APPROVED
By Olivia Yu at 11:20 am, Apr 02, 2018

NMOCD approves of the proposed delineation for 1RP-4258.

1RP-4258
DELINEATION PLAN
LR Chamberlain Tank Battery
Crude Oil & Produced Water Spill
Lea County, New Mexico

Latitude: N33.022359°
Longitude: W-103.170896°

LAI Project No. 17-0175-24

February 20, 2018

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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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 crude oil and produced water spill at the LR Chamberlain Tank Battery (Site) located in Unit C (NE/4, NW/4), Section 14, Township 15 South, Range 37 East, in Lea County, New Mexico. The geodetic position is North 33.022359° and West -103.170896°. Figure 1 presents a topographic map. Figure 2 presents an aerial map.

1.1 Background

The spill occurred on February 15, 2016, due to the dump valve on the free water knockout malfunctioning and allowing for approximately 260 barrels (bbl) of crude oil and produced water to be released inside and outside the earthen containment. Approximately 250 bbl were recovered. The affected area measures about 10,400 square feet. The initial C-141 was submitted on April 22, 2016 and assigned remediation permit number 1RP-4258. Appendix A presents the initial C-141.

On May 23, 2016 Environmental Plus, Inc. (EPI), personnel collected soil samples near the northeast corner of the tank battery and outside the spill area (SP1). Samples were collected at depths of 3, 4, 6, 7, 8, 9, 10, 11 and 12 feet below ground surface (bgs). The soil samples were analyzed in the field for chloride and screened for organic vapors using a photoionization detector (PID). The highest PID reading was reported at 7 feet (762 ppm). The highest chloride reading was at 11 feet bgs (440 mg/Kg).

EPI delivered the soil sample from SP1, 12 feet bgs to Cardinal Labs, in Hobbs, New Mexico under preservation and chain of custody. The soil sample was analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), total petroleum hydrocarbons (TPH), including gasoline range organics (GRO) and diesel range organics (DRO) and chloride by EPA SW-846 Methods 8021B and 8015M, respectively, and chloride by titration method SM4500CL-B, respectively. The laboratory reported BTEX and TPH below the RRAL. Chloride was reports at 176 milligrams per kilogram (mg/Kg). Visually contaminated soil was scraped and disposed at an OCD approved landfill. Appendix B presents the EPI site drawing and analytical data.

1.2 Physical Setting

The physical setting is as follows:

- The surface elevation is approximately 3,800 feet above mean sea level (msl);
- The surface topography gradually slopes towards the southeast and southwest;
- There are no surface water features within 1,000 feet of the Site;
- The soils are designated as “Stegall loam, 0 to 1 percent slopes”, consisting of 0 to 8 inches of loam, underlain by 8 to 28 inches of clay loam;
- The surface geology is the Ogallala Formation (lower Pliocene to middle Miocene)- Alluvial and eolian deposits, and petrocalcic soils of the southern High Plains;
- A monitoring well located approximately 400 feet southeast (1RP-10-1-2351) reported groundwater in the Ogallala formation at approximately 64.73 feet bgs (12/3/2015);
- The nearest fresh water well is located in Unit G (SW/4, NE/4), Section 14, Township 15 South, Range #7 East, about 0.30 miles southeast 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 600 milligrams per kilogram (mg/Kg) and maintained a minimum 5 feet farther in depth.

2.0 DELINEATION PLAN

LAI proposes to collect soil samples at six (6) locations within the contaminated area inside the secondary containment. The samples will be collected at 1 foot intervals to approximately 4 feet bgs and 2 foot intervals to approximately 12 feet bgs using direct push technology (DPT) depending on subsurface conditions. Additional samples will be collected in each cardinal direction (north, south, east and west) of the spill at the same depth intervals for horizontal delineation. The soil samples will be delivered under chain of custody and preservation to Xenco Laboratories (Xenco) in Midland, Texas, and analyzed for BTEX, total petroleum hydrocarbons (TPH), including gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) and chloride by EPA SW-846 Method 8021B, 8015M and 300 respectively. 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

