



October 12, 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

Closure Report

Emerald Federal #001

RP#: 1RP-5725

Incident #: NRM1927535848

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 closure report 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 was excavated to depths from one (1) to four and one-half (4.5) feet BGS.
- All of the excavated material was hauled to an NMOCD approved solid waste disposal facility.
- Confirmation soil samples were taken from the bottom and sidewalls of the excavated areas per NMED 19.15.29.13.
- The excavation will be backfilled with clean “like” material and contoured to match the surrounding terrain.

SITE RECLAMATION AND RESTORATION

Per NMED 19.15.29.13 reclamation of the pasture area has been performed by removing the impacted soil within the first four (4) feet BGS. Approximately nine-hundred (900) cubic yards of material was removed and hauled to an NMOCD approved solid waste disposal facility. Once excavated, soil samples were collected from the bottom and sidewalls of the excavation to confirm the removal of impacted soil greater than 600 mg/kg of chlorides. The backfill material was non-contaminated with concentrations below 600 mg/kg of chlorides. The surface was 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.

CLOSURE REQUEST

COG Operating, LLC respectfully requests that the New Mexico Oil Conservation Division and the Bureau of Land Management grant closure approval for the Emerald Federal #001 incident that occurred on September 16, 2019.

Should you have any questions or concerns please do not hesitate to contact me.

Sincerely,

Sincerely,



Sheldon L. Hitchcock
HSE Coordinator
slhitchcock@concho.com

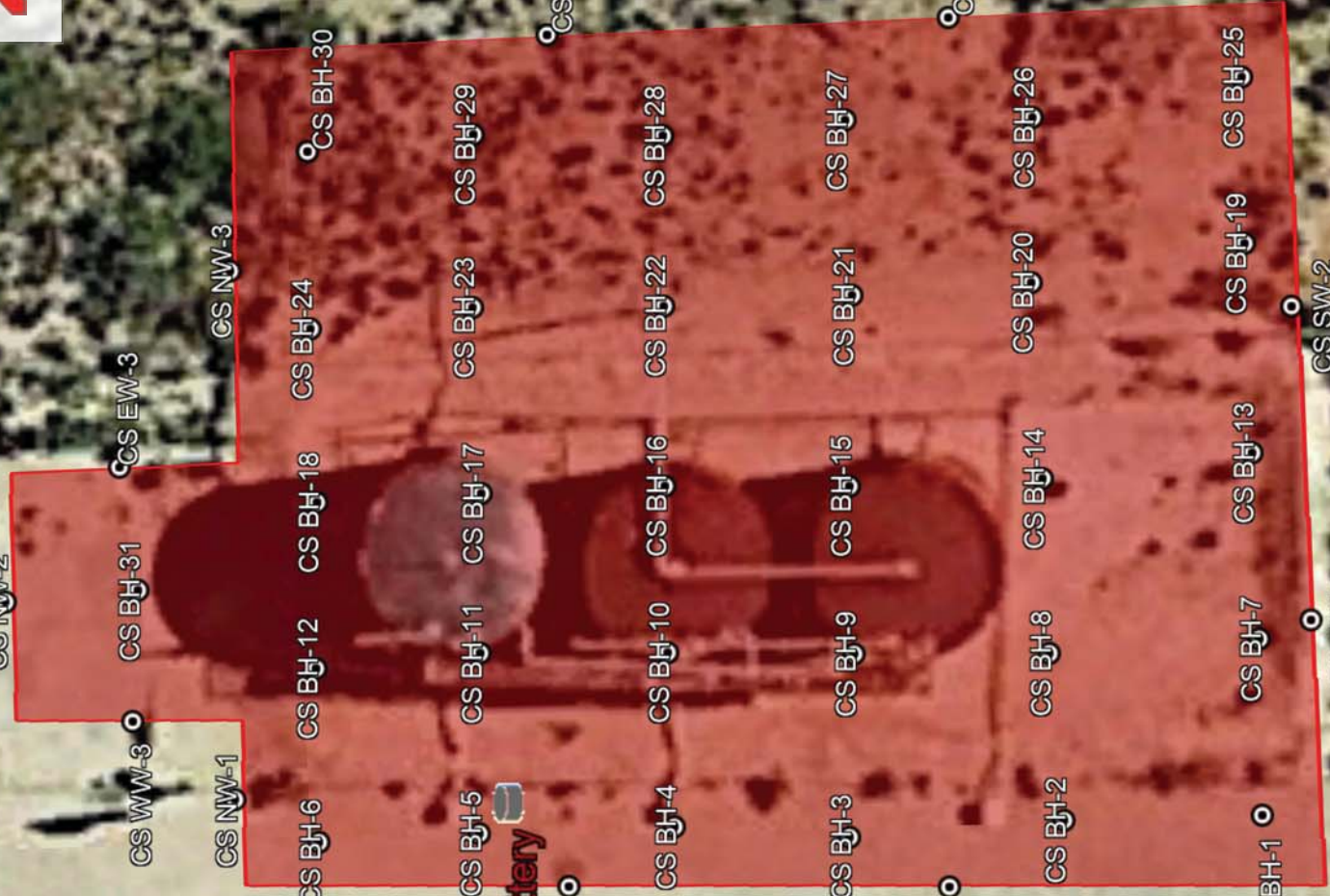
FIGURES

COG Operating LLC.

Emerald Federal #001
32.40059 -103.6687
Lea County , NM

Legend

- Confirmation Sample Points
- Remediation Area



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	
NMOC RRAL Limits	(mg/kg)				-	-	-	2,500	-	-	1,000	20,000
CS N. WALL 1	N/A	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	93.4
CS N. WALL 2	N/A	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	80.5
CS N. WALL 3	N/A	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	181.0
CS S. WALL 1	N/A	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	179.0
CS S. WALL 2	N/A	9/23/2020	X		<50.0	50.2	<50.0	50.2	<50.0	50.2	50.2	232.0
CS E. WALL 1	N/A	9/23/2020	X		<50.0	50.5	<50.0	50.5	<50.0	50.5	50.5	221.0
CS E. WALL 2	N/A	9/23/2020	X		<50.0	50.8	<50.0	50.8	<50.0	50.8	50.8	184
CS E. WALL 3	N/A	9/23/2020	X		<50.0	51.1	<50.0	51.1	<50.0	51.1	51.1	38
CS W. WALL 1	N/A	9/23/2020	X		<50.0	51.4	<50.0	51.4	<50.0	51.4	51.4	181
CS W. WALL 2	N/A	9/23/2020	X		<50.0	51.7	<50.0	51.7	<50.0	51.7	51.7	184
CS W. WALL 3	N/A	9/23/2020	X		<50.0	52	<50.0	52.0	<50.0	52	52.0	45
CS BTM 1	4	9/24/2020		X	<50.0	115	<50.0	115.0	<50.0	115	115.0	102
CS BTM 2	4	9/23/2020		X	<50.0	106.0	<50.0	106.0	<50.0	106	106.0	80.7
CS BTM 3	4	9/23/2020		X	<50.0	101.0	<50.0	101.0	<50.0	101	101.0	424.0
CS BTM 4	4	9/23/2020	X		<50.0	99.4	<50.0	99.4	<50.0	99.4	99.4	86.8
CS BTM 5	4	9/23/2020		X	<50.0	101.0	<50.0	101.0	<50.0	101	101.0	85.9
CS BTM 6	4	9/23/2020		X	<50.0	112.0	<50.0	112.0	<50.0	112	112.0	86.1
CS BTM 7	4	9/23/2020		X	<50.0	104.0	<50.0	104.0	<50.0	104	104.0	84.0
CS BTM 8	4	9/23/2020		X	<50.0	101.0	<50.0	101.0	<50.0	101	101.0	88.0
CS BTM 9	4	9/23/2020	X		<50.0	53.8	<50.0	53.8	<50.0	53.8	53.8	223.0
CS BTM 10	4	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	227.0
CS BTM 11	4	9/23/2020	X		<50.0	55.9	<50.0	55.9	<50.0	55.9	55.9	153.0
CS BTM 12	4	9/23/2020		X	<50.0	101.0	<50.0	101.0	<50.0	101	101.0	433.0
CS BTM 13	4	9/23/2020	X		<50.0	53.6	<50.0	53.6	<50.0	53.6	53.6	229.0
CS BTM 14	4	9/23/2020	X		<50.0	50.9	<50.0	50.9	<50.0	50.9	50.9	170.0
CS BTM 15	4	9/23/2020	X		<50.0	95.5	<50.0	95.5	<50.0	95.5	95.5	86.0
CS BTM 16	4	9/23/2020		X	<50.0	109.0	<50.0	109.0	<50.0	109	109.0	87.0
CS BTM 17	4	9/23/2020	X		<50.0	54.8	<50.0	54.8	<50.0	54.8	54.8	226.0
CS BTM 18	4	9/23/2020	X		<50.0	59.4	<50.0	59.4	<50.0	59.4	59.4	223.0
CS BTM 19	4	9/23/2020	X		<50.0	99.3	<50.0	99.3	<50.0	99.3	99.3	422.0
CS BTM 20	4	9/23/2020		X	<50.0	101.0	<50.0	101.0	<50.0	101	101.0	88.6
CS BTM 21	4	9/23/2020	X		<50.0	53.6	<50.0	53.6	<50.0	53.6	53.6	213.0
CS BTM 22	4	9/23/2020	X		<50.0	50.7	<50.0	50.7	<50.0	50.7	50.7	220.0
CS BTM 23	4	9/23/2020	X		<50.0	95.9	<50.0	95.9	<50.0	95.9	95.9	424.0
CS BTM 24	4	9/23/2020	X		<50.0	51.0	<50.0	51.0	<50.0	51	51.0	173.0
CS BTM 25	4	9/23/2020	X		<50.0	51.4	<50.0	51.4	<50.0	51.4	51.4	217.0
CS BTM 26	4	9/23/2020	X		<50.0	54.9	<50.0	54.9	<50.0	54.9	54.9	224.0
CS BTM 27	4	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	173.0
CS BTM 28	4	9/23/2020	X		<50.0	90.7	<50.0	90.7	<50.0	90.7	90.7	90.1
CS BTM 29	4	9/23/2020		X	<50.0	103.0	<50.0	103.0	<50.0	103	103.0	418.0
CS BTM 30	4	9/23/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	92.0
CS BTM 1	4.5	9/30/2020	X		<50.0	<50.0	<50.0	0.0	<50.0	<50.0	0.0	70

Table 1

[illegible]

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

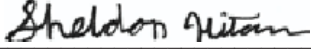
The release was caused by a lightning strike resulting in a fire.
The release was within the lined facility and liner was compromised. A vacuum truck was dispatched to remove all freestanding fluids. Concho will evaluate the site to determine if we may commence remediation immediately or delineate any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

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 <u>not</u> been undertaken, explain why:	
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.	
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.	
Printed Name: Sheldon L. Hitchcock	Title: HSE Coordinator
Signature: 	Date: 10/12/2020
email: slhitchcock@concho.com	Telephone: 575-746-2010
<u>OCD Only</u>	
Received by: _____	Date: _____

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?	<u>382</u> (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.

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:  Date: 10/12/2020
email: slhitchcock@concho.com Telephone: 575-746-2010

OCD Only

Received by: Cristina Eads Date: 10/14/2020

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: 10/12/2020
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: _____

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: 10/12/2020

email: slhitchcock@concho.com

Telephone: 575-746-2010

OCD Only

Received by: Cristina Eads

Date: 10/14/2020

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.

