

February 23, 2018

Mike Bratcher
Oil Conservation Division, District 2
811 S First St.
Artesia, NM 88210

Mark Naranjo
New Mexico State Land Office
1001 S. Atkinson
Roswell, NM 88230

Re: Work Plan
Munnynthabank State Com #002H
API #: 30-015-40622
RP#: 2RP-4456
Unit Letter B Section 34, Township 24S, Range 27E
Eddy County, NM

Mr. Bratcher/Mr. Naranjo,

COG Operating, LLC (COG) is pleased to submit for your consideration the following remediation work plan for the Munnynthabank State Com #002H. This plan is in response to an oil and produced water release that occurred on October 21, 2017. Subsequent to the release a C-141 initial report was submitted to the New Mexico Oil Conservation Division (NMOCD) on October 23, 2017.

BACKGROUND

The Munnynthabank State Com #002H release is located in Unit Letter B, Section 34, Township 24 South, and Range 27 East in Eddy County, New Mexico. More specifically the latitude and longitude for this release are 32.1803627 North and -104.1771088 West.

On October 21, 2017, a one (1) inch valve on the murphy switch failed resulting in the release of approximately two (2) barrels (bbls) of oil and three (3) bbls of produced water. All of the fluid remained on location and a vacuum truck was able to recover approximately two (2) bbls of oil and two & one-half (2.5) bbls of produced water.

On November 30, 2017, a site assessment and soil sampling were conducted in order to define the impacted area. A site diagram is included in Appendix I. The analytical results from the soil sampling activities are summarized in the table below.

GROUNDWATER AND SITE RANKING

According to the New Mexico Office of the State Engineer (NMOSE) groundwater in the project vicinity is approximately seventy (70) feet below ground surface (BGS) (Appendix II). No water well or surface water was observed within one-thousand (1,000) feet of the release site. Therefore the site ranking for this release is ten (10) based on the following:

Depth to groundwater	50-100-feet
Distance to surface water body	>1000-feet
Wellhead Protection Area	>1000-feet

Analytical Results

11/30/2017

Sample ID	Depth (feet)	Benzene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)	Total TPH (mg/kg)
T-1	0	<0.002	<0.002	5410	725
T-1	1	<0.002	<0.002	826	<15.0
T-1	2	<0.002	<0.002	870	<15.0
T-1	3	--	--	704	--
T-1	4	--	--	647	--
T-2	0	<0.100	3.74	9290	8720
T-2	1	<0.002	<0.002	77.1	<15.0
T-2	2	<0.002	<0.002	160	<15.0
T-2	3	--	--	171	--
T-2	4	--	--	275	--
T-2	5	--	--	263	--
T-2	6	--	--	213	--
T-3	0	<0.002	<0.002	195	28
T-3	1	<0.002	<0.002	<4.91	<15.0
T-3	2	<0.002	<0.002	<4.93	<15.0
T-3	3	--	--	<4.93	--
T-3	4	--	--	6.23	--
T-4	0	<0.002	<0.002	2080	<15.0
T-4	1	<0.002	<0.002	650	<15.0
T-4	2	<0.002	<0.002	290	<15.0
T-4	3	--	--	220	--

11/30/2017 Continued

Sample ID	Depth (feet)	Benzene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)	Total TPH (mg/kg)
T-4	4	--	--	260	--
T-4	5	--	--	183	--
T-4	7	--	--	221	--
T-4	9	--	--	190	--
T-4	11	--	--	227	--

(--) Analysis not requested

PROPOSED REMEDIAL ACTIONS

- The impacted area in the vicinity of sample location T-1 will be excavated to the depth of four and one-half (4.5) feet BGS.
- The impacted area in the vicinity of sample location T-2 will be excavated to the depth of one (1) foot BGS.
- The impacted area in the vicinity of sample location T-4 will be excavated to a depth of two (2) feet BGS.
- All of the excavated material will be transported to an NMOCD approved solid waste disposal facility.
- The excavation will be backfilled with caliche and contoured to match the surrounding location.

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

Sincerely,

A handwritten signature in black ink that reads "Sheldon Hitchcock". The signature is written in a cursive, flowing style.

Sheldon L. Hitchcock
HSE Coordinator
slhitchcock@concho.com

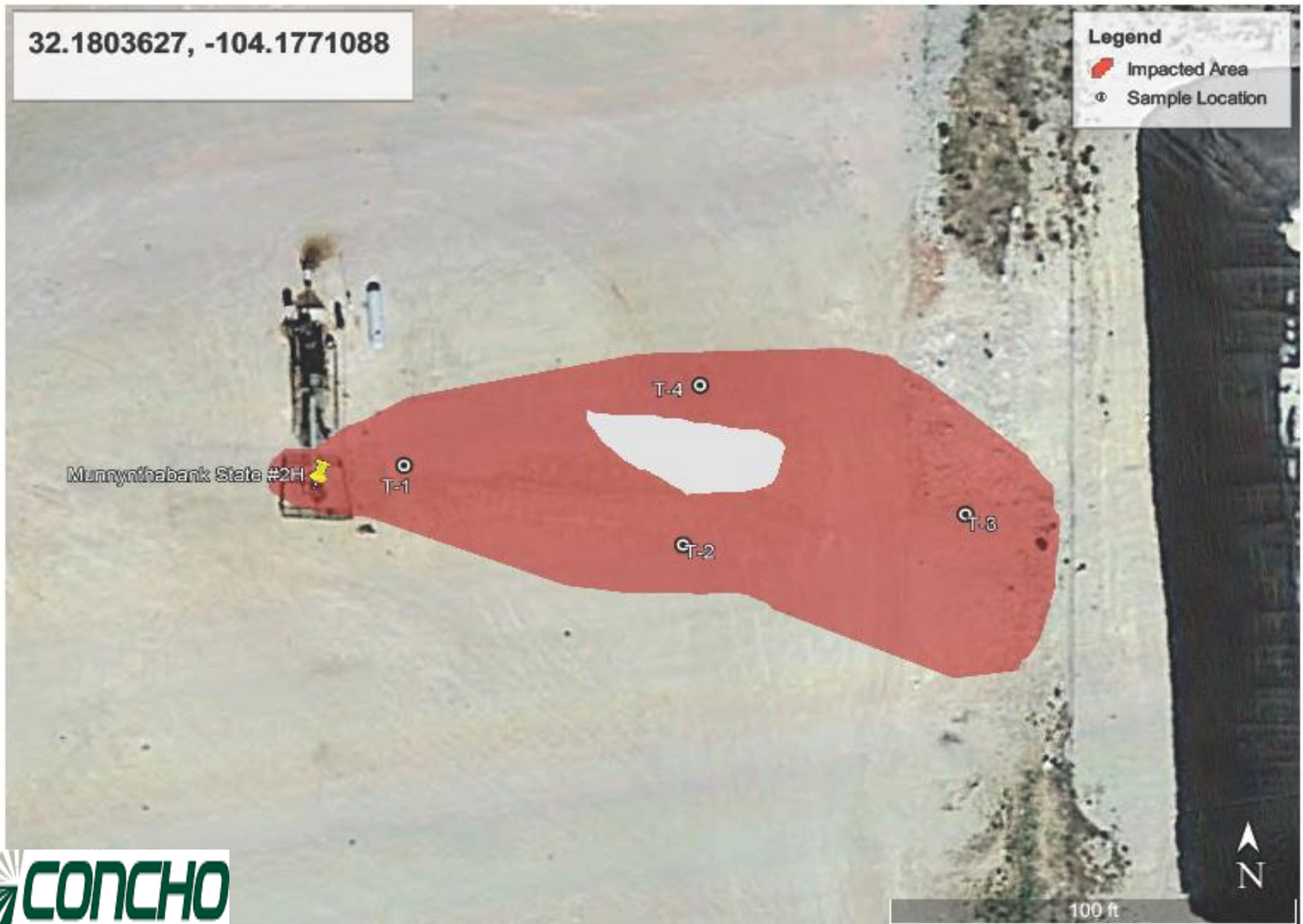
Enclosed:

- Appendix I: Site Diagram
- Appendix II: Groundwater Data
- Appendix III: Initial C-141 (Copy)
- Appendix IV: Analytical Reports and Chain-of-Custody Forms

APPENDIX I

February 23, 2018

Munnynthabank State Com #002H



APPENDIX II



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

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

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

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
C 03264 POD1	C	ED		2	1	2	02	25S	27E	579391	3559099*	2281			
C 01452	C	ED					22	24S	27E	577435	3563175*	2601	95	70	25
C 01721	C	ED				1	25	24S	27E	580271	3562033*	2988	170		
C 04147 POD1	CUB	ED		4	1	3	24	24S	27E	580101	3562969	3415	35		
C 01841	C	ED				1	29	24S	27E	573806	3561953*	4088	150		

Average Depth to Water: **70 feet**

Minimum Depth: **70 feet**

Maximum Depth: **70 feet**

Record Count: 5

Basin/County Search:

County: Eddy

UTM NAD83 Radius Search (in meters):

Easting (X): 577658

Northing (Y): 3560583

Radius: 5000

*UTM location was derived from PLSS - see Help

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

APPENDIX III

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

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

NM OIL CONSERVATION

ARTESIA DISTRICT

OCT 23 2017

Form C-141
Revised April 3, 2017

Submit 1 Copy to appropriate District Office in
conformance with 19.15.29 NMAC.

RECEIVED

Release Notification and Corrective Action

NAB1729756827

OPERATOR		<input checked="" type="checkbox"/> Initial Report	<input type="checkbox"/> Final Report
Name of Company: COG Operating, LLC (OGRID# 229137)		Contact: Robert McNeill	
Address: 600 West Illinois Avenue, Midland TX 79701		Telephone No.: 432-683-7443	
Facility Name: MUNNYNTHABANK St. Com #002H		Facility Type: Tank Battery	
Surface Owner: State		Mineral Owner: State	API No.: 30-015-40622

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
B	34	24S	27E	190	North	2260	East	Eddy

Latitude: 32.1803627 Longitude: -104.1771088 NAD83

NATURE OF RELEASE

Type of Release: Oil and Produced Water	Volume of Release: 2bbls oil and 3bbls PW	Volume Recovered: 2bbls oil and 2.5bbls PW
Source of Release: 1-inch valve	Date and Hour of Occurrence: 10/21/17	Date and Hour of Discovery: 10/21/17 8:30am
Was Immediate Notice Given? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Not Required	If YES, To Whom?	
By Whom?	Date and Hour:	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	
If a Watercourse was Impacted, Describe Fully.*		
Describe Cause of Problem and Remedial Action Taken.* A bad 1-inch valve on pumping T behind the murphy switch failed. The valve was replaced.		
Describe Area Affected and Cleanup Action Taken.* All of the fluid remained on location. A vacuum truck was dispatched to recover all freestanding fluids. Concho will have the spill area evaluated for any possible impact from the release and will present a remediation work plan to the NMOCD prior to any significant 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 NMOCD 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 NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD 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.		
Signature: <i>Sheldon Hitchcock</i>		OIL CONSERVATION DIVISION
Printed Name: Sheldon L. Hitchcock		Approved by Environmental Specialist: <i>[Signature]</i>
Title: HSE Coordinator	Approval Date: 10/24/17	Expiration Date: N/A
E-mail Address: slhitchcock@concho.com	Conditions of Approval: <i>see attached</i>	Attached: <i>2017-4456</i>
Date: 10/23/2017	Phone: 575-746-2010	

* Attach Additional Sheets If Necessary

10/24/17 AB

APPENDIX IV

Analytical Report 570435

for
COG Operating, LLC

Project Manager: Sheldon Hitchcock
Munnynthabank State #2H (10-21-2017)

12-JAN-18

Collected By: Client



1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-17-23), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab code: TX01468):
Texas (T104704295-17-15), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab code: TX00127): Texas (T104704221-17-12)
Xenco-Lubbock (EPA Lab code: TX00139): Texas (T104704219-17-16)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-17-13)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-17-3)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)



12-JAN-18

Project Manager: **Sheldon Hitchcock**

COG Operating, LLC

600 W Illinois

Midland, TX 79701

Reference: XENCO Report No(s): **570435**

Munnynthabank State #2H (10-21-2017)

Project Address: B-34-24S-27E

Sheldon Hitchcock:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 570435. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

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

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 570435 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Kelsey Brooks

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America

COG Operating, LLC, Midland, TX

Munnynthabank State #2H (10-21-2017)

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
T-1 0'	S	11-30-17 13:00	0	570435-001
T-1 1'	S	11-30-17 13:02	1	570435-002
T-1 2'	S	11-30-17 13:04	2	570435-003
T-1 3'	S	11-30-17 13:06	3	570435-004
T-1 4'	S	11-30-17 13:08	4	570435-005
T-2 0'	S	11-30-17 13:13	0	570435-006
T-2 1'	S	11-30-17 13:15	1	570435-007
T-2 2'	S	11-30-17 13:17	2	570435-008
T-2 3'	S	11-30-17 13:19	3	570435-009
T-2 4'	S	11-30-17 13:21	4	570435-010
T-2 5'	S	11-30-17 13:23	5	570435-011
T-2 6'	S	11-30-17 13:25	6	570435-012
T-2 8'	S	11-30-17 13:27	8	570435-013
T-2 10'	S	11-30-17 13:29	10	570435-014
T-2 12'	S	11-30-17 13:31	12	570435-015
T-3 0'	S	11-30-17 13:37	0	570435-016
T-3 1'	S	11-30-17 13:39	1	570435-017
T-3 2'	S	11-30-17 13:41	2	570435-018
T-3 3'	S	11-30-17 13:43	3	570435-019
T-3 4'	S	11-30-17 13:45	4	570435-020
T-4 0'	S	11-30-17 13:50	0	570435-021
T-4 1'	S	11-30-17 13:52	1	570435-022
T-4 2'	S	11-30-17 13:52	2	570435-023
T-4 3'	S	11-30-17 13:54	3	570435-024
T-4 4'	S	11-30-17 13:56	4	570435-025
T-4 5'	S	11-30-17 13:58	5	570435-026
T-4 7'	S	11-30-17 14:03	7	570435-027
T-4 9'	S	11-30-17 14:05	9	570435-028
T-4 11'	S	11-30-17 14:07	11	570435-029



CASE NARRATIVE

Client Name: COG Operating, LLC

Project Name: Munnynthabank State #2H (10-21-2017)

Project ID:

Work Order Number(s): 570435

Report Date: 12-JAN-18

Date Received: 12/07/2017

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3035359 Chloride by EPA 300

Lab Sample ID 570435-008 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: 570435-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012, -013, -014, -015, -016, -017.

