CONCHO

February 3, 2020

Oil Conservation Division, District 1
1625 N. French Dr.
Hobbs, NM 88240

Kelsey Wade
Bureau of Land Management, CFO
620 E. Green Street
Carlsbad, NM 88220

Work Plan

Emerald Federal #001
RP#: 1RP-5725
DOR: September 16, 2019
GPS: 32.4007378 -103.6690369
Unit Letter M, Section 10, Township 22 South, Range 32 East
Lea County, New Mexico

To Whom It May Concern,

COG Operating, LLC (COG) is pleased to submit the following work plan in response to a release that occurred due to a lightning strike at the Emerald Federal #001 tank battery. The release is located in Unit Letter M, Section 10, Township 22 South and Range 33 East in Lea County, New Mexico. More specifically the latitude and longitude for the release are 32.4007378 North and -103.669039 West.

BACKGROUND

The release was discovered on September 16, 2019. A C-141 initial report was submitted to the New Mexico Oil Conservation Division (NMOCD) and the Bureau of Land Management (BLM). The initial C-141 is presented in Appendix A. A lightning strike resulted in the release of approximately one-hundred and twenty-five (125) barrels (bbls) of produced water and five (5) bbls of oil.

On January 13, 2020, a hand auger was utilized to collect soil samples in an attempt to delineate the impacted area. Upon receipt of analytical results from the initial delineation activities it was determined that further vertical delineation would be required. On January 22, 2020, a trackhoe was utilized to complete vertical delineation of the impacted area.

GROUNDWATER AND REGULATORY FRAMEWORK

According to the United States Geological Survey (USGS) the nearest water well (322314103384301) is located approximately 1.4 miles southeast of the release point and indicates that groundwater in the project vicinity is approximately three-hundred and eighty-two (382) feet below ground surface (BGS). The water well information is shown in Appendix B.

A risk based evaluation and site determinations were performed in accordance to the New Mexico Oil Conservation Division (NMOCD) Rule (Title 19 Chapter 15 Part 29) for releases on oil and gas development and production in New Mexico (effective August 14, 2018). According to the site characterization evaluation, no other receptors (water wells, playas, karst, water course, lake beds or ordinance boundaries) were located within each specific boundaries or distance from the site. The groundwater data and the site characterization evaluation data is summarized in Appendix B. The delineation and closure criteria are listed below:

General Site Characterization and Groundwater:

Site Characterization	Average Groundwater Depth (ft.)
None Located	>100 feet

Delineation and Closure Criteria:

Recommended Remedial Action Levels (RRALs)	
Chlorides	20,000 mg/kg
TPH (GRO and DRO and MRO)	2,500 mg/kg
TPH (GRO and DRO)	1,000 mg/kg
Benzene	10 mg/kg
Total BTEX	50 mg/kg

PROPOSED WORK PLAN

- The impacted area in the vicinity of sample locations AH-1 and AH-3 will be excavated to a depth of three (3) feet BGS.
- The impacted area in the vicinity of sample location AH-2 will be excavated to a depth of one (1) foot BGS.
- All of the excavated material will be hauled to an NMOCD approved solid waste disposal facility.
- The excavation will be backfilled with clean “like” material and contoured to match the surrounding terrain.

SAMPLING PLAN

Once the excavation is complete, confirmation soil samples will be collected from the excavated areas. To collect representative samples, composite samples (5-point composite) will be collected every 200 square feet from the bottom and sidewalls of the excavated areas. The soil samples will be laboratory analyzed for the constituents of concern. Discrete soil samples will be collected from the excavation if any "hot spots" are encountered during the excavation.

REMEDIATION TIMEFRAME AND ESTIMATED VOLUME

The remediation will be performed 90 days after the work plan has been approved. Approximately two-hundred and ninety-four (294) cubic yards of soil will be excavated and hauled offsite for proper disposal.

SITE RECLAMATION AND RESTORATION

Upon completion of the remediation the excavation will be backfilled with top soil and contoured to match the surrounding terrain. The surface will be left in a rough condition to approximate natural surface deviations. The site will be mechanically seeded with the BLM #2 seed mixture once proper seasonal conditions exist.

Should you have any questions or concerns on the proposed remediation activities, please do not hesitate to contact me.

