

SITE INFORMATION

Report Type: Work Plan 1RP-4970

General Site Information:

Site:	ARU #14					
Company:	Grand Banks Energy Co					
Section, Township and Range	Unit I	Sec. 02	T 16S	R 32E		
Lease Number:	API No. 30-025-00365					
County:	Lea County					
GPS:	32.948710° N			103.730674° W		
Surface Owner:	State					
Mineral Owner:						
Directions:	From intersection of HWY 82 and 249 travel east on HWY 82 for 1.6 mi, turn north onto Mendel Rd for 4.60 mi, turn east onto Patterson Rd and continue for 2 mi, turn west onto lease road for 0.10 mi to location.					

Release Data:

Date Released:	5/16/2017
Type Release:	Oil
Source of Contamination:	Flowline
Fluid Released:	4 bbls
Fluids Recovered:	0 bbls

Official Communication:

Name:	Denise Jones		Ike Tavaréz
Company:	Grand Banks Energy Co.		Tetra Tech
Address:	10 Desta Dr, Ste 300E		4000 N. Big Spring
			Ste 401
City:	Midland Texas, 79705		Midland, Texas
Phone number:	(432) 620-9181		(432) 687-8110
Fax:			
Email:	djones@CambrianMgmt.com		Ike.Tavaréz@TetraTech.com

Ranking Criteria

Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	
50-99 ft	10	
>100 ft.	0	250'-275'
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



May 29, 2018

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

NMOCD approves of the preliminary delineation completed and proposed vertical delineation at T-1 for 1RP-4970. See email correspondence for remediation proposal and conditions.

Re: Work Plan for the Grand Banks Energy Co., ARU #14, Unit I, Section 02, Township 16 South, Range 32 East, Lea County, New Mexico. 1RP-4970.

Ms. Yu:

Tetra Tech, Inc. (Tetra Tech) was contacted by Cambrian Management (Cambrian) on behalf of Grand Banks Energy Co. (Grand Banks) to evaluate and assess a release that occurred at the ARU #14, Unit I, Section 2, Township 16 South, Range 32 East, Lea County, New Mexico (Site). The spill site coordinates are N 32.948710°, W 103.730674°. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the release was discovered on May 16, 2017, and released approximately four (4) barrels of oil due to a pinhole leak in a flowline. None of the fluids were recovered. The release occurred on the pad area impacting an area measuring approximately 115' x 130' and migrated into the adjacent pasture impacting an area measuring approximately 1' x 225'. The initial C-141 form is included in Appendix A.

Groundwater

Three (3) water wells are listed within Section 2 on the New Mexico Office of the State Engineer's (NMOSE) database with reported depths to groundwater ranging from 250' to 275' below ground surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is greater than 200' below surface. The groundwater data is shown in Appendix B.

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 April 4, 2018, Tetra Tech personnel were onsite to evaluate and sample the release area. A total of seven (7) backhoe trenches (T-1 through T-7) were installed to collect soil samples in the release area to total depths ranging from 1.5' to 4.0' 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 sampling results are summarized in Table 1. The trench locations are shown on Figure 3.

Referring to Table 1, all of the samples showed benzene concentrations below the laboratory reporting limit. However, the area of trench (T-4) did show a total BTEX concentration of 115 mg/kg at 2.0' below surface, which declined with depth to 27.5 mg/kg at 3.0' below surface. The samples collected at trenches (T-1, T-2, T-3, T-5, T-6 and T-7) did not show any total BTEX concentrations above the RRALs. Additionally, none of the samples analyzed showed TPH concentrations above 5,000 mg/kg, with concentrations ranging from 26.4 mg/kg to 1,830 mg/kg.

The area of trench (T-1) detected chloride concentrations above the 600 mg/kg threshold at 0-1' (1,030 mg/kg) and 2.0' (730 mg/kg). Deeper samples were not collected due to a dense formation in the area. None of the remaining trenches showed any chloride concentrations above the 600 mg/kg threshold.

Work Plan

Based on the laboratory results, Grand Banks proposes to remove the impacted material as highlighted (green) in Table 1 and shown on Figure 4. The areas of trenches (T-1 and T-4) will be excavated to approximately 1.0'-2.0' below surface. For the area of T-1, the area will be excavated to depth of approximately 2.0' below surface and sampled. If needed, the area will be vertically defined and the area will be excavated to the appropriate depth. The impacted soil from the area will be transported offsite for proper disposal.

In the area of T-4, the excavated material will be stockpiled onsite and worked to remediate the elevated total BTEX in the soil. Once worked, composite samples will be collected every 50 cubic yards and analyzed for total BTEX. If the laboratory analysis shows concentrations below the RRALS, the stockpile material will be placed back into the excavation. If the soil stockpile material exceeds the RRAL, the stockpile material will be hauled for proper disposal. Once the areas are excavated to the appropriate depths, the areas will be backfilled with clean material to surface grade.



As shown in Figure 3, buried electric lines are located in the area of trench (T-4). The electric lines will need to be spotted prior to beginning excavation activities to verify the location for safety concerns and lines may hinder the excavation for the area. In addition, the proposed excavation depths may not be reached due to wall cave ins and safety concerns for onsite personnel. The 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, Grand Banks will excavate the impacted soils to the maximum extent practicable.

Conclusion

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.