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

Sample 570435-013 chloride peak was incorrectly integrated by the software. Manual integration was performed to correct the discrepancy. 01/11/17 JM

Batch: LBA-3035722 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Batch: LBA-3035740 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Batch: LBA-3035888 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.



Certificate of Analysis Summary 570435

COG Operating, LLC, Midland, TX

Project Name: Munnynthabank State #2H (10-21-2017)



Project Id:

Contact: Sheldon Hitchcock

Project Location: B-34-24S-27E

Date Received in Lab: Thu Dec-07-17 11:15 am

Report Date: 12-JAN-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	570435-001	570435-002	570435-003	570435-004	570435-005	570435-006
	<i>Field Id:</i>	T-1 0'	T-1 1'	T-1 2'	T-1 3'	T-1 4'	T-2 0'
	<i>Depth:</i>	0-	1-	2-	3-	4-	0-
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-30-17 13:00	Nov-30-17 13:02	Nov-30-17 13:04	Nov-30-17 13:06	Nov-30-17 13:08	Nov-30-17 13:13
BTEX by EPA 8021B	<i>Extracted:</i>	Dec-12-17 08:30	Dec-12-17 08:30	Dec-12-17 08:30			Dec-13-17 09:30
	<i>Analyzed:</i>	Dec-12-17 16:14	Dec-12-17 09:55	Dec-12-17 10:14			Dec-13-17 12:50
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL			mg/kg RL
Benzene		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			<0.0100 0.0100
Toluene		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			0.290 0.0100
Ethylbenzene		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			0.406 0.0100
m,p-Xylenes		<0.00403 0.00403	<0.00402 0.00402	<0.00401 0.00401			2.21 0.0200
o-Xylene		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			0.834 0.0100
Total Xylenes		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			3.04 0.0100
Total BTEX		<0.00202 0.00202	<0.00201 0.00201	<0.00200 0.00200			3.74 0.0100
Chloride by EPA 300	<i>Extracted:</i>	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00
	<i>Analyzed:</i>	Dec-08-17 11:22	Dec-08-17 11:28	Dec-08-17 11:05	Dec-08-17 11:34	Dec-08-17 11:40	Dec-08-17 11:58
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		5410 49.6	826 24.9	870 4.97	704 4.99	647 4.92	9290 49.8
TPH by SW8015 Mod	<i>Extracted:</i>	Dec-07-17 16:00	Dec-07-17 16:00	Dec-07-17 16:00			Dec-07-17 16:00
	<i>Analyzed:</i>	Dec-07-17 23:57	Dec-08-17 00:19	Dec-08-17 00:39			Dec-08-17 08:57
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL			mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<15.0 15.0	<15.0 15.0	<15.0 15.0			206 74.9
Diesel Range Organics (DRO)		566 15.0	<15.0 15.0	<15.0 15.0			6940 74.9
Oil Range Hydrocarbons (ORO)		159 15.0	<15.0 15.0	<15.0 15.0			1570 74.9
Total TPH		725 15.0	<15.0 15.0	<15.0 15.0			8720 74.9

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

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Version: 1.9%

Kelsey Brooks
Project Manager



Certificate of Analysis Summary 570435

COG Operating, LLC, Midland, TX

Project Name: Munnynthabank State #2H (10-21-2017)



Project Id:

Contact: Sheldon Hitchcock

Project Location: B-34-24S-27E

Date Received in Lab: Thu Dec-07-17 11:15 am

Report Date: 12-JAN-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	570435-007	570435-008	570435-009	570435-010	570435-011	570435-012
	<i>Field Id:</i>	T-2 1'	T-2 2'	T-2 3'	T-2 4'	T-2 5'	T-2 6'
	<i>Depth:</i>	1-	2-	3-	4-	5-	6-
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-30-17 13:15	Nov-30-17 13:17	Nov-30-17 13:19	Nov-30-17 13:21	Nov-30-17 13:23	Nov-30-17 13:25
BTEX by EPA 8021B	<i>Extracted:</i>	Dec-12-17 08:30	Dec-12-17 08:30				
	<i>Analyzed:</i>	Dec-12-17 10:33	Dec-12-17 10:52				
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL				
	Benzene	<0.00199 0.00199	<0.00200 0.00200				
	Toluene	<0.00199 0.00199	<0.00200 0.00200				
Ethylbenzene		<0.00199 0.00199	<0.00200 0.00200				
m,p-Xylenes		<0.00398 0.00398	<0.00399 0.00399				
o-Xylene		<0.00199 0.00199	<0.00200 0.00200				
Total Xylenes		<0.00199 0.00199	<0.00200 0.00200				
Total BTEX		<0.00199 0.00199	<0.00200 0.00200				
Chloride by EPA 300	<i>Extracted:</i>	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00
	<i>Analyzed:</i>	Dec-08-17 12:04	Dec-08-17 12:28	Dec-08-17 12:10	Dec-08-17 12:16	Dec-08-17 12:22	Dec-08-17 12:45
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
	Chloride	77.1 4.91	160 4.98	171 50.0	275 49.6	263 49.3	213 49.6
TPH by SW8015 Mod	<i>Extracted:</i>	Dec-07-17 16:00	Dec-07-17 12:00				
	<i>Analyzed:</i>	Dec-08-17 01:57	Dec-07-17 20:13				
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL				
	Gasoline Range Hydrocarbons (GRO)	<15.0 15.0	<15.0 15.0				
	Diesel Range Organics (DRO)	<15.0 15.0	<15.0 15.0				
Oil Range Hydrocarbons (ORO)		<15.0 15.0	<15.0 15.0				
Total TPH		<15.0 15.0	<15.0 15.0				

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Version: 1.0%

Kelsey Brooks
Project Manager



Certificate of Analysis Summary 570435

COG Operating, LLC, Midland, TX

Project Name: Munnynthabank State #2H (10-21-2017)



Project Id:

Contact: Sheldon Hitchcock

Project Location: B-34-24S-27E

Date Received in Lab: Thu Dec-07-17 11:15 am

Report Date: 12-JAN-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	570435-013	570435-014	570435-015	570435-016	570435-017	570435-018
	<i>Field Id:</i>	T-2 8'	T-2 10'	T-2 12'	T-3 0'	T-3 1'	T-3 2'
	<i>Depth:</i>	8-	10-	12-	0-	1-	2-
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-30-17 13:27	Nov-30-17 13:29	Nov-30-17 13:31	Nov-30-17 13:37	Nov-30-17 13:39	Nov-30-17 13:41
BTEX by EPA 8021B	<i>Extracted:</i>				Dec-12-17 08:30	Dec-12-17 08:30	Dec-12-17 08:30
	<i>Analyzed:</i>				Dec-12-17 11:11	Dec-12-17 11:30	Dec-12-17 11:49
	<i>Units/RL:</i>				mg/kg RL	mg/kg RL	mg/kg RL
Benzene					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Toluene					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Ethylbenzene					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
m,p-Xylenes					<0.00402 0.00402	<0.00404 0.00404	<0.00399 0.00399
o-Xylene					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Total Xylenes					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Total BTEX					<0.00201 0.00201	<0.00202 0.00202	<0.00200 0.00200
Chloride by EPA 300	<i>Extracted:</i>	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 09:00	Dec-08-17 12:30
	<i>Analyzed:</i>	Dec-08-17 12:51	Dec-08-17 13:09	Dec-08-17 13:15	Dec-08-17 13:21	Dec-08-17 13:27	Dec-08-17 16:48
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		173 49.1	223 24.6	163 24.6	195 24.7	<4.91 4.91	<4.93 4.93
TPH by SW8015 Mod	<i>Extracted:</i>				Dec-07-17 12:00	Dec-07-17 12:00	Dec-07-17 12:00
	<i>Analyzed:</i>				Dec-07-17 20:33	Dec-07-17 20:53	Dec-07-17 21:14
	<i>Units/RL:</i>				mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)					<14.9 14.9	<15.0 15.0	<14.9 14.9
Diesel Range Organics (DRO)					28.0 14.9	<15.0 15.0	<14.9 14.9
Oil Range Hydrocarbons (ORO)					<14.9 14.9	<15.0 15.0	<14.9 14.9
Total TPH					28.0 14.9	<15.0 15.0	<14.9 14.9

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 570435

COG Operating, LLC, Midland, TX

Project Name: Munnynthabank State #2H (10-21-2017)



Project Id:

Contact: Sheldon Hitchcock

Project Location: B-34-24S-27E

Date Received in Lab: Thu Dec-07-17 11:15 am

Report Date: 12-JAN-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	570435-019	570435-020	570435-021	570435-022	570435-023	570435-024
	<i>Field Id:</i>	T-3 3'	T-3 4'	T-4 0'	T-4 1'	T-4 2'	T-4 3'
	<i>Depth:</i>	3-	4-	0-	1-	2-	3-
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-30-17 13:43	Nov-30-17 13:45	Nov-30-17 13:50	Nov-30-17 13:52	Nov-30-17 13:52	Nov-30-17 13:54
BTEX by EPA 8021B	<i>Extracted:</i>			Dec-12-17 08:30	Dec-12-17 08:30	Dec-12-17 17:00	
	<i>Analyzed:</i>			Dec-12-17 12:08	Dec-12-17 12:27	Dec-12-17 23:11	
	<i>Units/RL:</i>			mg/kg RL	mg/kg RL	mg/kg RL	
	Benzene			<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
	Toluene			<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
Ethylbenzene				<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
m,p-Xylenes				<0.00397 0.00397	<0.00396 0.00396	<0.00402 0.00402	
o-Xylene				<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
Total Xylenes				<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
Total BTEX				<0.00198 0.00198	<0.00198 0.00198	<0.00201 0.00201	
Chloride by EPA 300	<i>Extracted:</i>	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30
	<i>Analyzed:</i>	Dec-08-17 17:06	Dec-08-17 17:12	Dec-08-17 17:18	Dec-08-17 17:24	Dec-08-17 17:42	Dec-08-17 17:48
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
	Chloride	<4.93 4.93	6.23 4.96	2080 24.6	650 25.0	290 4.95	220 49.8
TPH by SW8015 Mod	<i>Extracted:</i>			Dec-07-17 12:00	Dec-07-17 12:00	Dec-07-17 12:00	
	<i>Analyzed:</i>			Dec-07-17 21:36	Dec-07-17 21:56	Dec-07-17 22:15	
	<i>Units/RL:</i>			mg/kg RL	mg/kg RL	mg/kg RL	
	Gasoline Range Hydrocarbons (GRO)			<15.0 15.0	<15.0 15.0	<15.0 15.0	
	Diesel Range Organics (DRO)			<15.0 15.0	<15.0 15.0	<15.0 15.0	
Oil Range Hydrocarbons (ORO)				<15.0 15.0	<15.0 15.0	<15.0 15.0	
Total TPH				<15.0 15.0	<15.0 15.0	<15.0 15.0	

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 570435

COG Operating, LLC, Midland, TX

Project Name: Munnynthabank State #2H (10-21-2017)



Project Id:

Contact: Sheldon Hitchcock

Project Location: B-34-24S-27E

Date Received in Lab: Thu Dec-07-17 11:15 am

Report Date: 12-JAN-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	570435-025	570435-026	570435-027	570435-028	570435-029	
	<i>Field Id:</i>	T-4 4'	T-4 5'	T-4 7'	T-4 9'	T-4 11'	
	<i>Depth:</i>	4-	5-	7-	9-	11-	
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	
	<i>Sampled:</i>	Nov-30-17 13:56	Nov-30-17 13:58	Nov-30-17 14:03	Nov-30-17 14:05	Nov-30-17 14:07	
Chloride by EPA 300	<i>Extracted:</i>	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	Dec-08-17 12:30	
	<i>Analyzed:</i>	Dec-08-17 17:54	Dec-08-17 18:00	Dec-08-17 18:05	Dec-08-17 18:29	Dec-08-17 18:35	
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	
Chloride		260 24.7	183 24.8	221 24.7	190 24.7	227 24.9	

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Kelsey Brooks
Project Manager

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

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

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

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

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

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(602) 437-0330	



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035310

Sample: 570435-008 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 20:13

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	94.8	99.9	95	70-135	
o-Terphenyl	48.7	50.0	97	70-135	

Lab Batch #: 3035310

Sample: 570435-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 20:33

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	90.9	99.6	91	70-135	
o-Terphenyl	45.1	49.8	91	70-135	

Lab Batch #: 3035310

Sample: 570435-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 20:53

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	92.1	99.7	92	70-135	
o-Terphenyl	47.6	49.9	95	70-135	

Lab Batch #: 3035310

Sample: 570435-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 21:14

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	81.8	99.6	82	70-135	
o-Terphenyl	42.8	49.8	86	70-135	

Lab Batch #: 3035310

Sample: 570435-021 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 21:36

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	79.8	99.8	80	70-135	
o-Terphenyl	42.3	49.9	85	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035310

Sample: 570435-022 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 21:56

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	91.6	99.8	92	70-135	
o-Terphenyl	47.7	49.9	96	70-135	

Lab Batch #: 3035310

Sample: 570435-023 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 22:15

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	92.4	99.9	92	70-135	
o-Terphenyl	47.0	50.0	94	70-135	

Lab Batch #: 3035311

Sample: 570435-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 23:57

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	90.4	99.8	91	70-135	
o-Terphenyl	47.4	49.9	95	70-135	

Lab Batch #: 3035311

Sample: 570435-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 00:19

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	84.3	99.8	84	70-135	
o-Terphenyl	43.1	49.9	86	70-135	

Lab Batch #: 3035311

Sample: 570435-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 00:39

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	82.2	99.9	82	70-135	
o-Terphenyl	43.3	50.0	87	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 570435-007 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 01:57

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	93.7	100	94	70-135	
o-Terphenyl	48.1	50.0	96	70-135	

Lab Batch #: 3035311

Sample: 570435-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 08:57

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	97.6	99.8	98	70-135	
o-Terphenyl	50.4	49.9	101	70-135	

Lab Batch #: 3035740

Sample: 570435-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 09:55

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0275	0.0300	92	80-120	
4-Bromofluorobenzene	0.0268	0.0300	89	80-120	