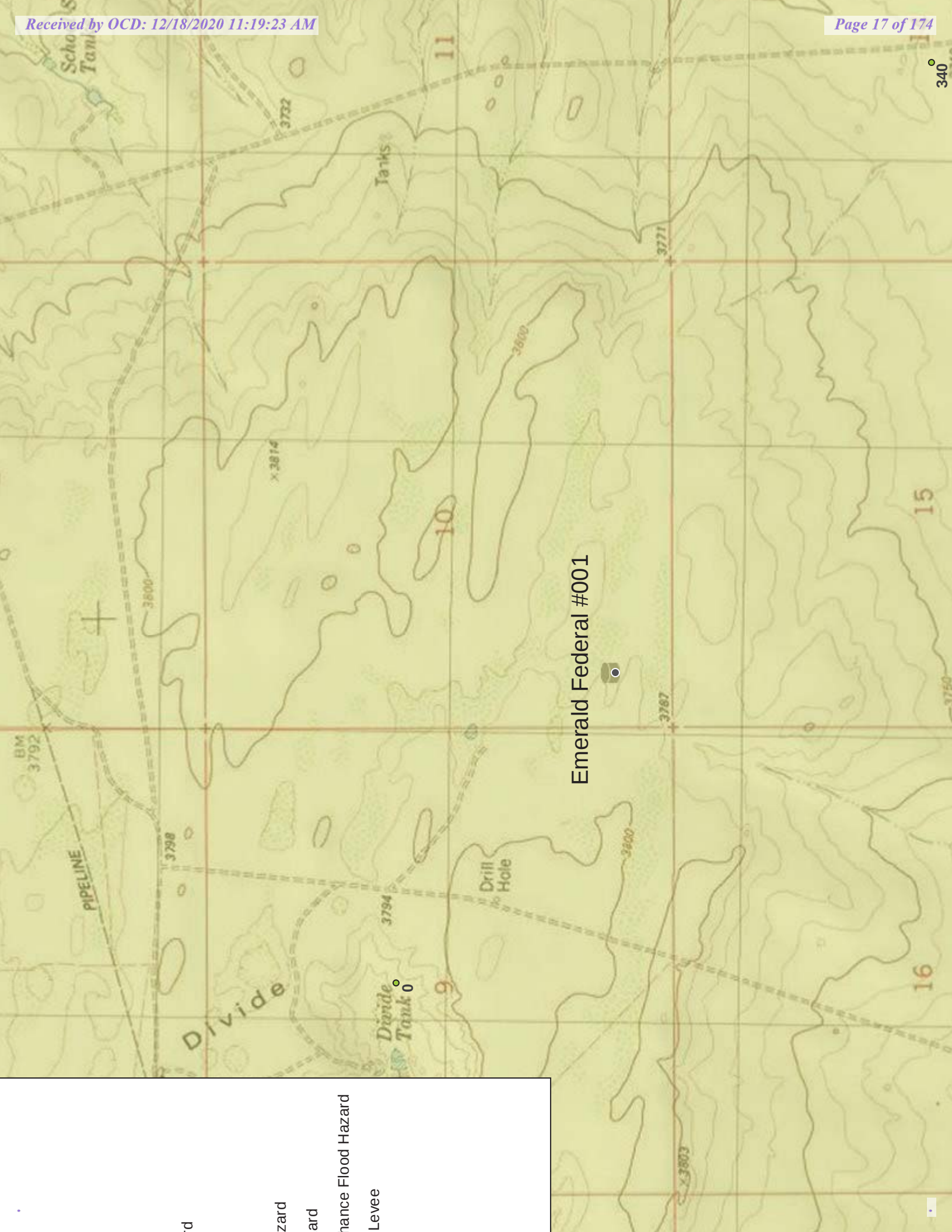
Closure Approved by: Cristina Eads

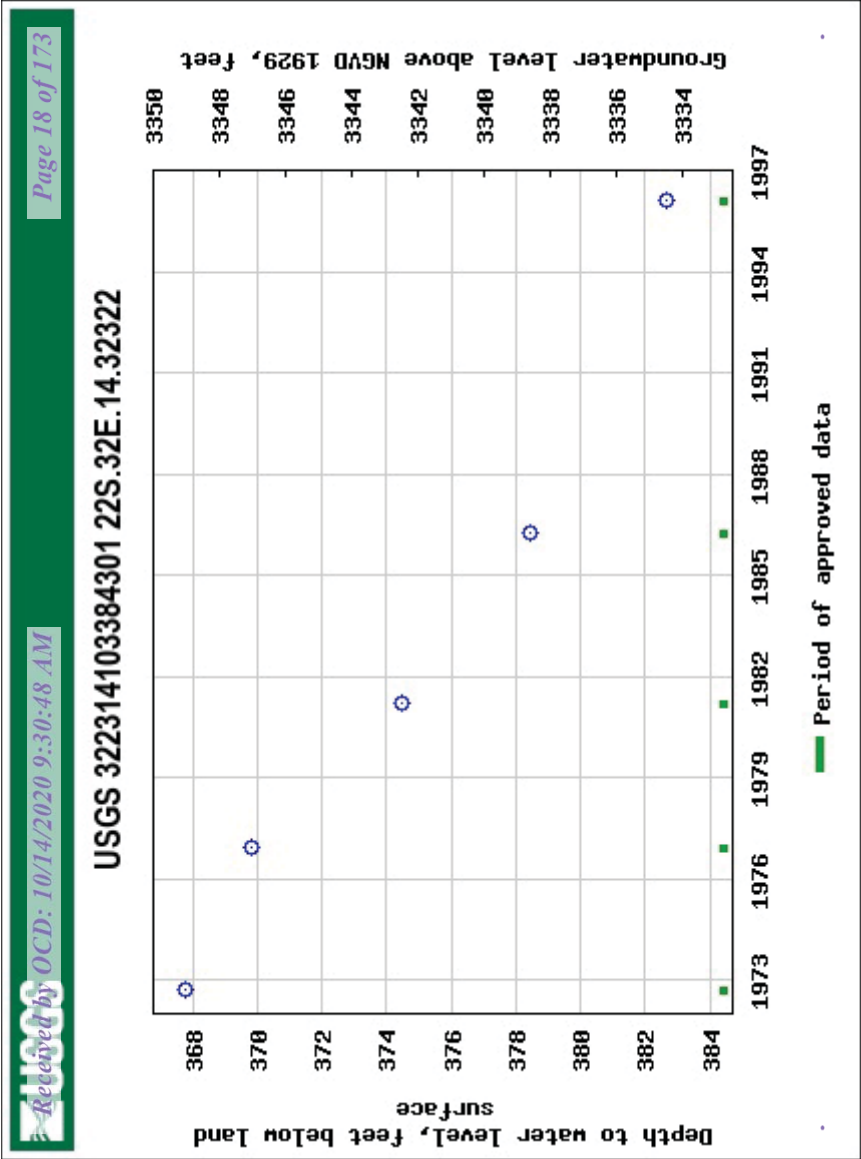
Date: 12/18/2020

Printed Name: Cristina Eads

Title: Environmental Specialist

APPENDIX B





APPENDIX C

Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaraz

Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50

Report Date: 09.28.2020 14:35

Project Manager: Jessica Kramer

Analysis Requested			Lab Id: Field Id: Depth: Matrix: Sampled:	673577-007 CS East Wall 2 SOIL 09.23.2020 00:00	673577-008 CS East Wall 3 SOIL 09.23.2020 00:00	673577-009 CS West Wall 1 SOIL 09.23.2020 00:00	673577-010 CS West Wall 2 SOIL 09.23.2020 00:00	673577-011 CS West Wall 3 SOIL 09.23.2020 00:00	673577-012 CS Bottom Hole 1 4'
BTEX by EPA 8021B			Extracted: Analyzed: Units/RL:	09.25.2020 11:00 09.25.2020 19:30 mg/kg RL <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198 <0.00397 0.00397 <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198	09.25.2020 11:00 09.25.2020 19:51 mg/kg RL <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198 <0.00396 0.00396 <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198	09.25.2020 11:00 09.25.2020 20:11 mg/kg RL <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198 <0.00397 0.00397 <0.00198 0.00198 <0.00198 0.00198 <0.00198 0.00198	09.25.2020 11:00 09.25.2020 20:32 mg/kg RL <0.00200 0.00200 <0.00200 0.00200 <0.00200 0.00200 <0.00399 0.00399 <0.00200 0.00200 <0.00200 0.00200 <0.00200 0.00200	09.25.2020 11:00 09.25.2020 22:13 mg/kg RL <0.00199 0.00199 <0.00199 0.00199 <0.00199 0.00199 <0.00398 0.00398 <0.00199 0.00199 <0.00199 0.00199 <0.00199 0.00199	09.25.2020 11:00 09.25.2020 22:33 mg/kg RL <0.00200 0.00200 <0.00200 0.00200 <0.00200 0.00200 <0.00400 0.00400 <0.00200 0.00200 <0.00200 0.00200 <0.00200 0.00200
Chloride by EPA 300			Extracted: Analyzed: Units/RL:	09.25.2020 17:10 09.25.2020 21:25 mg/kg RL 184 4.99	09.25.2020 17:10 09.25.2020 21:31 mg/kg RL 38.2 4.97	09.25.2020 17:10 09.25.2020 21:36 mg/kg RL 181 4.98	09.25.2020 17:10 09.25.2020 21:41 mg/kg RL 184 5.00	09.25.2020 17:10 09.25.2020 21:46 mg/kg RL 45.1 5.02	09.25.2020 17:10 09.25.2020 21:52 mg/kg RL 102 5.01
TPH By SW8015 Mod			Extracted: Analyzed: Units/RL:	09.25.2020 11:00 09.26.2020 05:28 mg/kg RL <49.8 49.8 <49.8 49.8 <49.8 49.8 <49.8 49.8	09.25.2020 11:00 09.26.2020 05:51 mg/kg RL <50.0 50.0 <50.0 50.0 <50.0 50.0 <50.0 50.0	09.25.2020 11:00 09.26.2020 06:13 mg/kg RL <50.0 50.0 <50.0 50.0 <50.0 50.0 <50.0 50.0	09.25.2020 11:00 09.26.2020 06:35 mg/kg RL <49.9 49.9 <49.9 49.9 <49.9 49.9 <49.9 49.9	09.25.2020 11:00 09.26.2020 07:21 mg/kg RL <49.8 49.8 <49.8 49.8 <49.8 49.8 <49.8 49.8	09.25.2020 11:00 09.26.2020 07:44 mg/kg RL <50.0 50.0 115 50.0 <50.0 50.0 115 50.0

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Session 11

Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaraz

Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50

Report Date: 09.28.2020 14:35

Project Manager: Jessica Kramer

Analysis Requested			Lab Id: Field Id: Depth: Matrix: Sampled:	673577-013 CS Bottom Hole 2 4'	673577-014 CS Bottom Hole 3 4'	673577-015 CS Bottom Hole 4 4'	673577-016 CS Bottom Hole 5 4'	673577-017 CS Bottom Hole 6 4'	673577-018 CS Bottom Hole 7 4'
BTEX by EPA 8021B			Extracted: Analyzed: Units/RL:	09.25.2020 11:00 09.25.2020 22:54 mg/kg RL <0.00200 0.00200	09.25.2020 11:00 09.25.2020 23:15 mg/kg RL <0.00201 0.00201	09.25.2020 11:00 09.25.2020 23:35 mg/kg RL <0.00200 0.00200	09.25.2020 11:00 09.25.2020 23:56 mg/kg RL <0.00201 0.00201	09.25.2020 11:00 09.26.2020 00:17 mg/kg RL <0.00200 0.00200	09.25.2020 11:00 09.26.2020 00:37 mg/kg RL <0.00202 0.00202
Benzene				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
Toluene				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
Ethylbenzene				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
m,p-Xylenes				<0.00399 0.00399	<0.00402 0.00402	<0.00401 0.00401	<0.00402 0.00402	<0.00399 0.00399	<0.00403 0.00403
o-Xylene				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
Total Xylenes				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
Total BTEX				<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00202 0.00202
Chloride by EPA 300			Extracted: Analyzed: Units/RL:	09.25.2020 17:20 09.25.2020 17:35 mg/kg RL 80.7 X 4.96	09.25.2020 17:20 09.25.2020 17:51 mg/kg RL 424 5.01	09.25.2020 17:20 09.25.2020 17:56 mg/kg RL 86.8 4.99	09.25.2020 17:20 09.25.2020 18:02 mg/kg RL 85.9 4.99	09.25.2020 17:20 09.25.2020 18:07 mg/kg RL 86.1 4.99	09.25.2020 17:20 09.25.2020 18:23 mg/kg RL 84.0 4.98
Chloride									
TPH By SW8015 Mod			Extracted: Analyzed: Units/RL:	09.25.2020 11:00 09.26.2020 08:06 mg/kg RL <50.0 50.0	09.25.2020 11:00 09.26.2020 08:29 mg/kg RL <49.9 49.9	09.25.2020 11:00 09.26.2020 08:51 mg/kg RL <49.8 49.8	09.25.2020 11:00 09.26.2020 09:13 mg/kg RL <50.0 50.0	09.25.2020 11:00 09.26.2020 09:35 mg/kg RL <49.9 49.9	09.25.2020 11:00 09.26.2020 09:58 mg/kg RL <49.9 49.9
Gasoline Range Hydrocarbons				106 50.0	101 49.9	99.4 49.8	101 50.0	112 49.9	104 49.9
Diesel Range Organics				<50.0 50.0	<49.9 49.9	<49.8 49.8	<50.0 50.0	<49.9 49.9	<49.9 49.9
Motor Oil Range Hydrocarbons (MRO)				106 50.0	101 49.9	99.4 49.8	101 50.0	112 49.9	104 49.9
Total TPH									

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Jessica Kramer

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaraz

Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50

Report Date: 09.28.2020 14:35

Project Manager: Jessica Kramer

Environment Testing
Xenco

Analysis Requested		Lab Id:	673577-019	673577-020	673577-021	673577-022	673577-023	673577-024
		Field Id:	CS Bottom Hole 8' 4"	CS Bottom Hole 9' 4"	CS Bottom Hole 10' 4"	CS Bottom Hole 11' 4"	CS Bottom Hole 12' 4"	CS Bottom Hole 13' 4"
		Depth:						
		Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled:	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00
BTEX by EPA 8021B		Extracted:	09.25.2020 11:00	09.25.2020 11:00	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30
	Analyzed:	09.26.2020 00:58	09.26.2020 01:19	09.26.2020 05:01	09.26.2020 05:21	09.26.2020 05:42	09.26.2020 06:03	09.26.2020 06:03
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
Toluene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
Ethylbenzene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
m,p-Xylenes		<0.00403 0.00403	<0.00398 0.00398	<0.00396 0.00396	<0.00399 0.00399	<0.00396 0.00396	<0.00398 0.00398	<0.00398 0.00398
o-Xylene		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
Total Xylenes		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
Total BTEX		<0.00202 0.00202	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00198 0.00198	<0.00199 0.00199	<0.00199 0.00199
Chloride by EPA 300		Extracted:	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20
	Analyzed:	09.25.2020 18:28	09.25.2020 18:33	09.25.2020 18:38	09.25.2020 18:44	09.25.2020 18:49	09.25.2020 19:05	09.25.2020 19:05
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		88.0 4.97	223 5.03	227 5.02	153 5.05	433 4.98	229 5.02	
TPH By SW8015 Mod		Extracted:	09.25.2020 11:00	09.25.2020 11:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00
	Analyzed:	09.26.2020 10:20	09.26.2020 10:43	09.26.2020 02:30	09.26.2020 03:37	09.26.2020 03:59	09.26.2020 04:21	09.26.2020 04:21
	Units/RL:	mg/kg 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	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.9 49.9	<49.8 49.8	<49.8 49.8
Diesel Range Organics		101 49.9	53.8 50.0	<50.0 50.0	55.9 50.0	101 49.9	53.6 49.8	53.6 49.8
Motor Oil Range Hydrocarbons (MRO)		<49.9 49.9	<50.0 50.0	<50.0 50.0	<50.0 50.0	<49.9 49.9	<49.8 49.8	<49.8 49.8
Total TPH		101 49.9	53.8 50.0	<50.0 50.0	55.9 50.0	101 49.9	53.6 49.8	53.6 49.8

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Final 1.000

Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX
Project Name: Emerald Federal #001 (9-16-19)

Project Id:
Contact: Ike Tavaréz
Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50
Report Date: 09.28.2020 14:35
Project Manager: Jessica Kramer

Analysis Requested	Lab Id:	673577-025	673577-026	673577-027	673577-028	673577-029	673577-030
	Field Id:	CS Bottom Hole 14 4'	CS Bottom Hole 15 4'	CS Bottom Hole 16 4'	CS Bottom Hole 17 4'	CS Bottom Hole 18 4'	CS Bottom Hole 19 4'
	Depth:						
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00
BTEX by EPA 8021B	Extracted:	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30
	Analyzed:	09.26.2020 06:24	09.26.2020 06:44	09.26.2020 07:05	09.26.2020 07:26	09.26.2020 07:47	09.26.2020 08:08
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
	Benzene	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	Toluene	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	Ethylbenzene	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	m,p-Xylenes	<0.00401 0.00401	<0.00398 0.00398	<0.00402 0.00402	<0.00402 0.00402	<0.00398 0.00398	<0.00398 0.00398
Chloride by EPA 300	o-Xylene	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	Total Xylenes	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	Total BTEX	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199
	Chloride	170 4.97	86.0 4.99	87.0 5.00	226 4.96	223 4.97	422 4.95
TPH By SW8015 Mod	Extracted:	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:20
	Analyzed:	09.25.2020 19:10	09.25.2020 19:26	09.25.2020 19:31	09.25.2020 19:36	09.25.2020 19:41	09.25.2020 19:47
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
	Gasoline Range Hydrocarbons	<50.0 50.0	<49.9 49.9	<50.0 50.0	<49.9 49.9	<49.8 49.8	<50.0 50.0
	Diesel Range Organics	50.9 50.0	95.5 49.9	109 50.0	54.8 49.9	59.4 49.8	99.3 50.0
Motor Oil Range Hydrocarbons (MRO)	Motor Oil Range Hydrocarbons (MRO)	<50.0 50.0	<49.9 49.9	<50.0 50.0	<49.9 49.9	<49.8 49.8	<50.0 50.0
	Total TPH	50.9 50.0	95.5 49.9	109 50.0	54.8 49.9	59.4 49.8	99.3 50.0

