

SITE INFORMATION

Report Type: Work Plan 1RP-4502

General Site Information:

| | | | | | | |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------|---------|-------|--------------|--|--|
| Site: | Lusk Deep Unit A #19 | | | | | |
| Company: | COG Operating LLC | | | | | |
| Section, Township and Range | Unit N | Sec. 17 | T 19S | R 32E | | |
| Lease Number: | API No. 30-025-35244 | | | | | |
| County: | Lea County | | | | | |
| GPS: | 32.65482° N | | | 103.79138° W | | |
| Surface Owner: | Federal | | | | | |
| Mineral Owner: | | | | | | |
| Directions: | From intersection of 126A & Dry Lake Rd travel EAST on Dry Lake for 0.25 mi to location on south side of the road. | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Release Data:

| | |
|---------------------------------|----------------------------|
| Date Released: | 10/29/2016 |
| Type Release: | Oil & Produced Water |
| Source of Contamination: | Wellhead |
| Fluid Released: | 2 bbls oil & 18 bbls water |
| Fluids Recovered: | 0 bbls oil & 5 bbls water |

Official Communication:

| | | | |
|----------------------|------------------------------------------------------------------------------|--|----------------------------------------------------------------------------|
| Name: | Robert McNeil | | Ike Tavaréz |
| Company: | COG Operating, LLC | | Tetra Tech |
| Address: | One Concho Center | | 4000 N. Big Spring |
| | 600 W. Illinois Ave. | | Ste 401 |
| City: | Midland Texas, 79701 | | Midland, Texas |
| Phone number: | (432) 686-3023 | | (432) 687-8110 |
| Fax: | (432) 684-7137 | | |
| Email: | rmcneil@conchoresources.com | | Ike.Tavaréz@tetrattech.com |

Ranking Criteria

| Depth to Groundwater: | Ranking Score | Site Data |
|-------------------------------------------|----------------------|------------------|
| <50 ft | 20 | |
| 50-99 ft | 10 | |
| >100 ft. | 0 | 300'+ |
| WellHead Protection: | Ranking Score | Site Data |
| Water Source <1,000 ft., Private <200 ft. | 20 | |
| Water Source >1,000 ft., Private >200 ft. | 0 | 0 |
| Surface Body of Water: | Ranking Score | Site Data |
| <200 ft. | 20 | |
| 200 ft - 1,000 ft. | 10 | |
| >1,000 ft. | 0 | 0 |
| Total Ranking Score: | | 0 |

| Acceptable Soil RRAL (mg/kg) | | |
|------------------------------|------------|-------|
| Benzene | Total BTEX | TPH |
| 10 | 50 | 5,000 |



APPROVED

By Olivia Yu at 3:40 pm, Jun 28, 2017

June 8, 2017

Ms. Olivia Yu
Environmental Engineer Specialist
Oil Conservation Division, District 1
1625 North French Drive
Hobbs, New Mexico 88240

NMOCD approves of the delineation completed for 1RP-4502 and proposed remediation plan with these conditions:
1. Trench 1 area: confirmatory bottom and sidewall samples at proposed excavation depth of 3 ft. bgs. If samples exceed permissible chloride levels (> 600 mg/kg), excavate to 4 ft. bgs.
2. Trench 2-4 areas: sidewall confirmation samples.

Re: Work Plan for the COG Operating LLC., Lusk Deep Unit A #19, Unit N, Section 17, Township 19 South, Range 32 East, Lea County, New Mexico. 1RP-4502.

Ms. Yu:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC., (COG) to assess a release that occurred at the Lusk Deep Unit A #19, Unit N, Section 17, Township 19 South, Range 32 East, Lea County, New Mexico (Site). The spill site coordinates are N 32.65482°, W 103.79138°. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the leak was discovered on October 29, 2016, and released approximately two (2) bbls of oil and eighteen (18) bbls of produced water due to a hole in a poly flowline. Approximately five (5) bbls of produced water was recovered, however none of the oil was recovered. The release occurred in the pasture to the south of the facility and impacted an area measuring approximately 90'x130'. The initial C-141 form is included in Appendix A.

Groundwater

No water wells were listed within Section 17 on the New Mexico Office of the State Engineer's database. The nearest well is located in Section 20 with a reported depth to water of approximately 345' below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is greater than 300' below surface. The groundwater data is shown in Appendix B.

Tetra Tech

4000 North Big Spring, Suite 401, Midland, TX 79705

Tel 432.682.4559 Fax 432.682.3946 www.tetrattech.com



Regulatory

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

Soil Assessment and Analytical Results

On December 1, 2016, Tetra Tech personnel were onsite to evaluate and sample the release area. Using a backhoe, four (4) sample trenches (T-1, T-2, T-3, and T-4) were installed to a total depth of 8.0' below surface. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 1. The trench locations are shown on Figure 3.

Referring to Table 1, all of the samples showed total TPH, benzene, and total BTEX concentrations below the laboratory reporting limits. The area of trench (T-1) showed elevated chloride concentrations in the shallow soils with a chloride high of 8,800 mg/kg at 2.0' below surface. The chloride concentrations then declined with depth to 880 mg/kg at 4.0' and showed a bottom hole concentration of 160 mg/kg at 8.0' below surface. However, the areas of trenches (T-2, T-3, and T-4) showed elevated chloride concentrations that were not vertically defined with bottom hole (8.0' below surface) concentrations of 4,530 mg/kg, 3,880 mg/kg, and 2,120 mg/kg, respectively.

Based on the laboratory results, Tetra Tech personnel returned to the site on March 28, 2017, to supervise the installation of three (3) boreholes; BH-1 (T-2), BH-2 (T-3), and BH-3 (T-4), in order to vertically define the chloride impact in these areas. Selected samples were analyzed for chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 1. The borehole locations are shown on Figure 3.

Referring to Table 1, the areas of boreholes (BH-1 and BH-2) showed elevated chloride concentrations in the deeper soils, with chloride highs of 4,850 mg/kg (14-15') and 6,030 mg/kg (9-10'), respectively. The chloride concentrations in these areas gradually declined with depth to below 400 mg/kg at 64-65' and showed bottom hole concentrations of 194 mg/kg (BH-1) and 170 mg/kg (BH-2) at 69-70' below surface. The area of borehole (BH-3) showed a chloride high of 757 mg/kg at 9-10', which rapidly declined with depth to 139 mg/kg at 14-15' and showed a bottom hole concentration of 35.4 mg/kg at 29-30' below surface.



TETRA TECH

Work Plan

Based on the laboratory results, COG proposes to remove the impacted material as highlighted (green) in Table 1 and shown on Figure 4. The area of trench (T-1) will be excavated to 3.0' below surface and the remaining areas of trenches (T-2, T-3, and T-4) will be excavated to 4.0-5.0' below surface to remove the elevated chloride impact in the shallow soils. Additionally, the areas of trenches (T-2, T-3, and T-4) will be capped with a 40 mil liner to prevent vertical migration of the impact. Once the areas are excavated to the appropriate depths and lined accordingly, the areas will be backfilled with clean material to surface grade. All of the excavated material will be transported offsite for proper disposal.

The proposed excavation depths may not be reached due to wall cave ins and safety concerns for onsite personnel. In addition, impacted soil around oil and gas equipment, structures or lines may not be feasible or practicable to be removed due to safety concerns for onsite personnel. As such, COG will excavate the impacted soils to the maximum extent practicable.

Upon completion, a final report detailing the remediation activities will be submitted to the NMOCD. If you have any questions or comments concerning the assessment or the proposed remediation activities for this site, please call at (432) 682-4559.