Lab Batch #: 3035740

Sample: 570435-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 10:14

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0273	0.0300	91	80-120	
4-Bromofluorobenzene	0.0270	0.0300	90	80-120	

Lab Batch #: 3035740

Sample: 570435-007 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 10:33

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0268	0.0300	89	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035740

Sample: 570435-008 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 10:52

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0275	0.0300	92	80-120	

Lab Batch #: 3035740

Sample: 570435-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 11:11

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0320	0.0300	107	80-120	

Lab Batch #: 3035740

Sample: 570435-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 11:30

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0274	0.0300	91	80-120	
4-Bromofluorobenzene	0.0273	0.0300	91	80-120	

Lab Batch #: 3035740

Sample: 570435-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 11:49

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0282	0.0300	94	80-120	
4-Bromofluorobenzene	0.0276	0.0300	92	80-120	

Lab Batch #: 3035740

Sample: 570435-021 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 12:08

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0284	0.0300	95	80-120	
4-Bromofluorobenzene	0.0292	0.0300	97	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035740

Sample: 570435-022 / SMP

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 12:27

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0286	0.0300	95	80-120	
4-Bromofluorobenzene	0.0284	0.0300	95	80-120	

Lab Batch #: 3035740

Sample: 570435-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 16:14

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0266	0.0300	89	80-120	
4-Bromofluorobenzene	0.0275	0.0300	92	80-120	

Lab Batch #: 3035722

Sample: 570435-023 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 23:11

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0274	0.0300	91	80-120	
4-Bromofluorobenzene	0.0281	0.0300	94	80-120	

Lab Batch #: 3035888

Sample: 570435-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/13/17 12:50

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0258	0.0300	86	80-120	
4-Bromofluorobenzene	0.0298	0.0300	99	80-120	

Lab Batch #: 3035310

Sample: 7635628-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 13:34

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	91.6	100	92	70-135	
o-Terphenyl	48.9	50.0	98	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 7635629-1-BLK / BLK

Project ID:

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 22:57

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	84.0	100	84	70-135	
o-Terphenyl	45.2	50.0	90	70-135	

Lab Batch #: 3035740

Sample: 7635895-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 09:36

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0281	0.0300	94	80-120	

Lab Batch #: 3035722

Sample: 7635897-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 19:10

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0266	0.0300	89	80-120	
4-Bromofluorobenzene	0.0268	0.0300	89	80-120	

Lab Batch #: 3035888

Sample: 7635967-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/13/17 09:59

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0275	0.0300	92	80-120	
4-Bromofluorobenzene	0.0252	0.0300	84	80-120	

Lab Batch #: 3035310

Sample: 7635628-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 13:53

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	91.9	100	92	70-135	
o-Terphenyl	49.7	50.0	99	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 7635629-1-BKS / BKS

Project ID:

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 23:17

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	87.3	100	87	70-135	
o-Terphenyl	47.5	50.0	95	70-135	

Lab Batch #: 3035740

Sample: 7635895-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 07:42

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0251	0.0300	84	80-120	
4-Bromofluorobenzene	0.0250	0.0300	83	80-120	

Lab Batch #: 3035722

Sample: 7635897-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 17:16

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0282	0.0300	94	80-120	
4-Bromofluorobenzene	0.0306	0.0300	102	80-120	

Lab Batch #: 3035888

Sample: 7635967-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/13/17 07:30

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0278	0.0300	93	80-120	
4-Bromofluorobenzene	0.0299	0.0300	100	80-120	

Lab Batch #: 3035310

Sample: 7635628-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 14:13

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	92.4	100	92	70-135	
o-Terphenyl	48.6	50.0	97	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 7635629-1-BSD / BSD

Project ID:

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/07/17 23:36

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	104	100	104	70-135	
o-Terphenyl	55.9	50.0	112	70-135	

Lab Batch #: 3035740

Sample: 7635895-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 08:01

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0285	0.0300	95	80-120	
4-Bromofluorobenzene	0.0290	0.0300	97	80-120	

Lab Batch #: 3035722

Sample: 7635897-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/12/17 17:35

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0273	0.0300	91	80-120	
4-Bromofluorobenzene	0.0279	0.0300	93	80-120	

Lab Batch #: 3035888

Sample: 7635967-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 12/13/17 07:49

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0277	0.0300	92	80-120	
4-Bromofluorobenzene	0.0338	0.0300	113	80-120	

Lab Batch #: 3035310

Sample: 570208-016 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 14:54

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	88.2	99.9	88	70-135	
o-Terphenyl	43.7	50.0	87	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 570435-003 S / MS

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 00:59

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	93.5	99.9	94	70-135	
o-Terphenyl	47.7	50.0	95	70-135	

Lab Batch #: 3035740

Sample: 570435-002 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 08:20

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0305	0.0300	102	80-120	
4-Bromofluorobenzene	0.0324	0.0300	108	80-120	

Lab Batch #: 3035722

Sample: 570484-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 17:54

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0275	0.0300	92	80-120	
4-Bromofluorobenzene	0.0347	0.0300	116	80-120	

Lab Batch #: 3035888

Sample: 570779-005 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/13/17 08:43

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0285	0.0300	95	80-120	
4-Bromofluorobenzene	0.0296	0.0300	99	80-120	

Lab Batch #: 3035310

Sample: 570208-016 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/07/17 15:13

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	91.4	99.8	92	70-135	
o-Terphenyl	47.7	49.9	96	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Munnynthabank State #2H (10-21-2017)

Work Orders : 570435,

Lab Batch #: 3035311

Sample: 570435-003 SD / MSD

Project ID:

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/08/17 01:18

SURROGATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	91.8	99.7	92	70-135	
o-Terphenyl	46.9	49.9	94	70-135	

Lab Batch #: 3035740

Sample: 570435-002 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 08:39

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0337	0.0300	112	80-120	
4-Bromofluorobenzene	0.0344	0.0300	115	80-120	

Lab Batch #: 3035722

Sample: 570484-001 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/12/17 18:13

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0264	0.0300	88	80-120	
4-Bromofluorobenzene	0.0319	0.0300	106	80-120	

Lab Batch #: 3035888

Sample: 570779-005 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 12/13/17 09:02

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0274	0.0300	91	80-120	
4-Bromofluorobenzene	0.0283	0.0300	94	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



BS / BSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order #: 570435

Project ID:

Analyst: ALJ

Date Prepared: 12/12/2017

Date Analyzed: 12/12/2017

Lab Batch ID: 3035740

Sample: 7635895-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00201	0.100	0.107	107	0.0998	0.111	111	4	70-130	35	
Toluene	<0.00201	0.100	0.103	103	0.0998	0.106	106	3	70-130	35	
Ethylbenzene	<0.00201	0.100	0.105	105	0.0998	0.108	108	3	71-129	35	
m,p-Xylenes	<0.00402	0.201	0.200	100	0.200	0.208	104	4	70-135	35	
o-Xylene	<0.00201	0.100	0.0992	99	0.0998	0.102	102	3	71-133	35	