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Jessica Kramer

Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaraz

Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50

Report Date: 09.28.2020 14:35

Project Manager: Jessica Kramer

Analysis Requested			673577-031 CS Bottom Hole 20 4'	673577-032 CS Bottom Hole 21 4'	673577-033 CS Bottom Hole 22 4'	673577-034 CS Bottom Hole 23 4'	673577-035 CS Bottom Hole 24 4'	673577-036 CS Bottom Hole 25 4'
Lab Id: Field Id: Depth: Matrix: Sampled:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00	09.23.2020 00:00
BTEX by EPA 8021B	Extracted:	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30	09.25.2020 11:30
	Analyzed:	09.26.2020 09:48	09.26.2020 10:09	09.26.2020 10:30	09.26.2020 10:51	09.26.2020 11:11	09.26.2020 11:32	09.26.2020 11:32
	Units/RL:	mg/kg RL <0.00199 0.00199	mg/kg RL <0.00198 0.00198	mg/kg RL <0.00200 0.00200	mg/kg RL <0.00200 0.00200	mg/kg RL <0.00199 0.00199	mg/kg RL <0.00201 0.00201	mg/kg RL <0.00201 0.00201
	Benzene							
	Toluene							
	Ethylbenzene							
Chloride by EPA 300	m,p-Xylenes	<0.00398 0.00398	<0.00397 0.00397	<0.00399 0.00399	<0.00401 0.00401	<0.00398 0.00398	<0.00402 0.00402	<0.00402 0.00402
	o-Xylene	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201
	Total Xylenes	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201
	Total BTEX	<0.00199 0.00199	<0.00198 0.00198	<0.00200 0.00200	<0.00200 0.00200	<0.00199 0.00199	<0.00201 0.00201	<0.00201 0.00201
	Extracted:	09.25.2020 17:20	09.25.2020 17:20	09.25.2020 17:30	09.25.2020 17:30	09.25.2020 17:30	09.25.2020 17:30	09.25.2020 17:30
	Analyzed:	09.25.2020 19:52	09.25.2020 19:57	09.25.2020 20:29	09.25.2020 20:44	09.25.2020 20:50	09.25.2020 20:55	09.25.2020 20:55
TPH By SW8015 Mod	Units/RL:	mg/kg RL 88.6 5.02	mg/kg RL 213 5.05	mg/kg RL 220 X 5.05	mg/kg RL 424 4.98	mg/kg RL 173 4.96	mg/kg RL 217 5.03	mg/kg RL 217 5.03
	Chloride							
	Extracted:	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00	09.25.2020 13:00
	Analyzed:	09.26.2020 07:21	09.26.2020 07:44	09.26.2020 08:06	09.26.2020 08:29	09.26.2020 08:51	09.26.2020 09:13	09.26.2020 09:13
	Units/RL:	mg/kg RL <49.9 49.9	mg/kg RL <50.0 50.0	mg/kg RL <49.9 49.9	mg/kg RL <50.0 50.0	mg/kg RL <50.0 50.0	mg/kg RL <49.9 49.9	mg/kg RL <49.9 49.9
	Gasoline Range Hydrocarbons							
Motor Oil Range Hydrocarbons (MRO)	Diesel Range Organics	101 49.9	53.6 50.0	50.7 49.9	95.9 50.0	51.0 50.0	51.4 49.9	51.4 49.9
	Motor Oil Range Hydrocarbons (MRO)	<49.9 49.9	<50.0 50.0	<49.9 49.9	<50.0 50.0	<50.0 50.0	<49.9 49.9	<49.9 49.9
	Total TPH	101 49.9	53.6 50.0	50.7 49.9	95.9 50.0	51.0 50.0	51.4 49.9	51.4 49.9

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Session Kramer

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Certificate of Analysis Summary 673577
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaraz

Project Location: Lea County NM

Date Received in Lab: Fri 09.25.2020 10:50

Report Date: 09.28.2020 14:35

Project Manager: Jessica Kramer

Analysis Requested			Lab Id: Field Id: Depth: Matrix: Sampled:	673577-037 CS Bottom Hole 26 4'	SOIL	673577-038 CS Bottom Hole 27 4'	SOIL	673577-039 CS Bottom Hole 28 4'	SOIL	673577-040 CS Bottom Hole 29 4'	SOIL	673577-041 CS Bottom Hole 30 4'
BTEX by EPA 8021B			Extracted: Analyzed: Units/RL:	09.25.2020 11:30 09.26.2020 11:53 mg/kg RL <0.00202 0.00202	09.23.2020 00:00	09.25.2020 11:30 09.26.2020 12:14 mg/kg RL <0.00202 0.00202	09.23.2020 00:00	09.25.2020 11:30 09.26.2020 12:34 mg/kg RL <0.00202 0.00202	09.23.2020 00:00	09.25.2020 11:30 09.26.2020 12:55 mg/kg RL <0.00199 0.00199	09.23.2020 00:00	09.25.2020 16:30 09.25.2020 23:26 mg/kg RL <0.00200 0.00200
Benzene				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
Toluene				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
Ethylbenzene				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
m,p-Xylenes				<0.00404 0.00404		<0.00403 0.00403		<0.00403 0.00403		<0.00398 0.00398		<0.00400 0.00400
o-Xylene				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
Total Xylenes				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
Total BTEX				<0.00202 0.00202		<0.00202 0.00202		<0.00202 0.00202		<0.00199 0.00199		<0.00200 0.00200
Chloride by EPA 300			Extracted: Analyzed: Units/RL:	09.25.2020 17:30 09.25.2020 21:00 mg/kg RL 224 4.99	09.23.2020 00:00	09.25.2020 17:30 09.25.2020 21:16 mg/kg RL 173 5.05	09.23.2020 00:00	09.25.2020 17:30 09.25.2020 21:21 mg/kg RL 90.1 5.05	09.23.2020 00:00	09.25.2020 17:30 09.25.2020 21:26 mg/kg RL 418 4.95	09.23.2020 00:00	09.25.2020 17:30 09.25.2020 21:42 mg/kg RL 92.0 4.97
Chloride				09.25.2020 13:00 09.26.2020 09:35 mg/kg RL <50.0 50.0	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 09:58 mg/kg RL <49.9 49.9	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 10:20 mg/kg RL <50.0 50.0	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 10:43 mg/kg RL <49.9 49.9	09.23.2020 00:00	09.25.2020 17:00 09.26.2020 02:58 mg/kg RL <50.0 50.0
TPH By SW8015 Mod			Extracted: Analyzed: Units/RL:	09.25.2020 13:00 09.26.2020 09:35 mg/kg RL <50.0 50.0	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 09:58 mg/kg RL <49.9 49.9	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 10:20 mg/kg RL <50.0 50.0	09.23.2020 00:00	09.25.2020 13:00 09.26.2020 10:43 mg/kg RL <49.9 49.9	09.23.2020 00:00	09.25.2020 17:00 09.26.2020 02:58 mg/kg RL <50.0 50.0
Gasoline Range Hydrocarbons				<50.0 50.0		<49.9 49.9		<50.0 50.0		<49.9 49.9		<50.0 50.0
Diesel Range Organics				54.9 50.0		<49.9 49.9		90.7 50.0		103 49.9		<50.0 50.0
Motor Oil Range Hydrocarbons (MRO)				<50.0 50.0		<49.9 49.9		<50.0 50.0		<49.9 49.9		<50.0 50.0
Total TPH				54.9 50.0		<49.9 49.9		90.7 50.0		103 49.9		<50.0 50.0

BRL - Below Reporting Limit

Session Kramer

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



Environment Testing
Xenco

Analytical Report 673577

for

COG Operating, LLC

Project Manager: Ike Tavaréz

Emerald Federal #001 (9-16-19)

09.28.2020

Collected By: Client



**1211 W. Florida Ave
Midland TX 79701**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-20-38), Arizona (AZ0765), Florida (E871002-33), Louisiana (03054)
Oklahoma (2020-014), North Carolina (681), Arkansas (20-035-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-20-26), Arizona (AZ0809)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-20-18)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-20-23)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-21)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-20-8)
Xenco-Tampa: Florida (E87429), North Carolina (483)



09.28.2020

Project Manager: **Ike Tavaréz**

COG Operating, LLC

600 W Illinois

Midland, TX 79701

Reference: Eurofins Xenco, LLC Report No(s): **673577**

Emerald Federal #001 (9-16-19)

Project Address: Lea County NM

Ike Tavaréz:

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 Eurofins Xenco, LLC Report Number(s) 673577. 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 Eurofins Xenco, LLC. 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. 673577 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 Eurofins Xenco, LLC to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink that reads "Jessica Kramer".

Jessica Kramer

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico



Sample Cross Reference 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
CS North Wall 1	S	09.23.2020 00:00		673577-001
CS North Wall 2	S	09.23.2020 00:00		673577-002
CS North Wall 3	S	09.23.2020 00:00		673577-003
CS South Wall 1	S	09.23.2020 00:00		673577-004
CS South Wall 2	S	09.23.2020 00:00		673577-005
CS East Wall 1	S	09.23.2020 00:00		673577-006
CS East Wall 2	S	09.23.2020 00:00		673577-007
CS East Wall 3	S	09.23.2020 00:00		673577-008
CS West Wall 1	S	09.23.2020 00:00		673577-009
CS West Wall 2	S	09.23.2020 00:00		673577-010
CS West Wall 3	S	09.23.2020 00:00		673577-011
CS Bottom Hole 1 4'	S	09.23.2020 00:00		673577-012
CS Bottom Hole 2 4'	S	09.23.2020 00:00		673577-013
CS Bottom Hole 3 4'	S	09.23.2020 00:00		673577-014
CS Bottom Hole 4 4'	S	09.23.2020 00:00		673577-015
CS Bottom Hole 5 4'	S	09.23.2020 00:00		673577-016
CS Bottom Hole 6 4'	S	09.23.2020 00:00		673577-017
CS Bottom Hole 7 4'	S	09.23.2020 00:00		673577-018
CS Bottom Hole 8 4'	S	09.23.2020 00:00		673577-019
CS Bottom Hole 9 4'	S	09.23.2020 00:00		673577-020
CS Bottom Hole 10 4'	S	09.23.2020 00:00		673577-021
CS Bottom Hole 11 4'	S	09.23.2020 00:00		673577-022
CS Bottom Hole 12 4'	S	09.23.2020 00:00		673577-023
CS Bottom Hole 13 4'	S	09.23.2020 00:00		673577-024
CS Bottom Hole 14 4'	S	09.23.2020 00:00		673577-025
CS Bottom Hole 15 4'	S	09.23.2020 00:00		673577-026
CS Bottom Hole 16 4'	S	09.23.2020 00:00		673577-027
CS Bottom Hole 17 4'	S	09.23.2020 00:00		673577-028
CS Bottom Hole 18 4'	S	09.23.2020 00:00		673577-029
CS Bottom Hole 19 4'	S	09.23.2020 00:00		673577-030
CS Bottom Hole 20 4'	S	09.23.2020 00:00		673577-031
CS Bottom Hole 21 4'	S	09.23.2020 00:00		673577-032
CS Bottom Hole 22 4'	S	09.23.2020 00:00		673577-033
CS Bottom Hole 23 4'	S	09.23.2020 00:00		673577-034
CS Bottom Hole 24 4'	S	09.23.2020 00:00		673577-035
CS Bottom Hole 25 4'	S	09.23.2020 00:00		673577-036
CS Bottom Hole 26 4'	S	09.23.2020 00:00		673577-037
CS Bottom Hole 27 4'	S	09.23.2020 00:00		673577-038
CS Bottom Hole 28 4'	S	09.23.2020 00:00		673577-039
CS Bottom Hole 29 4'	S	09.23.2020 00:00		673577-040
CS Bottom Hole 30 4'	S	09.23.2020 00:00		673577-041

**CASE NARRATIVE****Client Name: COG Operating, LLC****Project Name: Emerald Federal #001 (9-16-19)**Project ID:
Work Order Number(s): 673577Report Date: 09.28.2020
Date Received: 09.25.2020**Sample receipt non conformances and comments:****Sample receipt non conformances and comments per sample:**

None

Analytical non conformances and comments:

Batch: LBA-3138191 BTEX by EPA 8021B

Lab Sample ID 673577-021 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). m,p-Xylenes recovered below QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 673577-021, -022, -023, -024, -025, -026, -027, -028, -029, -030, -031, -032, -033, -034, -035, -036, -037, -038, -039, -040.

The Laboratory Control Sample for m,p-Xylenes is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3138211 Chloride by EPA 300

Lab Sample ID 673577-023 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: 673577-013, -014, -015, -016, -017, -018, -019, -020, -021, -022, -023, -024, -025, -026, -027, -028, -029, -030, -031, -032.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3138213 Chloride by EPA 300

Lab Sample ID 673577-041 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered below QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 673577-033, -034, -035, -036, -037, -038, -039, -040, -041.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-001

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	93.4	4.98	mg/kg	09.25.2020 20:33		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	90	%	70-130	09.26.2020 02:30	
o-Terphenyl	84-15-1	91	%	70-130	09.26.2020 02:30	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-001

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	09.25.2020 17:26	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 17:26	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	101	%	70-130	09.25.2020 17:26		
1,4-Difluorobenzene	540-36-3	90	%	70-130	09.25.2020 17:26		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-002

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	80.5	4.98	mg/kg	09.25.2020 20:38		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 03:37	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	09.26.2020 03:37	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 03:37	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	09.26.2020 03:37	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	91	%	70-130	09.26.2020 03:37	
o-Terphenyl	84-15-1	91	%	70-130	09.26.2020 03:37	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-002

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.25.2020 17:46	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 17:46	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.25.2020 17:46		
4-Bromofluorobenzene	460-00-4	92	%	70-130	09.25.2020 17:46		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 3**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-003

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	181	4.99	mg/kg	09.25.2020 20:43		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 03:59	U	1
Diesel Range Organics	C10C28DRO	<49.8	49.8	mg/kg	09.26.2020 03:59	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 03:59	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	09.26.2020 03:59	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-130	09.26.2020 03:59	
o-Terphenyl	84-15-1	92	%	70-130	09.26.2020 03:59	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS North Wall 3**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-003

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	09.25.2020 18:07	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 18:07	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	96	%	70-130	09.25.2020 18:07	
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.25.2020 18:07	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS South Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-004

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	179	5.02	mg/kg	09.25.2020 20:59		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 04:21	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 04:21	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 04:21	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 04:21	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-130	09.26.2020 04:21	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 04:21	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS South Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-004

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	09.25.2020 18:28	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.25.2020 18:28	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.25.2020 18:28		
4-Bromofluorobenzene	460-00-4	93	%	70-130	09.25.2020 18:28		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS South Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-005