Respectfully submitted,
TETRA TECH

Clair Gonzales,
Geologist I

Ike Tavaréz,
Senior Project Manager, P.G.

cc: Robert McNeill – COG
Dakota Neel – COG
Rebecca Haskell – COG
Shelly Tucker - BLM

Figures

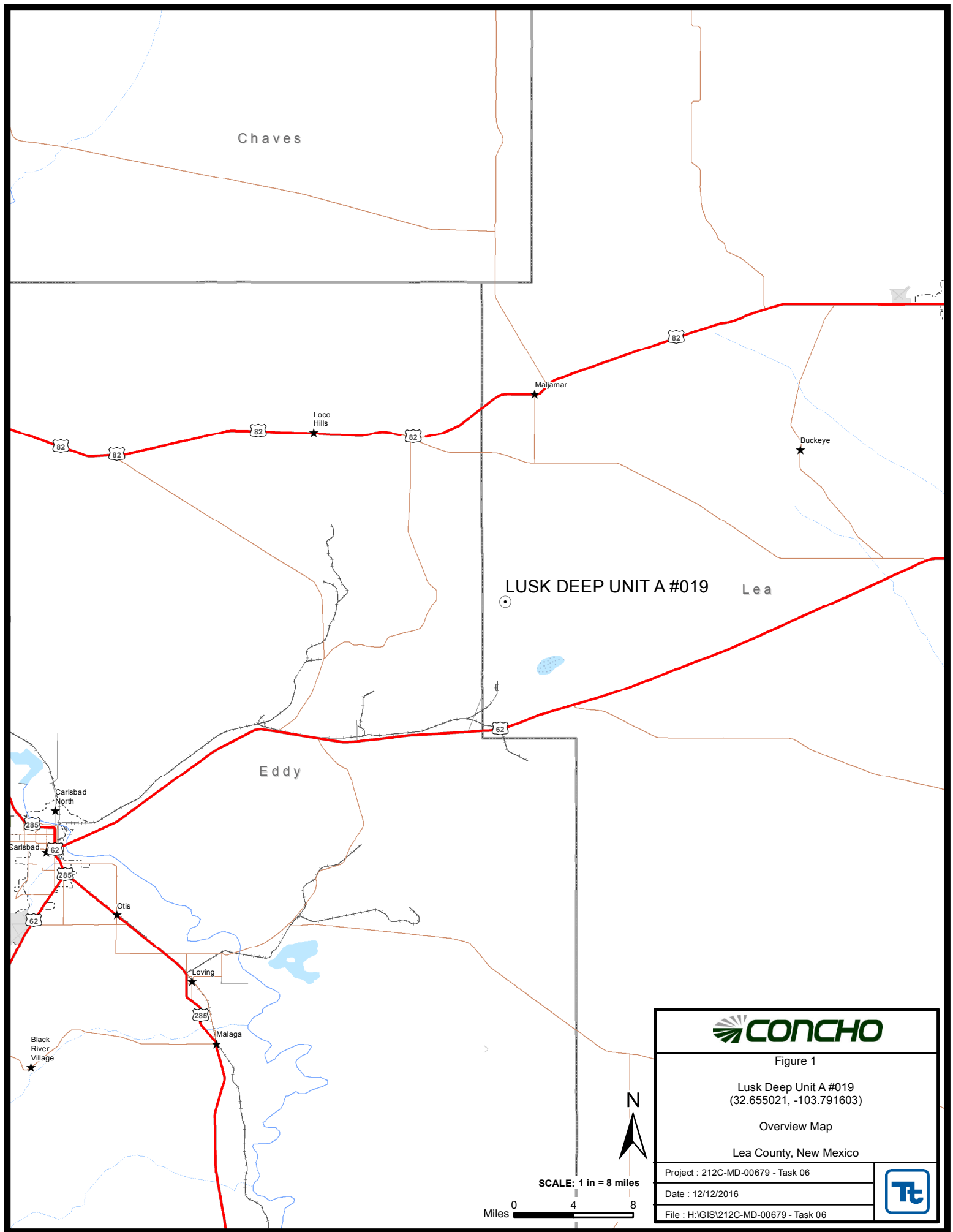


Figure 1

Lusk Deep Unit A #019
(32.655021, -103.791603)

Overview Map

Lea County, New Mexico

Project : 212C-MD-00679 - Task 06

Date : 12/12/2016

File : H:\GIS\212C-MD-00679 - Task 06



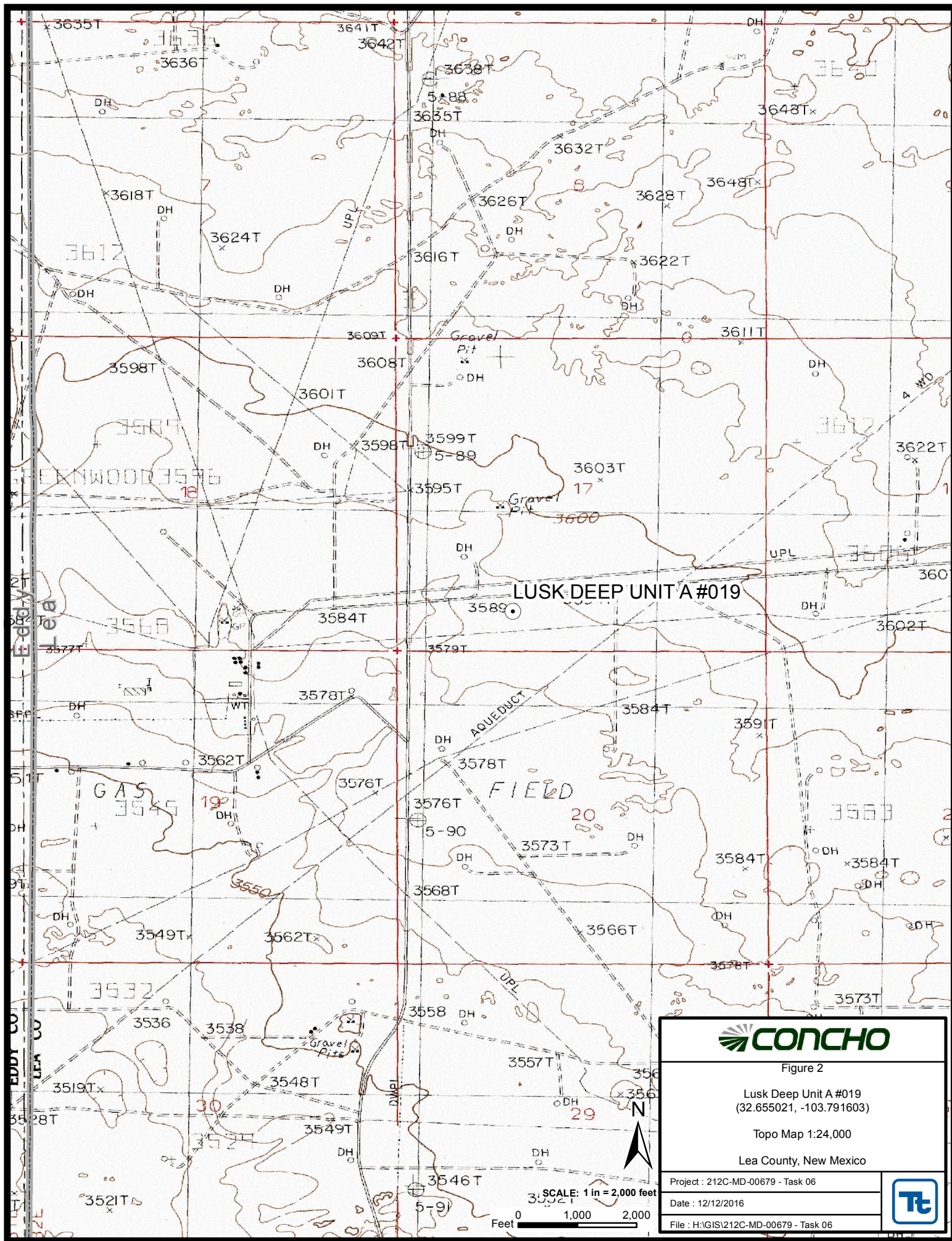


Figure 2

Lusk Deep Unit A #019
(32.655021, -103.791603)