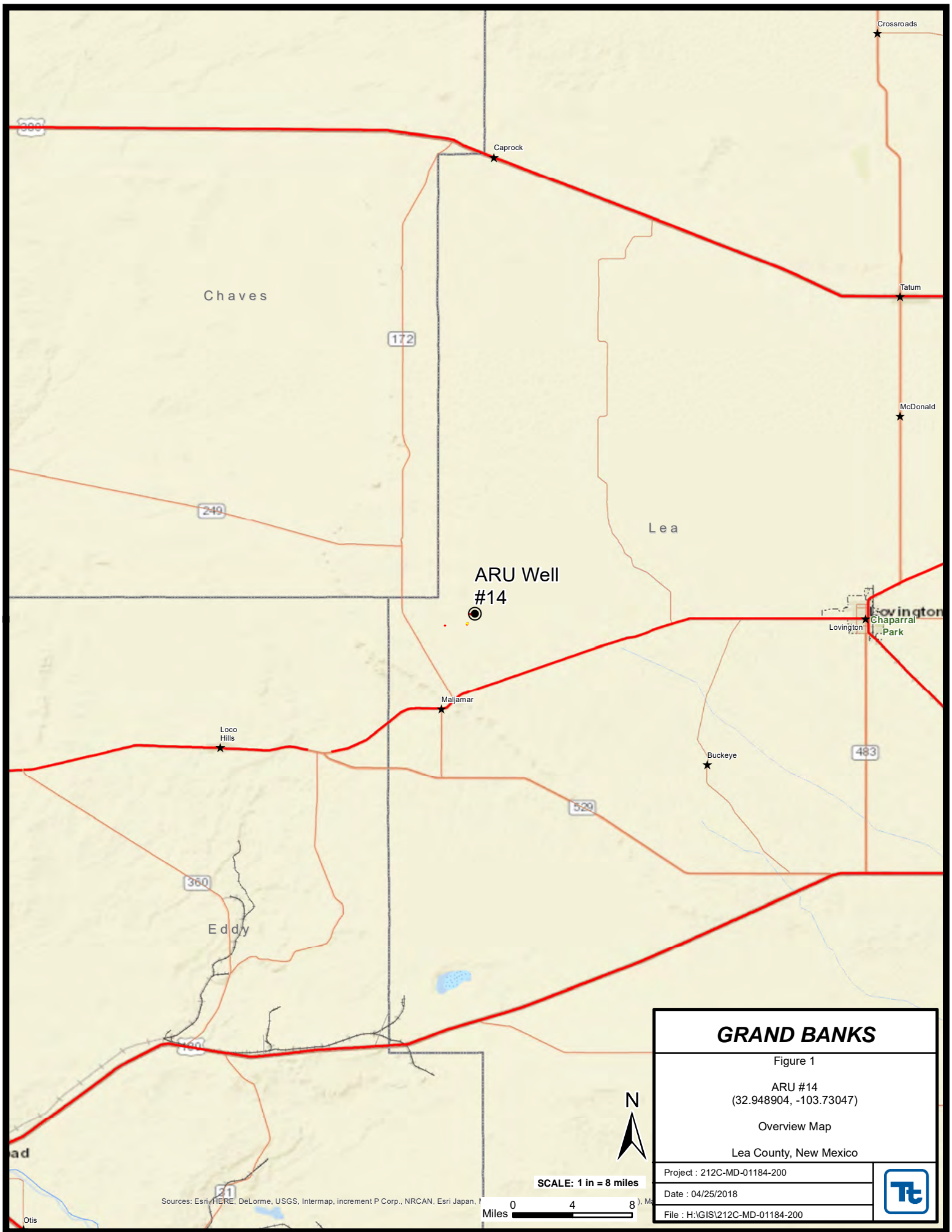
Respectfully submitted,
TETRA TECH

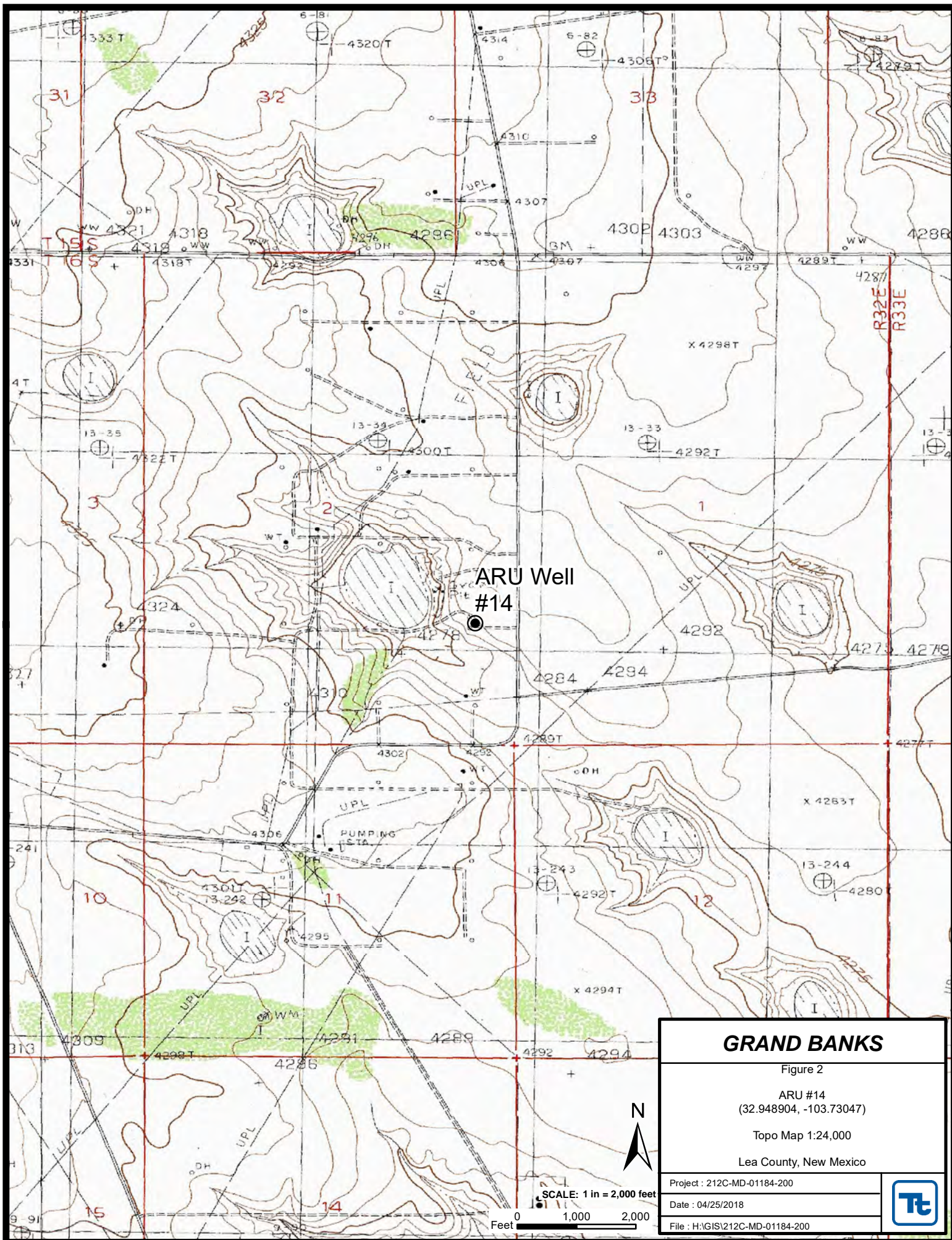
Clair Gonzales,
Project Manager

Ike Tavarez,
Senior Project Manager, P.G.

cc: Ryan Mann - SLO

Figures





GRAND BANKS

Figure 2

ARU #14
(32.948904, -103.73047)