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	232	5.04	mg/kg	09.25.2020 21:04		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 04:44	U	1
Diesel Range Organics	C10C28DRO	50.2	50.0	mg/kg	09.26.2020 04:44		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 04:44	U	1
Total TPH	PHC635	50.2	50.0	mg/kg	09.26.2020 04:44		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-130	09.26.2020 04:44	
o-Terphenyl	84-15-1	94	%	70-130	09.26.2020 04:44	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS South Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-005

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	09.25.2020 18:48	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.25.2020 18:48	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.25.2020 18:48		
4-Bromofluorobenzene	460-00-4	99	%	70-130	09.25.2020 18:48		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-006

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	221	4.99	mg/kg	09.25.2020 21:20		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 05:06	U	1
Diesel Range Organics	C10C28DRO	50.5	49.9	mg/kg	09.26.2020 05:06		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 05:06	U	1
Total TPH	PHC635	50.5	49.9	mg/kg	09.26.2020 05:06		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	91	%	70-130	09.26.2020 05:06	
o-Terphenyl	84-15-1	92	%	70-130	09.26.2020 05:06	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-006

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	09.25.2020 19:09	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 19:09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	99	%	70-130	09.25.2020 19:09		
4-Bromofluorobenzene	460-00-4	105	%	70-130	09.25.2020 19:09		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-007

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	184	4.99	mg/kg	09.25.2020 21:25		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 05:28	U	1
Diesel Range Organics	C10C28DRO	<49.8	49.8	mg/kg	09.26.2020 05:28	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 05:28	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	09.26.2020 05:28	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-130	09.26.2020 05:28	
o-Terphenyl	84-15-1	95	%	70-130	09.26.2020 05:28	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-007

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	09.25.2020 19:30	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.25.2020 19:30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	110	%	70-130	09.25.2020 19:30		
1,4-Difluorobenzene	540-36-3	103	%	70-130	09.25.2020 19:30		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 3**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-008

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	38.2	4.97	mg/kg	09.25.2020 21:31		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 05:51	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 05:51	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 05:51	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 05:51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	89	%	70-130	09.26.2020 05:51	
o-Terphenyl	84-15-1	92	%	70-130	09.26.2020 05:51	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS East Wall 3**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-008

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	09.25.2020 19:51	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.25.2020 19:51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	95	%	70-130	09.25.2020 19:51		
4-Bromofluorobenzene	460-00-4	103	%	70-130	09.25.2020 19:51		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS West Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-009

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	181	4.98	mg/kg	09.25.2020 21:36		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 06:13	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 06:13	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 06:13	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 06:13	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-130	09.26.2020 06:13	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 06:13	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS West Wall 1**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-009

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	09.25.2020 20:11	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.25.2020 20:11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.25.2020 20:11		
4-Bromofluorobenzene	460-00-4	105	%	70-130	09.25.2020 20:11		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS West Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-010

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	184	5.00	mg/kg	09.25.2020 21:41		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 06:35	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	09.26.2020 06:35	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 06:35	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	09.26.2020 06:35	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	99	%	70-130	09.26.2020 06:35	
o-Terphenyl	84-15-1	95	%	70-130	09.26.2020 06:35	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS West Wall 2**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-010

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.25.2020 20:32	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 20:32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	100	%	70-130	09.25.2020 20:32		
1,4-Difluorobenzene	540-36-3	99	%	70-130	09.25.2020 20:32		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: CS West Wall 3

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-011

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	45.1	5.02	mg/kg	09.25.2020 21:46		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 07:21	U	1
Diesel Range Organics	C10C28DRO	<49.8	49.8	mg/kg	09.26.2020 07:21	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 07:21	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	09.26.2020 07:21	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	92	%	70-130	09.26.2020 07:21	
o-Terphenyl	84-15-1	80	%	70-130	09.26.2020 07:21	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS West Wall 3**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-011

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.25.2020 22:13	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.25.2020 22:13	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	101	%	70-130	09.25.2020 22:13	
1,4-Difluorobenzene	540-36-3	88	%	70-130	09.25.2020 22:13	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 1 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-012

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:10

Basis: Wet Weight

Seq Number: 3138209

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	102	5.01	mg/kg	09.25.2020 21:52		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 07:44	U	1
Diesel Range Organics	C10C28DRO	115	50.0	mg/kg	09.26.2020 07:44		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 07:44	U	1
Total TPH	PHC635	115	50.0	mg/kg	09.26.2020 07:44		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	111	%	70-130	09.26.2020 07:44	
o-Terphenyl	84-15-1	104	%	70-130	09.26.2020 07:44	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 1 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-012

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	09.25.2020 22:33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 22:33	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	95	%	70-130	09.25.2020 22:33		
4-Bromofluorobenzene	460-00-4	95	%	70-130	09.25.2020 22:33		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 2 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-013

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	80.7	4.96	mg/kg	09.25.2020 17:35	X	1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 08:06	U	1
Diesel Range Organics	C10C28DRO	106	50.0	mg/kg	09.26.2020 08:06		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 08:06	U	1
Total TPH	PHC635	106	50.0	mg/kg	09.26.2020 08:06		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	84	%	70-130	09.26.2020 08:06	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 08:06	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 2 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-013

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.25.2020 22:54	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 22:54	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.25.2020 22:54		
4-Bromofluorobenzene	460-00-4	95	%	70-130	09.25.2020 22:54		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 3 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-014

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	424	5.01	mg/kg	09.25.2020 17:51		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 08:29	U	1
Diesel Range Organics	C10C28DRO	101	49.9	mg/kg	09.26.2020 08:29		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 08:29	U	1
Total TPH	PHC635	101	49.9	mg/kg	09.26.2020 08:29		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-130	09.26.2020 08:29	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 08:29	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 3 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-014

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	09.25.2020 23:15	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
Total BTEX		<0.00201	0.00201	mg/kg	09.25.2020 23:15	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	09.25.2020 23:15		
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.25.2020 23:15		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 4 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-015

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	86.8	4.99	mg/kg	09.25.2020 17:56		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 08:51	U	1
Diesel Range Organics	C10C28DRO	99.4	49.8	mg/kg	09.26.2020 08:51		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 08:51	U	1
Total TPH	PHC635	99.4	49.8	mg/kg	09.26.2020 08:51		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	96	%	70-130	09.26.2020 08:51	
o-Terphenyl	84-15-1	83	%	70-130	09.26.2020 08:51	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 4 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-015

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	09.25.2020 23:35	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 23:35	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.25.2020 23:35		
1,4-Difluorobenzene	540-36-3	99	%	70-130	09.25.2020 23:35		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 5 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-016

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	85.9	4.99	mg/kg	09.25.2020 18:02		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 09:13	U	1
Diesel Range Organics	C10C28DRO	101	50.0	mg/kg	09.26.2020 09:13		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 09:13	U	1
Total TPH	PHC635	101	50.0	mg/kg	09.26.2020 09:13		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	98	%	70-130	09.26.2020 09:13	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 09:13	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 5 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-016

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	09.25.2020 23:56	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
Total BTEX		<0.00201	0.00201	mg/kg	09.25.2020 23:56	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.25.2020 23:56		
1,4-Difluorobenzene	540-36-3	94	%	70-130	09.25.2020 23:56		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 6 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-017

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	86.1	4.99	mg/kg	09.25.2020 18:07		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 09:35	U	1
Diesel Range Organics	C10C28DRO	112	49.9	mg/kg	09.26.2020 09:35		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 09:35	U	1
Total TPH	PHC635	112	49.9	mg/kg	09.26.2020 09:35		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-130	09.26.2020 09:35	
o-Terphenyl	84-15-1	93	%	70-130	09.26.2020 09:35	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 6 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-017

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.26.2020 00:17	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.26.2020 00:17	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	98	%	70-130	09.26.2020 00:17		
4-Bromofluorobenzene	460-00-4	101	%	70-130	09.26.2020 00:17		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 7 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-018

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	84.0	4.98	mg/kg	09.25.2020 18:23		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1
Diesel Range Organics	C10C28DRO	104	49.9	mg/kg	09.26.2020 09:58		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1
Total TPH	PHC635	104	49.9	mg/kg	09.26.2020 09:58		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	86	%	70-130	09.26.2020 09:58	
o-Terphenyl	84-15-1	88	%	70-130	09.26.2020 09:58	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 7 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-018

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	09.26.2020 00:37	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.26.2020 00:37	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	107	%	70-130	09.26.2020 00:37		
1,4-Difluorobenzene	540-36-3	98	%	70-130	09.26.2020 00:37		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 8 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-019

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	88.0	4.97	mg/kg	09.25.2020 18:28		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 10:20	U	1
Diesel Range Organics	C10C28DRO	101	49.9	mg/kg	09.26.2020 10:20		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 10:20	U	1
Total TPH	PHC635	101	49.9	mg/kg	09.26.2020 10:20		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	92	%	70-130	09.26.2020 10:20	
o-Terphenyl	84-15-1	91	%	70-130	09.26.2020 10:20	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 8 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-019

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	09.26.2020 00:58	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.26.2020 00:58	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	09.26.2020 00:58		
1,4-Difluorobenzene	540-36-3	100	%	70-130	09.26.2020 00:58		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 9 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-020

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	223	5.03	mg/kg	09.25.2020 18:33		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138221

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 10:43	U	1
Diesel Range Organics	C10C28DRO	53.8	50.0	mg/kg	09.26.2020 10:43		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 10:43	U	1
Total TPH	PHC635	53.8	50.0	mg/kg	09.26.2020 10:43		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-130	09.26.2020 10:43	
o-Terphenyl	84-15-1	94	%	70-130	09.26.2020 10:43	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 9 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-020

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:00

Basis: Wet Weight

Seq Number: 3138190

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 01:19	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 01:19	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	105	%	70-130	09.26.2020 01:19		
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.26.2020 01:19		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 10 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-021

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	227	5.02	mg/kg	09.25.2020 18:38		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 02:30	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	93	%	70-130	09.26.2020 02:30	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 02:30	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 10 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-021

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	09.26.2020 05:01	UX	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.26.2020 05:01	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	88	%	70-130	09.26.2020 05:01		
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.26.2020 05:01		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 11 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-022

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	153	5.05	mg/kg	09.25.2020 18:44		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 03:37	U	1
Diesel Range Organics	C10C28DRO	55.9	50.0	mg/kg	09.26.2020 03:37		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 03:37	U	1
Total TPH	PHC635	55.9	50.0	mg/kg	09.26.2020 03:37		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	94	%	70-130	09.26.2020 03:37	
o-Terphenyl	84-15-1	94	%	70-130	09.26.2020 03:37	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 11 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-022

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.26.2020 05:21	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.26.2020 05:21	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	97	%	70-130	09.26.2020 05:21		
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.26.2020 05:21		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 12 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-023

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	433	4.98	mg/kg	09.25.2020 18:49		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 03:59	U	1
Diesel Range Organics	C10C28DRO	101	49.9	mg/kg	09.26.2020 03:59		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 03:59	U	1
Total TPH	PHC635	101	49.9	mg/kg	09.26.2020 03:59		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	85	%	70-130	09.26.2020 03:59	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 03:59	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 12 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-023

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
m,p-Xylenes	179601-23-1	<0.00396	0.00396	mg/kg	09.26.2020 05:42	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.26.2020 05:42	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	94	%	70-130	09.26.2020 05:42		
4-Bromofluorobenzene	460-00-4	97	%	70-130	09.26.2020 05:42		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 13 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-024

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	229	5.02	mg/kg	09.25.2020 19:05		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 04:21	U	1
Diesel Range Organics	C10C28DRO	53.6	49.8	mg/kg	09.26.2020 04:21		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 04:21	U	1
Total TPH	PHC635	53.6	49.8	mg/kg	09.26.2020 04:21		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	88	%	70-130	09.26.2020 04:21	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 04:21	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 13 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-024

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 06:03	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 06:03	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.26.2020 06:03		
4-Bromofluorobenzene	460-00-4	95	%	70-130	09.26.2020 06:03		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 14 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-025

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	170	4.97	mg/kg	09.25.2020 19:10		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 04:44	U	1
Diesel Range Organics	C10C28DRO	50.9	50.0	mg/kg	09.26.2020 04:44		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 04:44	U	1
Total TPH	PHC635	50.9	50.0	mg/kg	09.26.2020 04:44		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	86	%	70-130	09.26.2020 04:44	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 04:44	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 14 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-025

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	09.26.2020 06:24	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.26.2020 06:24	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	94	%	70-130	09.26.2020 06:24		
1,4-Difluorobenzene	540-36-3	91	%	70-130	09.26.2020 06:24		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 15 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-026

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	86.0	4.99	mg/kg	09.25.2020 19:26		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 05:06	U	1
Diesel Range Organics	C10C28DRO	95.5	49.9	mg/kg	09.26.2020 05:06		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 05:06	U	1
Total TPH	PHC635	95.5	49.9	mg/kg	09.26.2020 05:06		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	83	%	70-130	09.26.2020 05:06	
o-Terphenyl	84-15-1	80	%	70-130	09.26.2020 05:06	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 15 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-026

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 06:44	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 06:44	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.26.2020 06:44		
4-Bromofluorobenzene	460-00-4	102	%	70-130	09.26.2020 06:44		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 16 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-027

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	87.0	5.00	mg/kg	09.25.2020 19:31		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 05:28	U	1
Diesel Range Organics	C10C28DRO	109	50.0	mg/kg	09.26.2020 05:28		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 05:28	U	1
Total TPH	PHC635	109	50.0	mg/kg	09.26.2020 05:28		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	85	%	70-130	09.26.2020 05:28	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 05:28	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 16 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-027

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	09.26.2020 07:05	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
Total BTEX		<0.00201	0.00201	mg/kg	09.26.2020 07:05	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	99	%	70-130	09.26.2020 07:05		
1,4-Difluorobenzene	540-36-3	94	%	70-130	09.26.2020 07:05		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 17 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-028

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	226	4.96	mg/kg	09.25.2020 19:36		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 05:51	U	1
Diesel Range Organics	C10C28DRO	54.8	49.9	mg/kg	09.26.2020 05:51		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 05:51	U	1
Total TPH	PHC635	54.8	49.9	mg/kg	09.26.2020 05:51		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	86	%	70-130	09.26.2020 05:51	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 05:51	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 17 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-028

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	09.26.2020 07:26	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
Total BTEX		<0.00201	0.00201	mg/kg	09.26.2020 07:26	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.26.2020 07:26		
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.26.2020 07:26		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 18 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-029

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	223	4.97	mg/kg	09.25.2020 19:41		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	09.26.2020 06:13	U	1
Diesel Range Organics	C10C28DRO	59.4	49.8	mg/kg	09.26.2020 06:13		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	09.26.2020 06:13	U	1
Total TPH	PHC635	59.4	49.8	mg/kg	09.26.2020 06:13		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	84	%	70-130	09.26.2020 06:13	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 06:13	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 18 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-029