Topo Map 1:24,000

Lea County, New Mexico

Project : 212C-MD-00679 - Task 06

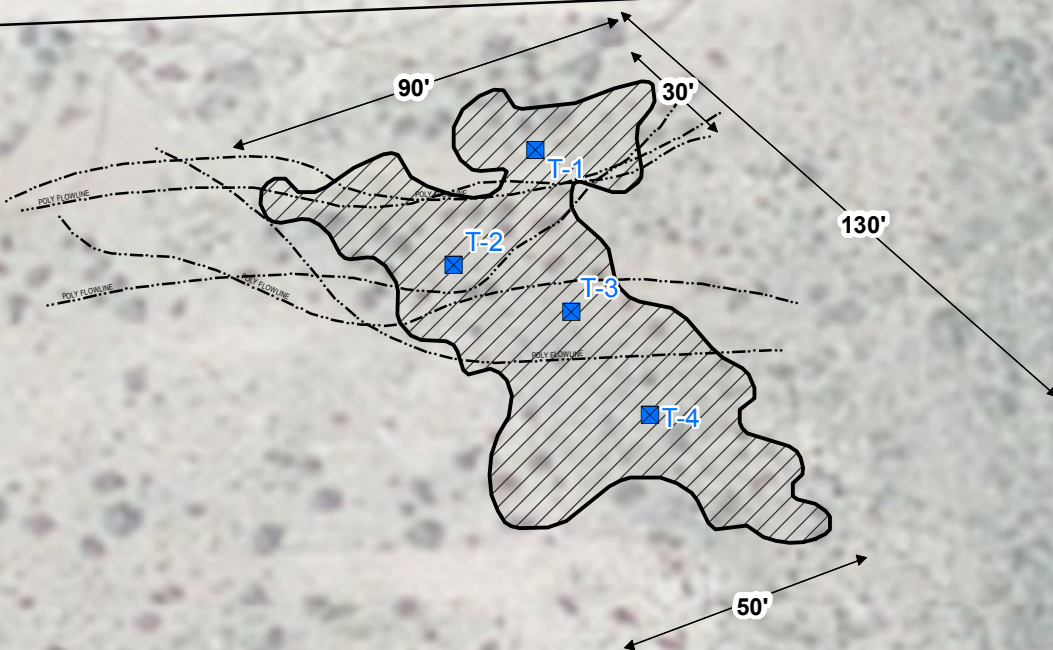
Date : 12/12/2016

File : H:\GIS\212C-MD-00679 - Task 06



PASTURE

PAD



EXPLANATION

- TRENCH SAMPLE LOCATIONS
- SPILL AREA



Source: Esri, DigitalGlobe, GeoEye, **SCALE: 1 IN = 50 FEET**
Feet 0 25 50 app



Figure 3

Lusk Deep Unit A #019
(32.655021, -103.791603)

Spill Assessment Map

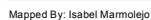
Lea County, New Mexico

Project : 212C-MD-00679 - Task 06

Date : 12/12/2016

File : H:\GIS\212C-MD-00679 - Task 06





Tables

Table 1
COG Operating LLC.
Lusk Deep Unit A #19
Lea County, New Mexico

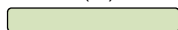
| Sample ID | Sample Date | Sample Depth (ft) | Soil Status | | TPH (mg/kg) | | | Benzene (mg/kg) | Toluene (mg/kg) | Ethlybenzene (mg/kg) | Xylene (mg/kg) | Total BTEX (mg/kg) | Chloride (mg/kg) |
|-----------|-------------|-------------------|-------------|---------|-------------|-------|-------|-----------------|-----------------|----------------------|----------------|--------------------|------------------|
| | | | In-Situ | Removed | GRO | DRO | Total | | | | | | |
| T-1 | 12/1/2016 | 0-1 | X | | <10.0 | 10.1 | 10.1 | <0.050 | <0.050 | <0.050 | <0.150 | <0.300 | 5,120 |
| | " | 2 | X | | - | - | - | - | - | - | - | - | 8,800 |
| | " | 3 | X | | - | - | - | - | - | - | - | - | 8,400 |
| | " | 4 | X | | - | - | - | - | - | - | - | - | 880 |
| | " | 6 | X | | - | - | - | - | - | - | - | - | 64.0 |
| | " | 8 | X | | - | - | - | - | - | - | - | - | 160 |
| T-2 | 12/1/2016 | 0-1 | X | | <10.0 | <10.0 | <20.0 | <0.050 | <0.050 | <0.050 | <0.150 | <0.300 | 48.0 |
| | " | 2 | X | | - | - | - | - | - | - | - | - | 4,270 |
| | " | 3 | X | | - | - | - | - | - | - | - | - | 1,300 |
| | " | 4 | X | | - | - | - | - | - | - | - | - | 3,440 |
| | " | 6 | X | | - | - | - | - | - | - | - | - | 1,310 |
| | " | 8 | X | | - | - | - | - | - | - | - | - | 4,530 |
| BH-1 | 3/28/2017 | 0-1 | X | | - | - | - | - | - | - | - | - | 1,120 |
| | " | 2-3 | X | | - | - | - | - | - | - | - | - | 2,860 |
| | " | 4-5 | X | | - | - | - | - | - | - | - | - | 1,500 |
| | " | 6-7 | X | | - | - | - | - | - | - | - | - | 1,490 |
| | " | 9-10 | X | | - | - | - | - | - | - | - | - | 2,680 |
| | " | 14-15 | X | | - | - | - | - | - | - | - | - | 4,850 |
| | " | 19-20 | X | | - | - | - | - | - | - | - | - | 3,880 |
| | " | 24-25 | X | | - | - | - | - | - | - | - | - | 4,010 |
| | " | 29-30 | X | | - | - | - | - | - | - | - | - | 4,230 |
| | " | 39-40 | X | | - | - | - | - | - | - | - | - | 2,820 |
| | " | 49-50 | X | | - | - | - | - | - | - | - | - | 3,060 |
| | " | 59-60 | X | | - | - | - | - | - | - | - | - | 1,590 |
| | " | 64-65 | X | | - | - | - | - | - | - | - | - | 306 |
| | " | 69-70 | X | | - | - | - | - | - | - | - | - | 194 |

Table 1
COG Operating LLC.
Lusk Deep Unit A #19
Lea County, New Mexico

| Sample ID | Sample Date | Sample Depth (ft) | Soil Status | | TPH (mg/kg) | | | Benzene (mg/kg) | Toluene (mg/kg) | Ethlybenzene (mg/kg) | Xylene (mg/kg) | Total BTEX (mg/kg) | Chloride (mg/kg) |
|-------------|-------------|-------------------|-------------|---------|-------------|-------|-------|-----------------|-----------------|----------------------|----------------|--------------------|------------------|
| | | | In-Situ | Removed | GRO | DRO | Total | | | | | | |
| T-3 | 12/1/2016 | 0-1 | X | | <10.0 | <10.0 | <20.0 | <0.050 | <0.050 | <0.050 | <0.150 | <0.300 | 4,800 |
| | " | 2 | X | | - | - | - | - | - | - | - | - | 4,560 |
| | " | 3 | X | | - | - | - | - | - | - | - | - | 992 |
| | " | 4 | X | | - | - | - | - | - | - | - | - | 1,630 |
| | " | 6 | X | | - | - | - | - | - | - | - | - | 1,090 |
| | " | 8 | X | | - | - | - | - | - | - | - | - | 3,880 |
| BH-2 | 3/28/2017 | 9-10 | X | | - | - | - | - | - | - | - | - | 6,030 |
| | " | 14-15 | X | | - | - | - | - | - | - | - | - | 3,890 |
| | " | 19-20 | X | | - | - | - | - | - | - | - | - | 4,630 |
| | " | 24-25 | X | | - | - | - | - | - | - | - | - | 2,520 |
| | " | 29-30 | X | | - | - | - | - | - | - | - | - | 2,090 |
| | " | 39-40 | X | | - | - | - | - | - | - | - | - | 1,950 |
| | " | 49-50 | X | | - | - | - | - | - | - | - | - | 2,810 |
| | " | 59-60 | X | | - | - | - | - | - | - | - | - | 976 |
| | " | 64-65 | X | | - | - | - | - | - | - | - | - | 354 |
| | " | 69-70 | X | | - | - | - | - | - | - | - | - | 170 |
| T-4 | 12/1/2016 | 0-1 | X | | <10.0 | <10.0 | <20.0 | <0.050 | <0.050 | <0.050 | <0.150 | <0.300 | 6,000 |
| | " | 2 | X | | - | - | - | - | - | - | - | - | 4,400 |
| | " | 3 | X | | - | - | - | - | - | - | - | - | 240 |
| | " | 4 | X | | - | - | - | - | - | - | - | - | 2,200 |
| | " | 6 | X | | - | - | - | - | - | - | - | - | 2,520 |
| | " | 8 | X | | - | - | - | - | - | - | - | - | 2,120 |
| BH-3 | 3/28/2017 | 9-10 | X | | - | - | - | - | - | - | - | - | 757 |
| | " | 14-15 | X | | - | - | - | - | - | - | - | - | 139 |
| | " | 19-20 | X | | - | - | - | - | - | - | - | - | 117 |
| | " | 24-25 | X | | - | - | - | - | - | - | - | - | 34.8 |
| | " | 29-30 | X | | - | - | - | - | - | - | - | - | 35.4 |

(-)

