AP - 089

STAGE 1 WORKPLAN

7/09/2008

AP089

Highlander Environmental Corp.

Midland, Texas

Stage 1 Abatement Plan
OXY, USA, Inc.
State L-2 Tank Battery
Section 2, T10S, R33E
Lea County, New Mexico
NMOCD AP089

July 9, 2008

1.0 EXECUTIVE SUMMARY

As part of a due diligence assessment for Pogo Producing Company (Pogo), this site, formerly operated by Latigo Petroleum, Inc., was inspected by Highlander Environmental Corp. of Midland, Texas. Prior to Highlander's inspection, Allstate Environmental Services, LLC had performed an investigation and excavation at this facility. An area measuring 75' x 126' was excavated to a depth of 5' bgs and a clay cap was installed and the excavation backfilled. The site location is shown on Figures 1 and 2.

Based upon the boring and sampling data, Allstate supervised the placement of a 2-inch monitor well to a total depth of 45'. Groundwater was encountered at approximately 38 feet below ground surface. On September 9, 2006 and May 15, 2007, Highlander purged and sampled the well per New Mexico Oil Conservation Division (NMOCD) guidelines for analyses of chlorides and BTEX. Chloride and benzene concentrations exceeded New Mexico Water Quality Control Commission (NMWQCC) standards. The well location has not been surveyed at this time. The analytical results are shown in Table 3.

On June 25, 2007, the Director of the (NMOCD), Environmental Bureau was notified in writing of groundwater impact at the above-referenced site in accordance with NM Rule 116. In order to further delineate the site, additional monitor wells were installed. During this time Plains Exploration & Production Company (PXP) purchased Pogo. In March 2008, OXY assumed operating responsibility for this site from PXP.

2.0 BACKGROUND & PREVIOUS WORK

Highlander Environmental Corp. (Highlander) performed a limited subsurface investigation at the Latigo State L Tank Battery, Section 22, Township 22 South, Range 37 East, Lea County, New Mexico. Prior to Highlander's inspection, Allstate Environmental Services,

LLC had performed an investigation and excavation at this facility. An area measuring 75' x 126' was excavated to a depth of 5' bgs and a clay cap was installed and the excavation backfilled. The site location is shown on Figures 1 and 2.

Based upon the boring and sampling data, Allstate supervised the placement of a 2-inch monitor well to a total depth of 45'. Groundwater was encountered at approximately 38 feet below ground surface. On September 9, 2006 and May 15, 2007, Highlander purged and sampled the well per New Mexico Oil Conservation Division (NMOCD) guidelines for analyses of chlorides and BTEX. Chloride and benzene concentrations exceeded New Mexico Water Quality Control Commission (NMWQCC) standards. The well location has not been surveyed at this time. The analytical results are shown in Table 3. On June 25, 2007, the Director of the (NMOCD), Environmental Bureau was notified in writing of groundwater impact at the above-referenced site in accordance with NM Rule 116. The analytical results are shown in Table 3.

3.0 GEOLOGY & HYDROGEOLOGY

3.1 Regional and Local Geology

According to the *Geologic Atlas of Texas Brownfield Sheet* (1974), the site is comprised of windblown sand. The sands are dark brown to grayish brown and occur in sheets locally in the form of cover sand, dunes and dune ridges. The sands are derived from lacustrine, fluviatile, and eolian deposits. Dune and dune ridges comprised of light brown to reddish sand overly the windblown sands in the western part of the area. These sands are mostly derived from the Gatuna Formation and average in thickness from 5 to 10 feet.

3.2 Regional and Local Hydrogeology

The primary aquifer in this area is the Ogallala Formation. The Ogallala Formation consists primarily of unconsolidated sand, silt, clay and gravel. Recharge to the Ogallala Formation occurs through infiltration of rainfall and snowmelt. Discharge occurs principally through pumping from wells.

The regional flow direction for groundwater in the High Plains aquifer is primarily to the south-southeast. The depth to water at the site is approximately 38' bgs.