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 07:47	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 07:47	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	09.26.2020 07:47		
4-Bromofluorobenzene	460-00-4	121	%	70-130	09.26.2020 07:47		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 19 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-030

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	422	4.95	mg/kg	09.25.2020 19:47		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 06:35	U	1
Diesel Range Organics	C10C28DRO	99.3	50.0	mg/kg	09.26.2020 06:35		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 06:35	U	1
Total TPH	PHC635	99.3	50.0	mg/kg	09.26.2020 06:35		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	88	%	70-130	09.26.2020 06:35	
o-Terphenyl	84-15-1	85	%	70-130	09.26.2020 06:35	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 19 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-030

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 08:08	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 08:08	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	110	%	70-130	09.26.2020 08:08		
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.26.2020 08:08		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 20 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-031

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	88.6	5.02	mg/kg	09.25.2020 19:52		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 07:21	U	1
Diesel Range Organics	C10C28DRO	101	49.9	mg/kg	09.26.2020 07:21		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 07:21	U	1
Total TPH	PHC635	101	49.9	mg/kg	09.26.2020 07:21		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	81	%	70-130	09.26.2020 07:21	
o-Terphenyl	84-15-1	83	%	70-130	09.26.2020 07:21	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 20 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-031

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 09:48	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 09:48	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	94	%	70-130	09.26.2020 09:48		
4-Bromofluorobenzene	460-00-4	106	%	70-130	09.26.2020 09:48		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 21 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-032

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:20

Basis: Wet Weight

Seq Number: 3138211

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	213	5.05	mg/kg	09.25.2020 19:57		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 07:44	U	1
Diesel Range Organics	C10C28DRO	53.6	50.0	mg/kg	09.26.2020 07:44		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 07:44	U	1
Total TPH	PHC635	53.6	50.0	mg/kg	09.26.2020 07:44		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	83	%	70-130	09.26.2020 07:44	
o-Terphenyl	84-15-1	81	%	70-130	09.26.2020 07:44	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 21 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-032

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	09.26.2020 10:09	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
Total BTEX		<0.00198	0.00198	mg/kg	09.26.2020 10:09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	91	%	70-130	09.26.2020 10:09		
4-Bromofluorobenzene	460-00-4	93	%	70-130	09.26.2020 10:09		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 22 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-033

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	220	5.05	mg/kg	09.25.2020 20:29	X	1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 08:06	U	1
Diesel Range Organics	C10C28DRO	50.7	49.9	mg/kg	09.26.2020 08:06		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 08:06	U	1
Total TPH	PHC635	50.7	49.9	mg/kg	09.26.2020 08:06		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	85	%	70-130	09.26.2020 08:06	
o-Terphenyl	84-15-1	84	%	70-130	09.26.2020 08:06	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 22 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-033

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	09.26.2020 10:30	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.26.2020 10:30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	93	%	70-130	09.26.2020 10:30		
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.26.2020 10:30		



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 23 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-034

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	424	4.98	mg/kg	09.25.2020 20:44		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 08:29	U	1
Diesel Range Organics	C10C28DRO	95.9	50.0	mg/kg	09.26.2020 08:29		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 08:29	U	1
Total TPH	PHC635	95.9	50.0	mg/kg	09.26.2020 08:29		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	81	%	70-130	09.26.2020 08:29	
o-Terphenyl	84-15-1	81	%	70-130	09.26.2020 08:29	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 23 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-034

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	09.26.2020 10:51	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.26.2020 10:51	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.26.2020 10:51		
1,4-Difluorobenzene	540-36-3	94	%	70-130	09.26.2020 10:51		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 24 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-035

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	173	4.96	mg/kg	09.25.2020 20:50		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 08:51	U	1
Diesel Range Organics	C10C28DRO	51.0	50.0	mg/kg	09.26.2020 08:51		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 08:51	U	1
Total TPH	PHC635	51.0	50.0	mg/kg	09.26.2020 08:51		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	81	%	70-130	09.26.2020 08:51	
o-Terphenyl	84-15-1	82	%	70-130	09.26.2020 08:51	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 24 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-035

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 11:11	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 11:11	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	92	%	70-130	09.26.2020 11:11		
4-Bromofluorobenzene	460-00-4	103	%	70-130	09.26.2020 11:11		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 25 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-036

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	217	5.03	mg/kg	09.25.2020 20:55		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 09:13	U	1
Diesel Range Organics	C10C28DRO	51.4	49.9	mg/kg	09.26.2020 09:13		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 09:13	U	1
Total TPH	PHC635	51.4	49.9	mg/kg	09.26.2020 09:13		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	82	%	70-130	09.26.2020 09:13	
o-Terphenyl	84-15-1	81	%	70-130	09.26.2020 09:13	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 25 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-036

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	09.26.2020 11:32	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
Total BTEX		<0.00201	0.00201	mg/kg	09.26.2020 11:32	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.26.2020 11:32		
4-Bromofluorobenzene	460-00-4	105	%	70-130	09.26.2020 11:32		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 26 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-037

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	224	4.99	mg/kg	09.25.2020 21:00		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 09:35	U	1
Diesel Range Organics	C10C28DRO	54.9	50.0	mg/kg	09.26.2020 09:35		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 09:35	U	1
Total TPH	PHC635	54.9	50.0	mg/kg	09.26.2020 09:35		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	83	%	70-130	09.26.2020 09:35	
o-Terphenyl	84-15-1	83	%	70-130	09.26.2020 09:35	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 26 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-037

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	09.26.2020 11:53	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.26.2020 11:53	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	109	%	70-130	09.26.2020 11:53	
1,4-Difluorobenzene	540-36-3	95	%	70-130	09.26.2020 11:53	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 27 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-038

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	173	5.05	mg/kg	09.25.2020 21:16		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	09.26.2020 09:58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	90	%	70-130	09.26.2020 09:58	
o-Terphenyl	84-15-1	89	%	70-130	09.26.2020 09:58	



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COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 27 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-038

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	09.26.2020 12:14	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.26.2020 12:14	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	107	%	70-130	09.26.2020 12:14		
1,4-Difluorobenzene	540-36-3	97	%	70-130	09.26.2020 12:14		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 28 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-039

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	90.1	5.05	mg/kg	09.25.2020 21:21		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 10:20	U	1
Diesel Range Organics	C10C28DRO	90.7	50.0	mg/kg	09.26.2020 10:20		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 10:20	U	1
Total TPH	PHC635	90.7	50.0	mg/kg	09.26.2020 10:20		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	83	%	70-130	09.26.2020 10:20	
o-Terphenyl	84-15-1	80	%	70-130	09.26.2020 10:20	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 28 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-039

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
m,p-Xylenes	179601-23-1	<0.00403	0.00403	mg/kg	09.26.2020 12:34	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
Total BTEX		<0.00202	0.00202	mg/kg	09.26.2020 12:34	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	113	%	70-130	09.26.2020 12:34		
1,4-Difluorobenzene	540-36-3	96	%	70-130	09.26.2020 12:34		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 29 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-040

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	418	4.95	mg/kg	09.25.2020 21:26		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 13:00

Basis: Wet Weight

Seq Number: 3138223

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	09.26.2020 10:43	U	1
Diesel Range Organics	C10C28DRO	103	49.9	mg/kg	09.26.2020 10:43		1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	09.26.2020 10:43	U	1
Total TPH	PHC635	103	49.9	mg/kg	09.26.2020 10:43		1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	86	%	70-130	09.26.2020 10:43	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 10:43	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 29 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-040

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 11:30

Basis: Wet Weight

Seq Number: 3138191

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	09.26.2020 12:55	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
Total BTEX		<0.00199	0.00199	mg/kg	09.26.2020 12:55	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	114	%	70-130	09.26.2020 12:55		
1,4-Difluorobenzene	540-36-3	91	%	70-130	09.26.2020 12:55		



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 30 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-041

Date Collected: 09.23.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 09.25.2020 17:30

Basis: Wet Weight

Seq Number: 3138213

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	92.0	4.97	mg/kg	09.25.2020 21:42		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 09.25.2020 17:00

Basis: Wet Weight

Seq Number: 3138217

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	09.26.2020 02:58	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	09.26.2020 02:58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	09.26.2020 02:58	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	09.26.2020 02:58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	80	%	70-130	09.26.2020 02:58	
o-Terphenyl	84-15-1	86	%	70-130	09.26.2020 02:58	



Certificate of Analytical Results 673577

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 30 4'**

Matrix: Soil

Date Received: 09.25.2020 10:50

Lab Sample Id: 673577-041

Date Collected: 09.23.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 09.25.2020 16:30

Basis: Wet Weight

Seq Number: 3138189

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	09.25.2020 23:26	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
Total BTEX		<0.00200	0.00200	mg/kg	09.25.2020 23:26	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	104	%	70-130	09.25.2020 23:26		
1,4-Difluorobenzene	540-36-3	99	%	70-130	09.25.2020 23:26		

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. **ND** Not Detected.

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



COG Operating, LLC
Emerald Federal #001 (9-16-19)

Analytical Method: Chloride by EPA 300

Seq Number: 3138209

MB Sample Id: 7712136-1-BLK

Matrix: Solid

LCS Sample Id: 7712136-1-BKS

Prep Method: E300P

Date Prep: 09.25.2020

LCSD Sample Id: 7712136-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	271	108	271	108	90-110	0	20	mg/kg	09.25.2020 19:19	

Analytical Method: Chloride by EPA 300

Seq Number: 3138211

MB Sample Id: 7712137-1-BLK

Matrix: Solid

LCS Sample Id: 7712137-1-BKS

Prep Method: E300P

Date Prep: 09.25.2020

LCSD Sample Id: 7712137-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	273	109	268	107	90-110	2	20	mg/kg	09.25.2020 17:25	

Analytical Method: Chloride by EPA 300

Seq Number: 3138213

MB Sample Id: 7712139-1-BLK

Matrix: Solid

LCS Sample Id: 7712139-1-BKS

Prep Method: E300P

Date Prep: 09.25.2020

LCSD Sample Id: 7712139-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	273	109	268	107	90-110	2	20	mg/kg	09.25.2020 20:18	

Analytical Method: Chloride by EPA 300

Seq Number: 3138209

Parent Sample Id: 673459-001

Matrix: Soil

MS Sample Id: 673459-001 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673459-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	18.4	252	283	105	283	105	90-110	0	20	mg/kg	09.25.2020 19:35	

Analytical Method: Chloride by EPA 300

Seq Number: 3138209

Parent Sample Id: 673577-003

Matrix: Soil

MS Sample Id: 673577-003 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673577-003 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	181	250	439	103	438	103	90-110	0	20	mg/kg	09.25.2020 20:48	

Analytical Method: Chloride by EPA 300

Seq Number: 3138211

Parent Sample Id: 673577-013

Matrix: Soil

MS Sample Id: 673577-013 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673577-013 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	80.7	248	370	117	346	107	90-110	7	20	mg/kg	09.25.2020 17:41	X

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



COG Operating, LLC

Emerald Federal #001 (9-16-19)

Analytical Method: Chloride by EPA 300

Seq Number: 3138211

Parent Sample Id: 673577-023

Matrix: Soil

MS Sample Id: 673577-023 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673577-023 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	433	249	693	104	677	98	90-110	2	20	mg/kg	09.25.2020 18:54	

Analytical Method: Chloride by EPA 300

Seq Number: 3138213

Parent Sample Id: 673577-033

Matrix: Soil

MS Sample Id: 673577-033 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673577-033 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	220	253	444	89	438	86	90-110	1	20	mg/kg	09.25.2020 20:34	X

Analytical Method: Chloride by EPA 300

Seq Number: 3138213

Parent Sample Id: 673577-041

Matrix: Soil

MS Sample Id: 673577-041 S

Prep Method: E300P

Date Prep: 09.25.2020

MSD Sample Id: 673577-041 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	92.0	249	361	108	355	106	90-110	2	20	mg/kg	09.25.2020 21:47	

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138221

MB Sample Id: 7712153-1-BLK

Matrix: Solid

LCS Sample Id: 7712153-1-BKS

Prep Method: SW8015P

Date Prep: 09.25.2020

LCSD Sample Id: 7712153-1-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	1140	114	1120	112	70-130	2	20	mg/kg	09.26.2020 01:46	
Diesel Range Organics	<50.0	1000	1110	111	1110	111	70-130	0	20	mg/kg	09.26.2020 01:46	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	89		105		101		70-130	%	09.26.2020 01:46
o-Terphenyl	94		90		87		70-130	%	09.26.2020 01:46

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138223

MB Sample Id: 7712155-1-BLK

Matrix: Solid

LCS Sample Id: 7712155-1-BKS

Prep Method: SW8015P

Date Prep: 09.25.2020

LCSD Sample Id: 7712155-1-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	1040	104	1020	102	70-130	2	20	mg/kg	09.26.2020 01:46	
Diesel Range Organics	<50.0	1000	1040	104	1030	103	70-130	1	20	mg/kg	09.26.2020 01:46	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	87		100		97		70-130	%	09.26.2020 01:46
o-Terphenyl	82		92		90		70-130	%	09.26.2020 01:46

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec

COG Operating, LLC

Emerald Federal #001 (9-16-19)

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138217

MB Sample Id: 7712148-1-BLK

Matrix: Solid

LCS Sample Id: 7712148-1-BKS

Prep Method: SW8015P

Date Prep: 09.25.2020

LCSD Sample Id: 7712148-1-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	1080	108	1080	108	70-130	0	20	mg/kg	09.25.2020 20:10	
Diesel Range Organics	<50.0	1000	1100	110	1080	108	70-130	2	20	mg/kg	09.25.2020 20:10	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	89		104		105		70-130	%	09.25.2020 20:10
o-Terphenyl	101		111		105		70-130	%	09.25.2020 20:10

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138221

Matrix: Solid

MB Sample Id: 7712153-1-BLK

Prep Method: SW8015P

Date Prep: 09.25.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	09.26.2020 01:23	

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138223

Matrix: Solid

MB Sample Id: 7712155-1-BLK

Prep Method: SW8015P

Date Prep: 09.25.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	09.26.2020 01:23	

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138217

Matrix: Solid

MB Sample Id: 7712148-1-BLK

Prep Method: SW8015P

Date Prep: 09.25.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	09.25.2020 19:50	

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138221

Matrix: Soil

Parent Sample Id: 673577-001

MS Sample Id: 673577-001 S

Prep Method: SW8015P

Date Prep: 09.25.2020

MSD Sample Id: 673577-001 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	<49.9	998	1110	111	1110	111	70-130	0	20	mg/kg	09.26.2020 02:53	
Diesel Range Organics	<49.9	998	1110	111	1130	113	70-130	2	20	mg/kg	09.26.2020 02:53	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	100		99		70-130	%	09.26.2020 02:53
o-Terphenyl	85		87		70-130	%	09.26.2020 02:53

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec

COG Operating, LLC

Emerald Federal #001 (9-16-19)