Not Analyzed



Proposed Excavation Depths



Proposed Liner Depth

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

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

Form C-141
Revised August 8, 2011

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

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

| | |
|-----------------------------------------------------|----------------------------|
| Name of Company: COG Operating LLC | Contact: Robert McNeill |
| Address: 600 West Illinois Avenue, Midland TX 79701 | Telephone No. 432-230-0077 |
| Facility Name: Lusk Deep Unit A #19 | Facility Type: Battery |

| | | |
|------------------------|------------------------|----------------------|
| Surface Owner: Federal | Mineral Owner: Federal | API No. 30-025-35244 |
|------------------------|------------------------|----------------------|

LOCATION OF RELEASE

| | | | | | | | | |
|------------------|---------------|-----------------|--------------|----------------------|---------------------------|-----------------------|------------------------|---------------|
| Unit Letter N | Section 17 | Township 19S | Range 32E | Feet from the 660 | North/South Line South | Feet from the 1650 | East/West Line West | County Lea |
|------------------|---------------|-----------------|--------------|----------------------|---------------------------|-----------------------|------------------------|---------------|

Latitude 32.655021314435 Longitude -103.791580657662

NATURE OF RELEASE

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
| Type of Release: Oil and Produced Water | Volume of Release: 2 bbls of Oil ; 18 bbls of PW | Volume Recovered: 0 bbls of Oil ; 5 bbls of PW |
| Source of Release: Wellhead | Date and Hour of Occurrence: 10/29/2016 unknown | Date and Hour of Discovery: 10/29/2016 10:00 AM |
| Was Immediate Notice Given? <input type="checkbox"/> Yes <input 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.*

This release was caused by a hole in a poly flow line. The damaged section of line was removed and replaced. Vacuum trucks were immediately dispatched to recover the free standing fluid.

Describe Area Affected and Cleanup Action Taken.*

This release occurred in the pasture just off of the location. Concho will have the spill site sampled to delineate any possible contamination from the release and we will present a remediation work plan to the NMOCD for approval prior to any significant remediation work.

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:  | OIL CONSERVATION DIVISION | | |
| Printed Name: Dakota Neel | Approved by Environmental Specialist: | | |
| Title: Environmental Coordinator | Approval Date: | Expiration Date: | |
| E-mail Address: dneel2@concho.com | Conditions of Approval: | | Attached <input type="checkbox"/> |
| Date: 11/3/2016 | Phone: 575-748-6933 | | |

* Attach Additional Sheets If Necessary

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
COG - Lusk Deep Unit A #19
Lea County, New Mexico

| 18 South | | | 31 East | | |
|----------|----|----|---------|-----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 98 | 14 |
| 19 | 20 | 21 | 22 | 317 | 23 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 19 South | | | 31 East | | |
|----------|------|-----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | SITE | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 180 | 34 | 35 | 36 |

| 20 South | | | 31 East | | |
|----------|----|----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 18 South | | | 32 East | | |
|----------|-----|----|---------|----|----|
| 6 | 5 | 4 | 65 | 3 | 2 |
| 7 | 460 | 8 | 9 | 10 | 11 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 19 South | | | 32 East | | |
|----------|----|----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 20 South | | | 32 East | | |
|----------|----|----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 18 South | | | 33 East | | |
|----------|----|-----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 100 | 9 | 10 | 11 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 19 South | | | 33 East | | |
|----------|----|----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

| 20 South | | | 33 East | | |
|----------|----|----|---------|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

- 88** New Mexico State Engineers Well Reports
- 105** USGS Well Reports
- 90** Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6)
- Geology and Groundwater Resources of Eddy County, NM (Report 3)
- 34** NMOCD - Groundwater Data
- 123** Tetra Tech installed temporary wells and field water level
- 143** NMOCD Groundwater map well location



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 | Depth Well | Depth Water | Water Column |
|-------------------------------|--------------|-------|--------|------|------|-----|-----|-----|-----|--------|----------|------------|-------------|--------------|
| CP 00073 | CP | LE | | 2 | 4 | 34 | 19S | 32E | | 617502 | 3609301 | 575 | | |
| CP 00075 | | LE | | 2 | 4 | 34 | 19S | 32E | | 617502 | 3609301 | 575 | | |
| CP 00563 POD1 | CP | LE | | 1 | 1 | 2 | 19 | 19S | 32E | 612118 | 3613376* | 300 | | |
| CP 00639 POD1 | CP | LE | | 3 | 1 | 20 | 19S | 32E | | 613029 | 3612880* | 350 | 345 | 5 |
| CP 00640 POD1 | CP | LE | | 2 | 2 | 19 | 19S | 32E | | 612621 | 3613280* | 260 | 102 | 158 |
| CP 00812 POD1 | CP | LE | | 4 | 4 | 01 | 19S | 32E | | 620623 | 3616973* | 200 | | |

Average Depth to Water: **223 feet**

Minimum Depth: **102 feet**

Maximum Depth: **345 feet**

Record Count: 6

PLSS Search:

Township: 19S

Range: 32E

*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 C



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

December 06, 2016

IKE TAVAREZ

TETRA TECH

1910 N. BIG SPRING STREET

MIDLAND, TX 79705

RE: COG / LUSK DEEP UNIT A #19

Enclosed are the results of analyses for samples received by the laboratory on 12/01/16 14:15.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/ga/lab_accred_certif.html.

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

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

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

| | |
|------------------|-------------------------------------------------|
| Method SM 9223-B | Total Coliform and E. coli (Colilert MMO-MUG) |
| Method EPA 524.2 | Regulated VOCs and Total Trihalomethanes (TTHM) |
| Method EPA 552.2 | Total Haloacetic Acids (HAA-5) |

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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

Sincerely,

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|-----------|---------------|--------|-----------------|-----------------|
| T-1 0-1 | H602691-01 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-1 2 | H602691-02 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-1 3 | H602691-03 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-1 4 | H602691-04 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-1 6 | H602691-05 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-1 8 | H602691-06 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 0-1 | H602691-07 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 2 | H602691-08 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 3 | H602691-09 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 4 | H602691-10 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 6 | H602691-11 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-2 8 | H602691-12 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 0-1 | H602691-13 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 2 | H602691-14 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 3 | H602691-15 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 4 | H602691-16 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 6 | H602691-17 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-3 8 | H602691-18 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 0-1 | H602691-19 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 2 | H602691-20 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 3 | H602691-21 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 4 | H602691-22 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 6 | H602691-23 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |
| T-4 8 | H602691-24 | Soil | 01-Dec-16 00:00 | 01-Dec-16 14:15 |

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

T-1 0-1 H602691-01 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories

Inorganic Compounds

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 5120 | | 16.0 | mg/kg | 4 | 6120208 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

Volatile Organic Compounds by EPA Method 8021

| | | | | | | | | | | |
|----------------|--------|--|-------|-------|----|---------|----|-----------|-------|--|
| Benzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Toluene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Ethylbenzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total Xylenes* | <0.150 | | 0.150 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total BTEX | <0.300 | | 0.300 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |

Surrogate: 4-Bromofluorobenzene (PID) 117 % 73.6-140 6120501 MS 05-Dec-16 8021B

Petroleum Hydrocarbons by GC FID

| | | | | | | | | | | |
|--------------|-------|--|------|-------|---|---------|----|-----------|-------|--|
| GRO C6-C10 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |
| DRO >C10-C28 | 10.1 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |

Surrogate: 1-Chlorooctane 82.6 % 35-147 6120204 MS 03-Dec-16 8015B

Surrogate: 1-Chlorooctadecane 86.1 % 28-171 6120204 MS 03-Dec-16 8015B

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-1 2****H602691-02 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|-------|
| Chloride | 8800 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | QM-07 |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|-------|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-1 3****H602691-03 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 8400 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-1 4****H602691-04 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 880 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-1 6**
H602691-05 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 64.0 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-1 8****H602691-06 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 160 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

T-2 0-1

H602691-07 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories

Inorganic Compounds

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 48.0 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

Volatile Organic Compounds by EPA Method 8021

| | | | | | | | | | | |
|----------------|--------|--|-------|-------|----|---------|----|-----------|-------|--|
| Benzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Toluene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Ethylbenzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total Xylenes* | <0.150 | | 0.150 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total BTEX | <0.300 | | 0.300 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |

Surrogate: 4-Bromofluorobenzene (PID) 117 % 73.6-140 6120501 MS 05-Dec-16 8021B

Petroleum Hydrocarbons by GC FID

| | | | | | | | | | | |
|--------------|-------|--|------|-------|---|---------|----|-----------|-------|--|
| GRO C6-C10 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |
| DRO >C10-C28 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |

Surrogate: 1-Chlorooctane 71.7 % 35-147 6120204 MS 03-Dec-16 8015B

Surrogate: 1-Chlorooctadecane 71.6 % 28-171 6120204 MS 03-Dec-16 8015B

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-2 2****H602691-08 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 4720 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-2 3****H602691-09 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 1300 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-2 4****H602691-10 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 3440 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-2 6****H602691-11 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 1310 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|

Cardinal Laboratories

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-2 8****H602691-12 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 4530 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

T-3 0-1 H602691-13 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories

Inorganic Compounds

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 4800 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

Volatile Organic Compounds by EPA Method 8021

| | | | | | | | | | | |
|----------------|--------|--|-------|-------|----|---------|----|-----------|-------|--|
| Benzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Toluene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Ethylbenzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total Xylenes* | <0.150 | | 0.150 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total BTEX | <0.300 | | 0.300 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |

Surrogate: 4-Bromofluorobenzene (PID) 117 % 73.6-140 6120501 MS 05-Dec-16 8021B

Petroleum Hydrocarbons by GC FID

| | | | | | | | | | | |
|--------------|-------|--|------|-------|---|---------|----|-----------|-------|--|
| GRO C6-C10 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |
| DRO >C10-C28 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |

Surrogate: 1-Chlorooctane 84.8 % 35-147 6120204 MS 03-Dec-16 8015B

Surrogate: 1-Chlorooctadecane 87.3 % 28-171 6120204 MS 03-Dec-16 8015B

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-3 2****H602691-14 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 4560 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-3 3****H602691-15 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 992 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-3 4****H602691-16 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 1630 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|-----------------|-------------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-3 6****H602691-17 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 1090 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-3 8****H602691-18 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 3880 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

T-4 0-1 H602691-19 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|-----------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories

Inorganic Compounds

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 6000 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

Volatile Organic Compounds by EPA Method 8021

| | | | | | | | | | | |
|---------------------------------------|--------|--|-------|-------|----------|---------|----|-----------|-------|--|
| Benzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Toluene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Ethylbenzene* | <0.050 | | 0.050 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total Xylenes* | <0.150 | | 0.150 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Total BTEX | <0.300 | | 0.300 | mg/kg | 50 | 6120501 | MS | 05-Dec-16 | 8021B | |
| Surrogate: 4-Bromofluorobenzene (PID) | | | 118 % | | 73.6-140 | 6120501 | MS | 05-Dec-16 | 8021B | |

Petroleum Hydrocarbons by GC FID

| | | | | | | | | | | |
|-------------------------------|-------|--|--------|-------|--------|---------|----|-----------|-------|--|
| GRO C6-C10 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |
| DRO >C10-C28 | <10.0 | | 10.0 | mg/kg | 1 | 6120204 | MS | 03-Dec-16 | 8015B | |
| Surrogate: 1-Chlorooctane | | | 74.5 % | | 35-147 | 6120204 | MS | 03-Dec-16 | 8015B | |
| Surrogate: 1-Chlorooctadecane | | | 75.1 % | | 28-171 | 6120204 | MS | 03-Dec-16 | 8015B | |

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-4 2****H602691-20 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 4400 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-4 3****H602691-21 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 240 | | 16.0 | mg/kg | 4 | 6120503 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|-----|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-4 4****H602691-22 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 2200 | | 16.0 | mg/kg | 4 | 6120504 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**T-4 6****H602691-23 (Soil)**

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories**Inorganic Compounds**

| | | | | | | | | | | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|
| Chloride | 2520 | | 16.0 | mg/kg | 4 | 6120504 | AC | 05-Dec-16 | 4500-Cl-B | |
|----------|------|--|------|-------|---|---------|----|-----------|-----------|--|

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 TETRA TECH
 1910 N. BIG SPRING STREET
 MIDLAND TX, 79705

 Project: COG / LUSK DEEP UNIT A #19
 Project Number: 212C-MD-00679.06
 Project Manager: IKE TAVAREZ
 Fax To: (432) 682-3946

 Reported:
 06-Dec-16 15:52

T-4 8
H602691-24 (Soil)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|
|---------|--------|-----|--------------------|-------|----------|-------|---------|----------|--------|-------|

Cardinal Laboratories
Inorganic Compounds

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Batch | Analyst | Analyzed | Method | Notes |
|----------|--------|-----|--------------------|-------|----------|---------|---------|-----------|-----------|-------|
| Chloride | 2120 | | 16.0 | mg/kg | 4 | 6120504 | AC | 05-Dec-16 | 4500-Cl-B | |

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

Inorganic Compounds - Quality Control

Cardinal Laboratories

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|

Batch 6120208 - 1:4 DI Water

Blank (6120208-BLK1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|
| Chloride | ND | 16.0 | mg/kg | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|

LCS (6120208-BS1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|
| Chloride | 400 | 16.0 | mg/kg | 400 | 100 | 80-120 | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|

LCS Dup (6120208-BSD1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|-----|--------|------|----|--|--|
| Chloride | 400 | 16.0 | mg/kg | 400 | 100 | 80-120 | 0.00 | 20 | | |
|----------|-----|------|-------|-----|-----|--------|------|----|--|--|

Batch 6120503 - 1:4 DI Water

Blank (6120503-BLK1)

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|
| Chloride | ND | 16.0 | mg/kg | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|

LCS (6120503-BS1)

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|
| Chloride | 416 | 16.0 | mg/kg | 400 | 104 | 80-120 | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|

LCS Dup (6120503-BSD1)

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|-----|--------|------|----|--|--|
| Chloride | 400 | 16.0 | mg/kg | 400 | 100 | 80-120 | 3.92 | 20 | | |
|----------|-----|------|-------|-----|-----|--------|------|----|--|--|

Batch 6120504 - 1:4 DI Water

Blank (6120504-BLK1)

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|
| Chloride | ND | 16.0 | mg/kg | | | | | | | |
|----------|----|------|-------|--|--|--|--|--|--|--|

LCS (6120504-BS1)

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|
| Chloride | 416 | 16.0 | mg/kg | 400 | 104 | 80-120 | | | | |
|----------|-----|------|-------|-----|-----|--------|--|--|--|--|

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946Reported:
06-Dec-16 15:52**Inorganic Compounds - Quality Control****Cardinal Laboratories**

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|

Batch 6120504 - 1:4 DI Water**LCS Dup (6120504-BSD1)**

Prepared & Analyzed: 05-Dec-16

| | | | | | | | | | | |
|----------|-----|------|-------|-----|--|-----|--------|------|----|--|
| Chloride | 400 | 16.0 | mg/kg | 400 | | 100 | 80-120 | 3.92 | 20 | |
|----------|-----|------|-------|-----|--|-----|--------|------|----|--|

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

Volatile Organic Compounds by EPA Method 8021 - Quality Control

Cardinal Laboratories

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|

Batch 6120501 - Volatiles

Blank (6120501-BLK1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|---------------------------------------|--------|-------|-------|--------|--|-----|----------|--|--|--|
| Benzene | ND | 0.050 | mg/kg | | | | | | | |
| Toluene | ND | 0.050 | mg/kg | | | | | | | |
| Ethylbenzene | ND | 0.050 | mg/kg | | | | | | | |
| Total Xylenes | ND | 0.150 | mg/kg | | | | | | | |
| Total BTEX | ND | 0.300 | mg/kg | | | | | | | |
| Surrogate: 4-Bromofluorobenzene (PID) | 0.0575 | | mg/kg | 0.0500 | | 115 | 73.6-140 | | | |

LCS (6120501-BS1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|---------------------------------------|--------|-------|-------|--------|--|-----|----------|--|--|--|
| Benzene | 2.02 | 0.050 | mg/kg | 2.00 | | 101 | 82.6-122 | | | |
| Toluene | 2.06 | 0.050 | mg/kg | 2.00 | | 103 | 72.9-122 | | | |
| Ethylbenzene | 2.01 | 0.050 | mg/kg | 2.00 | | 101 | 65.4-131 | | | |
| Total Xylenes | 6.09 | 0.150 | mg/kg | 6.00 | | 102 | 73.8-125 | | | |
| Surrogate: 4-Bromofluorobenzene (PID) | 0.0580 | | mg/kg | 0.0500 | | 116 | 73.6-140 | | | |

