APPROVED
By Olivia Yu at 9:38 am, Oct 16, 2017

NMOCD approved of the proposed additional delineation for 1RP-4787.

1RP-4787
DELINEATION PLAN
NGL Release
Lea County, New Mexico

Latitude: N33° 14' 58.20"
Longitude: W103° 06' 07.73"

LAI Project No. 17-0177-01

August 16, 2017

Prepared for:

Targa Midstream Services, LLC
P.O. Box 1689
Lovington, New Mexico 88260

Prepared by:

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

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

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1.0 INTRODUCTION

This delineation plan is submitted to the New Mexico Oil Conservation Division (OCD) District 1 on behalf of Targa Midstream Services, LLC (Targa) for a natural gas liquids (NGL) release from a 6 inch poly line (Site). The release occurred in Unit J (NW/4, SE/4), Section 28, Township 12 South, Range 38 East, Lea County, New Mexico. The geodetic position is North 33° 14' 58.20" and West 103° 06' 07.73". Figure 1 presents a location and topographic map. Figure 2 presents an aerial map.

1.1 Background

On August 5, 2017, Targa was notified of the release which was due to valve failure from corrosion on the 6 inch poly line. The line was isolated, blown down and the valve was replaced. Targa estimated approximately 7 barrels (bbl) of NGL and 425 mcf of gas was released. Wind dispersed NGL as a mist approximately 2,900 feet north and northwest from the source. NGL was dispersed over an area measuring approximately 1,257,240 square feet or about 28.86 acres. No liquid was recovered. Targa representatives submitted the initial C-141 to the OCD District 1 on August 11, 2017. The OCD assigned the release remediation permit number 1RP-4787 with conditions. Appendix A presents the initial C-141.

1.2 Physical Setting

The physical setting is as follows:

- Elevation is approximately 3,825 feet above mean sea level (amsl);
- Topography slopes gently toward the east;
- Surface water accumulates in a low area located southeast of the Site;
- The soils are designated as "Kimbrough-Lea complex" and "Kimbrough Gravelly Loam", consisting of calcareous alluvium derived from reworking the Blackwater Draw (Pleistocene) and Ogallala (Pliocene) formations, in descending order;
- The soil developed over cemented material (caliche);
- The upper geological unit is the Tertiary-age Blackwater Draw and Ogallala formations, in descending order, comprised of very fine to medium-grained quartz sand and gravel, with minor amount of silt and clay with indistinct to massive crossbeds;
- The Ogallala formation is underlain by clay, silty clay, shale and sandstone of the Chinle formation (Triassic) and is about 75 feet thick;
- The nearest fresh water well is located about 900 feet southwest (cross gradient) in Unit L (NW/4, SW/4), Section 28, Township 12 South, Range 38 East;
- The well is used for livestock watering and has a reported depth to groundwater of approximately 18 feet below ground surface (bgs).

1.3 Remediation Action Levels

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, August 13,* 1993":

Criteria	*Result*	*Score*
Depth-to-Groundwater	<50 feet	20
Wellhead Protection Area	Yes	20
Distance to Surface Water Body	<200 Horizontal Feet	20

The following RRAL apply to the release for ranking score: 60

- Benzene 10 mg/Kg
- BTEX 50 mg/Kg
- TPH 100 mg/Kg

The delineation limit for chloride in soil is 250 mg/Kg due to depth to groundwater less than 50 feet bgs.

1.4 Initial Soil Samples

On August 7, 2017, personnel from Larson & Associates, Inc. (LAI) met at the Site with Targa personnel and the landowner (Jeff Decker) to discuss the release. LAI personnel used a hand trowel to collect surface soil samples at seven (7) locations (S-1 through S-7) beginning near the source (S-1) and terminating about 1,000 feet north and northwest of the source S-7). The soil samples were collected between ground surface and about 6 inches below ground surface (bgs). The samples were collected in laboratory containers and delivered under preservation and chain of custody to Permian Basin Environmental Lab (PBEL) in Midland, Texas. The laboratory analyzed the samples for BTEX (sum of benzene, toluene, ethylbenzene and xylenes) by EPA SW-846 Method 8021B, total petroleum hydrocarbons (TPH) by Method 8015M including gasoline range organics (GRO), diesel range organics (DRO) and oil range organics (ORO) and chloride by Method 300. Table 1 presents the laboratory analytical data summary. Figure 2 presents the soil sample locations. Appendix B presents the laboratory report.

