LINN ENERGY
2130 W. Bender Blvd.
Hobbs, NM 88241
Phone 575.738.1739

J.L. Keel A #10

Corrective Action Plan

API No. 30-015-05098

Release Date: December 27th, 2013

Unit Letter I, O & P, Section 7, Township 17S, Range 31E

RECS
RICE ENVIRONMENTAL
CONSULTING & SAFETY

PO Box 2948 | Hobbs, NM 88241 | Phone 575.393.2967

April 4th, 2014

Mike Bratcher
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau – District 2
811 S. First St.
Artesia, NM 88210

RE: **Corrective Action Plan**
Linn Energy J.L. Keel A #10
UL/I, O & P sec. 7 T17S R31E
API No. 30-015-05098

Mr. Bratcher:

Linn Energy (Linn) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site.

Background and Previous Work

The site is located approximately 4.9 miles northeast of Loco Hills, New Mexico at UL/I, O & P sec. 7 T17S R31E. This site is in an area of no known groundwater.

On December 27th, 2013, a release occurred of produced water from a fiberglass pipeline. A total of 200 barrels of produced water was released over 26,301 square feet of pasture land. None of the fluid was recovered. NMOCD and BLM were notified of the release on December 27th, 2013, and an initial C-141 was submitted to NMOCD for their approval (Appendix A).

RECS personnel were on site beginning on December 31st, 2013 to assess the release. Seven points from within the release were sampled at the surface and with depth (Figure 1). All samples were field tested for chlorides and organic vapors, and representative samples were taken to a commercial laboratory for analysis (Appendix B). Vertical 1 was installed by hand augur and then backhoe to a depth of 12 ft bgs. At 12 ft bgs, the laboratory chloride concentration returned a result of 1,230 mg/kg. Vertical 3 was installed by hand augur and then backhoe to a depth of 15 ft bgs. At 15 ft bgs, the laboratory chloride concentration returned a result of 1,440 mg/kg. The remainder of verticals installed at the site achieved chloride values below regulatory standards at the bottom of each vertical.

Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) readings were elevated at the surface of Vertical 1, but decreased to below regulatory standards by 7 ft bgs. All other samples returned GRO and DRO readings below regulatory standards. All BTEX readings returned results that were near non-detectable levels or at non-detectable levels.

In order to further delineate the chloride concentrations in the vadose zone, three soil bores were installed on February 19th, 2014 (Figure 2). The soil bores were installed over Verticals 1-3. As the bores were advanced, samples were taken at regular intervals and field tested for chlorides and hydrocarbons. Representative samples from each bore were taken to a commercial laboratory for analysis. SB-1 returned laboratory chloride readings of 64 mg/kg at 18 ft bgs and 112 mg/kg at 21 ft bgs. SB-2 retuned laboratory chloride readings of 48 mg/kg at 24 and 27 ft bgs. SB-3 returned laboratory chloride readings of 176 mg/kg at 33 and 36 ft bgs. GRO, DRO and BTEX results were non-detect (Appendix C).

SB-4 was installed outside the release area to confirm that groundwater was not present at the site. The bore was installed to a depth of 105 ft bgs. At 103 ft bgs, red bed clay was encountered that indicated the bottom of the aquifer. The bore was left open for over 48 hours and on February 25th, 2014, the bore was gauged to determine depth to groundwater. No groundwater was discovered in the bore to a depth of 105 ft bgs.

Photo documentation of these activities can be found in Appendix D.

Corrective Action Plan

Based on the sampling at the site, the area around Verticals 1-3 will be excavated to a depth of 4 ft bgs (Figure 3). Once the excavation is completed, the walls of the excavation will be sampled to confirm that they show constituents below regulatory standards. A 20-mil reinforced poly liner will be seated and key set into the base of the excavation. The remainder of the release site will be scraped down to 2 ft bgs. A bottom composite of the 2 ft scrape will be taken to a commercial laboratory to confirm that all constituents are below regulatory standards.