Sincerely,

Sincerely,

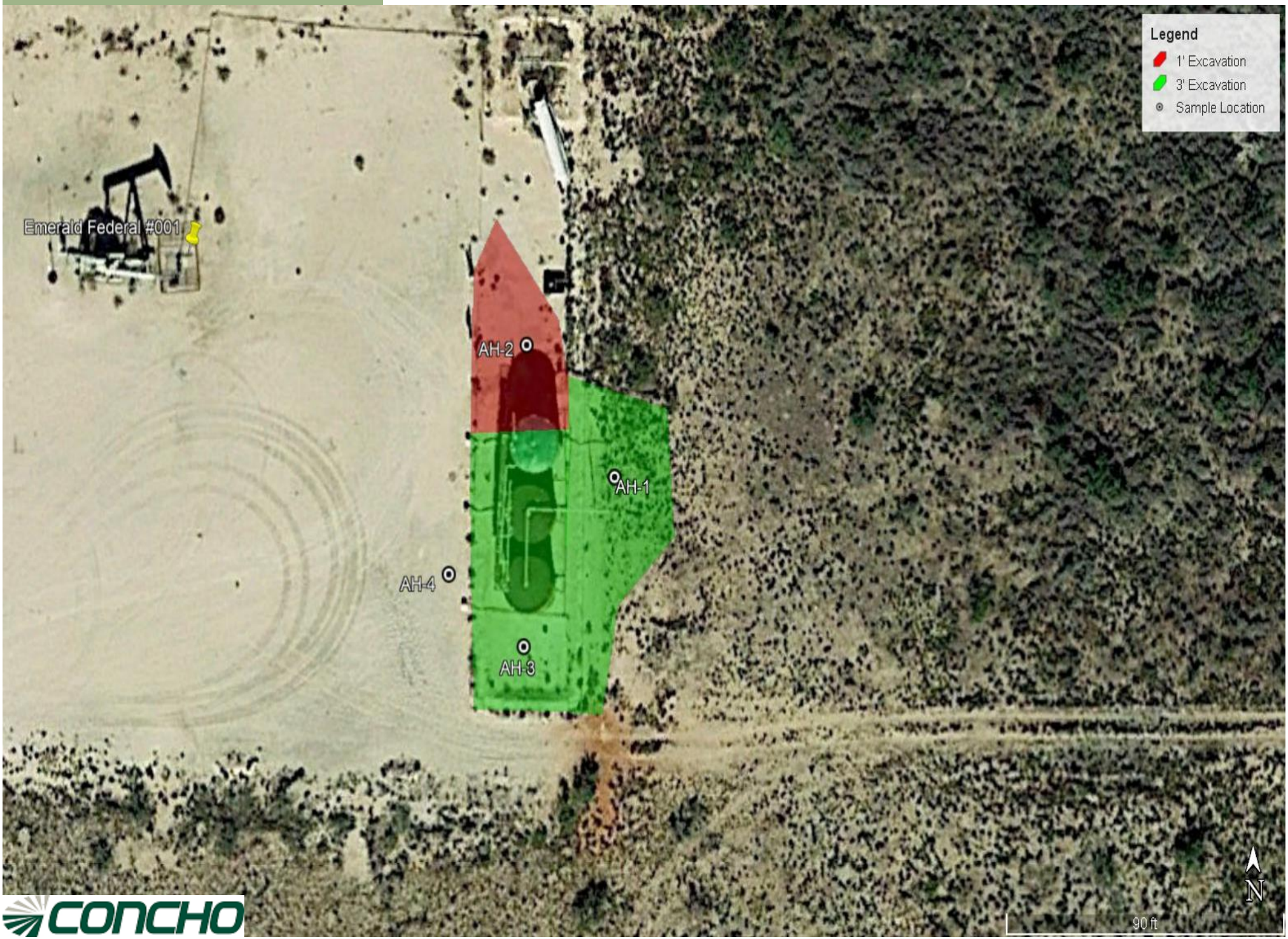
Sheldon Hitchcock

Sheldon L. Hitchcock
HSE Coordinator
slhitchcock@concho.com

FIGURES

September 16, 2019

Emerald Federal #001



CONCHO

TABLES

Table 1
COG Operating LLC.
Emerald Federal #001
Lea County, New Mexico

Sample ID	Sample Depth (ft)	Sample Date	Soil Status		TPH (mg/kg)							Benzene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
			In-Situ	Removed	GRO	DRO	MRO	*Total*	GRO	DRO	*Total*			
NMOCD RRAL Limits (mg/kg)					**-**	**-**	**-**	**2,500**	**-**	**-**	**1,000**	**10**	**50**	**20,000**
AH-1	0-0.5	1/13/2020	X		<49.9	57.8	<57.8	57.8	<49.9	57.8	57.8	<0.002	<0.002	2,160.0
AH-1	1	1/13/2020	X		<50.2	66	<50.2	66.0	<50.2	66	66.0	<0.002	<0.002	885.0
AH-1	2	1/13/2020	X		<50.3	117	<50.3	117.0	<50.3	117	117.0	<0.002	<0.002	1,150.0
AH-1	3	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	560.0
AH-1	4	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	592.0
AH-1	6	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	192.0
AH-2	0-0.5	1/13/2020	X		<50.3	182	<50.3	182.0	<50.3	182	182.0	<0.002	<0.002	28.5
AH-2	1	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	64.0
AH-2	2	1/22/2020	X		<10.0	14.8	<10.0	14.8	<10.0	14.8	14.8	<0.050	<0.300	80.0
AH-2	3	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	32.0
AH-2	4	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	80.0
AH-2	6	1/22/2020	X		<10.0	74.4	26.0	100.4	<10.0	74.4	74.4	<0.050	<0.300	32.0
AH-3	0.0.5	1/13/2020	X		<50.3	579	117	696.0	<50.3	579	579.0	<0.002	<0.002	808.0
AH-3	1	1/13/2020	X		<50.3	359	71.9	430.9	<50.3	359	359.0	<0.002	0.003	480.0
AH-3	1	1/22/2020	X		<10.0	102	40.7	142.7	<10.0	102	102.0	<0.050	<0.300	3,000.0
AH-3	2	1/22/2020	X		<10.0	173	112	285.0	<10.0	173	173.0	<0.050	<0.300	2,880.0
AH-3	3	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	592.0
AH-3	4	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	160.0
AH-3	6	1/22/2020	X		<10.0	18.3	<10.0	18.3	<10.0	18.3	18.3	<0.050	<0.300	704.0
AH-3	8	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	416.0
AH-3	10	1/22/2020	X		<10.0	<10.0	<10.0	0.0	<10.0	<10.0	0.0	<0.050	<0.300	144.0
AH-4	0-0.5	1/13/2020	X		<50.0	77.4	<50.0	77.4	<50.0	77.4	77.4	<0.002	<0.002	259.0
AH-4	1	1/13/2020	X		<50.1	<50.1	<50.1	0.0	<50.1	<50.1	0.0	<0.002	<0.002	230.0

Proposed Excavation Depth

(#) Not Analyzed

APPENDIX A

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

State of New Mexico
Energy Minerals and Natural Resources Department

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

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

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party	COG Operating, LLC	OGRID	229137
Contact Name	Jennifer Knowlton	Contact Telephone	(432) 683-7443
Contact email	jknowlton@concho.com	Incident # *(assigned by OCD)*	
Contact mailing address	600 West Illinois Avenue, Midland, Texas 79701		

Location of Release Source

Latitude 32.40059 Longitude -103.6687
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Emerald Federal #001	Site Type	Tank Battery
Date Release Discovered	September 16, 2019	API# *(if applicable)*	30-025-31976

Unit Letter	Section	Township	Range	County
M	10	22S	32E	Lea

Surface Owner: ☐ State ■ Federal ☐ Tribal ☐ Private (*Name:* _____)

Nature and Volume of Release

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

■ Crude Oil	Volume Released (bbls) 5	Volume Recovered (bbls) 0
■ Produced Water	Volume Released (bbls) 125	Volume Recovered (bbls) 0
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	■ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

The release was caused by a lightning strike resulting in a fire.
The release was within the lined facility and liner was compromised. A vacuum truck was dispatched to remove all freestanding fluids. Concho will evaluate the site to determine if we may commence remediation immediately or delineate any possible impact from the release and we will present a remediation work plan to the NMOCD for approval prior to any significant remediation activities.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? The volume released was greater than 25 barrels and a fire was involved.