Benzene and BTEX were below the RRAL in samples S-1 through S-7. TPH exceeded the RRAL in samples of 100 milligrams per kilogram (mg/Kg) in samples S-1 (12,850 mg/Kg), S-2 (3,920 mg/Kg) and S-3 (411.3 mg/Kg). Chloride was above 250 mg/Kg in samples S-1 (2,680 mg/kg) and S-2 (1,640 mg/Kg).

2.0 DELINEATION PLAN

LAI proposes to use direct push technology (DPT) to collect soil samples to delineate TPH and chloride vertically at sample locations S-1, S-2, S-3, S-4 and S-6. Soil samples will be collected at five (5) locations (S-8 through S-12) outside the release area east, west and south to horizontally delineate the release. Figure 2 presents the sample locations.

Soil samples will be collected at locations S-1 through S-4 and S-6 from ground surface to 0 to 6 inches to assess the bioremediation and from 6 inches to 1 foot and every 1 foot thereafter (i.e., 1 -2, 2 – 3, 3 – 4 feet, etc.) to approximately 12 feet bgs depending on subsurface conditions. Soil samples will be collected for horizontal delineation at locations from S-8 through S-12 in one foot increments beginning at ground surface to approximately 12 feet bgs depending on subsurface conditions. If necessary, an air rotary rig will be used to collect additional samples to vertically delineate chloride to 250 mg/Kg with 10 feet of separation with groundwater. The soil samples will be collected in clean glass containers and delivered to the laboratory under chain of custody and preservation. The samples will be collected in laboratory containers that will be hand delivered under preservation and chain of custody to PBEL. The laboratory will analyze the samples for TPH and chloride by EPA SW-846 Method 8015M, including GRO, DRO and ORO, and chloride by EPA Method 300.

3.0 REMEDIATION PLAN

As an emergency measure LAI initiated remediation of soil and vegetation with application of Microblaze microbial amendment. An 8% solution of Microblaze amendment and water was applied to soil and vegetation between the source and sample location S-4. A 6% solution of Microblaze amendment and water was applied to soil and vegetation between sample locations S-4 and S-7. A 3% solution of Microblaze amendment and water was applied to soil and vegetation over the remaining release area beyond sample location S-7. LAI will visually monitor the vegetation for a decrease in hydrocarbon staining. Figure 3 presents an aerial map of the Microblaze application area.

Targa will submit the analytical results from the delineation soil samples to the OCD following receipt of the laboratory report. Targa will propose additional remedial measures as may be necessary to reduce the TPH and chloride concentrations as required by OCD.

TABLES

Table 1
Soil Sample Analytical Data Summary
Targa Midstream Services, LLC, Decker Leak
UL J (NW/4, SE/4), Section 28, Township 12 South, Range 38 East
Lea County, New Mexico

Sample	Collection Date	Depth (Inches)	Benzene (mg/Kg)	BTEX (mg/Kg)	C6 - C10 (mg/Kg)	>C10 - C28 (mg/Kg)	>C28 - C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
RRAL:			10	50				100	*250
S-1	08/07/2017	0 - 6	0.0738	**11.9838**	1,650	9,760	1,440	**12,850**	2,680
S-2	08/07/2017	0 - 6	<0.0241	**0.4464**	239	3,120	560	**3,920**	1,640
S-3	08/07/2017	0 - 6	<0.0227	<0.1591	<28.4	345	66.3	**411.3**	96.9
S-4	08/07/2017	0 - 6	<0.0217	<0.1521	<27.2	89.1	<27.2	**89.1**	10.5
S-5	08/07/2017	0 - 6	<0.0217	<0.1521	<27.2	<27.2	<27.2	<27.2	4.72
S-6	08/07/2017	0 - 6	<0.0213	<0.1491	<26.6	36.9	<26.6	**36.9**	7.73
S-7	08/07/2017	0 - 6	<0.0233	<0.1629	<29.1	<29.1	<29.1	<29.1	7.45