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138223

Parent Sample Id: 673577-021

Matrix: Soil

MS Sample Id: 673577-021 S

Prep Method: SW8015P

Date Prep: 09.25.2020

MSD Sample Id: 673577-021 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	<49.9	997	925	93	936	94	70-130	1	20	mg/kg	09.26.2020 02:53	
Diesel Range Organics	<49.9	997	878	88	939	94	70-130	7	20	mg/kg	09.26.2020 02:53	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	93		98		70-130	%	09.26.2020 02:53
o-Terphenyl	83		87		70-130	%	09.26.2020 02:53

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138217

Parent Sample Id: 673554-001

Matrix: Soil

MS Sample Id: 673554-001 S

Prep Method: SW8015P

Date Prep: 09.25.2020

MSD Sample Id: 673554-001 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	<49.9	998	890	89	960	96	70-130	8	20	mg/kg	09.25.2020 21:08	
Diesel Range Organics	<49.9	998	924	93	1010	101	70-130	9	20	mg/kg	09.25.2020 21:08	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	95		97		70-130	%	09.25.2020 21:08
o-Terphenyl	93		100		70-130	%	09.25.2020 21:08

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138190

MB Sample Id: 7712133-1-BLK

Matrix: Solid

LCS Sample Id: 7712133-1-BKS

Prep Method: SW5035A

Date Prep: 09.25.2020

LCSD Sample Id: 7712133-1-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	0.106	106	0.121	121	70-130	13	35	mg/kg	09.25.2020 14:01	
Toluene	<0.00200	0.100	0.106	106	0.121	121	70-130	13	35	mg/kg	09.25.2020 14:01	
Ethylbenzene	<0.00200	0.100	0.104	104	0.118	118	70-130	13	35	mg/kg	09.25.2020 14:01	
m,p-Xylenes	<0.00400	0.200	0.201	101	0.230	115	70-130	13	35	mg/kg	09.25.2020 14:01	
o-Xylene	<0.00200	0.100	0.101	101	0.115	115	70-130	13	35	mg/kg	09.25.2020 14:01	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	82		94		94		70-130	%	09.25.2020 14:01
4-Bromofluorobenzene	90		96		106		70-130	%	09.25.2020 14:01

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



COG Operating, LLC
Emerald Federal #001 (9-16-19)

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138191

Matrix: Solid

Prep Method: SW5035A

Date Prep: 09.25.2020

MB Sample Id: 7712134-1-BLK

LCS Sample Id: 7712134-1-BKS

LCSD Sample Id: 7712134-1-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	0.108	108	0.0995	100	70-130	8	35	mg/kg	09.26.2020 02:30	
Toluene	<0.00200	0.100	0.106	106	0.103	103	70-130	3	35	mg/kg	09.26.2020 02:30	
Ethylbenzene	<0.00200	0.100	0.101	101	0.0924	92	70-130	9	35	mg/kg	09.26.2020 02:30	
m,p-Xylenes	<0.00400	0.200	0.193	97	0.176	88	70-130	9	35	mg/kg	09.26.2020 02:30	
o-Xylene	<0.00200	0.100	0.100	100	0.0936	94	70-130	7	35	mg/kg	09.26.2020 02:30	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	80		104		96		70-130	%	09.26.2020 02:30
4-Bromofluorobenzene	92		97		95		70-130	%	09.26.2020 02:30

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138189

Matrix: Solid

Prep Method: SW5035A

Date Prep: 09.25.2020

MB Sample Id: 7712132-1-BLK

LCS Sample Id: 7712132-1-BKS

LCSD Sample Id: 7712132-1-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	0.0900	90	0.0922	92	70-130	2	35	mg/kg	09.25.2020 20:44	
Toluene	<0.00200	0.100	0.0988	99	0.0893	89	70-130	10	35	mg/kg	09.25.2020 20:44	
Ethylbenzene	<0.00200	0.100	0.0879	88	0.0897	90	70-130	2	35	mg/kg	09.25.2020 20:44	
m,p-Xylenes	<0.00400	0.200	0.172	86	0.176	88	70-130	2	35	mg/kg	09.25.2020 20:44	
o-Xylene	<0.00200	0.100	0.0870	87	0.0897	90	70-130	3	35	mg/kg	09.25.2020 20:44	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	98		97		98		70-130	%	09.25.2020 20:44
4-Bromofluorobenzene	101		97		98		70-130	%	09.25.2020 20:44

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138190

Matrix: Soil

Prep Method: SW5035A

Date Prep: 09.25.2020

Parent Sample Id: 673577-001

MS Sample Id: 673577-001 S

MSD Sample Id: 673577-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.107	107	0.0983	99	70-130	8	35	mg/kg	09.25.2020 15:23	
Toluene	<0.00200	0.100	0.104	104	0.0972	98	70-130	7	35	mg/kg	09.25.2020 15:23	
Ethylbenzene	<0.00200	0.100	0.0971	97	0.0900	91	70-130	8	35	mg/kg	09.25.2020 15:23	
m,p-Xylenes	<0.00401	0.200	0.185	93	0.173	87	70-130	7	35	mg/kg	09.25.2020 15:23	
o-Xylene	<0.00200	0.100	0.0936	94	0.0898	90	70-130	4	35	mg/kg	09.25.2020 15:23	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	100		100		70-130	%	09.25.2020 15:23
4-Bromofluorobenzene	103		104		70-130	%	09.25.2020 15:23

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



COG Operating, LLC
Emerald Federal #001 (9-16-19)

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138191

Parent Sample Id: 673577-021

Matrix: Soil

MS Sample Id: 673577-021 S

Prep Method: SW5035A

Date Prep: 09.25.2020

MSD Sample Id: 673577-021 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00199	0.0996	0.0803	81	0.0946	95	70-130	16	35	mg/kg	09.26.2020 03:11	
Toluene	<0.00199	0.0996	0.0783	79	0.0900	90	70-130	14	35	mg/kg	09.26.2020 03:11	
Ethylbenzene	<0.00199	0.0996	0.0718	72	0.0848	85	70-130	17	35	mg/kg	09.26.2020 03:11	
m,p-Xylenes	<0.00398	0.199	0.136	68	0.161	81	70-130	17	35	mg/kg	09.26.2020 03:11	X
o-Xylene	<0.00199	0.0996	0.0717	72	0.0810	81	70-130	12	35	mg/kg	09.26.2020 03:11	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	99		99		70-130	%	09.26.2020 03:11
4-Bromofluorobenzene	100		102		70-130	%	09.26.2020 03:11

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138189

Parent Sample Id: 673277-082

Matrix: Soil

MS Sample Id: 673277-082 S

Prep Method: SW5035A

Date Prep: 09.25.2020

MSD Sample Id: 673277-082 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.0867	87	0.0834	84	70-130	4	35	mg/kg	09.25.2020 21:25	
Toluene	<0.00200	0.100	0.0880	88	0.0890	90	70-130	1	35	mg/kg	09.25.2020 21:25	
Ethylbenzene	<0.00200	0.100	0.0808	81	0.0786	79	70-130	3	35	mg/kg	09.25.2020 21:25	
m,p-Xylenes	<0.00400	0.200	0.158	79	0.153	77	70-130	3	35	mg/kg	09.25.2020 21:25	
o-Xylene	<0.00200	0.100	0.0801	80	0.0772	78	70-130	4	35	mg/kg	09.25.2020 21:25	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	98		97		70-130	%	09.25.2020 21:25
4-Bromofluorobenzene	102		102		70-130	%	09.25.2020 21:25

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



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

473571

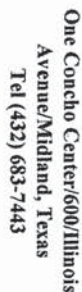
[illegible]



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

673577

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673577

Final 1.000

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

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1. D. I.

Eurofins Xenco, LLC

Prelogin/Nonconformance Report- Sample Log-In

Client: COG Operating, LLC

Date/ Time Received: 09.25.2020 10.50.00 AM

Work Order #: 673577

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR-8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	.1
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#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)?	N/A
#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:



Brianna Teel

Date: 09.25.2020

Checklist reviewed by:



Jessica Kramer

Date: 09.25.2020

Certificate of Analysis Summary 674139
COG Operating LLC, Artesia, NM

Project Id:

Contact: Ike Tavaréz

Project Location: Lea County, NM

Date Received in Lab: Fri 10.02.2020 08:50

Report Date: 10.05.2020 13:06

Project Manager: Jessica Kramer

Project Name: Emerald Federal #001 (9-16-19)

Analysis Requested	Lab Id:	Field Id:	Depth:	Matrix:	Sampled:	674139-001	674139-002	674139-003	674139-004	674139-005	674139-006
	Extracted:	Analyzed:	Units/RL:			CS Bottom Hole 1 4.5'	CS Bottom Hole 2 4.5'	CS Bottom Hole 3 4.5'	CS Bottom Hole 5 4.5'	CS Bottom Hole 6 4.5'	CS Bottom Hole 7 4.5'
						SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						09.30.2020 00:00	09.30.2020 00:00	09.30.2020 00:00	09.30.2020 00:00	09.30.2020 00:00	09.30.2020 00:00
						10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00
BTEX by EPA 8021B						10.02.2020 12:49	10.02.2020 13:09	10.02.2020 13:30	10.02.2020 13:50	10.02.2020 14:11	10.02.2020 14:31
Benzene						mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
Toluene						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
Ethylbenzene						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
m,p-Xylenes						<0.00404 0.00404	<0.00397 0.00397	<0.00402 0.00402	<0.00398 0.00398	<0.00398 0.00398	<0.00399 0.00399
o-Xylene						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
Total Xylenes						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
Total BTEX						<0.00202 0.00202	<0.00198 0.00198	<0.00201 0.00201	<0.00199 0.00199	<0.00199 0.00199	<0.00200 0.00200
Chloride by EPA 300											
Extracted:						10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25
Analyzed:						10.03.2020 14:06	10.03.2020 14:13	10.03.2020 14:19	10.03.2020 14:25	10.03.2020 14:44	10.03.2020 14:50
Units/RL:						mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride						69.8 5.04	69.3 4.98	69.8 5.00	68.0 5.02	74.1 4.98	68.8 5.00
TPH By SW8015 Mod											
Extracted:						10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00
Analyzed:						10.02.2020 15:25	10.02.2020 16:23	10.02.2020 16:43	10.02.2020 17:02	10.02.2020 17:40	10.02.2020 18:00
Units/RL:						mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons						<50.0 50.0	<49.9 49.9	<49.9 49.9	<49.8 49.8	<50.0 50.0	<50.0 50.0
Diesel Range Organics						<50.0 50.0	<49.9 49.9	<49.9 49.9	<49.8 49.8	<50.0 50.0	<50.0 50.0
Motor Oil Range Hydrocarbons (MRO)						<50.0 50.0	<49.9 49.9	<49.9 49.9	<49.8 49.8	<50.0 50.0	<50.0 50.0
Total TPH						<50.0 50.0	<49.9 49.9	<49.9 49.9	<49.8 49.8	<50.0 50.0	<50.0 50.0

BRL - Below Reporting Limit

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer

Certificate of Analysis Summary 674139
COG Operating LLC, Artesia, NM
Project Name: Emerald Federal #001 (9-16-19)

Project Id:
Contact: Ike Tavaréz
Project Location: Lea County, NM

Date Received in Lab: Fri 10.02.2020 08:50
Report Date: 10.05.2020 13:06
Project Manager: Jessica Kramer

Analysis Requested			Lab Id: Field Id: Depth: Matrix: Sampled:	674139-007 CS Bottom Hole 8 4.5' SOIL 09.30.2020 00:00	674139-008 CS Bottom Hole 12 4.5' SOIL 09.30.2020 00:00	674139-009 CS Bottom Hole 16 4.5' SOIL 09.30.2020 00:00	674139-010 CS Bottom Hole 31 1' SOIL 09.30.2020 00:00	
BTEX by EPA 8021B	Extracted:			10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00	10.02.2020 09:00	
	Analyzed:			10.02.2020 14:52	10.02.2020 15:12	10.02.2020 15:33	10.02.2020 15:53	
	Units/RL:			mg/kg RL <0.00201 0.00201	mg/kg RL <0.00199 0.00199	mg/kg RL <0.00200 0.00200	mg/kg RL <0.00199 0.00199	
	Benzene							
	Toluene							
	Ethylbenzene							
Chloride by EPA 300	m,p-Xylenes							
	o-Xylene							
	Total Xylenes							
	Total BTEX							
	Extracted:			10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25	10.02.2020 11:25	
	Analyzed:			10.03.2020 14:56	10.03.2020 15:03	10.03.2020 15:09	10.03.2020 15:15	
TPH By SW8015 Mod	Units/RL:			mg/kg RL 70.5 5.03	mg/kg RL 70.2 4.95	mg/kg RL 66.1 5.05	mg/kg RL 64.3 X 5.00	
	Chloride							
	Extracted:			10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00	10.02.2020 11:00	
	Analyzed:			10.02.2020 18:19	10.02.2020 18:39	10.02.2020 18:58	10.02.2020 19:17	
	Units/RL:			mg/kg RL <49.9 49.9	mg/kg RL <50.0 50.0	mg/kg RL <50.0 50.0	mg/kg RL <49.9 49.9	
	Gasoline Range Hydrocarbons							
Motor Oil Range Hydrocarbons (MRO)	Diesel Range Organics							
	Motor Oil Range Hydrocarbons (MRO)							
	Total TPH							

BRL - Below Reporting Limit

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer



Environment Testing
Xenco

Analytical Report 674139

for

COG Operating LLC

Project Manager: Ike Tavaréz

Emerald Federal #001 (9-16-19)

10.05.2020

Collected By: Client



**1211 W. Florida Ave
Midland TX 79701**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-20-38), Arizona (AZ0765), Florida (E871002-33), Louisiana (03054)
Oklahoma (2020-014), North Carolina (681), Arkansas (20-035-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-20-26), Arizona (AZ0809)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-20-18)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-20-23)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-21)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-20-8)
Xenco-Tampa: Florida (E87429), North Carolina (483)



10.05.2020

Project Manager: **Ike Tavaréz**

COG Operating LLC

2407 Pecos Avenue

Artesia, NM 88210

Reference: Eurofins Xenco, LLC Report No(s): **674139**

Emerald Federal #001 (9-16-19)

Project Address: Lea County, NM

Ike Tavaréz:

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 Eurofins Xenco, LLC Report Number(s) 674139. 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 Eurofins Xenco, LLC. 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. 674139 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 Eurofins Xenco, LLC to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink that reads "Jessica Kramer".