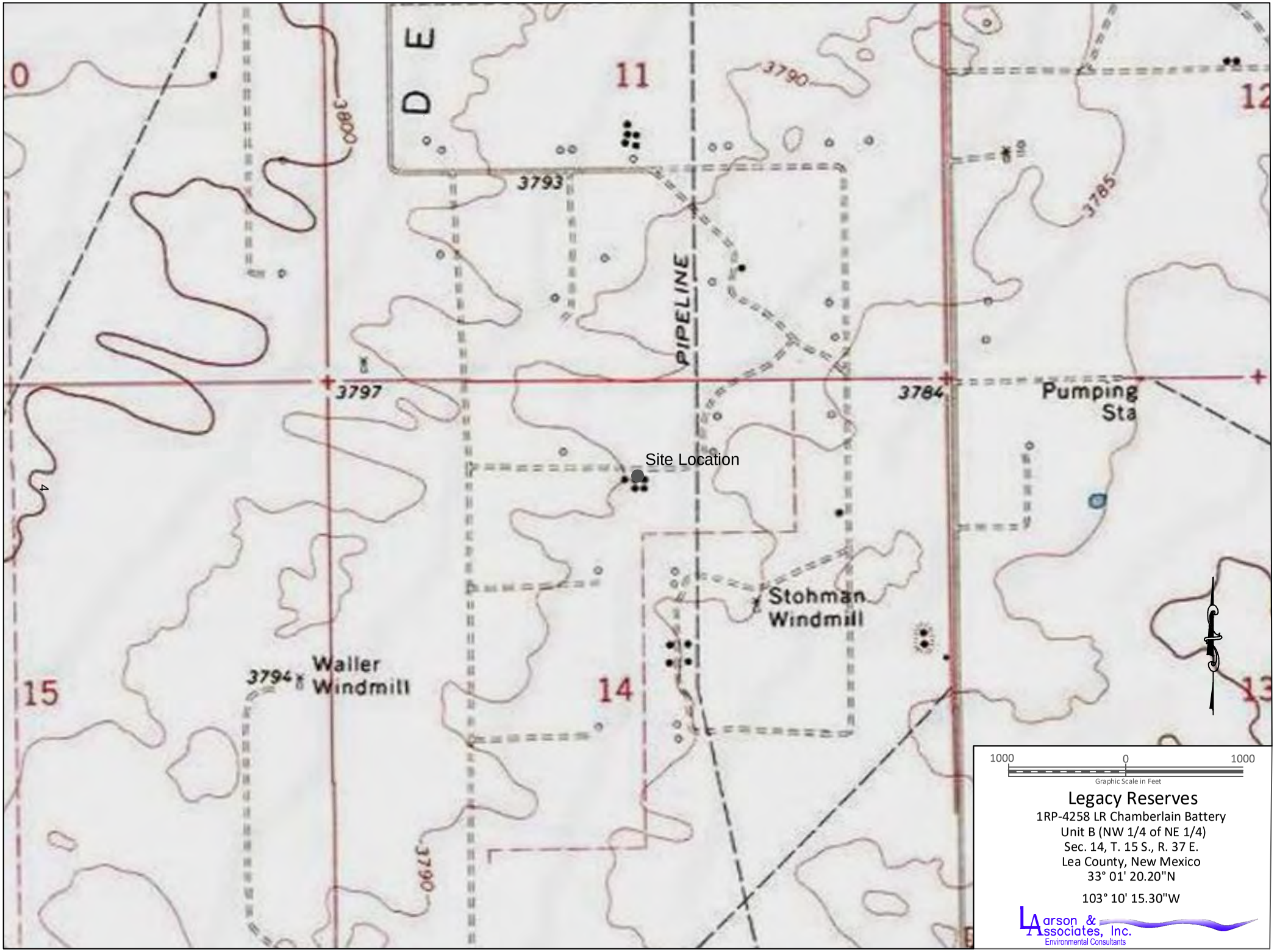


Figure 1 - Topographic Map

Figure 2 - Aerial Map

Appendix A

Initial C-141

RECEIVED
By JKeyes at 8:33 am, Apr 25, 2016

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: Legacy, L.P.	Contact: Manuel Soriano
Address: P.O. Box 10848, Midland, Texas 79702	Telephone No. 432-269-8806
Facility Name: LR Chamberlain Battery	Facility Type: Battery