3.3 Water Well Inventory

Highlander performed an internet search of the New Mexico Office of the State Engineer (OSE) and the United States Geologic Survey (USGS) databases for water wells within a ½ mile radius of the subject site.

The New Mexico State Engineer Office W.A.T.E.R.S. database did not show any wells in the vicinity of this site. The USGS database showed wells in Sections 12, 13 and 14, Township 10 South, Range 33 East, with average depths to water

ranging from 33' to 39'. Based on the monitor well installed at the Site the depth to groundwater at the Site is approximately 38.0' below surface. The water well inventory data sheet is included in Appendix A.

4.0 SUBSURFACE SOILS

The soils in the vicinity of this site are loamy fine sands of the Tivoli-Brownfield complex. Tivoli fine sands make up about 50% and Brownfield fine sand 40%. Tivoli fine sands are light yellow to pale brown fine sands to a depth of 60 inches. Brownfield fine sands are light brown to brown fine sands to 22 inches, underlain by red sandy clay loam.

5.0 GROUNDWATER QUALITY

5.1 Installation of Additional Monitor Wells

Additional monitor wells will be required at this facility to further delineate the source and extent of groundwater impact. One additional monitor well, as required in the April 25, 2008 NMOCD letter, will be installed with the screened interval placed entirely below the water table. If the sampling data indicate the necessity for additional monitor wells, they will be installed accordingly, to complete delineation.

5.2 Monitoring Program

The original monitoring well, MW-1, was sampled on September 6, 2006 and May 15, 2007. The well has not yet been surveyed. Once surveyed, the monitor well will be inspected prior to sampling. Quarterly sampling will commence in the third quarter of 2008 and continue until further notice.

5.3 Hydrocarbons in Groundwater

Traces of BTEX have been observed in MW-1, with benzene concentrations exceeding the NMWQCC standards.

5.4 Other Constituents of Concern

The initial chloride concentration in MW-1 was 6,060 mg/l, which increased to 12,700 mg/L in the May 2007 sampling event.

6.0 CONCLUSIONS

The extent of chloride impact in the groundwater has been not defined at this site, and benzene concentrations currently exceed the WQCC standards. There does not appear to be any receptors in close proximity to this site. Quarterly groundwater gauging and sampling will

commence in the third quarter of 2008. Additional monitor wells and soil borings will be required to define the extent of BTEX and chlorides in groundwater.

7.0 SOIL CORRECTIVE ACTION PLAN (CAP)

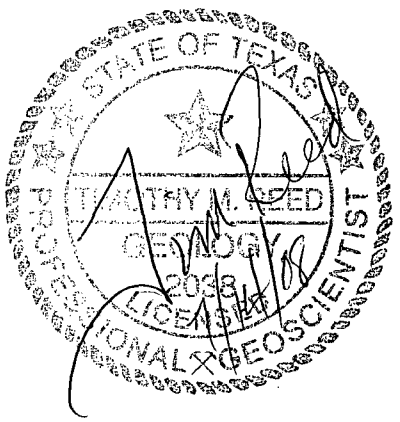
According to documentation supplied, the site soil impacts were excavated down to a depth of 5.0', the excavation capped with clay and the site backfilled. NMOCD records will be reviewed to confirm that the capping of the soils was approved and performed properly

8.0 QUALITY ASSURANCE/ QUALITY CONTROL

The monitor well appears to have been constructed to EPA and industry standards. The well was inspected for the presence of phase-separated hydrocarbons (PSH) and found not to contain any. The well was properly purged and sampled with a clean, dedicated, polyethylene bailer and disposable line. The groundwater samples were submitted to a laboratory for analysis of Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) by method EPA 8021B and chloride.

9.0 PROPOSED SCHEDULE OF ACTIVITIES

The monitor well will be surveyed and gauged. Quarterly sampling of the existing monitor well will be commenced and all results will be submitted in an annual summary report within the first quarter of 2009. As additional monitor wells are installed, they will be incorporated into the sampling program.