LCS Dup (6120501-BSD1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|---------------------------------------|--------|-------|-------|--------|--|-----|----------|------|------|--|
| Benzene | 2.08 | 0.050 | mg/kg | 2.00 | | 104 | 82.6-122 | 3.18 | 8.23 | |
| Toluene | 2.13 | 0.050 | mg/kg | 2.00 | | 106 | 72.9-122 | 3.09 | 8.71 | |
| Ethylbenzene | 2.07 | 0.050 | mg/kg | 2.00 | | 104 | 65.4-131 | 3.08 | 9.46 | |
| Total Xylenes | 6.26 | 0.150 | mg/kg | 6.00 | | 104 | 73.8-125 | 2.75 | 8.66 | |
| Surrogate: 4-Bromofluorobenzene (PID) | 0.0578 | | mg/kg | 0.0500 | | 116 | 73.6-140 | | | |

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

TETRA TECH
1910 N. BIG SPRING STREET
MIDLAND TX, 79705

Project: COG / LUSK DEEP UNIT A #19
Project Number: 212C-MD-00679.06
Project Manager: IKE TAVAREZ
Fax To: (432) 682-3946

Reported:
06-Dec-16 15:52

Petroleum Hydrocarbons by GC FID - Quality Control

Cardinal Laboratories

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|
|---------|--------|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|-------|

Batch 6120204 - General Prep - Organics

Blank (6120204-BLK1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|-------------------------------|------|------|-------|------|--|------|--------|--|--|--|
| GRO C6-C10 | ND | 10.0 | mg/kg | | | | | | | |
| DRO >C10-C28 | ND | 10.0 | mg/kg | | | | | | | |
| EXT DRO >C28-C35 | ND | 10.0 | mg/kg | | | | | | | |
| Total TPH C6-C28 | ND | 10.0 | mg/kg | | | | | | | |
| Surrogate: 1-Chlorooctane | 39.0 | | mg/kg | 50.0 | | 78.1 | 35-147 | | | |
| Surrogate: 1-Chlorooctadecane | 39.4 | | mg/kg | 50.0 | | 78.7 | 28-171 | | | |

LCS (6120204-BS1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|-------------------------------|------|------|-------|------|--|------|----------|--|--|--|
| GRO C6-C10 | 182 | 10.0 | mg/kg | 200 | | 90.9 | 76.7-115 | | | |
| DRO >C10-C28 | 192 | 10.0 | mg/kg | 200 | | 96.0 | 78.3-122 | | | |
| Total TPH C6-C28 | 374 | 10.0 | mg/kg | 400 | | 93.5 | 79.8-117 | | | |
| Surrogate: 1-Chlorooctane | 39.1 | | mg/kg | 50.0 | | 78.3 | 35-147 | | | |
| Surrogate: 1-Chlorooctadecane | 39.8 | | mg/kg | 50.0 | | 79.7 | 28-171 | | | |

LCS Dup (6120204-BSD1)

Prepared & Analyzed: 02-Dec-16

| | | | | | | | | | | |
|-------------------------------|------|------|-------|------|--|------|----------|------|------|--|
| GRO C6-C10 | 185 | 10.0 | mg/kg | 200 | | 92.6 | 76.7-115 | 1.79 | 9.42 | |
| DRO >C10-C28 | 197 | 10.0 | mg/kg | 200 | | 98.4 | 78.3-122 | 2.43 | 13.2 | |
| Total TPH C6-C28 | 382 | 10.0 | mg/kg | 400 | | 95.5 | 79.8-117 | 2.12 | 10.7 | |
| Surrogate: 1-Chlorooctane | 40.0 | | mg/kg | 50.0 | | 80.0 | 35-147 | | | |
| Surrogate: 1-Chlorooctadecane | 40.8 | | mg/kg | 50.0 | | 81.6 | 28-171 | | | |

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

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

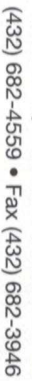
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Celey D. Keene, Lab Director/Quality Manager

ANALYSIS REQUEST
(Circle or Specify Method No.)

Page 32 of 34

Analysis Request of Chain of Custody Record



TETRA TECH
1910 N. Big Spring St.
Midland, Texas 79705
(432) 682-4559 • Fax (432) 682-3946

HL002691

CLIENT NAME:

SITE MANAGER:

PROJECT NO.:

PROJECT NAME:

LAB I.D. NUMBER

DATE

TIME

MATRIX

COMP.

GRAB

SAMPLE IDENTIFICATION

NUMBER OF CONTAINERS

FILTERED (Y/N)

HCL

HNO3

ICE

NONE

PRESERVATIVE METHOD

BTEX 8021B

TPH 8015 MOD. TX1005 (Ext. to C35)

PAH 8270

RCRA Metals Ag As Ba Cd Cr Pb Hg Se

TCLP Metals Ag As Ba Cd Vr Pd Hg Se

TCLP Volatiles

TCLP Semi Volatiles

RCI

GC.MS Vol. 8240/8260/624

GC.MS Semi. Vol. 8270/625

PCB's 8080/608

Pest. 808/608

Chloride

Gamma Spec.

Alpha Beta (Air)

PLM (Asbestos)

Major Anions/Cations, pH, TDS

ANALYSIS REQUEST
(Circle or Specify Method No.)

PAGE: 3

OF: 43

RELINQUISHED BY: (Signature)
RELINQUISHED BY: (Signature)
RELINQUISHED BY: (Signature)

Date: 12-1-10
Time: 14:15
Date: 12-1-10
Time: 14:15
Date: 12-1-10
Time: 14:15

RECEIVED BY: (Signature)
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RECEIVED BY: (Signature)

Date: 12-1-10
Time: 14:15
Date: 12-1-10
Time: 14:15
Date: 12-1-10
Time: 14:15

SAMPLED BY: (Print & Initial)
SAMPLE SHIPPED BY: (Circle)
HAND DELIVERED
TETRA TECH CONTACT PERSON:

AIRBILL #:
OTHER:
Results by:

RUSH Charges
Authorized:
Yes No

RECEIVING LABORATORY:

ADDRESS:

CITY:

STATE:

PHONE:

ZIP:

DATE:

TIME:

REMARKS:

SAMPLE CONDITION WHEN RECEIVED:

1.40c #75

Analytical Report 549845

**for
Tetra Tech- Midland**

Project Manager: Ike Tavaréz

COG-Lusk Deep Unit A #19

212C-MD-00679.06

07-APR-17

Collected By: Client



1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215), Arizona (AZ0765), Florida (E871002), Louisiana (03054)
Oklahoma (9218)

Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400)
Xenco-San Antonio: Texas (T104704534)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)



07-APR-17

Project Manager: **Ike Tavarez**

Tetra Tech- Midland

4000 N. Big Spring Suite 401

Midland, TX 79705

Reference: XENCO Report No(s): **549845**

COG-Lusk Deep Unit A #19

Project Address: Lea Co NM

Ike Tavarez:

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) 549845. 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. 549845 will be filed for 60 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.