Surface Owner: Darr Angell	Mineral Owner:	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
C	14	15S	37E					Lea

Latitude: N 33.022359° **Longitude:** W 103.170896°

NATURE OF RELEASE

Type of Release: oil and produced water	Volume of Release: ~260 bbls	Volume Recovered: ~250 bbls
Source of Release: dump on free water knockout malfunction	Date and Hour of Occurrence: 2-15-16 @ 11:00 pm	Date and Hour of Discovery: 2-16-16 @ 8:30 am
Was Immediate Notice Given? ☐ Yes ☒ No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour:	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse: Not Applicable	

If a Watercourse was Impacted, Describe Fully.* Not Applicable

Describe Cause of Problem and Remedial Action Taken.*
The dump on the free water knockout malfunctioned causing the release of oil and produced water. Vacuum trucks were called in to draw up standing fluid.

Describe Area Affected and Cleanup Action Taken.*
The spill impacted approximately 10,400 sq. ft. of caliche tank battery pad. The entire release of oil and produced water was contained within the berms. Vacuum trucks collected approximately 250 bbls of fluid from within containment. The stained soil has been scraped up and hauled to a state approved disposal facility.

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.

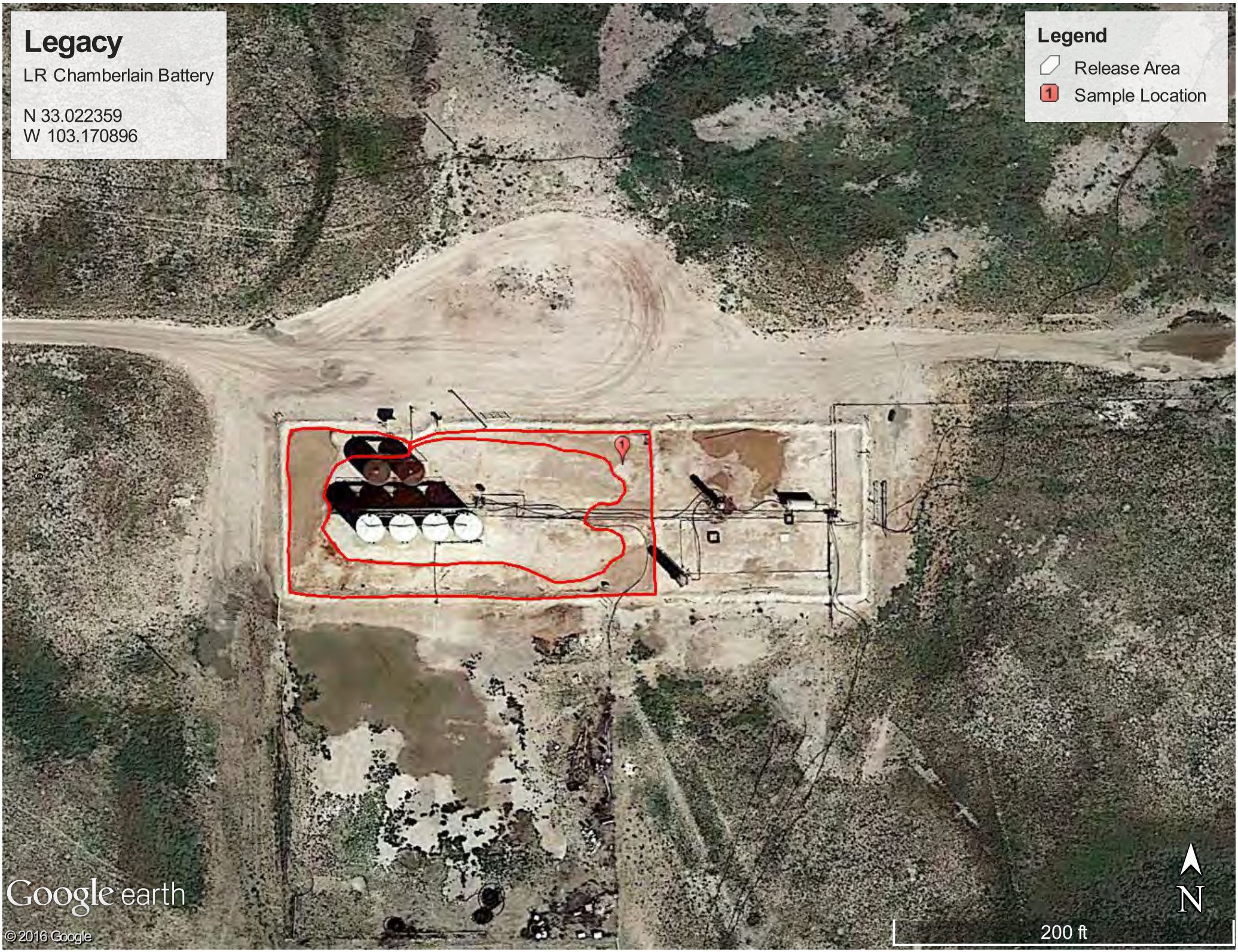
Signature: Manuel Soriano	OIL CONSERVATION DIVISION
Printed Name: Manuel Soriano	Approved by Environmental Specialist:
Title: Production Foreman	Approval Date: 04/25/2016 Expiration Date: 06/25/2016
E-mail Address: jsoriano@legacylp.com	Conditions of Approval: Discrete samples only. Delineate and remediate per NMOCD guidelines. Attached ☐ IRP 4258
Date: 4-22-16 Phone: 432-269-8806	