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?

Immediate notice was given by DeAnn Grant via e-mail September 16, 2019 at 1:07 pm to emnrd-ocd-district1spills@state.nm.us and Jim Amos.

Initial Response

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

- ☒ The source of the release has been stopped.
- ☒ The impacted area has been secured to protect human health and the environment.
- ☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.
- ☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

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

Printed Name: Sheldon L. Hitchcock Title: HSE Coordinator

Signature: Sheldon Hitchcock Date: 9/18/2019

email: slhitchcock@concho.com Telephone: 575-746-2010

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

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

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

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

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

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

State of New Mexico
Oil Conservation Division

Incident ID	
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: Sheldon L. Hitchcock Title: HSE Coordinator

Signature: Sheldon Hitchcock Date: 2/3/2020

email: slhitchcock@concho.com Telephone: 575-746-2010

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

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

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

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

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

☐ Extents of contamination must be fully delineated.

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

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

Printed Name: Sheldon L. Hitchcock Title: HSE Coordinator

Signature: Sheldon Hitchcock Date: 2/3/2020

email: slhitchcock@concho.com Telephone: 575-746-2010

OCD Only

Received by: _____ Date: _____

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

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
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: Sheldon L. Hitchcock Title: HSE Coordinator

Signature: Sheldon Hitchcock Date: 2/3/2020

email: slhitchcock@concho.com Telephone: 575-746-2010

OCD Only

Received by: _____ Date: _____

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

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

APPENDIX B

CONCHO

ArcGIS Web Map

Legend

OSE PODs

- Active
- Pending
- Unknown

Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Mine Workings

Karst Occurance Areas

- High
- Low
- Medium

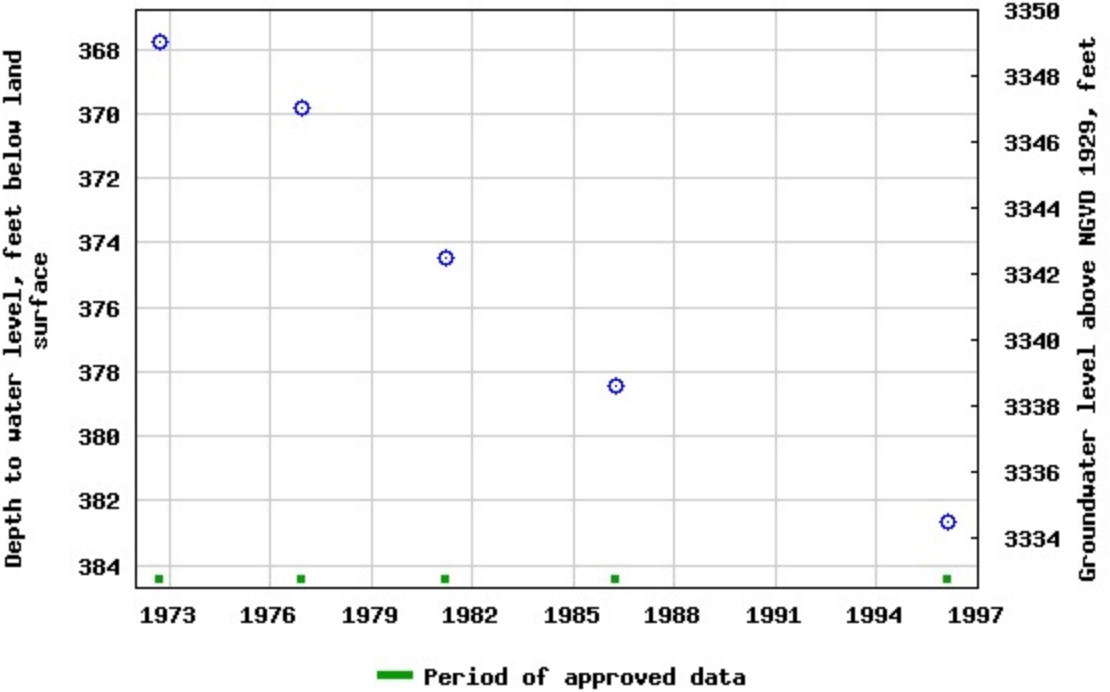
Emerald Federal #001

340

360

USGS

USGS 322314103384301 22S.32E.14.32322



APPENDIX C

Certificate of Analysis Summary 648862

COG Operating LLC, Artesia, NM

Project Name: Emerald Fed #1

Project Id:

Contact: Sheldon Hitchcock

Project Location: Lea, NM

Date Received in Lab: Mon Jan-13-20 03:45 pm

Report Date: 16-JAN-20

Project Manager: Jessica Kramer

Analysis Requested													
	Lab Id:	648862-001		648862-002		648862-003		648862-004		648862-005		648862-006	
	Field Id:	AH- 1 (0-0.5')		AH- 1 (1')		AH- 1 (2')		AH- 2 (0-0.5')		AH- 3 (0-0.5')		AH- 3 (1')	
	Depth:	0-0.5 ft		1- ft		2- ft		0-0.5 ft		0-0.5 ft		1- ft	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jan-13-20 13:30		Jan-13-20 13:32		Jan-13-20 13:34		Jan-13-20 13:40		Jan-13-20 13:45		Jan-13-20 13:47	
BTEX by EPA 8021B	***Extracted:***	Jan-13-20 17:30		Jan-13-20 17:30		Jan-13-20 17:30		Jan-13-20 17:30		Jan-13-20 17:30		Jan-13-20 17:30	
	Analyzed:	Jan-14-20 08:34		Jan-14-20 08:53		Jan-14-20 09:12		Jan-14-20 09:31		Jan-14-20 09:50		Jan-14-20 10:10	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Benzene		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202
Toluene		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202
Ethylbenzene		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202
m,p-Xylenes		<0.00404	0.00404	<0.00404	0.00404	<0.00402	0.00402	<0.00403	0.00403	<0.00402	0.00402	<0.00404	0.00404
o-Xylene		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	0.00377	0.00202
Total Xylenes		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	0.00377	0.00202
Total BTEX		<0.00202	0.00202	<0.00202	0.00202	<0.00201	0.00201	<0.00202	0.00202	<0.00201	0.00201	0.00377	0.00202
Chloride by EPA 300	***Extracted:***	Jan-13-20 18:00		Jan-13-20 18:00		Jan-13-20 18:00		Jan-13-20 18:00		Jan-13-20 18:00		Jan-13-20 18:00	
	Analyzed:	Jan-14-20 00:02		Jan-14-20 00:08		Jan-14-20 00:14		Jan-14-20 00:20		Jan-14-20 00:26		Jan-14-20 00:31	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		2160	50.4	885	50.2	1150	50.1	28.5	10.1	808	50.0	480	10.1
TPH By SW8015 Mod	***Extracted:***	Jan-14-20 11:00		Jan-14-20 11:00		Jan-14-20 11:00		Jan-14-20 11:00		Jan-14-20 11:00		Jan-14-20 11:00	
	Analyzed:	Jan-14-20 16:10		Jan-14-20 16:30		Jan-14-20 16:30		Jan-14-20 16:51		Jan-14-20 16:51		Jan-14-20 17:11	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Gasoline Range Hydrocarbons		<49.9	49.9	<50.2	50.2	<50.3	50.3	<50.3	50.3	<50.3	50.3	<50.3	50.3
Diesel Range Organics		57.8	49.9	66.0	50.2	117	50.3	182	50.3	579	50.3	359	50.3
Motor Oil Range Hydrocarbons (MRO)		<49.9	49.9	<50.2	50.2	<50.3	50.3	<50.3	50.3	117	50.3	71.9	50.3
Total TPH		57.8	49.9	66.0	50.2	117	50.3	182	50.3	696	50.3	431	50.3

Jessica Kramer
Project Assistant

Certificate of Analysis Summary 648862

COG Operating LLC, Artesia, NM

Project Name: Emerald Fed #1

Project Id:

Contact: Sheldon Hitchcock

Project Location: Lea, NM

Date Received in Lab: Mon Jan-13-20 03:45 pm

Report Date: 16-JAN-20

Project Manager: Jessica Kramer

Analysis Requested									
	Lab Id:	648862-007		648862-008					
	Field Id:	AH- 4 (0-0.5')		AH- 4 (1')					
	Depth:	0-0.5 ft		1- ft					
	Matrix:	SOIL		SOIL					
	Sampled:	Jan-13-20 13:55		Jan-13-20 14:00					
BTEX by EPA 8021B	***Extracted:***	Jan-13-20 17:30		Jan-13-20 17:30					
	Analyzed:	Jan-14-20 02:00		Jan-14-20 02:17					
	Units/RL:	mg/kg	RL	mg/kg	RL				
Benzene		<0.00202	0.00202	<0.00202	0.00202				
Toluene		<0.00202	0.00202	<0.00202	0.00202				
Ethylbenzene		<0.00202	0.00202	<0.00202	0.00202				
m,p-Xylenes		<0.00403	0.00403	<0.00404	0.00404				
o-Xylene		<0.00202	0.00202	<0.00202	0.00202				
Total Xylenes		<0.00202	0.00202	<0.00202	0.00202				
Total BTEX		<0.00202	0.00202	<0.00202	0.00202				
Chloride by EPA 300	***Extracted:***	Jan-13-20 18:00		Jan-13-20 18:00					
	Analyzed:	Jan-14-20 01:09		Jan-14-20 01:28					
	Units/RL:	mg/kg	RL	mg/kg	RL				
Chloride		259	9.98	230	10.0				
TPH By SW8015 Mod	***Extracted:***	Jan-14-20 11:00		Jan-14-20 11:00					
	Analyzed:	Jan-14-20 17:11		Jan-14-20 17:31					
	Units/RL:	mg/kg	RL	mg/kg	RL				
Gasoline Range Hydrocarbons		<50.0	50.0	<50.1	50.1				
Diesel Range Organics		77.4	50.0	<50.1	50.1				
Motor Oil Range Hydrocarbons (MRO)		<50.0	50.0	<50.1	50.1				
Total TPH		77.4	50.0	<50.1	50.1				

Jessica Kramer
Project Assistant

Analytical Report 648862

for

COG Operating LLC

Project Manager: Sheldon Hitchcock

Emerald Fed #1

16-JAN-20

Collected By: Client

1089 N Canal Street
Carlsbad, NM 88220

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-19-30), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2019-058), North Carolina (681), Arkansas (19-037-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (TX104704295-19-22), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-19-16)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-19-21)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-19)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-19-5)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Tampa: Florida (E87429), North Carolina (483)

16-JAN-20

Project Manager: **Sheldon Hitchcock**
COG Operating LLC
2407 Pecos Avenue
Artesia, NM 88210

Reference: XENCO Report No(s): **648862**
Emerald Fed #1
Project Address: Lea, NM

Sheldon Hitchcock:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 648862. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 648862 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Jessica Kramer

Jessica Kramer
Project Assistant

Sample Cross Reference 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
AH- 1 (0-0.5')	S	01-13-20 13:30	0 - 0.5 ft	648862-001
AH- 1 (1')	S	01-13-20 13:32	1 ft	648862-002
AH- 1 (2')	S	01-13-20 13:34	2 ft	648862-003
AH- 2 (0-0.5')	S	01-13-20 13:40	0 - 0.5 ft	648862-004
AH- 3 (0-0.5')	S	01-13-20 13:45	0 - 0.5 ft	648862-005
AH- 3 (1')	S	01-13-20 13:47	1 ft	648862-006
AH- 4 (0-0.5')	S	01-13-20 13:55	0 - 0.5 ft	648862-007
AH- 4 (1')	S	01-13-20 14:00	1 ft	648862-008

CASE NARRATIVE

Client Name: COG Operating LLC

Project Name: Emerald Fed #1

Project ID:
Work Order Number(s): *648862*

Report Date: *16-JAN-20*
Date Received: *01/13/2020*

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3113147 Chloride by EPA 300
Lab Sample ID 648862-007 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 648862-007, -008.
The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3113153 BTEX by EPA 8021B
Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Batch: LBA-3113154 BTEX by EPA 8021B
Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-001	Date Collected:	01.13.20 13.30	Sample Depth:	0 - 0.5 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**2160**	50.4	mg/kg	01.14.20 00.02		5