Topo Map 1:24,000

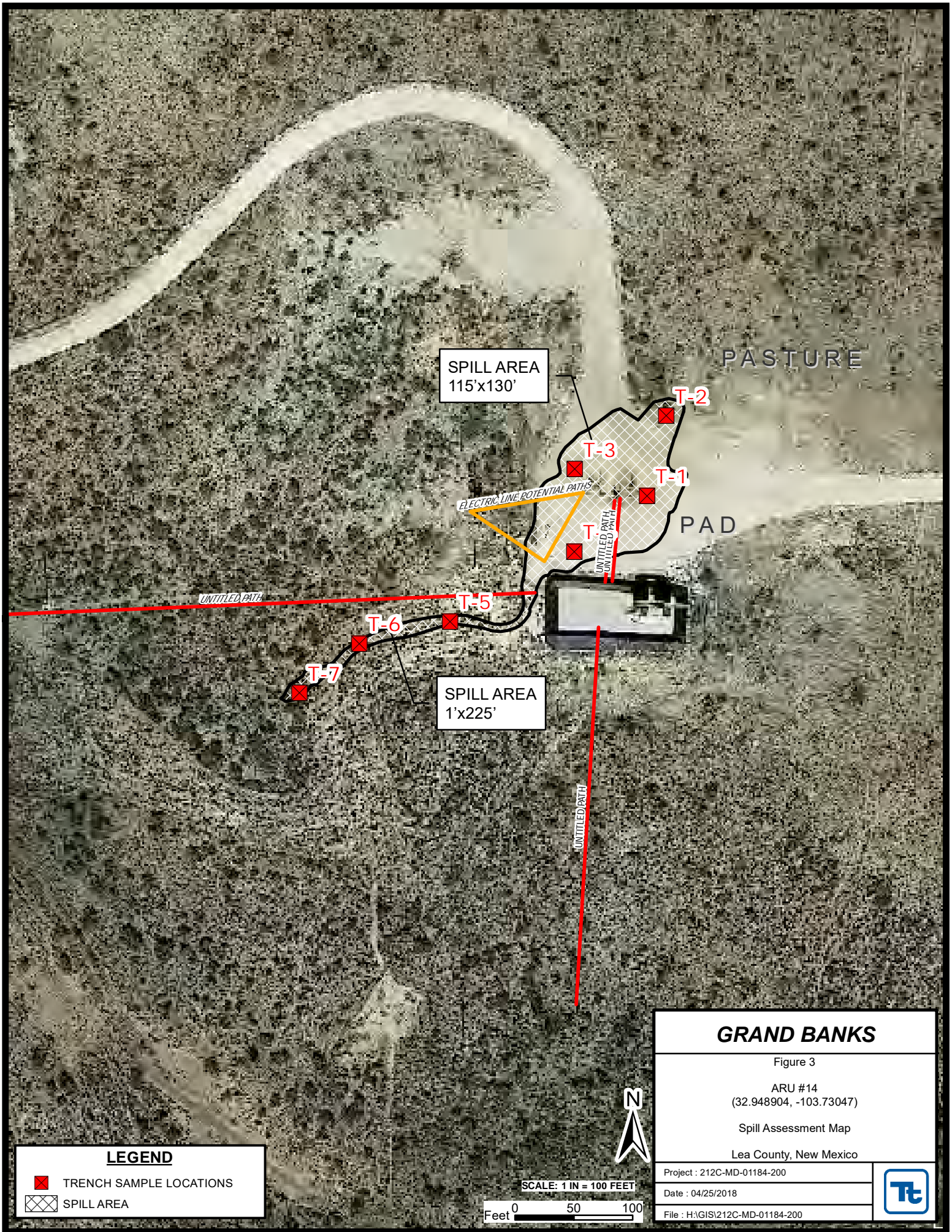
Lea County, New Mexico

Project : 212C-MD-01184-200

Date : 04/25/2018

File : H:\GIS\212C-MD-01184-200





GRAND BANKS

Figure 3

ARU #14
(32.948904, -103.73047)

Spill Assessment Map

Lea County, New Mexico

Project : 212C-MD-01184-200

Date : 04/25/2018

File : H:\GIS\212C-MD-01184-200



LEGEND

- TRENCH SAMPLE LOCATIONS
- SPILL AREA

SCALE: 1 IN = 100 FEET

Feet 0 50 100



Tables

Table 1
Grand Banks Energy
ARU Well #14
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	C6-C10	C10-C28	C28-C35	Total						
T-1	4/4/2018	0-1	X		<15.0	1,670	42.0	1,710	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	1,030
	"	2	X		<15.0	215	<15.0	215	<0.00201	<0.00201	0.00289	0.0381	0.0410	730
T-2	4/4/2018	0-1	X		<15.0	57.0	<15.0	57.0	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	60.6
	"	1-1.5	X		<14.9	238	<14.9	238	<0.00199	<0.00199	0.00233	<0.00199	0.00233	26.7
T-3	4/4/2018	0-1	X		<15.0	58.8	<15.0	58.8	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	218
	"	2	X		<14.9	123	<14.9	123	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	340
	"	2.5	X		-	-	-	-	-	-	-	-	-	544
T-4	4/4/2018	0-1	X		<15.0	58.3	<15.0	58.3	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	201
	"	2	X		528	1,300	<15.0	1,830	<0.201	5.8	7.0	102	115	183
	"	3	X		-	-	-	-	<0.200	1.40	1.84	24.3	27.5	555
T-5	4/4/2018	0-1	X		<15.0	777	33.4	810	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	32.5
	"	2	X		52.0	1,410	22.4	1,480	<0.00199	<0.00199	0.00420	0.0312	0.0354	10.7
	"	3	X		-	-	-	-	-	-	-	-	-	<4.91
T-6	4/4/2018	0-1	X		17.0	174	<15.0	191	<0.00200	<0.00200	<0.00200	0.00425	0.00425	5.28
	"	2	X		<14.9	26.4	<14.9	26.4	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<4.95
	"	3	X		-	-	-	-	-	-	-	-	-	42.5
	"	4	X		-	-	-	-	-	-	-	-	-	<5.00
T-7	4/4/2018	0-1	X		16.4	1,010	16.1	1,040	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	258
	"	2	X		<15.0	61.0	<15.0	61.0	<0.00198	<0.00198	<0.00198	<0.00198	<0.00198	412
	"	3	X		-	-	-	-	-	-	-	-	-	18.5
	"	4	X		-	-	-	-	-	-	-	-	-	<5.00

(-) Not Analyzed



Proposed Excavation Depths

Photos

Grand Banks Energy
ARU #14
Lea County, New Mexico



View West – Area of T-1



View North – Area of T-2

Grand Banks Energy
ARU #14
Lea County, New Mexico



View South – Area of T-3



View Southeast – Area of T-4

Grand Banks Energy
ARU #14
Lea County, New Mexico



View Northeast – Area of T-5



View Southwest – Area of T-6

Grand Banks Energy
ARU #14
Lea County, New Mexico



TETRA TECH



View Northeast – Area of T-7

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 April 3, 2017

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 Grand Banks Energy Company	Contact Mike Anthony
Address 10 Desta Drive, Suite 300-E, Midland, TX 79705	Telephone No. 432-631-4398
Facility Name ARU # 14	Facility Type Production & Exploration

Surface Owner State	Mineral Owner State	API No. 30-025-00365
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LOCATION OF RELEASE

Unit Letter 1	Section 2	Township 16S	Range 32E	Feet from the 1980	North/South Line South	Feet from the 660	East/West Line East	County Lea
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Latitude 32.948710 Longitude -103.730674 NAD83

NATURE OF RELEASE

Type of Release Oil	Volume of Release 4 bbls	Volume Recovered 0
Source of Release Flowline at well location	Date and Hour of Occurrence 05/16/2017	Date and Hour of Discovery 8:00 AM 05/16/2017
Was Immediate Notice Given? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input 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.*

Pinhole in line caused a leak, strong winds caused overspray in pasture

Describe Area Affected and Cleanup Action Taken.*

The released fluid and overspray affected an area of the caliche pad and access road measuring approximately 11,000 sq ft. Runoff from the release affected an area of the pasture to the west of the tank measuring approximately 1,000 sq ft. The overspray also affected an area of the pasture north of the pad measuring approximately 600 sq ft. Delineation of the release is currently underway. Remediation of the impacted area will be conducted in accordance with NMOCD and NMSLO guidelines. This is a revised C-141 to that which was submitted on 05/25/2017.

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: Denise Jones	Approved by Environmental Specialist:		
Title: Regulatory Analyst	Approval Date:	Expiration Date:	
E-mail Address: djones@cambrianmgmt.com	Conditions of Approval:		Attached <input type="checkbox"/>
Date: 02/06/2018	Phone: 432-620-9181		

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
Grand Banks Energy - ARU #14
Lea County, New Mexico

15 South						31 East						15 South						32 East						
6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	
7	8	9	280	10	11	7	8	9	10	11	12	7	8	9	10	11	12	7	8	9	10	11	12	
18	17	16		15	14	18	17	16		15	14	18	17	16		15	14	18	17	16		15	14	13
19	20	67	21	22	23	19	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24	
30	29		28	27	26	30	29		28	27	26	30	29		28	27	26	30	29		28	27	26	25
31	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36	

16 South

31 East

6	5	4	3	2	290	1	
7	8	9	10	11	12	288	
18	17	16	15	14	113	13	299
19	20	21	22	23	314	24	
30	29	28	27	26	25		
31	32	33	34	35	36	290	

16 South

32 East

6	5	4	3	65	2	275	1	265
7	8	9	248	10	11	12	275	215
18	17	16	15	14	13	221	215	
19	20	21	22	23	24	220	210	210
30	29	28	27	26	25	243		
31	32	33	34	35	36	260		

16 South

33 East

6	5	180	4	150	3	130	2	148	1	142
7	8	200	9	182	10	11	142	12		
18	17	16	15	14	13	182	180	175	143	110
19	20	21	22	23	24		120			
30	29	28	27	26	25	191	190	130	143	120
31	32	33	34	35	36	190	168	160		