Notes: Laboratory analysis performed by Permian Basin Environmental Lab, Midland, Texas, by SW-846 Method 8021B (BTEX), Method 8015M (GRO, DRO and ORO) and Method 300 (chloride).
Depth in feet below ground surface (bgs)
mg/Kg: milligrams per kilogram equivalent to parts per million (ppm)
*: OCD delineation limit
Bold and highlighted denotes analyte detected at concentration above the OCD Recommended Remediation Action Level (RRAL)

FIGURES

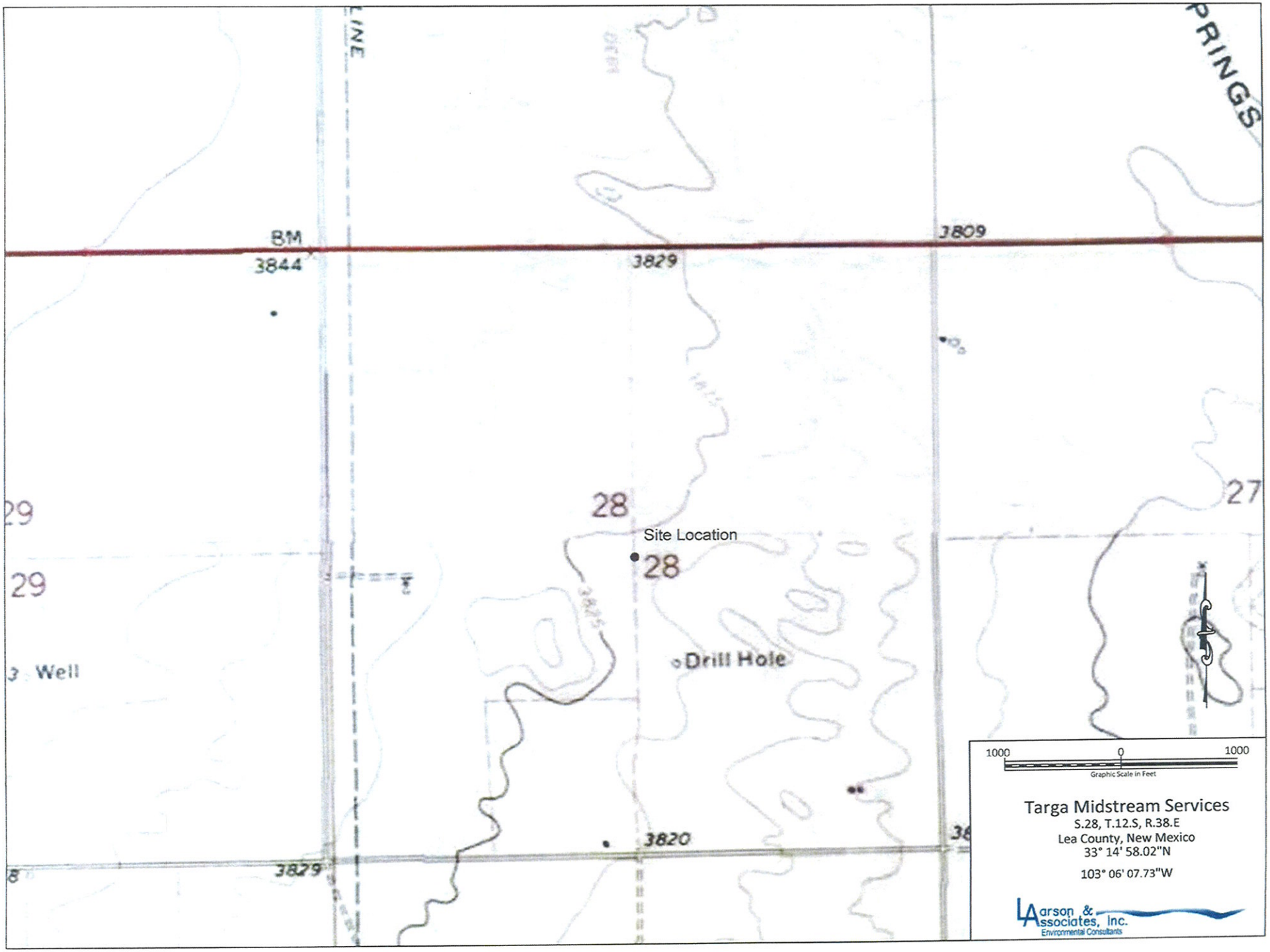

Figure 1 - Topographic Map

Figure 2 - Aerial Map Showing Spray area and Surface Soil Sample Location, August 7, 2017