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	01.14.20 16.10	U	1
Diesel Range Organics	C10C28DRO	**57.8**	49.9	mg/kg	01.14.20 16.10		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	01.14.20 16.10	U	1
Total TPH	PHC635	**57.8**	49.9	mg/kg	01.14.20 16.10		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.14.20 16.10	
o-Terphenyl	84-15-1	110	%	70-135	01.14.20 16.10	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-001	Date Collected:	01.13.20 13.30	Sample Depth:	0 - 0.5 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.14.20 08.34	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.14.20 08.34	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	109	%	70-130	01.14.20 08.34	
1,4-Difluorobenzene	540-36-3	108	%	70-130	01.14.20 08.34	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-002	Date Collected:	01.13.20 13.32	Sample Depth:	1 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**885**	50.2	mg/kg	01.14.20 00.08		5

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.2	50.2	mg/kg	01.14.20 16.30	U	1
Diesel Range Organics	C10C28DRO	**66.0**	50.2	mg/kg	01.14.20 16.30		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.2	50.2	mg/kg	01.14.20 16.30	U	1
Total TPH	PHC635	**66.0**	50.2	mg/kg	01.14.20 16.30		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.14.20 16.30	
o-Terphenyl	84-15-1	111	%	70-135	01.14.20 16.30	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-002	Date Collected:	01.13.20 13.32	Sample Depth:	1 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.14.20 08.53	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.14.20 08.53	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	112	%	70-130	01.14.20 08.53	
1,4-Difluorobenzene	540-36-3	105	%	70-130	01.14.20 08.53	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (2')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-003	Date Collected:	01.13.20 13.34	Sample Depth:	2 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**1150**	50.1	mg/kg	01.14.20 00.14		5

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.3	50.3	mg/kg	01.14.20 16.30	U	1
Diesel Range Organics	C10C28DRO	**117**	50.3	mg/kg	01.14.20 16.30		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.14.20 16.30	U	1
Total TPH	PHC635	**117**	50.3	mg/kg	01.14.20 16.30		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	114	%	70-135	01.14.20 16.30	
o-Terphenyl	84-15-1	113	%	70-135	01.14.20 16.30	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 1 (2')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-003	Date Collected:	01.13.20 13.34	Sample Depth:	2 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.14.20 09.12	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.14.20 09.12	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	110	%	70-130	01.14.20 09.12	
1,4-Difluorobenzene	540-36-3	106	%	70-130	01.14.20 09.12	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 2 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-004	Date Collected:	01.13.20 13.40	Sample Depth:	0 - 0.5 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**28.5**	10.1	mg/kg	01.14.20 00.20		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.3	50.3	mg/kg	01.14.20 16.51	U	1
Diesel Range Organics	C10C28DRO	**182**	50.3	mg/kg	01.14.20 16.51		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.3	50.3	mg/kg	01.14.20 16.51	U	1
Total TPH	PHC635	**182**	50.3	mg/kg	01.14.20 16.51		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	116	%	70-135	01.14.20 16.51	
o-Terphenyl	84-15-1	121	%	70-135	01.14.20 16.51	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 2 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-004	Date Collected:	01.13.20 13.40	Sample Depth:	0 - 0.5 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.14.20 09.31	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.14.20 09.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	111	%	70-130	01.14.20 09.31	
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.14.20 09.31	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 3 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-005	Date Collected:	01.13.20 13.45	Sample Depth:	0 - 0.5 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**808**	50.0	mg/kg	01.14.20 00.26		5

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.3	50.3	mg/kg	01.14.20 16.51	U	1
Diesel Range Organics	C10C28DRO	**579**	50.3	mg/kg	01.14.20 16.51		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	**117**	50.3	mg/kg	01.14.20 16.51		1
Total TPH	PHC635	**696**	50.3	mg/kg	01.14.20 16.51		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	110	%	70-135	01.14.20 16.51	
o-Terphenyl	84-15-1	109	%	70-135	01.14.20 16.51	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 3 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-005	Date Collected:	01.13.20 13.45	Sample Depth:	0 - 0.5 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	01.14.20 09.50	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1
Total BTEX		<0.00201	0.00201	mg/kg	01.14.20 09.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	110	%	70-130	01.14.20 09.50	
1,4-Difluorobenzene	540-36-3	104	%	70-130	01.14.20 09.50	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 3 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-006	Date Collected:	01.13.20 13.47	Sample Depth:	1 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113141				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**480**	10.1	mg/kg	01.14.20 00.31		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.3	50.3	mg/kg	01.14.20 17.11	U	1
Diesel Range Organics	C10C28DRO	**359**	50.3	mg/kg	01.14.20 17.11		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	**71.9**	50.3	mg/kg	01.14.20 17.11		1
Total TPH	PHC635	**431**	50.3	mg/kg	01.14.20 17.11		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	106	%	70-135	01.14.20 17.11	
o-Terphenyl	84-15-1	110	%	70-135	01.14.20 17.11	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 3 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-006	Date Collected:	01.13.20 13.47	Sample Depth:	1 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113153				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 10.10	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 10.10	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 10.10	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.14.20 10.10	U	1
o-Xylene	95-47-6	**0.00377**	0.00202	mg/kg	01.14.20 10.10		1
Total Xylenes	1330-20-7	**0.00377**	0.00202	mg/kg	01.14.20 10.10		1
Total BTEX		**0.00377**	0.00202	mg/kg	01.14.20 10.10		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	107	%	70-130	01.14.20 10.10	
4-Bromofluorobenzene	460-00-4	110	%	70-130	01.14.20 10.10	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 4 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-007	Date Collected:	01.13.20 13.55	Sample Depth:	0 - 0.5 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113147				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**259**	9.98	mg/kg	01.14.20 01.09		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	01.14.20 17.11	U	1
Diesel Range Organics	C10C28DRO	**77.4**	50.0	mg/kg	01.14.20 17.11		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	01.14.20 17.11	U	1
Total TPH	PHC635	**77.4**	50.0	mg/kg	01.14.20 17.11		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	112	%	70-135	01.14.20 17.11	
o-Terphenyl	84-15-1	111	%	70-135	01.14.20 17.11	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 4 (0-0.5')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-007	Date Collected:	01.13.20 13.55	Sample Depth:	0 - 0.5 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113154				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	01.14.20 02.00	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.14.20 02.00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	107	%	70-130	01.14.20 02.00	
1,4-Difluorobenzene	540-36-3	100	%	70-130	01.14.20 02.00	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 4 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-008	Date Collected:	01.13.20 14.00	Sample Depth:	1 ft