Jessica Kramer

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

**Sample Cross Reference 674139****COG Operating LLC, Artesia, NM**

Emerald Federal #001 (9-16-19)

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
CS Bottom Hole 1 4.5'	S	09.30.2020 00:00		674139-001
CS Bottom Hole 2 4.5'	S	09.30.2020 00:00		674139-002
CS Bottom Hole 3 4.5'	S	09.30.2020 00:00		674139-003
CS Bottom Hole 5 4.5'	S	09.30.2020 00:00		674139-004
CS Bottom Hole 6 4.5'	S	09.30.2020 00:00		674139-005
CS Bottom Hole 7 4.5'	S	09.30.2020 00:00		674139-006
CS Bottom Hole 8 4.5'	S	09.30.2020 00:00		674139-007
CS Bottom Hole 12 4.5'	S	09.30.2020 00:00		674139-008
CS Bottom Hole 16 4.5'	S	09.30.2020 00:00		674139-009
CS Bottom Hole 31 1'	S	09.30.2020 00:00		674139-010

**CASE NARRATIVE****Client Name: COG Operating LLC****Project Name: Emerald Federal #001 (9-16-19)**

Project ID:
Work Order Number(s): 674139

Report Date: 10.05.2020
Date Received: 10.02.2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3138804 Chloride by EPA 300

Lab Sample ID 674139-010 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike and Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 674139-001, -002, -003, -004, -005, -006, -007, -008, -009, -010.

The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 1 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-001

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	69.8	5.04	mg/kg	10.03.2020 14:06		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.02.2020 15:25	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.02.2020 15:25	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.02.2020 15:25	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.02.2020 15:25	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	87	%	70-130	10.02.2020 15:25	
o-Terphenyl	84-15-1	98	%	70-130	10.02.2020 15:25	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 1 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-001

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	10.02.2020 12:49	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
Total BTEX		<0.00202	0.00202	mg/kg	10.02.2020 12:49	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	103	%	70-130	10.02.2020 12:49		
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 12:49		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 2 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-002

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	69.3	4.98	mg/kg	10.03.2020 14:13		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	10.02.2020 16:23	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	10.02.2020 16:23	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	10.02.2020 16:23	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	10.02.2020 16:23	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	75	%	70-130	10.02.2020 16:23	
o-Terphenyl	84-15-1	85	%	70-130	10.02.2020 16:23	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 2 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-002

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
Toluene	108-88-3	<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
Ethylbenzene	100-41-4	<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
m,p-Xylenes	179601-23-1	<0.00397	0.00397	mg/kg	10.02.2020 13:09	U	1
o-Xylene	95-47-6	<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
Total Xylenes	1330-20-7	<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
Total BTEX		<0.00198	0.00198	mg/kg	10.02.2020 13:09	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	105	%	70-130	10.02.2020 13:09		
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 13:09		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 3 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-003

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	69.8	5.00	mg/kg	10.03.2020 14:19		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	10.02.2020 16:43	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	10.02.2020 16:43	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	10.02.2020 16:43	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	10.02.2020 16:43	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	74	%	70-130	10.02.2020 16:43	
o-Terphenyl	84-15-1	84	%	70-130	10.02.2020 16:43	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 3 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-003

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	10.02.2020 13:30	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
Total BTEX		<0.00201	0.00201	mg/kg	10.02.2020 13:30	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	101	%	70-130	10.02.2020 13:30		
4-Bromofluorobenzene	460-00-4	105	%	70-130	10.02.2020 13:30		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 5 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-004

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	68.0	5.02	mg/kg	10.03.2020 14:25		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.8	49.8	mg/kg	10.02.2020 17:02	U	1
Diesel Range Organics	C10C28DRO	<49.8	49.8	mg/kg	10.02.2020 17:02	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.8	49.8	mg/kg	10.02.2020 17:02	U	1
Total TPH	PHC635	<49.8	49.8	mg/kg	10.02.2020 17:02	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	80	%	70-130	10.02.2020 17:02	
o-Terphenyl	84-15-1	90	%	70-130	10.02.2020 17:02	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 5 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-004

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	10.02.2020 13:50	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
Total BTEX		<0.00199	0.00199	mg/kg	10.02.2020 13:50	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	108	%	70-130	10.02.2020 13:50		
1,4-Difluorobenzene	540-36-3	101	%	70-130	10.02.2020 13:50		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 6 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-005

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	74.1	4.98	mg/kg	10.03.2020 14:44		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.02.2020 17:40	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.02.2020 17:40	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.02.2020 17:40	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.02.2020 17:40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	75	%	70-130	10.02.2020 17:40	
o-Terphenyl	84-15-1	85	%	70-130	10.02.2020 17:40	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 6 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-005

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	10.02.2020 14:11	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1
Total BTEX		<0.00199	0.00199	mg/kg	10.02.2020 14:11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	101	%	70-130	10.02.2020 14:11	
4-Bromofluorobenzene	460-00-4	104	%	70-130	10.02.2020 14:11	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 7 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-006

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	68.8	5.00	mg/kg	10.03.2020 14:50		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.02.2020 18:00	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.02.2020 18:00	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.02.2020 18:00	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.02.2020 18:00	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	75	%	70-130	10.02.2020 18:00	
o-Terphenyl	84-15-1	85	%	70-130	10.02.2020 18:00	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 7 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-006

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	10.02.2020 14:31	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
Total BTEX		<0.00200	0.00200	mg/kg	10.02.2020 14:31	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 14:31		
4-Bromofluorobenzene	460-00-4	107	%	70-130	10.02.2020 14:31		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 8 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-007

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	70.5	5.03	mg/kg	10.03.2020 14:56		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	10.02.2020 18:19	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	10.02.2020 18:19	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	10.02.2020 18:19	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	10.02.2020 18:19	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	78	%	70-130	10.02.2020 18:19	
o-Terphenyl	84-15-1	87	%	70-130	10.02.2020 18:19	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 8 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-007

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	10.02.2020 14:52	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
Total BTEX		<0.00201	0.00201	mg/kg	10.02.2020 14:52	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	106	%	70-130	10.02.2020 14:52		
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 14:52		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 12 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-008

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	70.2	4.95	mg/kg	10.03.2020 15:03		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.02.2020 18:39	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.02.2020 18:39	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.02.2020 18:39	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.02.2020 18:39	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	83	%	70-130	10.02.2020 18:39	
o-Terphenyl	84-15-1	92	%	70-130	10.02.2020 18:39	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 12 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-008

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	10.02.2020 15:12	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
Total BTEX		<0.00199	0.00199	mg/kg	10.02.2020 15:12	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	106	%	70-130	10.02.2020 15:12		
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 15:12		



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 16 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-009

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	66.1	5.05	mg/kg	10.03.2020 15:09		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.02.2020 18:58	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.02.2020 18:58	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.02.2020 18:58	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.02.2020 18:58	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	78	%	70-130	10.02.2020 18:58	
o-Terphenyl	84-15-1	89	%	70-130	10.02.2020 18:58	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 16 4.5'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-009

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1
m,p-Xylenes	179601-23-1	<0.00400	0.00400	mg/kg	10.02.2020 15:33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	10.02.2020 15:33	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 15:33	
4-Bromofluorobenzene	460-00-4	105	%	70-130	10.02.2020 15:33	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 31 1'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-010

Date Collected: 09.30.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

% Moisture:

Analyst: CHE

Date Prep: 10.02.2020 11:25

Basis: Wet Weight

Seq Number: 3138804

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	64.3	5.00	mg/kg	10.03.2020 15:15	X	1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

% Moisture:

Analyst: ARM

Date Prep: 10.02.2020 11:00

Basis: Wet Weight

Seq Number: 3138817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<49.9	49.9	mg/kg	10.02.2020 19:17	U	1
Diesel Range Organics	C10C28DRO	<49.9	49.9	mg/kg	10.02.2020 19:17	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<49.9	49.9	mg/kg	10.02.2020 19:17	U	1
Total TPH	PHC635	<49.9	49.9	mg/kg	10.02.2020 19:17	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	75	%	70-130	10.02.2020 19:17	
o-Terphenyl	84-15-1	85	%	70-130	10.02.2020 19:17	



Certificate of Analytical Results 674139

COG Operating LLC, Artesia, NM

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 31 1'**

Matrix: Soil

Date Received: 10.02.2020 08:50

Lab Sample Id: 674139-010

Date Collected: 09.30.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

% Moisture:

Analyst: KTL

Date Prep: 10.02.2020 09:00

Basis: Wet Weight

Seq Number: 3138779

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	10.02.2020 15:53	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
Total BTEX		<0.00199	0.00199	mg/kg	10.02.2020 15:53	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
4-Bromofluorobenzene	460-00-4	113	%	70-130	10.02.2020 15:53		
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.02.2020 15:53		

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. **ND** Not Detected.

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



COG Operating LLC
Emerald Federal #001 (9-16-19)

Analytical Method: Chloride by EPA 300

Seq Number: 3138804

MB Sample Id: 7712517-1-BLK

Matrix: Solid

LCS Sample Id: 7712517-1-BKS

Prep Method: E300P

Date Prep: 10.02.2020

LCSD Sample Id: 7712517-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	255	102	254	102	90-110	0	20	mg/kg	10.03.2020 13:35	

Analytical Method: Chloride by EPA 300

Seq Number: 3138804

Parent Sample Id: 674012-030

Matrix: Soil

MS Sample Id: 674012-030 S

Prep Method: E300P

Date Prep: 10.02.2020

MSD Sample Id: 674012-030 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	24.2	248	302	112	306	114	90-110	1	20	mg/kg	10.03.2020 13:54	X

Analytical Method: Chloride by EPA 300

Seq Number: 3138804

Parent Sample Id: 674139-010

Matrix: Soil

MS Sample Id: 674139-010 S

Prep Method: E300P

Date Prep: 10.02.2020

MSD Sample Id: 674139-010 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	64.3	250	345	112	344	112	90-110	0	20	mg/kg	10.03.2020 15:22	X

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138817

MB Sample Id: 7712595-1-BLK

Matrix: Solid

LCS Sample Id: 7712595-1-BKS

Prep Method: SW8015P

Date Prep: 10.02.2020

LCSD Sample Id: 7712595-1-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	1040	104	936	94	70-130	11	20	mg/kg	10.02.2020 14:47	
Diesel Range Organics	<50.0	1000	1070	107	956	96	70-130	11	20	mg/kg	10.02.2020 14:47	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	84		99		92		70-130	%	10.02.2020 14:47
o-Terphenyl	98		104		93		70-130	%	10.02.2020 14:47

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138817

Matrix: Solid

MB Sample Id: 7712595-1-BLK

Prep Method: SW8015P

Date Prep: 10.02.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	10.02.2020 14:27	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * | (C - E) / (C + E) |$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec

COG Operating LLC

Emerald Federal #001 (9-16-19)

Analytical Method: TPH By SW8015 Mod

Seq Number: 3138817

Parent Sample Id: 674139-001

Matrix: Soil

MS Sample Id: 674139-001 S

Prep Method: SW8015P

Date Prep: 10.02.2020

MSD Sample Id: 674139-001 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	<49.9	997	1010	101	968	97	70-130	4	20	mg/kg	10.02.2020 15:44	
Diesel Range Organics	<49.9	997	1040	104	1010	101	70-130	3	20	mg/kg	10.02.2020 15:44	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	87		85		70-130	%	10.02.2020 15:44
o-Terphenyl	86		84		70-130	%	10.02.2020 15:44

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138779

MB Sample Id: 7712585-1-BLK

Matrix: Solid

LCS Sample Id: 7712585-1-BKS

Prep Method: SW5035A

Date Prep: 10.02.2020

LCSD Sample Id: 7712585-1-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	0.113	113	0.104	104	70-130	8	35	mg/kg	10.02.2020 08:58	
Toluene	<0.00200	0.100	0.107	107	0.107	107	70-130	0	35	mg/kg	10.02.2020 08:58	
Ethylbenzene	<0.00200	0.100	0.114	114	0.105	105	70-130	8	35	mg/kg	10.02.2020 08:58	
m,p-Xylenes	<0.00400	0.200	0.235	118	0.215	108	70-130	9	35	mg/kg	10.02.2020 08:58	
o-Xylene	<0.00200	0.100	0.114	114	0.104	104	70-130	9	35	mg/kg	10.02.2020 08:58	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	98		100		99		70-130	%	10.02.2020 08:58
4-Bromofluorobenzene	105		103		102		70-130	%	10.02.2020 08:58

Analytical Method: BTEX by EPA 8021B

Seq Number: 3138779

Parent Sample Id: 674139-001

Matrix: Soil

MS Sample Id: 674139-001 S

Prep Method: SW5035A

Date Prep: 10.02.2020

MSD Sample Id: 674139-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.0979	98	0.0984	99	70-130	1	35	mg/kg	10.02.2020 11:27	
Toluene	<0.00200	0.100	0.0915	92	0.0921	93	70-130	1	35	mg/kg	10.02.2020 11:27	
Ethylbenzene	<0.00200	0.100	0.0969	97	0.0982	99	70-130	1	35	mg/kg	10.02.2020 11:27	
m,p-Xylenes	<0.00401	0.200	0.199	100	0.202	102	70-130	1	35	mg/kg	10.02.2020 11:27	
o-Xylene	<0.00200	0.100	0.0965	97	0.0981	99	70-130	2	35	mg/kg	10.02.2020 11:27	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	96		97		70-130	%	10.02.2020 11:27
4-Bromofluorobenzene	98		102		70-130	%	10.02.2020 11:27

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



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

Client Name:							COG						Site Manager: Ike Tavaréz itavarez@concho.com Robert Grubbs Jr rgrubbs@concho.com																			
Project Name:							Emerald Federal #001 (9-16-19)																									
Project Location: (county, state)							Lea County, NM							Project #:																		
Invoice to:							COG																									
Receiving Laboratory:							Xenco							Sample Signature: Robert Grubbs Jr																		
Comments:																																
LAB # (USE ONLY)		SAMPLE IDENTIFICATION										SAMPLING		MATRIX		PRESERVATIVE METHOD					# CONTAINERS		FILTERED (Y/N)									
												YEAR: 2020																				
												DATE		TIME		WATER		SOIL		HCL		HNO ₃		ICE								
CS Bottom Hole 1 4.5'		9/30/2020				X				X				1				TPH TX1005 (Ext to C35)														
CS Bottom Hole 2 4.5'		9/30/2020				X				X				1				BTEx 8021B														
CS Bottom Hole 3 4.5'		9/30/2020				X				X				1				TPH 8015M (GRO - DRO - MRO)														
CS Bottom Hole 4.5'		9/30/2020				X				X				1				Chloride														
CS Bottom Hole 5 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 6 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 7 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 8 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 12 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 16 4.5'		9/30/2020				X				X				1																		
CS Bottom Hole 31 1'		9/30/2020				X				X				1																		
Relinquished by:		Date:		Time:		Relinquished by:		Date:		Time:		LAB USE ONLY																				
Robert Grubbs Jr		10/2/2020		0830		J. TAVAREZ		10/2		0850		REMARKS:																				
Relinquished by:		Date:		Time:		Relinquished by:		Date:		Time:		X RUSH: Same Day 24 hr 48 hr 72 hr																				
Relinquished by:		Date:		Time:		Relinquished by:		Date:		Time:		Rush Charges Authorized																				
Relinquished by:		Date:		Time:		Relinquished by:		Date:		Time:		Special Report Limits or TRRP Report																				
(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____																																