17 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

17 South

32 East

6	5	4	82	3	2	179	1	200
7	8	9	75	10	11	70	12	120
18	17	16	15	14	13	88		
19	20	21	22	23	24			
30	180	29	28	81	27	26	25	
31	dry	32	33	34	35	36		

17 South

33 East

6	90	5	4	3	155	2	158	1	150
7	167	8	173	9	10	11	12		
18	17	16	15	14	13	161			
188	180	19	20	21	22	23	24	165	
190	69	29	60	28	27	26	25	115	
31	32	33	34	35	36	120	155		

- 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 Code	Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	DepthWell	DepthWater	Water Column
L 02381		L	LE	3	1	13	16S	32E		619086	3643515*	308	215	93
L 02434		L	LE				01	16S	32E	619661	3646531*	337		
L 02449		L	LE				01	16S	32E	619661	3646531*	330	265	65
L 02467		L	LE	1	4	02	16S	32E		618250	3646322*	328	275	53
L 02617		L	LE	4	4	02	16S	32E		618656	3645924*	322	270	52
L 02752		L	LE	1	3	26	16S	32E		617521	3639880*	324	280	44
L 02846		L	LE	4	2	1	11	16S	32E	617956	3645413*	328	275	53
L 02846	R	L	LE	4	2	1	11	16S	32E	617956	3645413*	328	275	53
L 02847		L	LE	1	4	2	11	16S	32E	618564	3645219*	317	220	97
L 02847	R	L	LE	1	4	2	11	16S	32E	618564	3645219*	317	220	97
L 02954		L	LE	2	4	03	16S	32E		617043	3646310*	120	65	55
L 02993		L	LE	3	3	2	15	16S	32E	616572	3643391*	100		
L 03405		L	LE	1	1	2	25	16S	32E	619824	3640790	298	190	108
L 03587		L	LE	1	2	4	35	16S	32E	618647	3638383*	282	210	72
L 03587 S		L	LE	3	4	2	35	16S	32E	618642	3638586*	269	215	54
L 03587 S2		L	LE	2	2	35	16S	32E		618738	3639089*	299	192	107
L 03587 S4		L	LE	1	4	4	26	16S	32E	618632	3639590*	289	220	69
L 03631		L	LE	1	2	02	16S	32E		618240	3647126*	315	250	65
L 04737 POD3		L	LE	3	3	36	16S	32E		619048	3637777	304	214	90
L 04930		L	LE		1	23	16S	32E		617698	3642092*	307	210	97
L 05494		L	LE			36	16S	32E		619758	3638489*	303	200	103
L 06400		L	LE	1	3	3	36	16S	32E	619054	3637985*	330		
L 06557		L	LE	1	4	21	16S	32E		615089	3641466*	295	210	85
L 06807		L	LE	1	4	4	09	16S	32E	615356	3644383*	290	248	42
L 07823		L	LE	2	2	2	16	16S	32E	615561	3643981*	269	247	22
L 08084		L	LE	1	1	1	16	16S	32E	614157	3643970*	317	260	57
L 08084 POD4		L	LE		2	26	16S	32E		618522	3640492*	303	233	70
L 08084 POD5		L	LE	4	1	4	26	16S	32E	618425	3639788*	296	165	131
L 08084 S3		L	LE		2	26	16S	32E		618522	3640492*	305	205	100
L 08241		L	LE	4	4	02	16S	32E		618656	3645924*	316		
L 10204		L	LE	4	2	2	04	16S	32E	615524	3646993*	319		
L 10205		L	LE	4	1	08	16S	32E		613038	3645066*	330		
L 11189		L	LE	1	1	4	04	16S	32E	614932	3646391*	350		

Average Depth to Water:	224 feet
Minimum Depth:	65 feet
Maximum Depth:	280 feet

Record Count: 33

PLSS Search:

Township: 16S **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.

4/25/18 12:42 PM

WATER COLUMN/ AVERAGE DEPTH TO
WATER

Appendix C

Analytical Report 581425

**for
Tetra Tech- Midland**

Project Manager: Ike Tavaréz

Grand Banks-ARU Well #14

TBD

11-APR-18

Collected By: Client



1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):

Texas (T104704215-18-24), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab code: TX01468):

Texas (T104704295-17-16), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab code: TX00127): Texas (T104704221-17-12)

Xenco-Lubbock (EPA Lab code: TX00139): Texas (T104704219-17-16)

Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-18-14)

Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-17-3)

Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)

Xenco-Atlanta (LELAP Lab ID #04176)



11-APR-18

Project Manager: **Ike Tavaréz**

Tetra Tech- Midland

4000 N. Big Spring Suite 401

Midland, TX 79705

Reference: XENCO Report No(s): **581425**

Grand Banks-ARU Well #14

Project Address: Lea County NM

Ike Tavaréz:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 581425. 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. 581425 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Kelsey Brooks

Project Manager

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Tetra Tech- Midland, Midland, TX

Grand Banks-ARU Well #14

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
T-1 0-1	S	04-04-18 00:00		581425-001
T-1 2	S	04-04-18 00:00		581425-002
T-2 0-1	S	04-04-18 00:00		581425-003
T-2 1-1.5	S	04-04-18 00:00		581425-004
T-3 0-1	S	04-04-18 00:00		581425-005
T-3 2	S	04-04-18 00:00		581425-006
T-3 2.5	S	04-04-18 00:00		581425-007
T-4 0-1	S	04-04-18 00:00		581425-008
T-4 2	S	04-04-18 00:00		581425-009
T-4 3	S	04-04-18 00:00		581425-010
T-5 0-1	S	04-04-18 00:00		581425-011
T-5 2	S	04-04-18 00:00		581425-012
T-5 3	S	04-04-18 00:00		581425-013
T-6 0-1	S	04-04-18 00:00		581425-014
T-6 2	S	04-04-18 00:00		581425-015
T-6 3	S	04-04-18 00:00		581425-016
T-6 4	S	04-04-18 00:00		581425-017
T-7 0-1	S	04-04-18 00:00		581425-018
T-7 2	S	04-04-18 00:00		581425-019
T-7 3	S	04-04-18 00:00		581425-020
T-7 4	S	04-04-18 00:00		581425-021



CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: Grand Banks-ARU Well #14

Project ID: *TBD*
Work Order Number(s): *581425*

Report Date: *11-APR-18*
Date Received: *04/05/2018*

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3046073 BTEX by EPA 8021B

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

Batch: LBA-3046089 TPH By SW8015 Mod

Surrogate 1-Chlorooctane, Surrogate o-Terphenyl recovered below QC limits. Matrix interferences is suspected; data confirmed by re-analysis.

Samples affected are: 581425-009.

Batch: LBA-3046223 BTEX by EPA 8021B

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

Lab Sample ID 581425-012 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Ethylbenzene, Toluene, m,p-Xylenes, o-Xylene 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: 581425-006, -008, -012, -014, -015, -018, -019.