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 18.00	Basis:	Wet Weight
Seq Number:	3113147				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**230**	10.0	mg/kg	01.14.20 01.28		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	SW8015P
Tech:	DTH			% Moisture:	
Analyst:	DTH	Date Prep:	01.14.20 11.00	Basis:	Wet Weight
Seq Number:	3113293				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.1	50.1	mg/kg	01.14.20 17.31	U	1
Diesel Range Organics	C10C28DRO	<50.1	50.1	mg/kg	01.14.20 17.31	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.1	50.1	mg/kg	01.14.20 17.31	U	1
Total TPH	PHC635	<50.1	50.1	mg/kg	01.14.20 17.31	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	113	%	70-135	01.14.20 17.31	
o-Terphenyl	84-15-1	113	%	70-135	01.14.20 17.31	

Certificate of Analytical Results 648862

COG Operating LLC, Artesia, NM

Emerald Fed #1

Sample Id:	**AH- 4 (1')**	Matrix:	Soil	Date Received:	01.13.20 15.45
Lab Sample Id:	648862-008	Date Collected:	01.13.20 14.00	Sample Depth:	1 ft
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	MAB			% Moisture:	
Analyst:	MAB	Date Prep:	01.13.20 17.30	Basis:	Wet Weight
Seq Number:	3113154				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	01.14.20 02.17	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1
Total BTEX		<0.00202	0.00202	mg/kg	01.14.20 02.17	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	103	%	70-130	01.14.20 02.17	
4-Bromofluorobenzene	460-00-4	107	%	70-130	01.14.20 02.17	

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

QC Summary 648862

COG Operating LLC

Emerald Fed #1

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3113141 Matrix: Solid Date Prep: 01.13.20
MB Sample Id: 7694273-1-BLK LCS Sample Id: 7694273-1-BKS LCSD Sample Id: 7694273-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	248	99	248	99	90-110	0	20	mg/kg	01.13.20 21:42	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3113147 Matrix: Solid Date Prep: 01.13.20
MB Sample Id: 7694275-1-BLK LCS Sample Id: 7694275-1-BKS LCSD Sample Id: 7694275-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<10.0	250	248	99	252	101	90-110	2	20	mg/kg	01.14.20 00:56	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3113141 Matrix: Soil Date Prep: 01.13.20
Parent Sample Id: 648838-003 MS Sample Id: 648838-003 S MSD Sample Id: 648838-003 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	10600	203	10800	99	10800	99	90-110	0	20	mg/kg	01.13.20 22:00	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3113141 Matrix: Soil Date Prep: 01.13.20
Parent Sample Id: 648878-010 MS Sample Id: 648878-010 S MSD Sample Id: 648878-010 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	23.6	200	217	97	213	96	90-110	2	20	mg/kg	01.13.20 23:21	

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3113147 Matrix: Soil Date Prep: 01.13.20
Parent Sample Id: 648862-007 MS Sample Id: 648862-007 S MSD Sample Id: 648862-007 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	259	200	481	111	470	106	90-110	2	20	mg/kg	01.14.20 01:15	X

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike
Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added
LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec
Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

QC Summary 648862

COG Operating LLC

Emerald Fed #1

Analytical Method: **TPH By SW8015 Mod** Prep Method: SW8015P
Seq Number: 3113293 Matrix: Solid Date Prep: 01.14.20
MB Sample Id: 7694298-1-BLK LCS Sample Id: 7694298-1-BKS LCSD Sample Id: 7694298-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons	<50.0	1000	728	73	727	73	70-135	0	35	mg/kg	01.14.20 15:00	
Diesel Range Organics	<50.0	1000	741	74	749	75	70-135	1	35	mg/kg	01.14.20 15:00	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	128		127		127		70-135	%	01.14.20 15:00
o-Terphenyl	124		126		119		70-135	%	01.14.20 15:00

Analytical Method: **TPH By SW8015 Mod** Prep Method: SW8015P
Seq Number: 3113293 Matrix: Solid Date Prep: 01.14.20
MB Sample Id: 7694298-1-BLK

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	01.14.20 14:40	

Analytical Method: **TPH By SW8015 Mod** Prep Method: SW8015P
Seq Number: 3113293 Matrix: Soil Date Prep: 01.14.20
Parent Sample Id: 648878-011 MS Sample Id: 648878-011 S MSD Sample Id: 648878-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons	<50.1	1000	858	86	859	86	70-135	0	35	mg/kg	01.15.20 16:42	
Diesel Range Organics	996	1000	1670	67	1220	22	70-135	31	35	mg/kg	01.15.20 16:42	X

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	96		86		70-135	%	01.15.20 16:42
o-Terphenyl	82		76		70-135	%	01.15.20 16:42

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike
Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added
LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec
Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

QC Summary 648862

COG Operating LLC

Emerald Fed #1

Analytical Method: **BTEX by EPA 8021B** Prep Method: SW5030B
Seq Number: 3113153 Matrix: Solid Date Prep: 01.13.20
MB Sample Id: 7694260-1-BLK LCS Sample Id: 7694260-1-BKS LCSD Sample Id: 7694260-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.102	102	0.109	109	70-130	7	35	mg/kg	01.14.20 01:26	
Toluene	<0.00200	0.100	0.101	101	0.108	108	70-130	7	35	mg/kg	01.14.20 01:26	
Ethylbenzene	<0.00200	0.100	0.101	101	0.108	108	71-129	7	35	mg/kg	01.14.20 01:26	
m,p-Xylenes	<0.00400	0.200	0.203	102	0.215	108	70-135	6	35	mg/kg	01.14.20 01:26	
o-Xylene	<0.00200	0.100	0.102	102	0.109	109	71-133	7	35	mg/kg	01.14.20 01:26	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		101		103		70-130	%	01.14.20 01:26
4-Bromofluorobenzene	100		108		108		70-130	%	01.14.20 01:26