Analyst: ALJ

Date Prepared: 12/12/2017

Date Analyzed: 12/12/2017

Lab Batch ID: 3035722

Sample: 7635897-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00200	0.100	0.104	104	0.100	0.103	103	1	70-130	35	
Toluene	<0.00200	0.100	0.0976	98	0.100	0.0968	97	1	70-130	35	
Ethylbenzene	<0.00200	0.100	0.0983	98	0.100	0.0976	98	1	71-129	35	
m,p-Xylenes	<0.00400	0.200	0.190	95	0.200	0.188	94	1	70-135	35	
o-Xylene	<0.00200	0.100	0.0929	93	0.100	0.0922	92	1	71-133	35	

Relative Percent Difference RPD = $200 * |(C-F)/(C+F)|$

Blank Spike Recovery [D] = $100 * (C)/[B]$

Blank Spike Duplicate Recovery [G] = $100 * (F)/[E]$

All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order #: 570435

Project ID:

Analyst: ALJ

Date Prepared: 12/13/2017

Date Analyzed: 12/13/2017

Lab Batch ID: 3035888

Sample: 7635967-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00201	0.100	0.115	115	0.100	0.108	108	6	70-130	35	
Toluene	<0.00201	0.100	0.110	110	0.100	0.103	103	7	70-130	35	
Ethylbenzene	<0.00201	0.100	0.113	113	0.100	0.105	105	7	71-129	35	
m,p-Xylenes	<0.00402	0.201	0.218	108	0.200	0.203	102	7	70-135	35	
o-Xylene	<0.00201	0.100	0.107	107	0.100	0.0990	99	8	71-133	35	

Analyst: MNV

Date Prepared: 12/08/2017

Date Analyzed: 12/08/2017

Lab Batch ID: 3035359

Sample: 7635634-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	<5.00	250	246	98	250	245	98	0	90-110	20	

Relative Percent Difference RPD = $200 * |(C-F)/(C+F)|$

Blank Spike Recovery [D] = $100 * (C)/[B]$

Blank Spike Duplicate Recovery [G] = $100 * (F)/[E]$

All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order #: 570435

Project ID:

Analyst: MNV

Date Prepared: 12/08/2017

Date Analyzed: 12/08/2017

Lab Batch ID: 3035517

Sample: 7635642-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	<5.00	200	208	104	200	211	106	1	90-110	20	

Analyst: ARM

Date Prepared: 12/07/2017

Date Analyzed: 12/07/2017

Lab Batch ID: 3035311

Sample: 7635628-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TPH by SW8015 Mod	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	980	98	1000	986	99	1	70-135	35	
Diesel Range Organics (DRO)	<15.0	1000	1010	101	1000	1040	104	3	70-135	35	

Analyst: ARM

Date Prepared: 12/07/2017

Date Analyzed: 12/07/2017

Lab Batch ID: 3035311

Sample: 7635629-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TPH by SW8015 Mod	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	917	92	1000	943	94	3	70-135	35	
Diesel Range Organics (DRO)	<15.0	1000	982	98	1000	1050	105	7	70-135	35	

Relative Percent Difference RPD = $200 * |(C-F)/(C+F)|$

Blank Spike Recovery [D] = $100 * (C)/[B]$

Blank Spike Duplicate Recovery [G] = $100 * (F)/[E]$

All results are based on MDL and Validated for QC Purposes



Form 3 - MS / MSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order #: 570435

Project ID:

Lab Batch ID: 3035722

QC- Sample ID: 570484-001 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/12/2017

Date Prepared: 12/12/2017

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00198	0.0990	0.0672	68	0.0996	0.0724	73	7	70-130	35	X
Toluene	0.00540	0.0990	0.0540	49	0.0996	0.0557	51	3	70-130	35	X
Ethylbenzene	0.0274	0.0990	0.0475	20	0.0996	0.0517	24	8	71-129	35	X
m,p-Xylenes	0.0613	0.198	0.0915	15	0.199	0.101	20	10	70-135	35	X
o-Xylene	0.0155	0.0990	0.0466	31	0.0996	0.0498	34	7	71-133	35	X

Lab Batch ID: 3035740

QC- Sample ID: 570435-002 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/12/2017

Date Prepared: 12/12/2017

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00200	0.100	0.0959	96	0.0996	0.102	102	6	70-130	35	
Toluene	<0.00200	0.100	0.0885	89	0.0996	0.0889	89	0	70-130	35	
Ethylbenzene	<0.00200	0.100	0.0849	85	0.0996	0.0827	83	3	71-129	35	
m,p-Xylenes	<0.00401	0.200	0.163	82	0.199	0.159	80	2	70-135	35	
o-Xylene	<0.00200	0.100	0.0811	81	0.0996	0.0798	80	2	71-133	35	

Matrix Spike Percent Recovery $[D] = 100 * (C - A) / B$
Relative Percent Difference $RPD = 200 * |(C - F) / (C + F)|$

Matrix Spike Duplicate Percent Recovery $[G] = 100 * (F - A) / E$

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable

N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

Project Name: Munnynthabank State #2H (10-21-2017)

Work Order # : 570435

Project ID:

Lab Batch ID: 3035888

QC- Sample ID: 570779-005 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 12/13/2017

Date Prepared: 12/13/2017

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00200	0.0998	0.0861	86	0.100	0.0950	95	10	70-130	35	
Toluene	<0.00200	0.0998	0.0788	79	0.100	0.0870	87	10	70-130	35	
Ethylbenzene	<0.00200	0.0998	0.0760	76	0.100	0.0832	83	9	71-129	35	
m,p-Xylenes	<0.00399	0.200	0.145	73	0.200	0.159	80	9	70-135	35	
o-Xylene	<0.00200	0.0998	0.0716	72	0.100	0.0794	79	10	71-133	35	

Lab Batch ID: 3035359

QC- Sample ID: 570435-003 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 12/08/2017

Date Prepared: 12/08/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	870	249	1090	88	249	1090	88	0	90-110	20	X

Lab Batch ID: 3035359

QC- Sample ID: 570435-008 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 12/08/2017

Date Prepared: 12/08/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	160	249	396	95	249	402	97	2	90-110	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable

N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Form 3 - MS / MSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order # : 570435

Project ID:

Lab Batch ID: 3035517

QC- Sample ID: 570434-002 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/08/2017

Date Prepared: 12/08/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	591	248	816	91	248	817	91	0	90-110	20	

Lab Batch ID: 3035517

QC- Sample ID: 570435-018 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/08/2017

Date Prepared: 12/08/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Chloride by EPA 300 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<4.93	247	272	110	247	270	109	1	90-110	20	

Lab Batch ID: 3035310

QC- Sample ID: 570208-016 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/07/2017

Date Prepared: 12/07/2017

Analyst: ARM

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	999	956	96	998	1030	103	7	70-135	35	
Diesel Range Organics (DRO)	<15.0	999	1000	100	998	1080	108	8	70-135	35	

Matrix Spike Percent Recovery $[D] = 100 * (C - A) / B$
Relative Percent Difference $RPD = 200 * |(C - F) / (C + F)|$

Matrix Spike Duplicate Percent Recovery $[G] = 100 * (F - A) / E$

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable

N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Form 3 - MS / MSD Recoveries



Project Name: Munnynthabank State #2H (10-21-2017)

Work Order # : 570435

Project ID:

Lab Batch ID: 3035311

QC- Sample ID: 570435-003 S

Batch #: 1 Matrix: Soil

Date Analyzed: 12/08/2017

Date Prepared: 12/07/2017

Analyst: ARM

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

TPH by SW8015 Mod Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	999	1030	103	997	1000	100	3	70-135	35	
Diesel Range Organics (DRO)	<15.0	999	1110	111	997	1090	109	2	70-135	35	

Matrix Spike Percent Recovery $[D] = 100 * (C - A) / B$
Relative Percent Difference $RPD = 200 * |(C - F) / (C + F)|$

Matrix Spike Duplicate Percent Recovery $[G] = 100 * (F - A) / E$

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

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Xenco Quote

Xenco Job #

570435

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Page 2 of 4

Client / Reporting Information		Project Information		Xenoco Quote #		Xenoco Job #											
Company Name / Branch: COG Operating, LLC		Project Name/Number: Munnysbank State #2H (10-21-2017)		570435													
Company Address: 2407 Pecos Ave. Artesia NM 88210		Project Location: B-34-24S-27E															
Email: slhitchcock@concho.com Phone No: 575-703-6475 dhneel2@concho.com; cgray@concho.com; rhaskell@concho.com		Invoice To: COG Operating, LLC Attn: Robert McNeill 600 W. Illinois Ave. Midland TX, 79701															
Project Contact: Sheldon Hitchcock		PO Number:															
Sampler's Name: Sheldon Hitchcock																	
No.	Field ID / Point of Collection	Collection	Matrix	# of bottles	HCl	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MeOH	Other	TPH EXTENDED	BTEX	CHLORIDES	Field Comments	
1	T-2 5'	5'	11/30	1:23P	S	1											
2	T-2 6'	6'	11/30	1:26P	S	1											
3	T-2 8'	8'	11/30	1:27P	S	1											
4	T-2 10'	10'	11/30	1:29P	S	1											
5	T-2 12'	12'	11/30	1:31P	S	1											
6					S	1											
7					S	1											
8					S	1											
9					S	1											
10					S	1											
Turnaround Time (Business days)																	
<input type="checkbox"/> Same Day TAT		<input type="checkbox"/> 5 Day TAT															
<input type="checkbox"/> Next Day EMERGENCY		<input type="checkbox"/> 7 Day TAT															
<input type="checkbox"/> 2 Day EMERGENCY		<input checked="" type="checkbox"/> Contract TAT															
<input type="checkbox"/> 3 Day EMERGENCY																	
TAT Starts Day received by Lab, if received by 5:00 pm																	
Relinquished by Sampler:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Date Time:		Received By:		Date Time:	
1. Sheldon Hitchcock		12-17-08		Sheldon		2		12-17-08		Sheldon		4		12-17-08		Sheldon	
Relinquished by:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Date Time:		Received By:		Date Time:	
3																	
Relinquished by:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Date Time:		Received By:		Date Time:	
5																	
Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenoco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenoco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the Client if such losses are due to circumstances beyond the control of Xenoco. A minimum charge of \$75 will be applied to each project. Xenoco's liability will be limited to the cost of samples. Any samples received by Xenoco but not analyzed will be invoiced at \$5 per sample. These terms will be enforced unless previously negotiated under a fully executed client contract.																	



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Client / Reporting Information

Company Name / Branch:
COG Operating, LLC

Company Address:
2407 Pecos Ave, Artesia NM 88210

Email: shitchcock@concho.com
dnee12@concho.com, cgray@concho.com, rhaskell@concho.com

Project Contact: Sheldon Hitchcock

Sample's Name: Sheldon Hitchcock

Project Information

Project Name/Number: Mumfrybank State #2H (10-21-2017)

Project Location:
B-34-24S-27E

Invoice To: COG Operating, LLC
Attn: Robert McNeill
600 W. Illinois Ave.
Midland TX, 79701

PO Number:

Analytical Information

Matrix Codes

W = Water
S = Soil/Sediment
GW = Ground Water
DW = Drinking Water
P = Product
SW = Surface water
SL = Sludge
OW = Ocean/Sea Water
WI = Wipe
O = Oil
WW = Waste Water
A = Air

No. Field ID / Point of Collection

No.	Field ID / Point of Collection	Sample Depth	Date	Time	Matrix	# of bottles	HCl	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MEOH	Other	TPH EXTENDED	BTEX	CHLORIDES	Notes	Field Comments
1	T-3 0'	0'	11/30	1:37 P	S	1									X	X	X		
2	T-3 1'	1'	11/30	1:39 P	S	1									X	X	X		
3	T-3 2'	2'	11/30	1:41 P	S	1									X	X	X		
4	T-3 3'	3'	11/30	1:43 P	S	1									X	X	X		
5	T-3 4'	4'	11/30	1:45 P	S	1									X	X	X		
6	T-4 0'	0'	11/30	1:50 P	S	1									X	X	X		
7	T-4 1'	1'	11/30	1:52 P	S	1									X	X	X		
8	T-4 2'	2'	11/30	1:54 P	S	1									X	X	X		
9	T-4 3'	3'	11/30	1:56 P	S	1									X	X	X		
10	T-4 4'	4'	11/30	1:58 P	S	1									X	X	X		

Notes:

☐ Same Day TAT ☐ 5 Day TAT ☐ Level II Std QC ☐ Level IV (Full Data Pkg /raw data)

☐ Next Day EMERGENCY ☐ 7 Day TAT ☐ Level III Std QC+ Forms ☐ TRRP Level IV

☐ 2 Day EMERGENCY ☒ Contract TAT ☐ Level 3 (CLP Forms) ☐ UST / RG-411

☐ 3 Day EMERGENCY ☐ TRRP Checklist

TAT Starts Day received by Lab, if received by 5:00 pm

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY

Relinquished by Sampler:

Relinquished by:

Relinquished by:

5

Date Time:

Date Time:

Date Time:

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Received By:

Received By:

Received By:

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Dallas | Texas (214-902-0300)

Stafford, Texas (281-240-4200)

Dallas Texas (214-902-0300)

San Antonio, Texas (740 F00 2004)

Midland Towers (400-704 FORT)

Phoenix, Arizona (480-355-0900)