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

Batch: LBA-3046232 BTEX by EPA 8021B

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



Certificate of Analysis Summary 581425

Tetra Tech- Midland, Midland, TX

Project Name: Grand Banks-ARU Well #14



Project Id: TBD
Contact: Ike Tavarez
Project Location: Lea County NM

Date Received in Lab: Thu Apr-05-18 10:00 am
Report Date: 11-APR-18
Project Manager: Kelsey Brooks

Analysis Requested	Lab Id:	581425-001	581425-002	581425-003	581425-004	581425-005	581425-006
	Field Id:	T-1 0-1	T-1 2	T-2 0-1	T-2 1-1.5	T-3 0-1	T-3 2
	Depth:						
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00
BTEX by EPA 8021B	Extracted:	Apr-06-18 16:50	Apr-06-18 16:50	Apr-06-18 16:50	Apr-06-18 16:50	Apr-06-18 16:50	Apr-09-18 17:00
	Analyzed:	Apr-06-18 23:45	Apr-07-18 01:39	Apr-07-18 01:58	Apr-07-18 02:17	Apr-07-18 02:36	Apr-09-18 22:42
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Benzene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00199 0.00199
Toluene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00199 0.00199
Ethylbenzene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	0.00233 0.00199	<0.00199 0.00199	<0.00199 0.00199
m,p-Xylenes		<0.00399 0.00399	<0.00402 0.00402	<0.00401 0.00401	<0.00398 0.00398	<0.00398 0.00398	<0.00398 0.00398
o-Xylene		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00199 0.00199
Total Xylenes		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	<0.00199 0.00199	<0.00199 0.00199	<0.00199 0.00199
Total BTEX		<0.00200 0.00200	<0.00201 0.00201	<0.00200 0.00200	0.00233 0.00199	<0.00199 0.00199	<0.00199 0.00199
Inorganic Anions by EPA 300/300.1	Extracted:	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30
	Analyzed:	Apr-06-18 13:11	Apr-06-18 12:55	Apr-06-18 13:16	Apr-06-18 13:32	Apr-06-18 13:37	Apr-06-18 13:42
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		1030 24.9	730 4.95	60.6 4.98	26.7 4.94	218 4.93	340 5.00
TPH By SW8015 Mod	Extracted:	Apr-07-18 13:00	Apr-07-18 13:00	Apr-07-18 13:00	Apr-07-18 13:00	Apr-07-18 13:00	Apr-07-18 13:00
	Analyzed:	Apr-08-18 23:05	Apr-08-18 23:32	Apr-08-18 23:58	Apr-08-18 01:20	Apr-08-18 01:46	Apr-08-18 02:15
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)		<15.0 15.0	<15.0 15.0	<15.0 15.0	<14.9 14.9	<15.0 15.0	<14.9 14.9
Diesel Range Organics (DRO)		1670 15.0	215 15.0	57.0 15.0	238 14.9	58.8 15.0	123 14.9
Oil Range Hydrocarbons (ORO)		42.0 15.0	<15.0 15.0	<15.0 15.0	<14.9 14.9	<15.0 15.0	<14.9 14.9
Total TPH		1710 15.0	215 15.0	57.0 15.0	238 14.9	58.8 15.0	123 14.9

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 581425

Tetra Tech- Midland, Midland, TX

Project Name: Grand Banks-ARU Well #14



Project Id: TBD
Contact: Ike Tavarez
Project Location: Lea County NM

Date Received in Lab: Thu Apr-05-18 10:00 am
Report Date: 11-APR-18
Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	581425-007	581425-008	581425-009	581425-010	581425-011	581425-012
	<i>Field Id:</i>	T-3 2.5	T-4 0-1	T-4 2	T-4 3	T-5 0-1	T-5 2
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00
BTEX by EPA 8021B	<i>Extracted:</i>		Apr-09-18 17:00	Apr-10-18 08:00		Apr-10-18 08:00	Apr-09-18 17:00
	<i>Analyzed:</i>		Apr-09-18 23:01	Apr-10-18 14:32		Apr-10-18 11:31	Apr-09-18 23:58
	<i>Units/RL:</i>		mg/kg RL	mg/kg RL		mg/kg RL	mg/kg RL
Benzene			<0.00200 0.00200	<0.201 0.201		<0.00200 0.00200	<0.00199 0.00199
Toluene			<0.00200 0.00200	5.81 0.201		<0.00200 0.00200	<0.00199 0.00199
Ethylbenzene			<0.00200 0.00200	7.00 0.201		<0.00200 0.00200	0.00420 0.00199
m,p-Xylenes			<0.00399 0.00399	70.2 0.402		<0.00399 0.00399	0.0221 0.00398
o-Xylene			<0.00200 0.00200	31.5 0.201		<0.00200 0.00200	0.00906 0.00199
Total Xylenes			<0.00200 0.00200	102 0.201		<0.00200 0.00200	0.0312 0.00199
Total BTEX			<0.00200 0.00200	115 0.201		<0.00200 0.00200	0.0354 0.00199
Inorganic Anions by EPA 300/300.1	<i>Extracted:</i>	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 09:30	Apr-06-18 16:00	Apr-06-18 16:00
	<i>Analyzed:</i>	Apr-06-18 13:48	Apr-06-18 13:53	Apr-06-18 13:58	Apr-06-18 16:21	Apr-06-18 17:01	Apr-06-18 17:16
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		544 4.96	201 4.93	183 4.96	555 4.90	32.5 5.00	10.7 4.95
TPH By SW8015 Mod	<i>Extracted:</i>		Apr-07-18 13:00	Apr-07-18 13:00		Apr-07-18 13:00	Apr-07-18 13:00
	<i>Analyzed:</i>		Apr-08-18 03:35	Apr-08-18 04:03		Apr-08-18 04:31	Apr-08-18 04:56
	<i>Units/RL:</i>		mg/kg RL	mg/kg RL		mg/kg RL	mg/kg RL
Gasoline Range Hydrocarbons (GRO)			<15.0 15.0	528 15.0		<15.0 15.0	52.0 15.0
Diesel Range Organics (DRO)			58.3 15.0	1300 15.0		777 15.0	1410 15.0
Oil Range Hydrocarbons (ORO)			<15.0 15.0	<15.0 15.0		33.4 15.0	22.4 15.0
Total TPH			58.3 15.0	1830 15.0		810 15.0	1480 15.0

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 581425

Tetra Tech- Midland, Midland, TX

Project Name: Grand Banks-ARU Well #14



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

Date Received in Lab: Thu Apr-05-18 10:00 am
Report Date: 11-APR-18
Project Manager: Kelsey Brooks

Analysis Requested	Lab Id:	581425-013	581425-014	581425-015	581425-016	581425-017	581425-018
	Field Id:	T-5 3	T-6 0-1	T-6 2	T-6 3	T-6 4	T-7 0-1
	Depth:						
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampled:	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00
BTEX by EPA 8021B	Extracted:		Apr-09-18 17:00	Apr-09-18 17:00			Apr-09-18 17:00
	Analyzed:		Apr-10-18 00:17	Apr-10-18 00:36			Apr-10-18 00:56
	Units/RL:		mg/kg RL	mg/kg RL			mg/kg RL
			<0.00200 0.00200	<0.00200 0.00200			<0.00202 0.00202
Benzene			<0.00200 0.00200	<0.00200 0.00200			<0.00202 0.00202
Toluene			<0.00200 0.00200	<0.00200 0.00200			<0.00202 0.00202
Ethylbenzene			<0.00200 0.00200	<0.00200 0.00200			<0.00202 0.00202
m,p-Xylenes			0.00425 0.00399	<0.00401 0.00401			<0.00403 0.00403
o-Xylene			<0.00200 0.00200	<0.00200 0.00200			<0.00202 0.00202
Total Xylenes			0.00425 0.00200	<0.00200 0.00200			<0.00202 0.00202
Total BTEX			0.00425 0.00200	<0.00200 0.00200			<0.00202 0.00202
Inorganic Anions by EPA 300/300.1	Extracted:	Apr-06-18 16:00	Apr-06-18 16:00	Apr-06-18 16:00	Apr-06-18 16:00	Apr-06-18 16:00	Apr-06-18 16:00
	Analyzed:	Apr-06-18 17:22	Apr-06-18 17:27	Apr-06-18 17:32	Apr-06-18 17:48	Apr-06-18 17:53	Apr-06-18 17:59
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		<4.91 4.91	5.28 4.95	<4.95 4.95	42.5 4.99	<5.00 5.00	258 5.00
TPH By SW8015 Mod	Extracted:		Apr-07-18 13:00	Apr-07-18 13:00			Apr-07-18 13:00
	Analyzed:		Apr-08-18 05:25	Apr-08-18 05:51			Apr-08-18 06:20
	Units/RL:		mg/kg RL	mg/kg RL			mg/kg RL
Gasoline Range Hydrocarbons (GRO)			17.0 15.0	<14.9 14.9			16.4 15.0
Diesel Range Organics (DRO)			174 15.0	26.4 14.9			1010 15.0
Oil Range Hydrocarbons (ORO)			<15.0 15.0	<14.9 14.9			16.1 15.0
Total TPH			191 15.0	26.4 14.9			1040 15.0