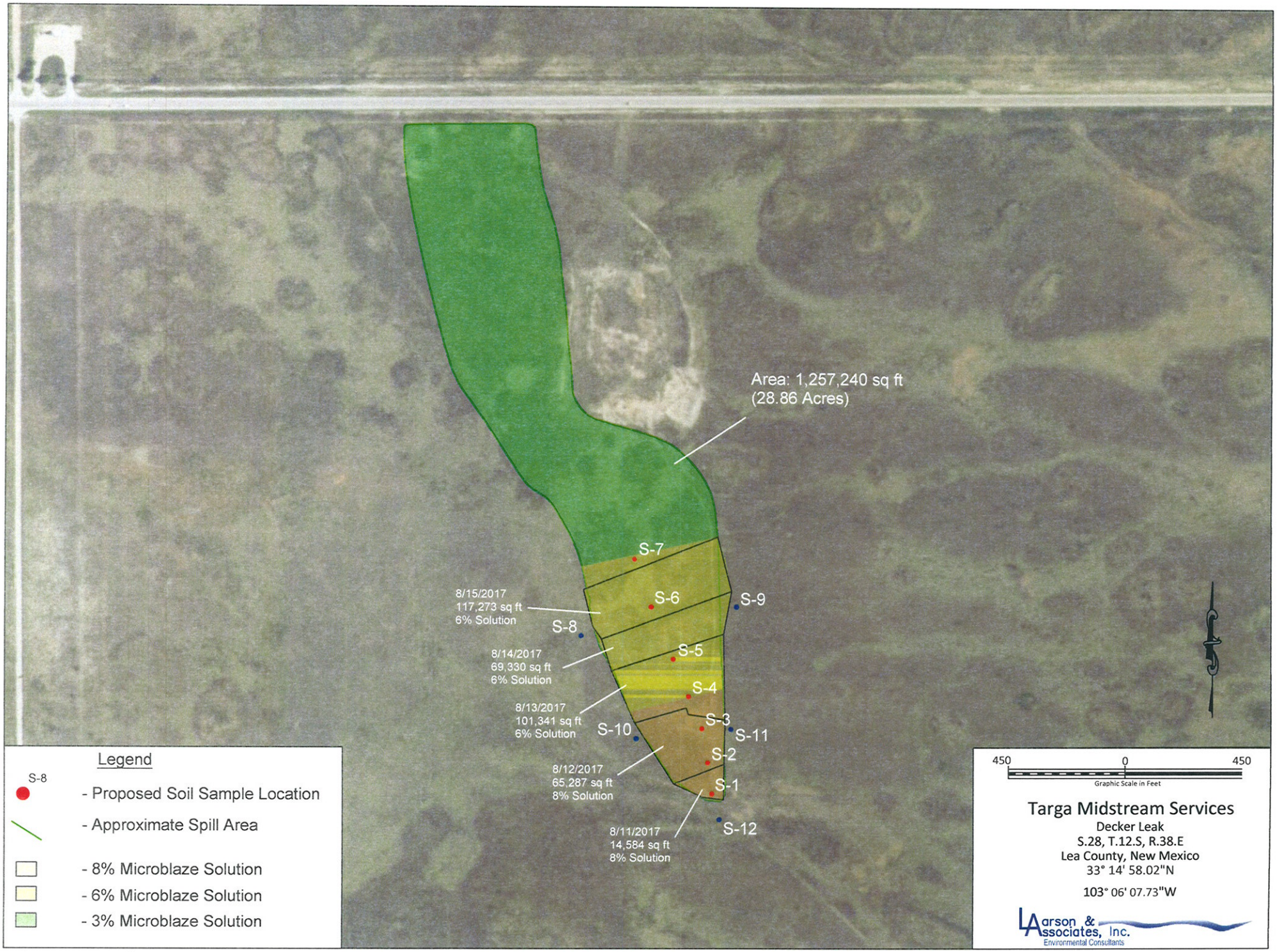

Figure 3 - Aerial Map Showing Microblaze Application

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 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 Targa Midstream Services	Contact: Randy Duncan
Address PO Box: P.O. Box 1689, Lovington, NM 88260	Telephone No. (575)631-7065
Facility Name: Saunders Plant	Facility Type: Gas gathering line