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Xenco Job #

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Xenco Quote #

Xenco Job #

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Client / Reporting Information		Project Information		Analytical Information		Matrix Codes												
Company Name / Branch: COG Operating, LLC		Project Name/Number: Murnynbank State #2H (10-21-2017)																
Company Address: 2407 Pecos Ave. Artesia NM 88210		Project Location: B-34-24S-27E																
Email: slhitchcock@concho.com Phone No: 575-703-6475 dhneel2@concho.com; cgray@concho.com; mskell@concho.com		Invoice To: COG Operating, LLC Attn: Robert McNeill 600 W. Illinois Ave. Midland TX, 79701																
Project Contact: Sheldon Hitchcock		PO Number:																
Sampler's Name: Sheldon Hitchcock																		
No.	Field ID / Point of Collection	Sample Depth	Date	Time	Matrix	# of bottles	HCI	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MEOH	TPH EXTENDED	BTEX	CHLORIDES	Field Comments	
1	T-1 0'	0'	11/30	1:00 P	S	1								X	X	X		
2	T-1 1'	1'	11/30	1:02 P	S	1								X	X	X		
3	T-1 2'	2'	11/30	1:04 P	S	1								X	X	X		
4	T-1 3'	3'	11/30	1:06 P	S	1								X	X	X		
5	T-1 4'	4'	11/30	1:08 P	S	1								X	X	X		
6	T-2 0'	0'	11/30	1:13 P	S	1								X	X	X		
7	T-2 1'	1'	11/30	1:15 P	S	1								X	X	X		
8	T-2 2'	2'	11/30	1:17 P	S	1								X	X	X		
9	T-2 3'	3'	11/30	1:19 P	S	1								X	X	X		
10	T-2 4'	4'	11/30	1:21 P	S	1								X	X	X		
Turnaround Time (Business days)																		
<input type="checkbox"/> Same Day TAT		<input type="checkbox"/> 5 Day TAT																
<input type="checkbox"/> Next Day EMERGENCY		<input type="checkbox"/> 7 Day TAT																
<input type="checkbox"/> 2 Day EMERGENCY		<input checked="" type="checkbox"/> Contract TAT																
<input type="checkbox"/> 3 Day EMERGENCY																		
TAT Starts Day received by Lab, if received by 5:00 pm																		
Relinquished by Sampler:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:		
1. Sheldon McNeil		12-11-03		Spente				2. Spente				3. Spente				4. Spente		
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:		
3																		
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:		
5																		
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Client / Reporting Information		Project Information		Xenoco Quote #		Xenoco Job #		Matrix Codes									
Company Name / Branch: COG Operating, LLC		Project Name/Number: Munyhabank State #21 (10-21-2017)															
Company Address: 2407 Pecos Ave. Artesia NM 88210		Project Location: B-34-245-27E															
Email: shitchcock@concho.com Phone No: 575-703-6475 dhneel2@concho.com; cgray@concho.com; raskell@concho.com		Invoice To: COG Operating, LLC Attn: Robert McNeill 600 W. Illinois Ave. Midland TX, 79701															
Project Contact: Sheldon Hitchcock		PO Number:															
Sampler's Name: Sheldon Hitchcock																	
No.	Field ID / Point of Collection	Collection	Matrix	# of bottles	HCl	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MEOH	OTHER	TPH EXTENDED	BTEX	CHLORIDES	Field Comments	
1	T-3 0'	0'	11/30	1:37P	S	1							X	X	X		
2	T-3 1'	1'	11/30	1:39P	S	1							X	X	X		
3	T-3 2'	2'	11/30	1:41P	S	1							X	X	X		
4	T-3 3'	3'	11/30	1:43P	S	1							X	X	X		
5	T-3 4'	4'	11/30	1:45P	S	1							X	X	X		
6	T-4 0'	0'	11/30	1:50P	S	1							X	X	X		
7	T-4 1'	1'	11/30	1:52P	S	1							X	X	X		
8	T-4 2'	2'	11/30	1:54P	S	1							X	X	X		
9	T-4 3'	3'	11/30	1:56P	S	1							X	X	X		
10	T-4 4'	4'	11/30	1:58P	S	1							X	X	X		
Turnaround Time (Business days)																	
<input type="checkbox"/> Same Day TAT		<input type="checkbox"/> 5 Day TAT															
<input type="checkbox"/> Next Day EMERGENCY		<input type="checkbox"/> 7 Day TAT															
<input type="checkbox"/> 2 Day EMERGENCY		<input checked="" type="checkbox"/> Contract TAT															
<input type="checkbox"/> 3 Day EMERGENCY																	
TAT Starts Day received by Lab, if received by 5:00 pm																	
Relinquished by Sampler:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:	
1. Sheldon Hitchcock		12/6/2015		1		S.H.A.T.C.		2		2		S.H.A.T.C.		2		S.H.A.T.C.	
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:	
3																	
Relinquished by:		Date Time:		Received By:		Date Time:		Relinquished By:		Date Time:		Received By:		Date Time:		Relinquished By:	
5																	
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Client / Reporting Information		Project Information		Xenco Quote #		Xenco Job #											
Company Name / Branch: COG Operating, LLC		Project Name/Number: Mumyhabank State #2H (10-21-2017)															
Company Address: 2407 Pecos Ave. Artesia NM 88210		Project Location: B-34-24S-27E															
Email: slhitchcock@concho.com Phone No: 575-703-6475 dhneel2@concho.com; cgray@concho.com; raskell@concho.com		Invoice To: COG Operating, LLC Attn: Robert McNeill 600 W. Illinois Ave. Midland TX, 79701															
Project Contact: Sheldon Hitchcock		PO Number:															
Sampler's Name: Sheldon Hitchcock																	
No.	Field ID / Point of Collection	Sample Depth	Date	Time	Matrix	# of bottles	HCl	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MEOH	TPH EXTENDED	BTEX	CHLORIDES	Field Comments
1	T-4 5'	5'	11/30	8:03 P	S	1								X			
2	T-4 7'	7'	11/30	8:05 P	S	1								X			
3	T-4 9'	9'	11/30	8:07 P	S	1								X			
4	T-4 11'	11'	11/30	8:09 P	S	1								X			
5					S	1											
6					S	1											
7					S	1											
8					S	1											
9					S	1											
10					S	1											
Turnaround Time (Business days)																	
<input type="checkbox"/> Same Day TAT		<input type="checkbox"/> 5 Day TAT		<input type="checkbox"/> Level II Std QC		<input type="checkbox"/> Level IV (Full Data Pkg/raw data)											
<input type="checkbox"/> Next Day EMERGENCY		<input type="checkbox"/> 7 Day TAT		<input type="checkbox"/> Level III Std QC+ Forms		<input type="checkbox"/> TRRP Level IV											
<input type="checkbox"/> 2 Day EMERGENCY		<input checked="" type="checkbox"/> Contract TAT		<input type="checkbox"/> Level 3 (CLP Forms)		<input type="checkbox"/> UST / RG -411											
<input type="checkbox"/> 3 Day EMERGENCY				<input type="checkbox"/> TRRP Checklist													
TAT Starts Day received by Lab, if received by 5:00 pm																	
Relinquished by Sampler		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Custody Seal #		Preserved where applicable		On Ice	
1 Sheldon Harris		12:00 am, 11/30/15		Sheldon Harris		2		2		2		4		5-6		5-6	
Relinquished by:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Custody Seal #		Preserved where applicable		On Ice	
3																	
Relinquished by:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Custody Seal #		Preserved where applicable		On Ice	
5																	

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the Client if such losses are due to circumstances beyond the control of Xenco. A minimum charge of \$75 will be applied to each project. Xenco's liability will be limited to the cost of samples. Any samples received by Xenco but not analyzed will be invoiced at \$5 per sample. These terms will be enforced unless previously negotiated under a fully executed client contract.

Temp: 2.3°C IR ID: R-8
CF: (0-6: -0.2°C)
(6-23: +0.2°C)
Corrected Temp: 2.1°C

Notes: 11.15



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In



Client: COG Operating, LLC

Date/ Time Received: 12/07/2017 11:15:00 AM

Work Order #: 570435

Acceptable Temperature Range: 0 - 6 degC

Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sample Receipt Checklist

Comments

#1 *Temperature of cooler(s)?	2.1
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	No
#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)?	No
#18 Water VOC samples have zero headspace?	N/A

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

Analyst:

PH Device/Lot#:

Checklist completed by:

Connie Hernandez

Date: 12/07/2017

Checklist reviewed by:

Mike Kimmel

Date: 12/14/2017