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Kelsey Brooks
Project Manager



Certificate of Analysis Summary 581425

Tetra Tech- Midland, Midland, TX

Project Name: Grand Banks-ARU Well #14



Project Id: TBD
Contact: Ike Tavarez
Project Location: Lea County NM

Date Received in Lab: Thu Apr-05-18 10:00 am
Report Date: 11-APR-18
Project Manager: Kelsey Brooks

Analysis Requested	Lab Id:	581425-019	581425-020	581425-021			
	Field Id:	T-7 2	T-7 3	T-7 4			
	Depth:						
	Matrix:	SOIL	SOIL	SOIL			
	Sampled:	Apr-04-18 00:00	Apr-04-18 00:00	Apr-04-18 00:00			
BTEX by EPA 8021B	Extracted:	Apr-09-18 17:00					
	Analyzed:	Apr-10-18 01:15					
	Units/RL:	mg/kg RL					
	Benzene	<0.00198 0.00198					
	Toluene	<0.00198 0.00198					
	Ethylbenzene	<0.00198 0.00198					
	m,p-Xylenes	<0.00397 0.00397					
	o-Xylene	<0.00198 0.00198					
Inorganic Anions by EPA 300/300.1	Extracted:	Apr-06-18 16:00	Apr-06-18 16:00	Apr-06-18 16:00			
	Analyzed:	Apr-06-18 18:04	Apr-06-18 18:09	Apr-06-18 18:15			
	Units/RL:	mg/kg RL	mg/kg RL	mg/kg RL			
	Chloride	412 5.00	18.5 4.98	<5.00 5.00			
	Extracted:	Apr-07-18 13:00					
	Analyzed:	Apr-08-18 06:46					
	Units/RL:	mg/kg RL					
	Gasoline Range Hydrocarbons (GRO)	<15.0 15.0					
TPH By SW8015 Mod	Diesel Range Organics (DRO)	61.0 15.0					
	Oil Range Hydrocarbons (ORO)	<15.0 15.0					
	Total TPH	61.0 15.0					

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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

SMP Client Sample

BLK

Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample

BKSD/LCSD

Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate

MS

Matrix Spike

MSD: Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046073

Sample: 581425-001 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/06/18 23:45

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0276	0.0300	92	70-130	
4-Bromofluorobenzene	0.0257	0.0300	86	70-130	

Lab Batch #: 3046073

Sample: 581425-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/07/18 01:39

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0284	0.0300	95	70-130	
4-Bromofluorobenzene	0.0275	0.0300	92	70-130	

Lab Batch #: 3046073

Sample: 581425-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/07/18 01:58

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	70-130	
4-Bromofluorobenzene	0.0300	0.0300	100	70-130	

Lab Batch #: 3046073

Sample: 581425-004 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/07/18 02:17

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0290	0.0300	97	70-130	
4-Bromofluorobenzene	0.0294	0.0300	98	70-130	

Lab Batch #: 3046073

Sample: 581425-005 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/07/18 02:36

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0279	0.0300	93	70-130	
4-Bromofluorobenzene	0.0282	0.0300	94	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046089

Sample: 581425-004 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 01:20

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	92.4	99.6	93	70-135	
o-Terphenyl	47.5	49.8	95	70-135	

Lab Batch #: 3046089

Sample: 581425-005 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 01:46

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	95.2	99.7	95	70-135	
o-Terphenyl	48.7	49.9	98	70-135	

Lab Batch #: 3046089

Sample: 581425-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 02:15

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	100	99.6	100	70-135	
o-Terphenyl	50.9	49.8	102	70-135	

Lab Batch #: 3046089

Sample: 581425-008 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 03:35

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	96.6	99.9	97	70-135	
o-Terphenyl	49.3	50.0	99	70-135	

Lab Batch #: 3046089

Sample: 581425-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 04:03

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	24.9	99.9	25	70-135	**
o-Terphenyl	10.3	50.0	21	70-135	**

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046089

Sample: 581425-011 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 04:31

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	107	99.7	107	70-135	
o-Terphenyl	54.7	49.9	110	70-135	

Lab Batch #: 3046089

Sample: 581425-012 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 04:56

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	98.6	100	99	70-135	
o-Terphenyl	53.4	50.0	107	70-135	

Lab Batch #: 3046089

Sample: 581425-014 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 05:25

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	88.7	99.8	89	70-135	
o-Terphenyl	43.7	49.9	88	70-135	

Lab Batch #: 3046089

Sample: 581425-015 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 05:51

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	96.3	99.6	97	70-135	
o-Terphenyl	47.9	49.8	96	70-135	

Lab Batch #: 3046089

Sample: 581425-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 06:20

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	94.4	99.8	95	70-135	
o-Terphenyl	52.9	49.9	106	70-135	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046089

Sample: 581425-019 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 06:46

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	96.2	99.9	96	70-135	
o-Terphenyl	50.1	50.0	100	70-135	

Lab Batch #: 3046089

Sample: 581425-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 23:05

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	108	99.7	108	70-135	
o-Terphenyl	64.6	49.9	129	70-135	

Lab Batch #: 3046089

Sample: 581425-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 23:32

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	96.6	99.7	97	70-135	
o-Terphenyl	50.4	49.9	101	70-135	

Lab Batch #: 3046089

Sample: 581425-003 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 23:58

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	95.0	99.9	95	70-135	
o-Terphenyl	48.9	50.0	98	70-135	

Lab Batch #: 3046223

Sample: 581425-006 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 22:42

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0298	0.0300	99	70-130	
4-Bromofluorobenzene	0.0311	0.0300	104	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046223

Sample: 581425-008 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 23:01

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0275	0.0300	92	70-130	
4-Bromofluorobenzene	0.0281	0.0300	94	70-130	

Lab Batch #: 3046223

Sample: 581425-012 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 23:58

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0262	0.0300	87	70-130	
4-Bromofluorobenzene	0.0328	0.0300	109	70-130	

Lab Batch #: 3046223

Sample: 581425-014 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 00:17

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0290	0.0300	97	70-130	
4-Bromofluorobenzene	0.0326	0.0300	109	70-130	

Lab Batch #: 3046223

Sample: 581425-015 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 00:36

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	70-130	
4-Bromofluorobenzene	0.0312	0.0300	104	70-130	

Lab Batch #: 3046223

Sample: 581425-018 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 00:56

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0292	0.0300	97	70-130	
4-Bromofluorobenzene	0.0235	0.0300	78	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046223

Sample: 581425-019 / SMP

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 01:15

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0293	0.0300	98	70-130	
4-Bromofluorobenzene	0.0283	0.0300	94	70-130	

Lab Batch #: 3046232

Sample: 581425-011 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 11:31

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0300	0.0300	100	70-130	
4-Bromofluorobenzene	0.0311	0.0300	104	70-130	

Lab Batch #: 3046232

Sample: 581425-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 14:32

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0259	0.0300	86	70-130	
4-Bromofluorobenzene	0.0317	0.0300	106	70-130	

Lab Batch #: 3046073

Sample: 7642269-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/06/18 21:13

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0278	0.0300	93	70-130	
4-Bromofluorobenzene	0.0223	0.0300	74	70-130	

Lab Batch #: 3046089

Sample: 7642265-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/07/18 21:43

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	98.7	100	99	70-135	
o-Terphenyl	50.4	50.0	101	70-135	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046223