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

Tetra Tech- Midland, Midland, TX

COG-Lusk Deep Unit A #19

| Sample Id | Matrix | Date Collected | Sample Depth | Lab Sample Id |
|------------------|--------|----------------|--------------|---------------|
| BH-1 (T-2) 0-1 | S | 03-28-17 00:00 | | 549845-001 |
| BH-1 (T-2) 2-3 | S | 03-28-17 00:00 | | 549845-002 |
| BH-1 (T-2) 4-5 | S | 03-28-17 00:00 | | 549845-003 |
| BH-1 (T-2) 6-7 | S | 03-28-17 00:00 | | 549845-004 |
| BH-1 (T-2) 9-10 | S | 03-28-17 00:00 | | 549845-005 |
| BH-1 (T-2) 14-15 | S | 03-28-17 00:00 | | 549845-006 |
| BH-1 (T-2) 19-20 | S | 03-28-17 00:00 | | 549845-007 |
| BH-1 (T-2) 24-25 | S | 03-28-17 00:00 | | 549845-008 |
| BH-1 (T-2) 29-30 | S | 03-28-17 00:00 | | 549845-009 |
| BH-1 (T-2) 39-40 | S | 03-28-17 00:00 | | 549845-010 |
| BH-1 (T-2) 49-50 | S | 03-28-17 00:00 | | 549845-011 |
| BH-1 (T-2) 59-60 | S | 03-28-17 00:00 | | 549845-012 |
| BH-1 (T-2) 64-65 | S | 03-28-17 00:00 | | 549845-013 |
| BH-1 (T-2) 69-70 | S | 03-28-17 00:00 | | 549845-014 |
| BH-2 (T-3) 9-10 | S | 03-28-17 00:00 | | 549845-015 |
| BH-2 (T-3) 14-15 | S | 03-28-17 00:00 | | 549845-016 |
| BH-2 (T-3) 19-20 | S | 03-28-17 00:00 | | 549845-017 |
| BH-2 (T-3) 24-25 | S | 03-28-17 00:00 | | 549845-018 |
| BH-2 (T-3) 29-30 | S | 03-28-17 00:00 | | 549845-019 |
| BH-2 (T-3) 39-40 | S | 03-28-17 00:00 | | 549845-020 |
| BH-2 (T-3) 49-50 | S | 03-28-17 00:00 | | 549845-021 |
| BH-2 (T-3) 59-60 | S | 03-28-17 00:00 | | 549845-022 |
| BH-2 (T-3) 64-65 | S | 03-28-17 00:00 | | 549845-023 |
| BH-2 (T-3) 69-70 | S | 03-28-17 00:00 | | 549845-024 |
| BH-3 (T-4) 9-10 | S | 03-28-17 00:00 | | 549845-025 |
| BH-3 (T-4) 14-15 | S | 03-28-17 00:00 | | 549845-026 |
| BH-3 (T-4) 19-20 | S | 03-28-17 00:00 | | 549845-027 |
| BH-3 (T-4) 24-25 | S | 03-28-17 00:00 | | 549845-028 |
| BH-3 (T-4) 29-30 | S | 03-28-17 00:00 | | 549845-029 |



CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: COG-Lusk Deep Unit A #19

Project ID: 212C-MD-00679.06
Work Order Number(s): 549845

Report Date: 07-APR-17
Date Received: 03/30/2017

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3014353 Inorganic Anions by EPA 300/300.1

Lab Sample ID 549845-001 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: 549845-001, -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.

Nitrite as N Relative Percent Difference (RPD) between matrix spike and duplicate was above quality control limits.

Samples in the analytical batch are: 549845-001, -002, -003, -004, -005, -006, -007, -008, -009, -010

Batch: LBA-3014356 Inorganic Anions by EPA 300/300.1

Lab Sample ID 549845-026 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered below QC limits in the Matrix Spike Duplicate. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 549845-011, -012, -013, -014, -015, -016, -017, -018, -019, -020, -021, -022, -023, -024, -025, -026, -027, -028, -029.

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



Certificate of Analysis Summary 549845

Tetra Tech- Midland, Midland, TX

Project Name: COG-Lusk Deep Unit A #19



Project Id: 212C-MD-00679.06

Contact: Ike Tavaréz

Project Location: Lea Co NM

Date Received in Lab: Thu Mar-30-17 04:29 pm

Report Date: 07-APR-17

Project Manager: Kelsey Brooks

| <i>Analysis Requested</i> | <i>Lab Id:</i> | 549845-001 | 549845-002 | 549845-003 | 549845-004 | 549845-005 | 549845-006 |
|------------------------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| | <i>Field Id:</i> | BH-1 (T-2) 0-1 | BH-1 (T-2) 2-3 | BH-1 (T-2) 4-5 | BH-1 (T-2) 6-7 | BH-1 (T-2) 9-10 | BH-1 (T-2) 14-15 |
| | <i>Depth:</i> | | | | | | |
| | <i>Matrix:</i> | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | <i>Sampled:</i> | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 |
| Inorganic Anions by EPA 300/300.1 | <i>Extracted:</i> | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 |
| | <i>Analyzed:</i> | Apr-06-17 19:01 | Apr-06-17 19:26 | Apr-06-17 19:34 | Apr-06-17 19:58 | Apr-06-17 20:06 | Apr-06-17 20:14 |
| | <i>Units/RL:</i> | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL |
| Chloride | | 1120 24.9 | 2860 24.3 | 1500 24.4 | 1490 24.9 | 2680 25.0 | 4850 48.8 |

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 549845

Tetra Tech- Midland, Midland, TX

Project Name: COG-Lusk Deep Unit A #19



Project Id: 212C-MD-00679.06

Contact: Ike Tavaréz

Project Location: Lea Co NM

Date Received in Lab: Thu Mar-30-17 04:29 pm

Report Date: 07-APR-17

Project Manager: Kelsey Brooks

| <i>Analysis Requested</i> | <i>Lab Id:</i> | 549845-007 | 549845-008 | 549845-009 | 549845-010 | 549845-011 | 549845-012 |
|------------------------------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | <i>Field Id:</i> | BH-1 (T-2) 19-20 | BH-1 (T-2) 24-25 | BH-1 (T-2) 29-30 | BH-1 (T-2) 39-40 | BH-1 (T-2) 49-50 | BH-1 (T-2) 59-60 |
| | <i>Depth:</i> | | | | | | |
| | <i>Matrix:</i> | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | <i>Sampled:</i> | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 |
| Inorganic Anions by EPA 300/300.1 | <i>Extracted:</i> | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 16:02 | Apr-06-17 17:14 | Apr-06-17 17:14 |
| | <i>Analyzed:</i> | Apr-06-17 20:22 | Apr-06-17 20:30 | Apr-06-17 20:38 | Apr-06-17 20:47 | Apr-06-17 21:59 | Apr-06-17 22:08 |
| | <i>Units/RL:</i> | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL |
| Chloride | | 3880 49.4 | 4010 24.9 | 4230 49.6 | 2820 24.8 | 3060 24.8 | 1590 24.9 |

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 549845

Tetra Tech- Midland, Midland, TX

Project Name: COG-Lusk Deep Unit A #19



Project Id: 212C-MD-00679.06

Contact: Ike Tavaréz

Project Location: Lea Co NM

Date Received in Lab: Thu Mar-30-17 04:29 pm

Report Date: 07-APR-17

Project Manager: Kelsey Brooks

| <i>Analysis Requested</i> | <i>Lab Id:</i> | 549845-013 | 549845-014 | 549845-015 | 549845-016 | 549845-017 | 549845-018 |
|------------------------------------------|-------------------|------------------|------------------|-----------------|------------------|------------------|------------------|
| | <i>Field Id:</i> | BH-1 (T-2) 64-65 | BH-1 (T-2) 69-70 | BH-2 (T-3) 9-10 | BH-2 (T-3) 14-15 | BH-2 (T-3) 19-20 | BH-2 (T-3) 24-25 |
| | <i>Depth:</i> | | | | | | |
| | <i>Matrix:</i> | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | <i>Sampled:</i> | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 |
| Inorganic Anions by EPA 300/300.1 | <i>Extracted:</i> | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 |
| | <i>Analyzed:</i> | Apr-07-17 00:41 | Apr-06-17 22:16 | Apr-06-17 22:24 | Apr-06-17 22:48 | Apr-06-17 22:56 | Apr-06-17 23:04 |
| | <i>Units/RL:</i> | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL |
| Chloride | | 306 4.92 | 194 4.96 | 6030 49.6 | 3890 24.6 | 4630 49.2 | 2520 24.9 |

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 549845

Tetra Tech- Midland, Midland, TX

Project Name: COG-Lusk Deep Unit A #19



Project Id: 212C-MD-00679.06

Contact: Ike Tavaréz

Project Location: Lea Co NM

Date Received in Lab: Thu Mar-30-17 04:29 pm

Report Date: 07-APR-17

Project Manager: Kelsey Brooks

| <i>Analysis Requested</i> | <i>Lab Id:</i> | 549845-019 | 549845-020 | 549845-021 | 549845-022 | 549845-023 | 549845-024 |
|------------------------------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | <i>Field Id:</i> | BH-2 (T-3) 29-30 | BH-2 (T-3) 39-40 | BH-2 (T-3) 49-50 | BH-2 (T-3) 59-60 | BH-2 (T-3) 64-65 | BH-2 (T-3) 69-70 |
| | <i>Depth:</i> | | | | | | |
| | <i>Matrix:</i> | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| | <i>Sampled:</i> | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 |
| Inorganic Anions by EPA 300/300.1 | <i>Extracted:</i> | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 |
| | <i>Analyzed:</i> | Apr-06-17 23:12 | Apr-06-17 23:20 | Apr-06-17 23:53 | Apr-07-17 00:01 | Apr-07-17 00:25 | Apr-07-17 00:33 |
| | <i>Units/RL:</i> | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL |
| Chloride | | 2090 24.6 | 1950 24.7 | 2810 24.6 | 976 4.91 | 354 4.92 | 170 4.91 |