* Attach Additional Sheets If Necessary

nJXK1611630540
pJXK1611630727

Appendix B

EPI Site Drawing and Analytical Drawing


Legacy
LR Chamberlain Battery
N 33.022359
W 103.170896
Legend
Release Area
Sample Location
1
Google earth
© 2016 Google
N
200 ft

CARDINAL Laboratories

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

May 26, 2016

Daniel Dominguez

Environmental Plus, Inc.

P.O. Box 1558

Eunice, NM 88231

RE: LR CHAMBERLAIN

Enclosed are the results of analyses for samples received by the laboratory on 05/24/16 15:33.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-15-7. 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:

Environmental Plus, Inc.
Daniel Dominguez
P.O. Box 1558
Eunice NM, 88231
Fax To: (505) 394-2601

Received:	05/24/2016	Sampling Date:	05/23/2016
Reported:	05/26/2016	Sampling Type:	Soil
Project Name:	LR CHAMBERLAIN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	UL-C SEC.14, T15S, R37E		

Sample ID: SP 1 (12') (H601131-01)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/25/2016	ND	2.14	107	2.00	1.18	
Toluene*	<0.050	0.050	05/25/2016	ND	2.07	104	2.00	1.11	
Ethylbenzene*	<0.050	0.050	05/25/2016	ND	1.86	92.9	2.00	1.39	
Total Xylenes*	<0.150	0.150	05/25/2016	ND	5.71	95.1	6.00	1.47	
Total BTEX	<0.300	0.300	05/25/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *100 %* *73.6-140*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**176**	16.0	05/25/2016	ND	432	108	400	0.00	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/25/2016	ND	190	94.9	200	5.43	
DRO >C10-C28	**32.1**	10.0	05/25/2016	ND	186	92.9	200	16.1	

Surrogate: 1-Chlorooctane *102 %* *35-147*

Surrogate: 1-Chlorooctadecane *107 %* *28-171*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

QR-03	The RPD value for the sample duplicate or MS/MSD was outside if QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
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

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

Environmental Plus, Inc.