Sample: 7642314-1-BLK / BLK

Project ID: TBD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/09/18 22:23

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0265	0.0300	88	70-130	
4-Bromofluorobenzene	0.0229	0.0300	76	70-130	

Lab Batch #: 3046232

Sample: 7642361-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/10/18 10:06

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0252	0.0300	84	70-130	
4-Bromofluorobenzene	0.0243	0.0300	81	70-130	

Lab Batch #: 3046073

Sample: 7642269-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/06/18 19:18

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0285	0.0300	95	70-130	
4-Bromofluorobenzene	0.0260	0.0300	87	70-130	

Lab Batch #: 3046089

Sample: 7642265-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/07/18 22:12

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	118	100	118	70-135	
o-Terphenyl	57.9	50.0	116	70-135	

Lab Batch #: 3046223

Sample: 7642314-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/09/18 20:30

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0308	0.0300	103	70-130	
4-Bromofluorobenzene	0.0279	0.0300	93	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046232

Sample: 7642361-1-BKS / BKS

Project ID: TBD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/10/18 08:10

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0305	0.0300	102	70-130	
4-Bromofluorobenzene	0.0317	0.0300	106	70-130	

Lab Batch #: 3046073

Sample: 7642269-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/06/18 19:37

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0310	0.0300	103	70-130	
4-Bromofluorobenzene	0.0285	0.0300	95	70-130	

Lab Batch #: 3046089

Sample: 7642265-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/07/18 22:37

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	120	100	120	70-135	
o-Terphenyl	59.0	50.0	118	70-135	

Lab Batch #: 3046223

Sample: 7642314-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/09/18 20:49

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0310	0.0300	103	70-130	
4-Bromofluorobenzene	0.0304	0.0300	101	70-130	

Lab Batch #: 3046232

Sample: 7642361-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/10/18 08:30

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0281	0.0300	94	70-130	
4-Bromofluorobenzene	0.0307	0.0300	102	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046073

Sample: 581330-001 S / MS

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/06/18 19:57

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0302	0.0300	101	70-130	
4-Bromofluorobenzene	0.0272	0.0300	91	70-130	

Lab Batch #: 3046089

Sample: 581425-003 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 00:26

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	110	99.8	110	70-135	
o-Terphenyl	52.4	49.9	105	70-135	

Lab Batch #: 3046223

Sample: 581425-012 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 21:06

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0301	0.0300	100	70-130	
4-Bromofluorobenzene	0.0373	0.0300	124	70-130	

Lab Batch #: 3046232

Sample: 581763-004 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 08:49

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0305	0.0300	102	70-130	
4-Bromofluorobenzene	0.0333	0.0300	111	70-130	

Lab Batch #: 3046089

Sample: 581425-003 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/08/18 00:52

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	108	99.8	108	70-135	
o-Terphenyl	53.0	49.9	106	70-135	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



Form 2 - Surrogate Recoveries

Project Name: Grand Banks-ARU Well #14

Work Orders : 581425,

Lab Batch #: 3046073

Sample: 581330-001 SD / MSD

Project ID: TBD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 10:29

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0261	0.0300	87	70-130	
4-Bromofluorobenzene	0.0292	0.0300	97	70-130	

Lab Batch #: 3046232

Sample: 581425-012 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/09/18 21:25

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0270	0.0300	90	70-130	
4-Bromofluorobenzene	0.0333	0.0300	111	70-130	

Lab Batch #: 3046232

Sample: 581763-004 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/10/18 09:08

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0323	0.0300	108	70-130	
4-Bromofluorobenzene	0.0334	0.0300	111	70-130	

* Surrogate outside of Laboratory QC limits

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

*** Poor recoveries due to dilution

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

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



BS / BSD Recoveries



Project Name: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Analyst: ALJ

Date Prepared: 04/06/2018

Date Analyzed: 04/06/2018

Lab Batch ID: 3046073

Sample: 7642269-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00201	0.101	0.106	105	0.100	0.120	120	12	70-130	35	
Toluene	<0.00201	0.101	0.101	100	0.100	0.116	116	14	70-130	35	
Ethylbenzene	<0.00201	0.101	0.0994	98	0.100	0.113	113	13	70-130	35	
m,p-Xylenes	<0.00402	0.201	0.206	102	0.200	0.233	117	12	70-130	35	
o-Xylene	<0.00201	0.101	0.103	102	0.100	0.118	118	14	70-130	35	

Analyst: ALJ

Date Prepared: 04/09/2018

Date Analyzed: 04/09/2018

Lab Batch ID: 3046223

Sample: 7642314-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00200	0.100	0.109	109	0.101	0.114	113	4	70-130	35	
Toluene	<0.00200	0.100	0.103	103	0.101	0.108	107	5	70-130	35	
Ethylbenzene	<0.00200	0.100	0.103	103	0.101	0.109	108	6	70-130	35	
m,p-Xylenes	<0.00401	0.200	0.211	106	0.201	0.226	112	7	70-130	35	
o-Xylene	<0.00200	0.100	0.107	107	0.101	0.113	112	5	70-130	35	

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

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

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

All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Analyst: ALJ

Date Prepared: 04/10/2018

Date Analyzed: 04/10/2018

Lab Batch ID: 3046232

Sample: 7642361-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00198	0.0990	0.118	119	0.0994	0.116	117	2	70-130	35	
Toluene	<0.00198	0.0990	0.115	116	0.0994	0.111	112	4	70-130	35	
Ethylbenzene	<0.00198	0.0990	0.115	116	0.0994	0.112	113	3	70-130	35	
m,p-Xylenes	<0.00396	0.198	0.240	121	0.199	0.230	116	4	70-130	35	
o-Xylene	<0.00198	0.0990	0.119	120	0.0994	0.115	116	3	70-130	35	

Analyst: SCM

Date Prepared: 04/06/2018

Date Analyzed: 04/06/2018

Lab Batch ID: 3045932

Sample: 7642190-1-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	<5.00	250	275	110	250	273	109	1	90-110	20	

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

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

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

All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Analyst: SCM

Date Prepared: 04/06/2018

Date Analyzed: 04/06/2018

Lab Batch ID: 3046064

Sample: 7642209-1-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	<5.00	250	229	92	250	239	96	4	90-110	20	

Analyst: ARM

Date Prepared: 04/07/2018

Date Analyzed: 04/07/2018

Lab Batch ID: 3046089

Sample: 7642265-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015 Mod	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	1070	107	1000	1070	107	0	70-135	20	
Diesel Range Organics (DRO)	<15.0	1000	1120	112	1000	1110	111	1	70-135	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: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Lab Batch ID: 3046073

QC- Sample ID: 581330-001 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2018

Date Prepared: 04/06/2018

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00202	0.101	0.105	104	0.100	0.0954	95	10	70-130	35	
Toluene	<0.00202	0.101	0.0989	98	0.100	0.0923	92	7	70-130	35	
Ethylbenzene	<0.00202	0.101	0.0966	96	0.100	0.0893	89	8	70-130	35	
m,p-Xylenes	<0.00403	0.202	0.197	98	0.201	0.183	91	7	70-130	35	
o-Xylene	<0.00202	0.101	0.0986	98	0.100	0.0897	90	9	70-130	35	

Lab Batch ID: 3046223

QC- Sample ID: 581425-012 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/09/2018

Date Prepared: 04/09/2018

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00200	0.0998	0.0833	83	0.100	0.0710	71	16	70-130	35	
Toluene	<0.00200	0.0998	0.0642	64	0.100	0.0559	56	14	70-130	35	X
Ethylbenzene	0.00420	0.0998	0.0571	53	0.100	0.0492	45	15	70-130	35	X
m,p-Xylenes	0.0221	0.200	0.107	42	0.200	0.0927	35	14	70-130	35	X
o-Xylene	0.00906	0.0998	0.0512	42	0.100	0.0447	36	14	70-130	35	X