Analytical Method: **BTEX by EPA 8021B** Prep Method: SW5030B
Seq Number: 3113154 Matrix: Solid Date Prep: 01.13.20
MB Sample Id: 7694261-1-BLK LCS Sample Id: 7694261-1-BKS LCSD Sample Id: 7694261-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.107	107	0.103	103	70-130	4	35	mg/kg	01.14.20 00:33	
Toluene	<0.00200	0.100	0.105	105	0.103	103	70-130	2	35	mg/kg	01.14.20 00:33	
Ethylbenzene	<0.00200	0.100	0.102	102	0.0997	100	71-129	2	35	mg/kg	01.14.20 00:33	
m,p-Xylenes	<0.00400	0.200	0.208	104	0.205	103	70-135	1	35	mg/kg	01.14.20 00:33	
o-Xylene	<0.00200	0.100	0.102	102	0.101	101	71-133	1	35	mg/kg	01.14.20 00:33	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	102		102		101		70-130	%	01.14.20 00:33
4-Bromofluorobenzene	102		103		102		70-130	%	01.14.20 00:33

Analytical Method: **BTEX by EPA 8021B** Prep Method: SW5030B
Seq Number: 3113153 Matrix: Soil Date Prep: 01.13.20
Parent Sample Id: 648849-004 MS Sample Id: 648849-004 S MSD Sample Id: 648849-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00202	0.101	0.0930	92	0.116	116	70-130	22	35	mg/kg	01.14.20 02:05	
Toluene	<0.00202	0.101	0.0910	90	0.113	113	70-130	22	35	mg/kg	01.14.20 02:05	
Ethylbenzene	<0.00202	0.101	0.0910	90	0.114	114	71-129	22	35	mg/kg	01.14.20 02:05	
m,p-Xylenes	<0.00403	0.202	0.181	90	0.226	113	70-135	22	35	mg/kg	01.14.20 02:05	
o-Xylene	<0.00202	0.101	0.0907	90	0.114	114	71-133	23	35	mg/kg	01.14.20 02:05	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	100		105		70-130	%	01.14.20 02:05
4-Bromofluorobenzene	105		111		70-130	%	01.14.20 02:05

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike
Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added
LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec
Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

QC Summary 648862

COG Operating LLC

Emerald Fed #1

Analytical Method: **BTEX by EPA 8021B** Prep Method: SW5030B

Seq Number: 3113154 Matrix: Soil Date Prep: 01.13.20

Parent Sample Id: 648862-007 MS Sample Id: 648862-007 S MSD Sample Id: 648862-007 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00201	0.100	0.0961	96	0.0830	83	70-130	15	35	mg/kg	01.14.20 01:07	
Toluene	<0.00201	0.100	0.0937	94	0.0814	82	70-130	14	35	mg/kg	01.14.20 01:07	
Ethylbenzene	<0.00201	0.100	0.0894	89	0.0774	78	71-129	14	35	mg/kg	01.14.20 01:07	
m,p-Xylenes	<0.00402	0.201	0.183	91	0.159	80	70-135	14	35	mg/kg	01.14.20 01:07	
o-Xylene	<0.00201	0.100	0.0898	90	0.0771	77	71-133	15	35	mg/kg	01.14.20 01:07	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		99		70-130	%	01.14.20 01:07
4-Bromofluorobenzene	105		98		70-130	%	01.14.20 01:07

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike

Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added

LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec

Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

Analysis Request of Chain of Custody Record

648862

Page 1 of 1

CONCHO

One Concho Center/600/Illinois Avenue/Midland, Texas
Tel (432) 683-7443

Client Name: COG-Artesia

Site Manager: Sheldon Hitchcock

Project Name: Emerald Fed #1

Project Location: (county, state) Lea, NM

Project #:

Invoice to: Sheldon Hitchcock

Receiving Laboratory:

Sampler Name: Sheldon Hitchcock

Comments:

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: 2020 DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	# CONTAINERS	(C)omposite/(G)rab	TPH 8015M (GRO - DRO - MRO)	BTEX 8021B	Chloride	Hold
	AH-1 0-0.5'	1/13	1:30		X			X	1	G	X	X	X	
	AH-1 1'		1:32											
	AH-1 2'		1:34											
	AH-2 0-0.5'		1:40											
	AH-3 0-0.5'		1:45											
	AH-3 1'		1:47											
	AH-4 0-0.5'		1:55											
	AH-4 1'		2:00											

ANALYSIS REQUEST (Circle or Specify Method No.)

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	1/13/20	15:45		1/13/20	15:45
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

LAB USE ONLY

Sample Temperature 0.8°C

REMARKS: Std TAT

- RUSH: Same Day 24 hr 48 hr 72 hr
- Rush Charges Authorized
- Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

ORIGINAL COPY

Final 1.000

XENCO Laboratories
Prelogin/Nonconformance Report- Sample Log-In

Client: COG Operating LLC

Date/ Time Received: 01/13/2020 03:45:00 PM

Work Order #: 648862

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : T-NM-007

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.8
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**Yes**
#5 Custody Seals intact on sample bottles?	**Yes**
#6*Custody Seals Signed and dated?	**Yes**
#7 *Chain of Custody present?	**Yes**
#8 Any missing/extra samples?	**No**
#9 Chain of Custody signed when relinquished/ received?	**Yes**
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**
#11 Container label(s) legible and intact?	**Yes**
#12 Samples in proper container/ bottle?	**Yes**
#13 Samples properly preserved?	**Yes**
#14 Sample container(s) intact?	**Yes**
#15 Sufficient sample amount for indicated test(s)?	**Yes**
#16 All samples received within hold time?	**Yes**
#17 Subcontract of sample(s)?	**No**
#18 Water VOC samples have zero headspace?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Elizabeth McClellan Date: 01/13/2020

Checklist reviewed by: Jessica Kramer Date: 01/14/2020

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

January 24, 2020

SHELDON HITCHCOCK

COG OPERATING

P. O. BOX 1630

ARTESIA, NM 88210

RE: EMERALD FED #1

Enclosed are the results of analyses for samples received by the laboratory on 01/22/20 12:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-19-12. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 1 3' (H000216-01)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.3 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**560**	16.0	01/23/2020	ND	432	108	400	0.00	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	196	97.9	200	3.17	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	183	91.6	200	0.0634	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *85.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *84.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 1 4' (H000216-02)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.7 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**592**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *65.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *63.4 %* *37.6-147*