All excavated soils will be evaluated for use as backfill and any soils that do not meet regulatory standards will be disposed of at a NMOCD approved facility. The remaining soil will be blended on site to serve as backfill. Clean soil will be imported to the site to replace any soils taken for disposal. A sample of the blended backfill will be taken to a commercial laboratory for analysis to confirm that the constituents are below regulatory standards.

The blended backfill will be used to backfill the entire site to ground surface and to contour the site to the surrounding area. All disturbed areas will be seeded with a blend of native vegetation. Vegetation will provide an infiltration barrier for the site, since plants capture water through their roots thereby reducing the amount of water traveling through the vadose zone to groundwater.

Once these activities are completed, a report will be submitted to NMOCD and BLM detailing these actions and asking for ‘remediation termination’ and site closure.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

- Figure 1 – Initial Sampling Data
- Figure 2 – Soil Bore Installation
- Figure 3 – Proposed Corrective Action
- Appendix A – Initial C-141
- Appendix B – Initial Sampling Labs
- Appendix C – Soil Bore Installation Lab
- Appendix D – Photo Documentation

Figures

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948, Hobbs, NM 88241
Phone 575.393.2967

Initial Sampling Data

Vertical 1

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	1720	2030	7850	31500	16.1	170	208	336	729
6"	2775	1445							
1'	3265	478							
1.5'	3087	363							
2'	3058	391							
2.5'	3754	123							
3'	3493	253							
3.5'	4249	112							
4'	5907	216							
4.5'	4052	197							
5'	5679	176							
5.5'	6354	231							
6'	5932	169							
7'	5680	3.1	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3
8'	3460	2.9							
9'	1470	2.3							
10'	1234	1.1							
11'	1136	0.6							
12'	1230	0.4	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3

Vertical 2

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	20000	316	60	1310	0.166	0.834	3.08	7.42	11.5
6"	5515	481.5							
1'	2441	179.2							
1.5'	3313	104.3							
2'	3784	57.7							
2.5'	3569	442.8							
3'	3500	30.2							
3.5'	2414	68.7							
4'	2250	371.2							
5'	3170	3.2							
6'	3575	3.4							
7'	4320	4.1	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3
8'	3299	1.7							
9'	2612	1.4							
10'	3611	1.8							
11'	2913	1.3							
12'	1619	0.8							
13'	854	0.7							
14'	1858	0.9							
15'	336	0.6	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3

Vertical 3

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	8800	434	215	1320	<0.2	0.689	2.57	6.78	10
6"	2971	121.3							
1'	1331	57.1							
1.5'	1470	7.8							
2'	1566	7.4							
2.5'	1532	13.3							
3'	1430	15.1							
3.5'	1947	10.3							
4'	1452	4.8							
5'	1416	3.5							
6'	1977	1.7							
7'	2053	2.1							
8'	2558	3.2							
9'	2520	1.1	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3
10'	1896	1.2							
11'	2399	0.8							
12'	2192	1							
13'	1679	1.7							
14'	1358	1.5							
15'	1440	1.2	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3

Vertical 4

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	3320	108	19.8	639	<0.05	0.14	0.349	1	1.49
6"	3088	71.3							
1'	1727	102							
1.5'	1799	12.9							
2'	464	72.3	<50	107	<0.05	<0.05	0.621	0.429	1.05
2.5'	96	64	<50	131	<0.05	<0.05	0.347	0.245	0.592