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 549845

Tetra Tech- Midland, Midland, TX

Project Name: COG-Lusk Deep Unit A #19



Project Id: 212C-MD-00679.06

Contact: Ike Tavaréz

Project Location: Lea Co NM

Date Received in Lab: Thu Mar-30-17 04:29 pm

Report Date: 07-APR-17

Project Manager: Kelsey Brooks

| <i>Analysis Requested</i> | <i>Lab Id:</i> | 549845-025 | 549845-026 | 549845-027 | 549845-028 | 549845-029 | |
|------------------------------------------|-------------------|-----------------|------------------|------------------|------------------|------------------|--|
| | <i>Field Id:</i> | BH-3 (T-4) 9-10 | BH-3 (T-4) 14-15 | BH-3 (T-4) 19-20 | BH-3 (T-4) 24-25 | BH-3 (T-4) 29-30 | |
| | <i>Depth:</i> | | | | | | |
| | <i>Matrix:</i> | SOIL | SOIL | SOIL | SOIL | SOIL | |
| | <i>Sampled:</i> | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | Mar-28-17 00:00 | |
| Inorganic Anions by EPA 300/300.1 | <i>Extracted:</i> | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | Apr-06-17 17:14 | |
| | <i>Analyzed:</i> | Apr-06-17 23:28 | Apr-06-17 21:35 | Apr-07-17 00:49 | Apr-07-17 00:58 | Apr-07-17 01:06 | |
| | <i>Units/RL:</i> | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | mg/kg RL | |
| Chloride | | 757 4.92 | 139 4.94 | 117 4.92 | 34.8 4.88 | 35.4 4.98 | |

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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 **MQL** 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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 5332 Blackberry Drive, San Antonio TX 78238
 1211 W Florida Ave, Midland, TX 79701
 2525 W. Huntington Dr. - Suite 102, Tempe AZ 85282

| Phone | Fax |
|----------------|----------------|
| (281) 240-4200 | (281) 240-4280 |
| (214) 902 0300 | (214) 351-9139 |
| (210) 509-3334 | (210) 509-3335 |
| (432) 563-1800 | (432) 563-1713 |
| (602) 437-0330 | |



BS / BSD Recoveries



Project Name: COG-Lusk Deep Unit A #19

Work Order #: 549845

Project ID: 212C-MD-00679.06

Analyst: MGO

Date Prepared: 04/06/2017

Date Analyzed: 04/06/2017

Lab Batch ID: 3014353

Sample: 722686-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 | 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 | <4.99 | 250 | 239 | 96 | 250 | 234 | 94 | 2 | 90-110 | 20 | |

Analyst: MGO

Date Prepared: 04/06/2017

Date Analyzed: 04/06/2017

Lab Batch ID: 3014356

Sample: 722693-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 | 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 | <4.91 | 246 | 237 | 96 | 246 | 238 | 97 | 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



Form 3 - MS / MSD Recoveries



Project Name: COG-Lusk Deep Unit A #19

Work Order #: 549845

Project ID: 212C-MD-00679.06

Lab Batch ID: 3014353

QC- Sample ID: 549844-006 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2017

Date Prepared: 04/06/2017

Analyst: MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 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 | 497 | 244 | 727 | 94 | 244 | 711 | 88 | 2 | 90-110 | 20 | X |

Lab Batch ID: 3014353

QC- Sample ID: 549845-001 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2017

Date Prepared: 04/06/2017

Analyst: MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 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 | 1120 | 249 | 1280 | 64 | 249 | 1320 | 80 | 3 | 90-110 | 20 | X |

Lab Batch ID: 3014356

QC- Sample ID: 549845-025 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2017

Date Prepared: 04/06/2017

Analyst: MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 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 | 757 | 246 | 986 | 93 | 246 | 967 | 85 | 2 | 90-110 | 20 | X |

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

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

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: COG-Lusk Deep Unit A #19

Work Order # : 549845

Project ID: 212C-MD-00679.06

Lab Batch ID: 3014356

QC- Sample ID: 549845-026 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2017

Date Prepared: 04/06/2017

Analyst: MGO

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

| Inorganic Anions by EPA 300/300.1 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 | 139 | 247 | 387 | 100 | 247 | 381 | 98 | 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.

1910 N. Big Spring St
Midland, Texas 79705

(432) 682-4559 • Fax (432) 682-3946

549845

SITE MANAGER:

PROJECT NAME:

1st Deep Unit A #19

| |
|--------|
| MATRIX |
| COMP. |
| GRAB |

SAMPLE IDENTIFICATION
Lea Co NM

| | |
|----------------------|---------------------|
| NUMBER OF CONTAINERS | |
| FILTERED (Y/N) | |
| HCL | PRESERVATION METHOD |
| HNO3 | |
| ICE | |
| NONE | |

| |
|-------------------------------------|
| BTEX 8021B |
| TPH 8015 MOD. TX1005 (Ext. to C35) |
| PAH 8270 |
| RCRA Metals Ag As Ba Cd Cr Pb Hg Se |
| TCLP Metals Ag As Ba Cd Vr Pd Hg Se |
| TCLP Volatiles |
| TCLP Semi Volatiles |
| RCI |
| GC.MS Vol. 8240/8260/624 |
| GC.MS Semi. Vol. 8270/625 |
| PCB's 8080/608 |
| Pest. 808/608 |
| Chloride |
| Gamma Spec. |
| Alpha Beta (Air) |
| PLM (Asbestos) |
| Major Anions/Cations. pH. TDS |

ANALYSIS REQUEST
(Circle or Specify Method No.)

OF:

OF: 3

STATE: Xenico PHONE: _____

[illegible]

| | |
|--------------------------|--|
| RECEIVED BY: (Signature) | |
| RECEIVED BY: (Signature) | |
| RECEIVED BY: (Signature) | |
| RECEIVED BY: (Signature) | |
| DATE: | |

TIME _____

| | |
|-------|-----------|
| Date: | 13/3/2011 |
| Time: | 10:09 |
| Date: | |
| Time: | |
| Date: | |
| Time: | |

EXAMPLED BY: Print & Initial

FEDEX BU
HAND DELIVERED UP

ETRA TECH CONTACT PER

Joanne Fitch

| | |
|------------------|---------------------------|
| Date: 5/2/2017 | |
| Time: 1:30 | |
| AIRBILL #: _____ | |
| OTHER: _____ | |
| Results | RUSH C Authoriz Yes |

| | | |
|------|-----|----|
| 8/15 | ges | No |
|------|-----|----|

Please fill out all copies - Laboratory retains Yellow copy - Return Original copy to Tetra Tech - Project Manager

Temp: 20.4 IR ID: R-8
CF: +0.1
Corrected Temp: 20.5

receives Gold copy.



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In



Client: Tetra Tech- Midland

Date/ Time Received: 03/30/2017 04:29:00 PM

Work Order #: 549845

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)? | 20.5 |
| #2 *Shipping container in good condition? | Yes |
| #3 *Samples received on ice? | Yes |
| #4 *Custody Seal present on shipping container/ cooler? | N/A |
| #5 *Custody Seals intact on shipping container/ cooler? | N/A |
| #6 Custody Seals intact on sample bottles? | N/A |
| #7 *Custody Seals Signed and dated? | N/A |
| #8 *Chain of Custody present? | Yes |
| #9 Sample instructions complete on Chain of Custody? | Yes |
| #10 Any missing/extra samples? | No |
| #11 Chain of Custody signed when relinquished/ received? | Yes |
| #12 Chain of Custody agrees with sample label(s)? | Yes |
| #13 Container label(s) legible and intact? | Yes |
| #14 Sample matrix/ properties agree with Chain of Custody? | Yes |
| #15 Samples in proper container/ bottle? | Yes |
| #16 Samples properly preserved? | Yes |
| #17 Sample container(s) intact? | Yes |
| #18 Sufficient sample amount for indicated test(s)? | Yes |
| #19 All samples received within hold time? | Yes |
| #20 Subcontract of sample(s)? | Yes Houston |
| #21 VOC samples have zero headspace? | N/A |
| #22 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts. | N/A |
| #23 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH? | N/A |

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

Analyst:

PH Device/Lot#:

Checklist completed by:

Jessica Kramer

Jessica Kramer

Date: 03/31/2017

Checklist reviewed by:

Kelsey Brooks

Kelsey Brooks

Date: 03/31/2017