Environmental & Safety Solutions, Inc.

Electronic Correspondence

July 28, 2014

Mr. Mike Bratcher
State of New Mexico
Oil Conservation Division
811 S. 1st Street
Artesia, NM 88210
mike.bratcher@state.nm.us

Re: Corrective Action Plan Amendment
LINN Energy, Barclay Federal 20
Legal: P Sec 1-T23S-R31E, 660 FSL & 660 FEL, Eddy County, NM
API No.:30-015-30821
Lat-Long: 32.33067N – 103.72862W
Depth to Ground Water: 240ft

Dear Mike:

Etech Environmental & Safety Solutions, Inc. (Etech) submits the following amended corrective action plan on the aforementioned site for your review and approval.

Current Project Status

1. The status of the remediation of the site to date is as follows:

2. The impacted area (approximately 100‘ by 42’) has been excavated to a depth of 4 feet vertical.

3. Numerous lines have been encountered within the confines of the excavation including a DCP 3” high pressure line. The lines traverse through all parts of the excavation.

4. All side walls of the excavation are below the regulatory threshold levels of 1,000 mg/kg chlorides. SP1 North has been excavated an additional 5ft to the north at a depth of 3ft.

5. The bottom of the excavation still has elevated levels of chlorides. A map showing the sample locations and analytical results along with a copy of the analysis is attached.

6. The presence of the lines has restricted further excavation due to safety concerns. Three (3) soils borings via hand auger were advanced within the bottom of the excavation to attempt to delineate the vertical extent of the impact. The chlorides were delineated at 17ft at SP1, 11ft at SP2, and 3ft at SP3. The results of the laboratory analysis of samples collected from the bottom of the soil borings are as follows:

Table 1
Hand Auger Vertical Delineation
Analytical Results

ID	Cl (mg/kg)	ID	Cl (mg/kg)	ID	Cl (mg/kg)
SP1 - 17’	816	SP2 - 11’	48	SP3 – 3’	<16.0

Field screening data using a YSI chloride probe and the laboratory analysis of the bottom of the soil borings is attached

Proposed Corrective Action

LINN is proposing an amendment to the corrective action to this site. The factors used to determine this corrective action include first the safety of all persons related to performing additional excavation within the site. In addition, based upon available data, groundwater in the area is believed to be in excess of 240 feet and the current depth of the excavation is of sufficient depth that vegetation should be able to be successfully established when the site restoration is complete. The corrective actions evaluated for the site (based upon the above) are presented as follows:

1. Backfill with clean compacted fill material to within 1.5 – 2 feet of surface then complete the backfill with compatible soil which is conducive to growing vegetation.

2. Apply a calcium amendment to the bottom of the excavation (gypsum) then backfill with clean compacted fill material to within 1.5 – 2 feet of surface then complete the backfill with compatible soil which is conducive to growing vegetation.

3. Irrigate the bottom of the excavation with freshwater until the chloride levels are under regulatory threshold levels for the bottom two feet of the excavation. This action was considered after reviewing the data associated with the Turner B Premier South Tank Battery Remediation where impacts within the bottom of the arroyo were effectively flushed vertically from the soils well below any established root zone. Once the irrigation is complete, the excavation will be backfilled with clean compacted fill material to within 1.5 – 2 feet of surface then complete the backfill with compatible soil which is conducive to growing vegetation.

4. Installation of a 20 mil polyethylene liner in the bottom of the excavation, then backfill with clean compacted fill material to within 1.5 – 2 feet of surface then complete the backfill with compatible soil which is conducive to growing vegetation.

After review of the above options, LINN believes, *the best approach is Option 2, utilizing the application of a calcium amendment to the bottom of the excavation (gypsum) then backfill with clean compacted fill material to within 1.5 – 2 feet of surface then complete the backfill with compatible soil which is conducive to growing vegetation*. Using gypsum will effectively ensure

that any residual chlorides in the bottom of the excavation will migrate further vertically and not cause any adverse impact to the reclamation of the site.

As noted in the stipulations from the BLM, the reclamation of the site with regards to contouring and vegetation of the site will still apply.

Thank you for your assistance on this matter. Also, attached is the initial C-141 for your reference. Should you have any questions, require additional information, or have any additional stipulations for this site, please contact Mr. Brian Wall at (575) 738-1739 (Office) or via email at bwall@linnenergy.com or myself at (432) 563-2200 (office) or via email at kit@etechenv.com.

Respectfully:

Kit Prichard
Environmental Professional

cc: Jeff Robertson, BLM Carlsbad District Office

Etech Environmental Safety Solutions, Inc.

Chloride Probe Field Analysis Sheet

Client: LINN

Site: Barclay Federal 20 **Project Number:** 253-4581-010

Technican: Abe Friesen **Contaminant:** Chlorides

Instrument: YSI PRO 1030 **Model/SN:** PRO 1030 / 114100517

Calibration Checks Good: ☑ Yes ☐ No **Claibration Standard:** 250

Date	Sample I.D.	Milliliters of Sample Used	Dilution	Reading (mg/kg)	Final Result (mg/kg)	Notations
06/26/14	SP1 Bottom 6'	10	5.00	820.00	**4,100.00**	
06/26/14	SP1 Bottom 9'	10	5.00			to high to read
07/21/14	SP1 Bottom 14'	10	5.00	304.00	**1,520.00**	
07/21/14	SP1 Bottom 15'	10	5.00	210.00	**1,050.00**	
07/21/14	SP1 Bottom 17'	10	5.00	136.00	**680.00**	
06/26/14	SP2 Bottom 6'	10	5.00	447.00	**2,235.00**	
07/21/00	SP2 Bottom 11'	10	5.00	0.00	**<16.0**	
		10	5.00			
06/26/14	SP3 Bottom 6'	10	5.00	22.00	**110.00**	
		10	5.00			
07/21/14	SP1 North 6'	10	5.00	0.00	**<16.0**	
06/27/14	SP1 South 6'	10	5.00	72.00	**360.00**	
06/27/14	SP1 West 6'	10	5.00	2.00	**10.00**	
		10	5.00			
06/27/14	SP2 North 6'	10	5.00	8.00	**40.00**	
06/27/14	SP2 South 6'	10	5.00	2.00	**10.00**	
		10	5.00			
06/27/14	SP3 North 6'	10	5.00	5.00	**25.00**	
06/27/14	SP3 South 6'	10	5.00	2.00	**10.00**	
06/27/14	SP3 East 6'	10	5.00	9.80	**49.00**	
		10	5.00			
		10	5.00			
		10	5.00			
		10	5.00			
		10	5.00			
		10	5.00			
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