Vertical 5

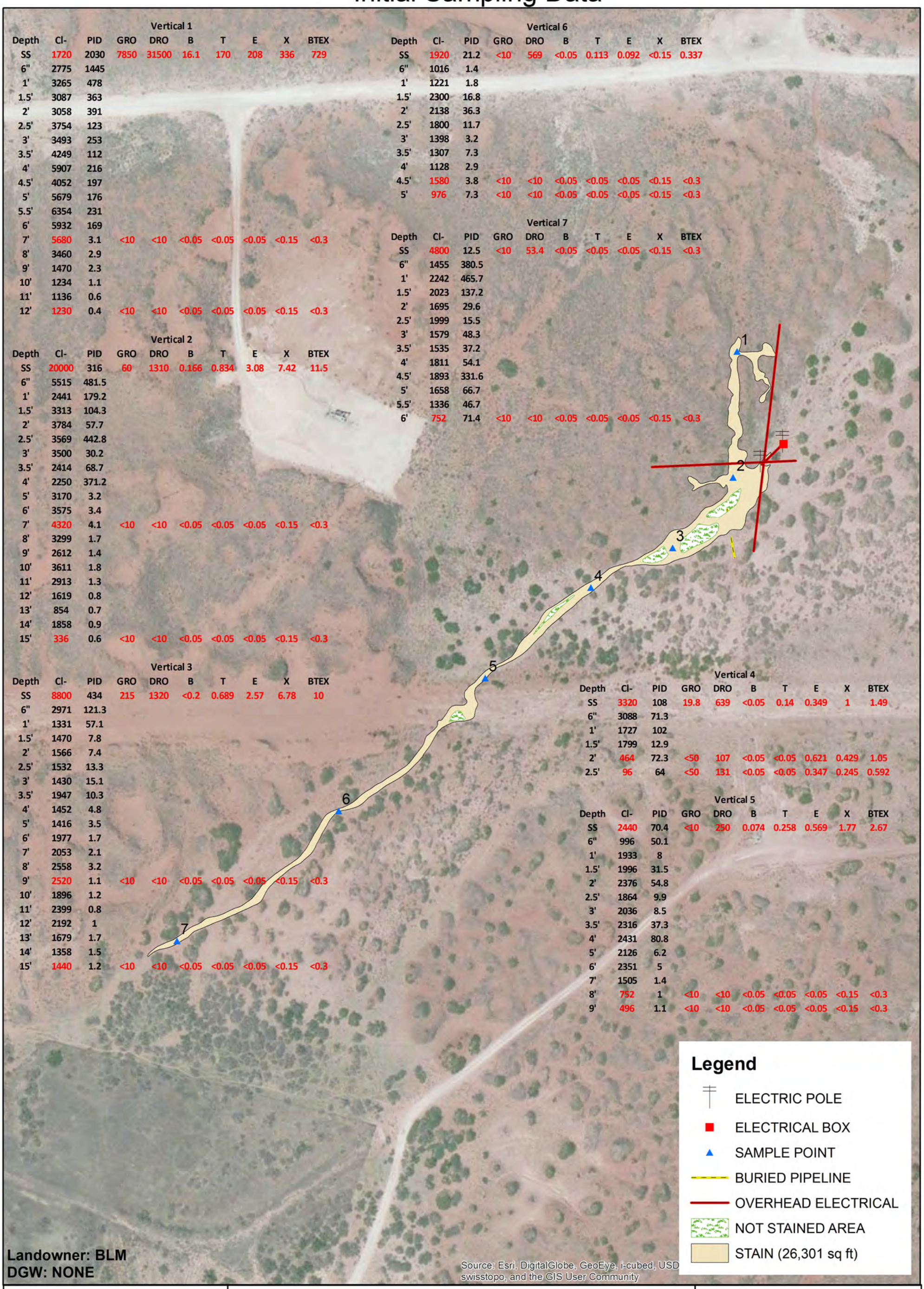
Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	2440	70.4	<10	250	0.074	0.258	0.569	1.77	2.67
6"	996	50.1							
1'	1933	8							
1.5'	1996	31.5							
2'	2376	54.8							
2.5'	1864	9.9							
3'	2036	8.5							
3.5'	2316	37.3							
4'	2431	80.8							
5'	2126	6.2							
6'	2351	5							
7'	1505	1.4							
8'	752	1	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3
9'	496	1.1	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3