Surface Owner: Jeff Decker	Mineral Owner State	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
C, G	28	12S	38E					Lea

Latitude: Longitude:

NATURE OF RELEASE

Type of Release: Gas and pipeline liquids	Volume of Release:: 7 BBLS of liquid, 425 mcf gas	Volume Recovered: NA
Source of Release: 6" poly pipeline	Date and Hour of Occurrence: 8/5/2017, 7:30 PM	Date and Hour of Discovery 8/5/2017, 7:30 PM
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.	

If a Watercourse was Impacted, Describe Fully *

RECEIVED
By Olivia Yu at 2:35 pm, Aug 11, 2017

Describe Cause of Problem and Remedial Action Taken.*

Targa's 6" poly pipeline was discovered leaking as the result of external corrosion on a 2" valve. The line was isolated, blown down and a new valve installed. The line was put back in service.

Describe Area Affected and Cleanup Action Taken.*

The leak caused hydrocarbon spraying over the affected area. The area affected is being determined and delineated by Larson and Associates.

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: Randy A. Duncan	OIL CONSERVATION DIVISION
Printed Name: Randy Duncan	Approved by Environmental Specialist: OY
Title: Plant Manager	Approval Date: 8/11/2017 Expiration Date:
E-mail Address: rduncan@targaresources.com	Conditions of Approval: see attached directive Attached ☑
Date: 8/9/2017 Phone: (575) 631-7065	

* Attach Additional Sheets If Necessary

fOY1722353253 1RP-4787 nOY1722353505 pOY1722353426

Operator/Responsible Party,

The OCD has received the form C-141 you provided on _8/10/2017_ regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number _1RP-4787__ has been assigned. **Please refer to this case number in all future correspondence.**

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

> *The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC.* [emphasis added]

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District _1_ office in __Hobbs____ on or before _9/11/2017_. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

- Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.

- Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.

- Nominal detection limits for field and laboratory analyses must be provided.

- Composite sampling is not generally allowed.

- Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

•Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

• If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

• Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.

Jim Griswold
OCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505-476-3465
jim.griswold@state.nm.us

APPENDIX B

Laboratory Report

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, TX 79710

Project: Decker Leak
Project Number: 17-0177-01
Location:

Lab Order Number: 7H08007

NELAP/TCEQ # T104704516-16-7

Report Date: 08/11/17

Larson & Associates, Inc.	Project: Decker Leak	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-1	7H08007-01	Soil	08/07/17 15:09	08-08-2017 16:15
S-2	7H08007-02	Soil	08/07/17 15:01	08-08-2017 16:15
S-3	7H08007-03	Soil	08/07/17 14:56	08-08-2017 16:15
S-4	7H08007-04	Soil	08/07/17 14:50	08-08-2017 16:15
S-5	7H08007-05	Soil	08/07/17 14:45	08-08-2017 16:15
S-6	7H08007-06	Soil	08/07/17 14:43	08-08-2017 16:15
S-7	7H08007-07	Soil	08/07/17 14:40	08-08-2017 16:15

Larson & Associates, Inc.	Project: Decker Leak	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-1

7H08007-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	0.0738	0.0238	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	2.68	0.0476	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	3.63	0.0238	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	4.06	0.0476	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	1.54	0.0238	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*32.9 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
Surrogate: 1,4-Difluorobenzene		*80.7 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	2680	11.9	mg/kg dry	10	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	16.0	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	1650	149	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C12-C28	9760	149	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C28-C35	1440	149	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*120 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*128 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	12800	149	mg/kg dry	5	[CALC]	08/08/17	08/09/17	calc	

Larson & Associates, Inc.	Project: Decker Leak	Fax: (432) 687-0456
P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-2

