APPROVED
By Olivia Yu at 10:41 am, Jan 02, 2018

NMOCD approves of the proposed additional delineation for 1RP-4316.

1RP-4316
DELINEATION PLAN
Tamaño Production Facility
Produced Water Spill
Lea County, New Mexico

Latitude: N32.744684°
Longitude: W-103.814419°

LAI Project No. 17-0175-29

October 10, 2017

Prepared for:
Legacy Reserves Operating, LP
303 West Wall Street, Suite 1300
Midland, Texas 79701

Prepared by:
Larson & Associates, Inc.
507 North Marienfeld Street, Suite 205
Midland, Texas 79701

Mark J. Larson, P.G.
Certified Professional Geologist #10490

Sarah R. Johnson
Staff Geologist

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Table of Contents

Figures

Appendices

1.0 INTRODUCTION

Larson & Associates, Inc. (LAI) has prepared this delineation plan on behalf of Legacy Reserves Operating, LP (Legacy) for submittal to the New Mexico Oil Conservation Division (OCD) District I for a produced water spill at the Tamaño Production Facility (Site) located in Unit L (NW/4, SW/4), Section 18, Township 18 South, Range 32 East, in Lea County, New Mexico. The geodetic position is North 32.744684° and West -103.814419°. Figure 1 presents a topographic map. Figure 2 presents an aerial map.

1.1 Background

The spill occurred on June 19, 2016, due to a ruptured poly injection line releasing approximately 150 barrels (bbl) of produced water. No fluid was recovered. Personnel from the Trinity Field Services (trinity) responded to the spill and indicated the affected area measures approximately 32,000 square feet. Trinity personnel indicated the spill migrated south along the lease road for a distance of about 1,000 feet. The initial C-141 was submitted on June 21, 2016 and assigned remediation permit number 1RP-4316. Appendix A presents the initial C-141.

On September 12, 2016, personnel, collected soil samples at 9 locations (SP1-SP9). The samples were collected at depths of 10' (SP5, SP6, and SP8), 13' (SP4), 14' (SP7 and SP9), 22' (SP1), 23' (SP2), and 24' (SP3). The samples were delivered to Cardinal Laboratories in Hobbs, New Mexico under chain of custody and preservation. The samples were analyzed for chloride by titration Method SM4500CL-B. The following samples exceeded 600 mg/Kg for chloride:

- SP1, 22' (7,680 mg/Kg)
- SP3, 24' (640 mg/Kg)
- SP4, 13' (848 mg/Kg)
- SP7, 14' (752 mg/Kg)

Appendix B presents the Trinity sample location drawing and laboratory report.

1.2 Physical Setting

The physical setting is as follows:

- The surface elevation is approximately 3,735 feet above mean sea level (msl);
- The topography is gradually sloping towards the southwest;
- The nearest surface water feature is a seasonal playa approximately 0.20 miles southwest of Site;
- The soils are designated as "Kermit-Berino fine sands, 0 to 3 percent slopes", consisting of 0 to 60 inches of fine sand;
- The surface geology is Eolian and Piedmont deposits (Holocene to middle Pleistocene)-interlayed eolian sands an piedmont-slope deposits;
- Groundwater occurs in the Ogallala formation at approximately 82 feet below ground surface (bgs) (1996);
- The nearest freshwater well is in Unit M (SE/4, SE/4), Section 7, Township 18 South, Range 32 East about 1.25 miles northeast of the Site.

1.3 Recommended Remediation Action Levels

The recommended remediation action levels (RRAL) were calculated for benzene, BTEX and TPH based on the following criteria established by the OCD in "*Guidelines for Remediation of Leaks, Spills and Releases, pp. 6-7, August 13, 1993"*:

Criteria	***Result***	***Score***
Depth-to-Groundwater	50 – 99 Feet	10
Wellhead Protection area	No	0
Distance to Surface Water Body	>1,000 Horizontal Feet	0

The following RRAL apply to the release ranking score: 10

- Benzene 10 mg/Kg
- BTEX 50 mg/Kg
- TPH 1,000 mg/Kg

Depth to groundwater between 50 and 99 feet bgs requires vertical delineation of chloride to 500 milligrams per kilogram (mg/Kg) and maintained a minimum 5 feet farther in depth.

2.0 DELINEATION PLAN

On September 11, 2017, LAI personnel visited the Site for the purpose of observing the spill and collecting photographs and measurements. LAI was able to identify where the spill occurred in the pasture; however, the spill area was less visible in the lease road. The Trinity laboratory analysis reported chloride concentrations above the delineation limit (600 mg/Kg) in samples SP4, 13 feet (848 mg/Kg), SP7, 14 feet (752 mg/Kg), SP1, 22 feet (7,680 mg/Kg) and SP3, 24 feet (640mg/Kg); therefore, additional soil samples will be collected to complete the vertical and horizontal delineation.