2100 Avenue O, Eunice, NM 88231 P.O. Box 1558, Eunice, NM 88231
(575) 394-3481 FAX: (575) 394-2601

Chain of Custody Form

LAB Cardinal

Company Name	Environmental Plus, Inc.
EPI Project Manager	Daniel Dominguez
Mailing Address	P.O. BOX 1558
City, State, Zip	Eunice New Mexico 88231
EPI Phone#/Fax#	575-394-3481 / 575-394-2601
Client Company	Legacy LP
Facility Name	LR Chamberlain
Location	UL-C Sec. 14, T15S, R37E
Project Reference	
EPI Sampler Name	Eddie Gaytan

Bill To

Attn: Daniel Dominguez
P.O. Box 1558
Eunice, NM 88231

ANALYSIS REQUEST

LAB I.D.	SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE/COOL	OTHER	SAMPLING: DATE	TIME	BTEX 8021B	TPH 8015M	CHLORIDES (Cl^-)	SULFATES ($SO_4^{=}$)	pH	TCLP	OTHER >>>	PAH			
H601131																									
1	SP1 (12')	G	1			X					X		23-May-16	11:16	X	X	X								
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									

13

Sampler Relinquished:	Date 5/24/16	Received By:	E-mail results to: ddominguezepi@gmail.com & jsoriano@legacylp.com
	Time 6:00 am		NOTES:
Relinquished by:	Date 5/24/16	Received By: (lab staff)	
	Time 3:33 pm		
Delivered by: -10.4°c	Sample Cool & Intact (Yes) No	Checked By:	

corrected -10.3°c

#54

Environmental Plus, Inc.
P.O. Box 1558
2100 Avenue O
Eunice, NM 88231
(575) 394-3481
(575) 394-2601 (fax)

FIELD MEASUREMENT/OBSERVATION LOG

COMPANY: Legacy | **PROJECT NAME:** L.R. Chamberlan | **PROJECT NUMBER:**

PROJECT MANAGER: Manuel Soriano | **FIELD TECHNICIAN:** EDDIE GAYTAN | **DATE:** 5-23-16

SAMPLE ID	SAMPLE DEPTH (FT)	COLLECTION TIME	PID ANALYSIS TIME	PID READING (PPM)	CHLORIDE ANALYSIS							SOIL DESCRIPTION
							Titration Tube Reading				mg/Kg	
Sp1	3'	9:01	9:26	423	2 gms of soil	40 ml H2O	12	x	20	=	240	
Sp1A	4'	9.05	9:18	673	2 gms of soil	40 ml H2O	12	x	20	=	240	
Sp1B	6'	9:46	10:04	139	2 gms of soil	40 ml H2O	20	x	20	=	400	
Sp1C	7'	9:48	10:05	762	2 gms of soil	40 ml H2O	20	x	20	=	400	
Sp1D	8'	9:59	10:07	122	2 gms of soil	40 ml H2O	20	x	20	=	400	
Sp1E	9'	10:00	10:21	97.4	2 gms of soil	40 ml H2O	20	x	20	=	400	
Sp1F	10'	10:10	10:22	470	2 gms of soil	40 ml H2O	20	x	20	=	400	
Sp1G	11'	10:29	10:43	191	2 gms of soil	40 ml H2O	22	x	20	=	440	
Sp1H	12'	11:06	11:16	48	2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		
					2 gms of soil	40 ml H2O		x	20	=		

PID CALIBRATION						WEATHER		
Time	Fresh Air	Span Gas	Time	Fresh Air	Span Gas	Time	Temp.	Misc

Appendix C

Photographs

Site Location

Site Prior to Remediation Viewing South, September 14, 2017

Site Prior to Remediation Viewing East, September 14, 2017

Site Prior to Remediation Viewing South, September 14, 2017

Site Prior to Remediation Viewing West, September 14, 2017