7H08007-02 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.0241	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0482	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	0.142	0.0241	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	0.221	0.0482	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	0.0834	0.0241	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*99.0 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*35.7 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	1640	6.02	mg/kg dry	5	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	17.0	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	239	151	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C12-C28	3120	151	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C28-C35	560	151	mg/kg dry	5	P7H1108	08/08/17	08/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*97.3 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*102 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	3920	151	mg/kg dry	5	[CALC]	08/08/17	08/09/17	calc	

Larson & Associates, Inc. P.O. Box 50685 Midland TX, 79710	Project: Decker Leak Project Number: 17-0177-01 Project Manager: Mark Larson	Fax: (432) 687-0456

S-3

7H08007-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.0227	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0455	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	ND	0.0227	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	ND	0.0455	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	ND	0.0227	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*100 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*45.1 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**96.9**	1.14	mg/kg dry	1	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P7H1031	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	28.4	mg/kg dry	1	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C12-C28	**345**	28.4	mg/kg dry	1	P7H1108	08/08/17	08/09/17	TPH 8015M	
>C28-C35	**66.3**	28.4	mg/kg dry	1	P7H1108	08/08/17	08/09/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*99.8 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*102 %*	*70-130*		*P7H1108*	*08/08/17*	*08/09/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**411**	28.4	mg/kg dry	1	[CALC]	08/08/17	08/09/17	calc	

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-4

7H08007-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0435	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	ND	0.0435	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		*96.0 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
Surrogate: 4-Bromofluorobenzene		*42.3 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**10.5**	1.09	mg/kg dry	1	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C12-C28	**89.1**	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*103 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*105 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**89.1**	27.2	mg/kg dry	1	[CALC]	08/08/17	08/10/17	calc	

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Midland TX, 79710	Project Manager: Mark Larson	

S-5

7H08007-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0435	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	ND	0.0435	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	ND	0.0217	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*42.0 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
Surrogate: 1,4-Difluorobenzene		*94.6 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**4.72**	1.09	mg/kg dry	1	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	**8.0**	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*69.8 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	*S-GC*
Surrogate: o-Terphenyl		*70.9 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	27.2	mg/kg dry	1	[CALC]	08/08/17	08/10/17	calc	

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-6

7H08007-06 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Organics by GC									
Benzene	ND	0.0213	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0426	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	ND	0.0213	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	ND	0.0426	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	ND	0.0213	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*38.5 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
Surrogate: 1,4-Difluorobenzene		*97.7 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**7.73**	1.06	mg/kg dry	1	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.6	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C12-C28	**36.9**	26.6	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C28-C35	ND	26.6	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*100 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*101 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**36.9**	26.6	mg/kg dry	1	[CALC]	08/08/17	08/10/17	calc	

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

S-7

7H08007-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
Organics by GC									
Benzene	ND	0.0233	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Toluene	ND	0.0465	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Ethylbenzene	ND	0.0233	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (p/m)	ND	0.0465	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Xylene (o)	ND	0.0233	mg/kg dry	20	P7H1114	08/09/17	08/09/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		*53.5 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	*S-GC*
Surrogate: 1,4-Difluorobenzene		*97.2 %*	*75-125*		*P7H1114*	*08/09/17*	*08/09/17*	*EPA 8021B*	
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**7.45**	1.16	mg/kg dry	1	P7H0908	08/09/17	08/09/17	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	P7H1001	08/10/17	08/10/17	ASTM D2216	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	29.1	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C12-C28	ND	29.1	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
>C28-C35	ND	29.1	mg/kg dry	1	P7H1108	08/08/17	08/10/17	TPH 8015M	
Surrogate: 1-Chlorooctane		*99.5 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Surrogate: o-Terphenyl		*103 %*	*70-130*		*P7H1108*	*08/08/17*	*08/10/17*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	ND	29.1	mg/kg dry	1	[CALC]	08/08/17	08/10/17	calc	