An air rotary rig and jam tube sampler will be used to collect soil samples at 14 locations shown on Figure 2. Soil samples will be collected at 5 foot intervals beginning at ground surface and terminating at approximately 35 feet, depending on field chloride readings. The soil samples will be delivered under chain of custody and preservation to Permian Basin Environmental Lab (PBEL) in Midland, Texas. The laboratory will analyze the upper (ground surface) for benzene, toluene, ethylbenzene (BTEX) and total petroleum hydrocarbons (TPH), including gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) by EPA SW-846 Methods 8021B and 8015M. All samples will be analyzed for chloride by EPA Method 300. Pending laboratory results, further delineation may be required to reach cleanup level standards. Figure 2 presents a site map showing proposed soil sample locations. Appendix C presents photographs.

3.0 REMEDIATION PLAN

Legacy will include a remediation plan in the delineation report to be submitted to the OCD upon receipt of the laboratory report.

Figures

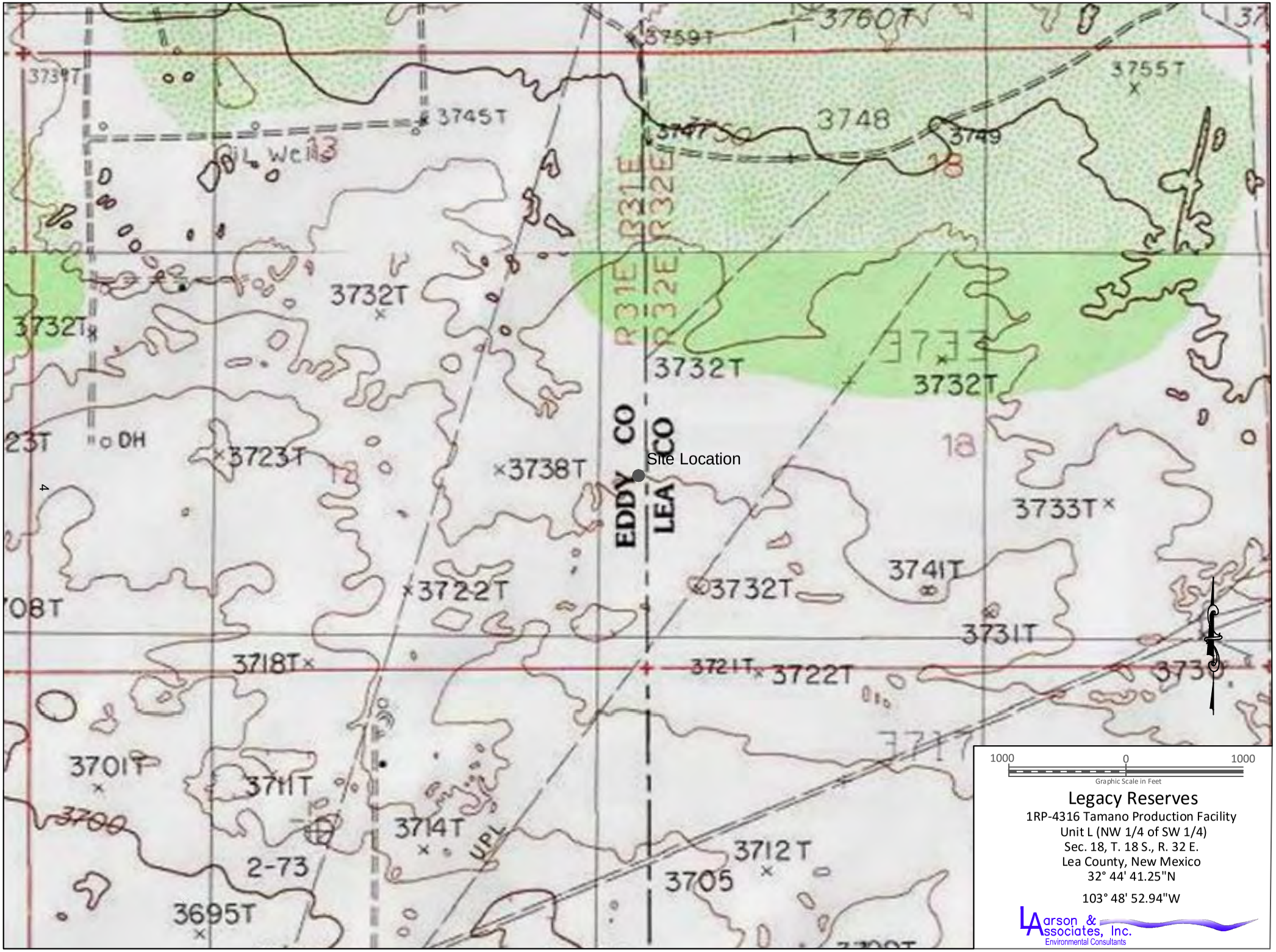

Figure 1 - Topographic Map

Figure 2 - Aerial Map

Appendix A

Initial C-141

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 Res

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

RECEIVED
By JKeyes at 3:18 pm, Jun 21, 2016

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company – Legacy Reserves, LP	Contact – Brian Cunningham
Address – 303 W. Wall St #1800 Midland, TX 79701	Telephone No. – 432-234-9450
Facility Name – Tamano Production Facility	Facility Type – Battery/Production Facility
Surface Owner – Federal	Mineral Owner – Federal