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

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

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

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



Form 3 - MS / MSD Recoveries



Project Name: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Lab Batch ID: 3046232

QC- Sample ID: 581763-004 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/10/2018

Date Prepared: 04/10/2018

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00200	0.100	0.0887	89	0.101	0.107	106	19	70-130	35	
Toluene	<0.00200	0.100	0.0819	82	0.101	0.101	100	21	70-130	35	
Ethylbenzene	<0.00200	0.100	0.0764	76	0.101	0.100	99	27	70-130	35	
m,p-Xylenes	<0.00401	0.200	0.157	79	0.202	0.205	101	27	70-130	35	
o-Xylene	<0.00200	0.100	0.0787	79	0.101	0.103	102	27	70-130	35	

Lab Batch ID: 3045932

QC- Sample ID: 581273-035 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2018

Date Prepared: 04/06/2018

Analyst: SCM

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	7.10	247	252	99	247	253	100	0	90-110	20	

Lab Batch ID: 3045932

QC- Sample ID: 581425-002 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2018

Date Prepared: 04/06/2018

Analyst: SCM

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	730	248	953	90	248	969	96	2	90-110	20	

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: Grand Banks-ARU Well #14

Work Order #: 581425

Project ID: TBD

Lab Batch ID: 3046064

QC- Sample ID: 581425-011 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2018

Date Prepared: 04/06/2018

Analyst: SCM

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	32.5	250	272	96	250	271	95	0	90-110	20	

Lab Batch ID: 3046064

QC- Sample ID: 581425-021 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/06/2018

Date Prepared: 04/06/2018

Analyst: SCM

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	<5.00	250	242	97	250	240	96	1	90-110	20	

Lab Batch ID: 3046089

QC- Sample ID: 581425-003 S

Batch #: 1 Matrix: Soil

Date Analyzed: 04/08/2018

Date Prepared: 04/07/2018

Analyst: ARM

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	998	978	98	998	984	99	1	70-135	20	
Diesel Range Organics (DRO)	57.0	998	1080	103	998	1080	103	0	70-135	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.



Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland, Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

581425

Client Name: Grand Banks		Site Manager: Ike Tavaroz	
Project Name: ARU Well #14		Project #: TBD	
Project Location: Lea County, New Mexico		Invoice to: Tetra Tech, Inc.	
Receiving Laboratory: Xenco		Sampler Signature: Clair Gonzales	
Comments: Run deeper samples if benzene exceeds 10 mg/kg or total BTEX exceeds 50 mg/kg. Run deeper samples if TPH exceeds 5,000 mg/kg			

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD				# CONTAINERS	FILTERED (Y/N)	ANALYSIS REQUEST (Circle or Specify Method No.)	
		YEAR	DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE				
T-1 0-1			4/4/2018		X		X				1	X	BTEX 8021B BTEX 8260B
T-1 2			04/04/18		X		X				1	X	TPH TX1005 (Ext to C35)
T-2 0-1			04/04/18		X		X				1	X	TPH 8015M (GRO - DRO - ORO)
T-2 1.0-1.5			04/04/18		X		X				1	X	PAH 8270C
T-3 0-1			04/04/18		X		X				1	X	Total Metals Ag As Ba Cd Cr Pb Se Hg
T-3 2			04/04/18		X		X				1	X	TCLP Metals Ag As Ba Cd Cr Pb Se Hg
T-3 2.5'			04/04/18		X		X				1	X	TCLP Volatiles
T-4 0-1			04/04/18		X		X				1	X	TCLP Semi Volatiles
T-4 2			04/04/18		X		X				1	X	RCI
T-4 3			04/04/18		X		X				1	X	GC/MS Vol. 8260B / 624
													GC/MS Semi. Vol. 8270C/625
													PCB's 8082 / 608
													NORM
													PLM (Asbestos)
													Chloride
													Chloride Sulfate TDS
													General Water Chemistry (see attached list)
													Hold

Relinquished by: <i>[Signature]</i> Date: 4-5-18 Time: 1015	Received by: <i>[Signature]</i> Date: 4/5/18 Time: 10:00
Relinquished by: _____ Date: _____ Time: _____	Received by: _____ Date: _____ Time: _____

LAB USE ONLY

REMARKS: *[Signature]*

Sample Temperature

Temp: 8.4 IR ID: R-8

CF: (0-6: -0.2°C)

(6-23: +0.2°C)

Corrected Temp: 8.4

Special Report Limits or TRRP Report

ORIGINAL COPY



Fax (432) 682-3946

ORIGINAL COPY

Temp: 8.4 IR ID: R-8
CF: (0-6: -0.2°C)

8.4



Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland, Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

Client Name: Grand Banks Site Manager: Ike Tavaréz

Project Name: ARU Well #14

Project Location: Lea County, New Mexico

Invoice to:

Tetra Tech, Inc.

Receiving Laboratory:

Xenco

Sampler Signature:

Clair Gonzales

Comments:

Run deeper samples if benzene exceeds 10 mg/kg or total BTEX exceeds 50 mg/kg. Run deeper samples if TPH exceeds 5,000 mg/kg

LAB #
(LAB USE ONLY)

SAMPLE IDENTIFICATION

T-7 4

SAMPLING
YEAR: DATE TIME

4/4/2018

MATRIX
WATER SOIL HCL HNO₃ ICE

X X

CONTAINERS
FILTERED (Y/N)

1

BTEX 8021B BTEX 8260B

TPH TX1005 (Ext to C35)

TPH 8015M (GRO - DRO - ORO)

PAH 8270C

Total Metals Ag As Ba Cd Cr Pb Se Hg

TCLP Metals Ag As Ba Cd Cr Pb Se Hg

TCLP Volatiles

TCLP Semi Volatiles

RCI

GC/MS Vol. 8260B / 624

GC/MS Semi. Vol. 8270C/625

PCB's 8082 / 608

NORM

PLM (Asbestos)

Chloride

Chloride Sulfate TDS

General Water Chemistry (see attached list)

Hold

ANALYSIS REQUEST

(Circle or Specify Method No.)

Relinquished by: Date: Time:

Relinquished by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

Received by: Date: Time:

Received by: Date: Time:

LAB USE ONLY

REMARKS:

Standard

☐ RUSH: Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

Sample Temperature

Temp: 8.4 IR ID: R-8

CF: (-0.6: -0.2°C)

(6-23: +0.2°C)

Corrected Temp: 8.4

ORIGINAL COPY

581425



XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In



Client: Tetra Tech- Midland

Date/ Time Received: 04/05/2018 10:00:00 AM

Work Order #: 581425

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)?	8.6
#2 *Shipping container in good condition?	Yes
#3 *Samples received on ice?	Yes
#4 *Custody Seals intact on shipping container/ cooler?	N/A
#5 Custody Seals intact on sample bottles?	N/A
#6 *Custody Seals Signed and dated?	N/A
#7 *Chain of Custody present?	Yes
#8 Any missing/extra samples?	No
#9 Chain of Custody signed when relinquished/ received?	Yes
#10 Chain of Custody agrees with sample labels/matrix?	Yes
#11 Container label(s) legible and intact?	Yes
#12 Samples in proper container/ bottle?	Yes
#13 Samples properly preserved?	Yes
#14 Sample container(s) intact?	Yes
#15 Sufficient sample amount for indicated test(s)?	Yes
#16 All samples received within hold time?	Yes
#17 Subcontract of sample(s)?	N/A
#18 Water VOC samples have zero headspace?	N/A

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

Analyst:

PH Device/Lot#:

Checklist completed by:

Brianna Teel

Brianna Teel

Date: 04/05/2018

Checklist reviewed by:

Jessica Kramer

Jessica Kramer

Date: 04/05/2018