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Decker Leak
Project Number: 17-0177-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7H1114 - General Preparation (GC)										
Blank (P7H1114-BLK1)				Prepared & Analyzed: 08/09/17						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 1,4-Difluorobenzene	*0.0633*		"	*0.0600*		*105*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0394*		"	*0.0600*		*65.7*	*75-125*			*S-GC*
LCS (P7H1114-BS1)				Prepared & Analyzed: 08/09/17						
Benzene	0.117	0.00100	mg/kg wet	0.100		117	70-130			
Toluene	0.114	0.00200	"	0.100		114	70-130			
Ethylbenzene	0.109	0.00100	"	0.100		109	70-130			
Xylene (p/m)	0.195	0.00200	"				70-130			
Xylene (o)	0.0929	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	*0.0615*		"	*0.0600*		*103*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0307*		"	*0.0600*		*51.2*	*75-125*			*S-GC*
LCS Dup (P7H1114-BSD1)				Prepared & Analyzed: 08/09/17						
Benzene	0.107	0.00100	mg/kg wet	0.100		107	70-130	8.85	20	
Toluene	0.103	0.00200	"	0.100		103	70-130	10.2	20	
Ethylbenzene	0.102	0.00100	"	0.100		102	70-130	7.01	20	
Xylene (p/m)	0.182	0.00200	"				70-130		20	
Xylene (o)	0.0837	0.00100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	*0.0317*		"	*0.0600*		*52.8*	*75-125*			*S-GC*
Surrogate: 1,4-Difluorobenzene	*0.0614*		"	*0.0600*		*102*	*75-125*			
Matrix Spike (P7H1114-MS1)	**Source: 7H08007-07**			Prepared & Analyzed: 08/09/17						
Benzene	0.148	0.0233	mg/kg dry	0.233	ND	63.6	80-120			QM-07
Toluene	0.143	0.0465	"	0.233	ND	61.3	80-120			QM-07
Ethylbenzene	0.100	0.0233	"	0.233	ND	43.2	80-120			QM-07
Xylene (p/m)	0.220	0.0465	"		ND		80-120			
Xylene (o)	0.0972	0.0233	"		ND		80-120			
Surrogate: 4-Bromofluorobenzene	*0.0342*		"	*0.0698*		*49.0*	*75-125*			*S-GC*
Surrogate: 1,4-Difluorobenzene	*0.0725*		"	*0.0698*		*104*	*75-125*			

Larson & Associates, Inc.
P.O. Box 50685
Midland TX, 79710

Project: Decker Leak
Project Number: 17-0177-01
Project Manager: Mark Larson

Fax: (432) 687-0456

Organics by GC - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7H1114 - General Preparation (GC)										
Matrix Spike Dup (P7H1114-MSD1)	Source: 7H08007-07			Prepared & Analyzed: 08/09/17						
Benzene	0.165	0.0233	mg/kg dry	0.233	ND	71.0	80-120	11.0	20	QM-07
Toluene	0.160	0.0465	"	0.233	ND	68.6	80-120	11.2	20	QM-07
Ethylbenzene	0.109	0.0233	"	0.233	ND	46.7	80-120	7.79	20	QM-07
Xylene (p/m)	0.233	0.0465	"		ND		80-120		20	
Xylene (o)	0.0974	0.0233	"		ND		80-120		20	
Surrogate: 1,4-Difluorobenzene	*0.0729*		"	*0.0698*		*104*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*0.0355*		"	*0.0698*		*50.9*	*75-125*			*S-GC*

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7H0908 - * DEFAULT PREP *** **										
LCS (P7H0908-BS1)				Prepared & Analyzed: 08/09/17						
Chloride	428	1.00	mg/kg wet	400		107	80-120			
LCS Dup (P7H0908-BSD1)				Prepared & Analyzed: 08/09/17						
Chloride	429	1.00	mg/kg wet	400		107	80-120	0.142	20	
Duplicate (P7H0908-DUP1)	Source: 7H08007-01			Prepared & Analyzed: 08/09/17						
Chloride	2680	11.9	mg/kg dry		2680			0.169	20	
Duplicate (P7H0908-DUP2)	Source: 7H07005-04			Prepared: 08/09/17 Analyzed: 08/10/17						
Chloride	2790	29.4	mg/kg dry		2780			0.412	20	
Matrix Spike (P7H0908-MS1)	Source: 7H08007-01			Prepared & Analyzed: 08/09/17						
Chloride	3930	11.9	mg/kg dry	1190	2680	105	80-120			
Batch P7H1001 - * DEFAULT PREP *** **										
Blank (P7H1001-BLK1)				Prepared & Analyzed: 08/10/17						
% Moisture	ND	0.1	%							
Duplicate (P7H1001-DUP1)	Source: 7H08007-07			Prepared & Analyzed: 08/10/17						
% Moisture	15.0	0.1	%		14.0			6.90	20	