Eurofins Xenco, LLC

Prelogin/Nonconformance Report- Sample Log-In

Client: COG Operating LLC

Date/ Time Received: 10.02.2020 08.50.00 AM

Work Order #: 674139

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR-8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	2.6
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#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)?	N/A
#18 Water VOC samples have zero headspace?	N/A

BTEX was in bulk container

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

Analyst:

PH Device/Lot#:

Checklist completed by:



Brianna Teel

Date: 10.02.2020

Checklist reviewed by:



Jessica Kramer

Date: 10.02.2020

Certificate of Analysis Summary 674515
COG Operating, LLC, Midland, TX

Project Name: Emerald Federal #001 (9-16-19)

Project Id:

Contact: Ike Tavaréz

Project Location: Lea County NM

Date Received in Lab: Wed 10.07.2020 11:30

Report Date: 10.08.2020 16:32

Project Manager: Jessica Kramer

Analysis Requested		Lab Id: Field Id: Depth: Matrix: Sampled:	674515-001 CS Bottom Hole 20 4.5' SOIL 10.06.2020 00:00	674515-002 CS Bottom Hole 29 4.5' SOIL 10.06.2020 00:00		
BTEX by EPA 8021B	Extracted:	10.08.2020 08:30	10.08.2020 08:30	10.08.2020 08:30		
	Analyzed:	10.08.2020 13:22	10.08.2020 13:42	10.08.2020 13:42		
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL		
	Benzene	<0.00199	0.00199	<0.00202	0.00202	
	Toluene	<0.00199	0.00199	<0.00202	0.00202	
	Ethylbenzene	<0.00199	0.00199	<0.00202	0.00202	
Chloride by EPA 300	m,p-Xylenes	<0.00398	0.00398	<0.00404	0.00404	
	o-Xylene	<0.00199	0.00199	<0.00202	0.00202	
	Total Xylenes	<0.00199	0.00199	<0.00202	0.00202	
	Total BTEX	<0.00199	0.00199	<0.00202	0.00202	
	Extracted:	10.07.2020 16:50	10.07.2020 16:50	10.07.2020 16:50		
	Analyzed:	10.07.2020 19:43	10.07.2020 19:58	10.07.2020 19:58		
TPH By SW8015 Mod	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL		
	Chloride	131	5.05	120	4.98	
	Extracted:	10.07.2020 12:00	10.07.2020 12:00	10.07.2020 12:00		
	Analyzed:	10.07.2020 21:38	10.07.2020 21:57	10.07.2020 21:57		
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL		
	Gasoline Range Hydrocarbons	<50.0	50.0	<50.0	50.0	
Motor Oil Range Hydrocarbons (MRO)	Diesel Range Organics	<50.0	50.0	<50.0	50.0	
	Motor Oil Range Hydrocarbons (MRO)	<50.0	50.0	<50.0	50.0	
	Total TPH	<50.0	50.0	<50.0	50.0	

BRL - Below Reporting Limit

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

Jessica Kramer



Environment Testing
Xenco

Analytical Report 674515

for

COG Operating, LLC

Project Manager: Ike Tavaréz

Emerald Federal #001 (9-16-19)

10.08.2020

Collected By: Client



**1211 W. Florida Ave
Midland TX 79701**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-20-38), Arizona (AZ0765), Florida (E871002-33), Louisiana (03054)
Oklahoma (2020-014), North Carolina (681), Arkansas (20-035-0)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-20-26), Arizona (AZ0809)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-20-18)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-20-23)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-19-21)
Xenco-Carlsbad (LELAP): Louisiana (05092)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-20-8)
Xenco-Tampa: Florida (E87429), North Carolina (483)



10.08.2020

Project Manager: **Ike Tavaréz**

COG Operating, LLC

600 W Illinois

Midland, TX 79701

Reference: Eurofins Xenco, LLC Report No(s): **674515**

Emerald Federal #001 (9-16-19)

Project Address: Lea County NM

Ike Tavaréz:

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 Eurofins Xenco, LLC Report Number(s) 674515. 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 Eurofins Xenco, LLC. 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. 674515 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 Eurofins Xenco, LLC to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

A handwritten signature in black ink that reads "Jessica Kramer".

Jessica Kramer

Project Manager

A Small Business and Minority Company

Houston - Dallas - Midland - Tampa - Phoenix - Lubbock - San Antonio - El Paso - Atlanta - New Mexico

**Sample Cross Reference 674515****COG Operating, LLC, Midland, TX**

Emerald Federal #001 (9-16-19)

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
CS Bottom Hole 20 4.5'	S	10.06.2020 00:00		674515-001
CS Bottom Hole 29 4.5'	S	10.06.2020 00:00		674515-002



CASE NARRATIVE

Client Name: COG Operating, LLC

Project Name: Emerald Federal #001 (9-16-19)

Project ID:

Work Order Number(s): 674515

Report Date: 10.08.2020

Date Received: 10.07.2020

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None



Certificate of Analytical Results 674515

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 20 4.5'**

Matrix: Soil

Date Received: 10.07.2020 11:30

Lab Sample Id: 674515-001

Date Collected: 10.06.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

Analyst: CHE

Date Prep: 10.07.2020 16:50

% Moisture:

Seq Number: 3139121

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	131	5.05	mg/kg	10.07.2020 19:43		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

Analyst: ARM

Date Prep: 10.07.2020 12:00

% Moisture:

Seq Number: 3139155

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.07.2020 21:38	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.07.2020 21:38	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.07.2020 21:38	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.07.2020 21:38	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1-Chlorooctane	111-85-3	108	%	70-130	10.07.2020 21:38		
o-Terphenyl	84-15-1	115	%	70-130	10.07.2020 21:38		



Certificate of Analytical Results 674515

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 20 4.5'**

Matrix: Soil

Date Received: 10.07.2020 11:30

Lab Sample Id: 674515-001

Date Collected: 10.06.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

Analyst: KTL

Date Prep: 10.08.2020 08:30

% Moisture:

Seq Number: 3139168

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	10.08.2020 13:22	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
Total BTEX		<0.00199	0.00199	mg/kg	10.08.2020 13:22	U	1
Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag	
1,4-Difluorobenzene	540-36-3	102	%	70-130	10.08.2020 13:22		
4-Bromofluorobenzene	460-00-4	107	%	70-130	10.08.2020 13:22		



Certificate of Analytical Results 674515

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 29 4.5'**

Matrix: Soil

Date Received: 10.07.2020 11:30

Lab Sample Id: 674515-002

Date Collected: 10.06.2020 00:00

Analytical Method: Chloride by EPA 300

Prep Method: E300P

Tech: CHE

Analyst: CHE

Date Prep: 10.07.2020 16:50

% Moisture:

Seq Number: 3139121

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	120	4.98	mg/kg	10.07.2020 19:58		1

Analytical Method: TPH By SW8015 Mod

Prep Method: SW8015P

Tech: DVM

Analyst: ARM

Date Prep: 10.07.2020 12:00

% Moisture:

Seq Number: 3139155

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons	PHC610	<50.0	50.0	mg/kg	10.07.2020 21:57	U	1
Diesel Range Organics	C10C28DRO	<50.0	50.0	mg/kg	10.07.2020 21:57	U	1
Motor Oil Range Hydrocarbons (MRO)	PHCG2835	<50.0	50.0	mg/kg	10.07.2020 21:57	U	1
Total TPH	PHC635	<50.0	50.0	mg/kg	10.07.2020 21:57	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	103	%	70-130	10.07.2020 21:57	
o-Terphenyl	84-15-1	112	%	70-130	10.07.2020 21:57	



Certificate of Analytical Results 674515

COG Operating, LLC, Midland, TX

Emerald Federal #001 (9-16-19)

Sample Id: **CS Bottom Hole 29 4.5'**

Matrix: Soil

Date Received: 10.07.2020 11:30

Lab Sample Id: 674515-002

Date Collected: 10.06.2020 00:00

Analytical Method: BTEX by EPA 8021B

Prep Method: SW5035A

Tech: KTL

Analyst: KTL

Date Prep: 10.08.2020 08:30

% Moisture:

Seq Number: 3139168

Basis: Wet Weight

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1
Toluene	108-88-3	<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1
Ethylbenzene	100-41-4	<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1
m,p-Xylenes	179601-23-1	<0.00404	0.00404	mg/kg	10.08.2020 13:42	U	1
o-Xylene	95-47-6	<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1
Total Xylenes	1330-20-7	<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1
Total BTEX		<0.00202	0.00202	mg/kg	10.08.2020 13:42	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	105	%	70-130	10.08.2020 13:42	
1,4-Difluorobenzene	540-36-3	100	%	70-130	10.08.2020 13:42	

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. **ND** Not Detected.

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



COG Operating, LLC
Emerald Federal #001 (9-16-19)

Analytical Method: Chloride by EPA 300

Seq Number: 3139121

MB Sample Id: 7712817-1-BLK

Matrix: Solid

LCS Sample Id: 7712817-1-BKS

Prep Method: E300P

Date Prep: 10.07.2020

LCSD Sample Id: 7712817-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	266	106	268	107	90-110	1	20	mg/kg	10.07.2020 19:32	

Analytical Method: Chloride by EPA 300

Seq Number: 3139121

Parent Sample Id: 674515-001

Matrix: Soil

MS Sample Id: 674515-001 S

Prep Method: E300P

Date Prep: 10.07.2020

MSD Sample Id: 674515-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	131	253	387	101	391	103	90-110	1	20	mg/kg	10.07.2020 19:48	

Analytical Method: Chloride by EPA 300

Seq Number: 3139121

Parent Sample Id: 674537-009

Matrix: Soil

MS Sample Id: 674537-009 S

Prep Method: E300P

Date Prep: 10.07.2020

MSD Sample Id: 674537-009 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	367	249	602	94	602	94	90-110	0	20	mg/kg	10.07.2020 21:02	

Analytical Method: TPH By SW8015 Mod

Seq Number: 3139155

MB Sample Id: 7712843-1-BLK

Matrix: Solid

LCS Sample Id: 7712843-1-BKS

Prep Method: SW8015P

Date Prep: 10.07.2020

LCSD Sample Id: 7712843-1-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	1160	116	1120	112	70-130	4	20	mg/kg	10.07.2020 15:11	
Diesel Range Organics	<50.0	1000	1140	114	1140	114	70-130	0	20	mg/kg	10.07.2020 15:11	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	94		128		127		70-130	%	10.07.2020 15:11
o-Terphenyl	107		112		125		70-130	%	10.07.2020 15:11

Analytical Method: TPH By SW8015 Mod

Seq Number: 3139155

Matrix: Solid

MB Sample Id: 7712843-1-BLK

Prep Method: SW8015P

Date Prep: 10.07.2020

Parameter	MB Result	Units	Analysis Date	Flag
Motor Oil Range Hydrocarbons (MRO)	<50.0	mg/kg	10.07.2020 14:51	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec

COG Operating, LLC

Emerald Federal #001 (9-16-19)

Analytical Method: TPH By SW8015 Mod

Seq Number: 3139155

Parent Sample Id: 674514-001

Matrix: Soil

MS Sample Id: 674514-001 S

Prep Method: SW8015P

Date Prep: 10.07.2020

MSD Sample Id: 674514-001 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	<49.9	998	950	95	959	96	70-130	1	20	mg/kg	10.07.2020 16:09	
Diesel Range Organics	<49.9	998	980	98	989	99	70-130	1	20	mg/kg	10.07.2020 16:09	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	119		114		70-130	%	10.07.2020 16:09
o-Terphenyl	114		112		70-130	%	10.07.2020 16:09

Analytical Method: BTEX by EPA 8021B

Seq Number: 3139168

MB Sample Id: 7712869-1-BLK

Matrix: Solid

LCS Sample Id: 7712869-1-BKS

Prep Method: SW5035A

Date Prep: 10.08.2020

LCSD Sample Id: 7712869-1-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	0.0844	84	0.0784	78	70-130	7	35	mg/kg	10.08.2020 08:57	
Toluene	<0.00200	0.100	0.0930	93	0.0859	86	70-130	8	35	mg/kg	10.08.2020 08:57	
Ethylbenzene	<0.00200	0.100	0.0915	92	0.0835	84	70-130	9	35	mg/kg	10.08.2020 08:57	
m,p-Xylenes	<0.00400	0.200	0.185	93	0.168	84	70-130	10	35	mg/kg	10.08.2020 08:57	
o-Xylene	<0.00200	0.100	0.0940	94	0.0854	85	70-130	10	35	mg/kg	10.08.2020 08:57	

Surrogate

	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	101		98		98		70-130	%	10.08.2020 08:57
4-Bromofluorobenzene	105		102		101		70-130	%	10.08.2020 08:57

Analytical Method: BTEX by EPA 8021B

Seq Number: 3139168

Parent Sample Id: 674514-005

Matrix: Soil

MS Sample Id: 674514-005 S

Prep Method: SW5035A

Date Prep: 10.08.2020

MSD Sample Id: 674514-005 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00198	0.0990	0.0694	70	0.0739	73	70-130	6	35	mg/kg	10.08.2020 09:37	
Toluene	<0.00198	0.0990	0.0716	72	0.0772	76	70-130	8	35	mg/kg	10.08.2020 09:37	
Ethylbenzene	<0.00198	0.0990	0.0659	67	0.0736	73	70-130	11	35	mg/kg	10.08.2020 09:37	X
m,p-Xylenes	<0.00396	0.198	0.132	67	0.148	74	70-130	11	35	mg/kg	10.08.2020 09:37	X
o-Xylene	<0.00198	0.0990	0.0690	70	0.0767	76	70-130	11	35	mg/kg	10.08.2020 09:37	

Surrogate

	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	99		100		70-130	%	10.08.2020 09:37
4-Bromofluorobenzene	103		105		70-130	%	10.08.2020 09:37

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

$[D] = 100 * (C - A) / B$
 $RPD = 200 * |(C - E) / (C + E)|$
 $[D] = 100 * (C) / [B]$
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result

MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec

674515

0.1/0.6

Eurofins Xenco, LLC

Prelogin/Nonconformance Report- Sample Log-In

Client: COG Operating, LLC

Date/ Time Received: 10.07.2020 11.30.00 AM

Work Order #: 674515

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : IR8

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	.6	
#2 *Shipping container in good condition?	Yes	
#3 *Samples received on ice?	Yes	
#4 *Custody Seals intact on shipping container/ cooler?	N/A	
#5 Custody Seals intact on sample bottles?	N/A	
#6 *Custody Seals Signed and dated?	N/A	
#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	TPH was in bulk container
#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)?	N/A	
#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:



Brianna Teel

Date: 10.07.2020

Checklist reviewed by:



Jessica Kramer

Date: 10.07.2020

APPENDIX D





Phone:(505) 476-3470 Fax:(505) 476-3462

Action 10623

OCD Reviewer	Condition
ceads	None