzed for this constituent
BTEX = benzene, ethylbenzene, toluene, and total xylenes
COGCC = Colorado Oil and Gas Conservation Commission
ft bgs = feet below ground surface
GWSSL = Protection of Groundwater Soil Screening Level Concentration
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
mmhos/cm = millimhos per centimeter