Vertical 6

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	1920	21.2	<10	569	<0.05	0.113	0.092	<0.15	0.337
6"	1016	1.4							
1'	1221	1.8							
1.5'	2300	16.8							
2'	2138	36.3							
2.5'	1800	11.7							
3'	1398	3.2							
3.5'	1307	7.3							
4'	1128	2.9							
4.5'	1580	3.8	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3
5'	976	7.3	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3

Vertical 7

Depth	Cl-	PID	GRO	DRO	B	T	E	X	BTEX
SS	4800	12.5	<10	53.4	<0.05	<0.05	<0.05	<0.15	<0.3
6"	1455	380.5							
1'	2242	465.7							
1.5'	2023	137.2							
2'	1695	29.6							
2.5'	1999	15.5							
3'	1579	48.3							
3.5'	1535	37.2							
4'	1811	54.1							
4.5'	1893	331.6							
5'	1658	66.7							
5.5'	1336	46.7							
6'	752	71.4	<10	<10	<0.05	<0.05	<0.05	<0.15	<0.3



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LINN J.L.
KEEL A #10

LEGALS: UL/I, O, P sec. 7
T-17-S R-31-E
EDDY COUNTY, NM

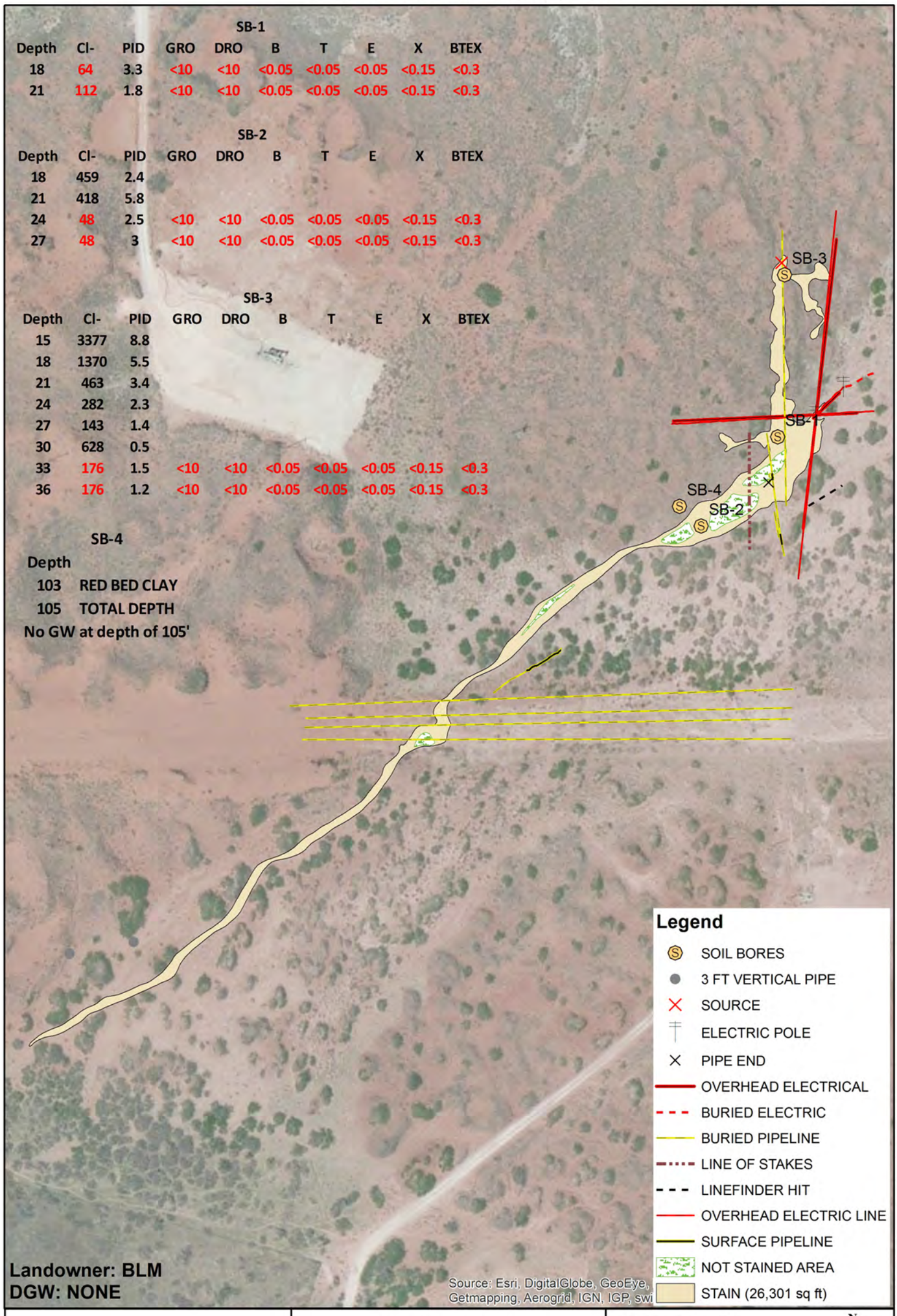
Figure 1

N W E S

0 100 200 Feet

GPS date: 12/31/14 &1/2/14 KS
Drawing date: 2/10/14
Drafted by: L. Weinheimer

Soil Bore Installation



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LEGALS: UL/I, O, P sec. 7
T-17-S R-31-E
EDDY COUNTY, NM

Figure 2

N
W E
S

0 100 200
Feet

GPS date: 2/19/14
Drawing date: 2/25/14
Drafted by: L. Weinheimer

Proposed Corrective Action

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KEEL A #10

LEGALS: UL/I, O, P sec. 7
T-17-S R-31-E
EDDY COUNTY, NM

Figure 3

N
W E
S

0 100 200
Feet

GPS date: 12/31/14 &1/2/14 KS
Drawing date: 3/14/14
Drafted by: T. Grieco

Appendix A
Initial C-141

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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 October 10, 2003