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 1 6' (H000216-03)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.4 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**192**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *62.7 %* *41-142*

Surrogate: 1-Chlorooctadecane *61.2 %* *37.6-147*

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 2 1' (H000216-04)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.6 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**64.0**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *68.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *66.8 %* *37.6-147*

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Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 2 2' (H000216-05)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.6 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**80.0**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	**14.8**	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *70.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *69.1 %* *37.6-147*

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Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 2 3' (H000216-06)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.1 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**32.0**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *64.8 %* *41-142*

Surrogate: 1-Chlorooctadecane *63.8 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 2 4' (H000216-07)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.8 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**80.0**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *65.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *64.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 2 6' (H000216-08)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.0 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**32.0**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	205	103	200	2.32	
DRO >C10-C28*	**74.4**	10.0	01/23/2020	ND	216	108	200	2.60	
EXT DRO >C28-C36	**26.0**	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *65.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *66.0 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

QR-04	The RPD for the BS/BSD was outside of historical limits.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

Analysis Request of Chain of Custody Record

CONCHO

One Concho Center/600/Illinois
Avenue/Midland, Texas
Tel (432) 683-7443

Client Name: COG-Artesia	Site Manager: Sheldon Hitchcock
Project Name: Emerald Fed #1	
Project Location: (county, state) Lea, NM	Project #:
Invoice to: Sheldon Hitchcock	
Receiving Laboratory: Cardinal	Sampler Name: Sheldon Hitchcock
Comments:	

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: 2020 DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	# CONTAINERS	(C)omposite/(G)rab	TPH 8015M (GRO - DRO - MRO)	BTEX 8021B	Chloride	Hold
H000216														
1	AH-1 3'	1/22	9:00		X			X	1	G	X	X	X	
2	AH-1 4'		9:05											
3	AH-1 6'		9:10											
4	AH-2 1'		9:15											
5	AH-2 2'		9:20											
6	AH-2 3'		9:25											
7	AH-2 4'		9:30											
8	AH-2 6'		9:35											
	[redacted]													
	[redacted]													

Relinquished by:	Date: 1/22/20	Time: 1255	Received by: Date: 1-22-20 Time: 1255
Relinquished by:	Date:	Time:	Received by: Date: Time:
Relinquished by:	Date:	Time:	Received by: Date: Time:

LAB USE ONLY

Sample Temperature
#113
-0.4°c

REMARKS:

☐ RUSH: Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

ORIGINAL COPY

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

January 24, 2020

SHELDON HITCHCOCK

COG OPERATING

P. O. BOX 1630

ARTESIA, NM 88210

RE: EMERALD FED #1

Enclosed are the results of analyses for samples received by the laboratory on 01/22/20 12:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-19-12. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 1' (H000217-01)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.9 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3000**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	**102**	10.0	01/23/2020	ND	191	95.3	200	5.89	QM-07
EXT DRO >C28-C36	**40.7**	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *63.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *64.9 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 2' (H000217-02)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.2 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2880**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	**173**	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	**112**	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *68.7 %* *41-142*

Surrogate: 1-Chlorooctadecane *72.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 3' (H000217-03)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.2 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**592**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *66.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *61.4 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 4' (H000217-04)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.3 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**160**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *64.4 %* *41-142*

Surrogate: 1-Chlorooctadecane *62.0 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 6' (H000217-05)

BTEX 8021B mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.3 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**704**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	**18.3**	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *63.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *61.7 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 8' (H000217-06)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.5 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**416**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *65.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *63.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
SHELDON HITCHCOCK
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	01/22/2020	Sampling Date:	01/22/2020
Reported:	01/24/2020	Sampling Type:	Soil
Project Name:	EMERALD FED #1	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: AH - 3 10' (H000217-07)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	01/23/2020	ND	1.72	85.9	2.00	20.9	
Toluene*	<0.050	0.050	01/23/2020	ND	1.77	88.3	2.00	21.6	
Ethylbenzene*	<0.050	0.050	01/23/2020	ND	1.73	86.4	2.00	21.6	
Total Xylenes*	<0.150	0.150	01/23/2020	ND	5.04	83.9	6.00	21.8	
Total BTEX	<0.300	0.300	01/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.4 %* *73.3-129*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	01/23/2020	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	01/23/2020	ND	200	99.8	200	1.44	
DRO >C10-C28*	<10.0	10.0	01/23/2020	ND	191	95.3	200	5.89	
EXT DRO >C28-C36	<10.0	10.0	01/23/2020	ND					

Surrogate: 1-Chlorooctane *70.0 %* *41-142*

Surrogate: 1-Chlorooctadecane *68.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

QR-04	The RPD for the BS/BSD was outside of historical limits.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

Analysis Request of Chain of Custody Record

CONCHO

One Concho Center/600/Illinois Avenue/Midland, Texas
Tel (432) 683-7443

Client Name: COG-Artesia	Site Manager: Sheldon Hitchcock
Project Name: Emerald Fed #1	
Project Location: (county, state) Lea, NM	Project #:
Invoice to: Sheldon Hitchcock	
Receiving Laboratory: Cardinal	Sampler Name: Sheldon Hitchcock
Comments:	

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE	SAMPLING TIME	MATRIX: WATER	MATRIX: SOIL	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO_3	PRESERVATIVE METHOD: ICE	# CONTAINERS	(C)omposite/(G)rab	TPH 8015M (GRO - DRO - MRO)	BTEX 8021B	Chloride	Hold
H000217		YEAR: 2020												
1	AH-3 1'	1/22	10:00		X				1	G	X	X	X	
2	AH-3 2'		10:05											
3	AH-3 3'		10:10											
4	AH-3 4'		10:15											
5	AH-3 6'		10:20											
6	AH-3 8'		10:25											
7	AH-3 10'		10:30											

Relinquished by:	Date: 1/22/20	Time: 1255	Received by: Tamara Oldaker 1-22-20 1255
Relinquished by:	Date:	Time:	Received by: Date: Time:
Relinquished by:	Date:	Time:	Received by: Date: Time:

LAB USE ONLY

Sample Temperature
#113
-0.4°c

REMARKS:

- ☐ RUSH: Same Day 24 hr 48 hr 72 hr
- ☐ Rush Charges Authorized
- ☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

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