API No 30-0 5-26286

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
	18	18S	32E					Lea

Latitude 32.744684 Longitude -103.814419

NATURE OF RELEASE

Type of Release – Produced Water	Volume of Release – 1500bl	Volume Recovered – 0
Source of Release – Injection Line	Date and Hour of Occurrence 6/19/16 - 0800	Date and Hour of Discovery 6/19/16 0800
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? James Keys	
By Whom? Todd Robinson	Date and Hour 6/20/16 - 1600	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
A poly injection line broke and caused fluid to be released. The line was shut in, repaired, and put back in service.

Describe Area Affected and Cleanup Action Taken.*
The Affected area is Approx. 32,000 Sq ft. A work plan will be created and submitted to NMOCD Dist. I for approval.

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: Brian Cunningham
Printed Name: Brian Cunningham
Title: Production Foreman
E-mail Address: bcunningham@legacylp.com
Date: 6/21/16 Phone: 432-234-9450

OIL CONSERVATION DIVISION

Approved by Environmental Specialist: James Keys

Approval Date: 06/21/2016 Expiration Date: 08/21/2016

Conditions of Approval:
Discrete samples only. Delineate and remediate per NMOCD guidelines.
Ensure BLM concurrence/approval.

Attached ☐
IRP 4316

nJXK1617354810
pJXK1617354983

* Attach Additional Sheets If Necessary

Appendix B

Trinity Sample Location Drawing and Laboratory Report

Tamano Flowline

Sample Points	Chloride
SP1-22	7680
SP2-23	48
SP3-24	640
SP4-13	848
SP5-10	96
SP6-10	< 16.0
SP7-14	752
SP8-10	112
SP9-14	368

TRINITY OILFIELD SERVICES

LEGACY RESERVES

CARDINAL Laboratories

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

September 14, 2016

TODD ROBERSON

TRINITY OILFIELD SERVICES & RENTALS, LLC

P. O. BOX 2587

HOBBS, NM 88241

RE: TAMANO FLOWLINE

Enclosed are the results of analyses for samples received by the laboratory on 09/13/16 8:45.

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/qa/lab_accred_certif.html.

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TRINITY OILFIELD SERVICES & RENTALS, LLC
TODD ROBERSON
P. O. BOX 2587
HOBBS NM, 88241
Fax To: NONE

Received:	09/13/2016	Sampling Date:	09/12/2016
Reported:	09/14/2016	Sampling Type:	Soil
Project Name:	TAMANO FLOWLINE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 1 - 22 (H602038-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**7680**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 2 - 23 (H602038-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 3 - 24 (H602038-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**640**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 4 - 13 (H602038-04)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**848**	16.0	09/14/2016	ND	432	108	400	0.00	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TRINITY OILFIELD SERVICES & RENTALS, LLC
TODD ROBERSON
P. O. BOX 2587
HOBBS NM, 88241
Fax To: NONE

Received:	09/13/2016	Sampling Date:	09/12/2016
Reported:	09/14/2016	Sampling Type:	Soil
Project Name:	TAMANO FLOWLINE	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 5 - 10 (H602038-05)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 6 - 10 (H602038-06)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 7 - 14 (H602038-07)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**752**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 8 - 10 (H602038-08)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**112**	16.0	09/14/2016	ND	432	108	400	0.00	

Sample ID: SP 9 - 14 (H602038-09)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**368**	16.0	09/14/2016	ND	432	108	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

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

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Trinity Oilfield	**BILL TO** P.O. #:	
Project Manager:	Todd Roberson	Company:	
Address:	1416 W. Broadway	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	Fax #:	City:	
Project #:	Project Owner: Legacy	State: Zip:	
Project Name:	Tamano Flowline	Phone #:	
Project Location:		Fax #:	
Sampler Name:	Tyson Pierce		

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX	Chlorides TPH
H602038																
1	SP1-22	G	1			X							9/12	9:00 am		X
2	SP2-23	G	1			X								9:15		X
3	SP3-24	G	1			X								9:50		X
4	SP4-13	G	1			X								10:20		X
5	SP5-10	G	1			X								10:45		X
6	SP6-10	G	1			X								11:30		X
7	SP7-14	G	1			X								11:50		X
8	SP8-10	G	1			X								12:45		X
9	SP9-14	G	1			X								1:30		X

Relinquished By:	Date: 9-13	Received By: Jodi Henson	
Relinquished By:	Time: 8:45	Received By:	
	Date:		
	Time:		

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: -14.2°C

Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

#75

Appendix C

Photographs

Site Prior to Remediation Viewing East, September 11, 2017

Site Prior to Remediation Viewing South, September 11, 2017

Site Prior to Remediation Viewing West, September 11, 2017

Site Prior to Remediation Viewing North, September 11, 2017