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7H1108 - TX 1005										
Blank (P7H1108-BLK1)				Prepared: 08/08/17 Analyzed: 08/09/17						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*107*		"	*100*		*107*	*70-130*			
Surrogate: o-Terphenyl	*54.2*		"	*50.0*		*108*	*70-130*			
LCS (P7H1108-BS1)				Prepared: 08/08/17 Analyzed: 08/09/17						
C6-C12	836	25.0	mg/kg wet	1000		83.6	75-125			
>C12-C28	853	25.0	"	1000		85.3	75-125			
Surrogate: 1-Chlorooctane	*95.8*		"	*100*		*95.8*	*70-130*			
Surrogate: o-Terphenyl	*44.7*		"	*50.0*		*89.4*	*70-130*			
LCS Dup (P7H1108-BSD1)				Prepared: 08/08/17 Analyzed: 08/09/17						
C6-C12	858	25.0	mg/kg wet	1000		85.8	75-125	2.64	20	
>C12-C28	873	25.0	"	1000		87.3	75-125	2.29	20	
Surrogate: 1-Chlorooctane	*100*		"	*100*		*100*	*70-130*			
Surrogate: o-Terphenyl	*45.8*		"	*50.0*		*91.5*	*70-130*			

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P.O. Box 50685	Project Number: 17-0177-01	
Midland TX, 79710	Project Manager: Mark Larson	

Notes and Definitions

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
BULK	Samples received in Bulk soil containers
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: _____ Date: 8/11/2017

Brent Barron, Laboratory Director/Technical Director

CHAIN-OF-CUSTOD

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 8/8/17 PAGE 1 OF 1
PO #: LAB WORK ORDER #: 17H0800M
PROJECT LOCATION OR NAME: Decker Leak
LAI PROJECT #: 17-0177-01 COLLECTOR: ML/AT
Data Reported to:

TRRP report? ☐ Yes ☒ No
TIME ZONE: Time zone/State: MST/NM
S=SOIL W=WATER A=AIR P=PAINT SL=SLUDGE OT=OTHER

	Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO3	H2SO4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES: BTEX ☒ MTBE ☐	TRPH 418.1 ☐ TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☒	DIESEL - MOD 8015 ☒ ORO	VOC 8260 ☐	SVOC 8270 ☐ PAH 8270 ☐ HOLDPAH ☐	8081 PESTICIDES ☐ 8151 HERBICIDES ☐	8082 PCBS ☐	TCLP - METALS (RCRA) ☐ TCLP VOC ☐	TCLP - PEST ☐ HERB ☐ Semi-VOC ☐	TOTAL METALS (RCRA) ☐ OTHER LIST ☐	LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐	RCI ☐ TOX ☐ FLASHPOINT ☐	TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐	pH ☐ HEXAVALENT CHROMIUM ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☒ ANIONS ☐ ALKALINITY ☐ Method 300	FIELD NOTES
1	S-1		8/7/17	15:09	S	1				X		X			X	X												X	
2	S-2			15:01																									
3	S-3			14:56																									
4	S-4			14:50																									
5	S-5			14:45																									
6	S-6			14:43																									
7	S-7		X	14:40	X	X				X		X			X	X												X	
	TOTAL																												

RELINQUISHED BY:(Signature) Cam Burgess DATE/TIME 8/8/17 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME 8-8-17 1615 RECEIVED BY: (Signature)

TURN AROUND TIME
NORMAL ☐
1 DAY ☐
2 DAY ☐
OTHER ☐ RUSH 2 DAY

LABORATORY USE ONLY:
RECEIVING TEMP: 1.0 THERM # NCF4
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL #
☒ HAND DELIVERED

PBF-1

APPENDIX C

Photographs

Source of Release Viewing North

Source of Release

Release Area Viewing from South to North

Soil Sample Location S-1 Viewing South

Release Area Viewing South from Soil Sample Location S-2

Release Area Viewing South from Soil Sample Location S-3

Release Area Viewing South from Soil Sample Location S-5

Release Area Viewing South from Soil Sample Location S-7