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: Linn Operating	Contact: Brian Wall
Address: 2130 W. Bender Hobbs, NM 88240	Telephone No.: 575-738-1739
Facility Name: J L Keel A #10	Facility Type: Injection

Surface Owner: Federal	Mineral Owner:	API No.: 30-015-05098

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
I	07	17S	31E	1980	South	660	East	Eddy

Latitude: 32.84728 **Longitude:** -103.90176

NATURE OF RELEASE

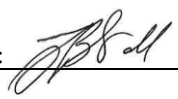
Type of Release: Produced Water	Volume of Release: 200 bbls	Volume Recovered: 0
Source of Release: Fiberglass pipeline	Date and Hour of Occurrence: 12/27/2013 2:00pm	Date and Hour of Discovery: 12/27/2013 2:00pm
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Mike Burton- BLM Mike Bratcher-NM OCD	
By Whom? Joe Hernandez	Date and Hour 12/27/2013 3:00pm	
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.*: Mario Hernandaz, called me told me that line #3 at Keel West injection was going down on low discharge pressure. We went to chasing lines out to find leak, found leak 500 feet south of Keel A. #10 well. Shut line in. Waiting on one call to clear to repair and clean up spill.

Describe Area Affected and Cleanup Action Taken.* : Legals for spill are. 32.5045N 103.5410 W. Spill runs 300 feet south,15 to 50 feet wide, then goes south west 1650 feet, 20 feet wide. legals at end of spill are. 32.5035 N 103.5421 W. @" fiber glass line blow in two pieces.

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: Brian Wall	Approved by District Supervisor:	
Title: Construction Foreman II	Approval Date:	Expiration Date:
E-mail Address: bwall@linnenergy.com	Conditions of Approval:	Attached ☐
Date: 12/30/2013 Phone: 806-367-0645		

* Attach Additional Sheets If Necessary