Respectfully submitted,
Highlander - Tetra Tech

Timothy M. Reed, P.G.
Senior Project Manager

cc: Daniel Sanchez-NMOCD
enclosures: figures, water well information, boring and completion logs, tables

FIGURES

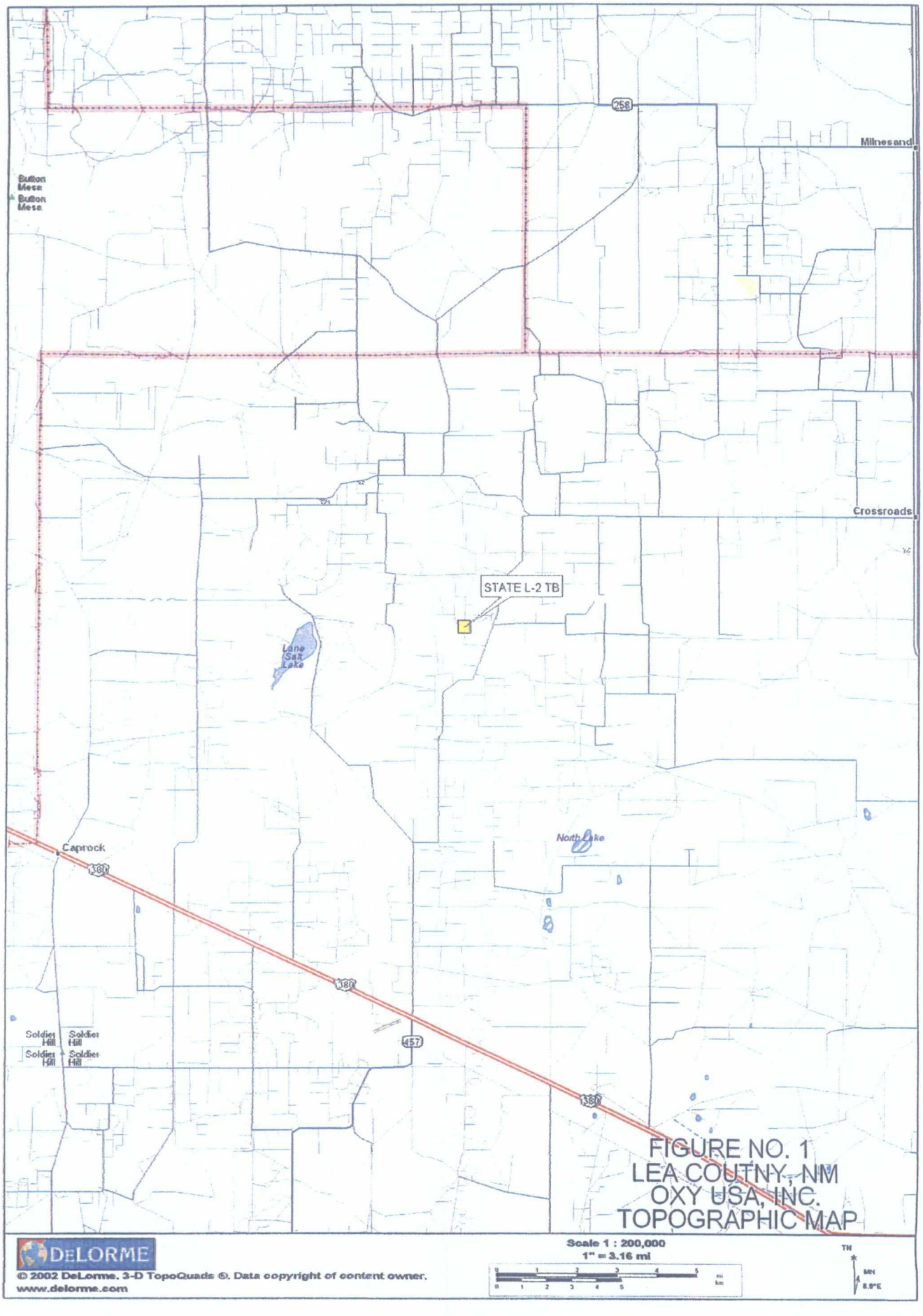


FIGURE NO. 1
LEA COUTNY, NM
OXY USA, INC.
TOPOGRAPHIC MAP

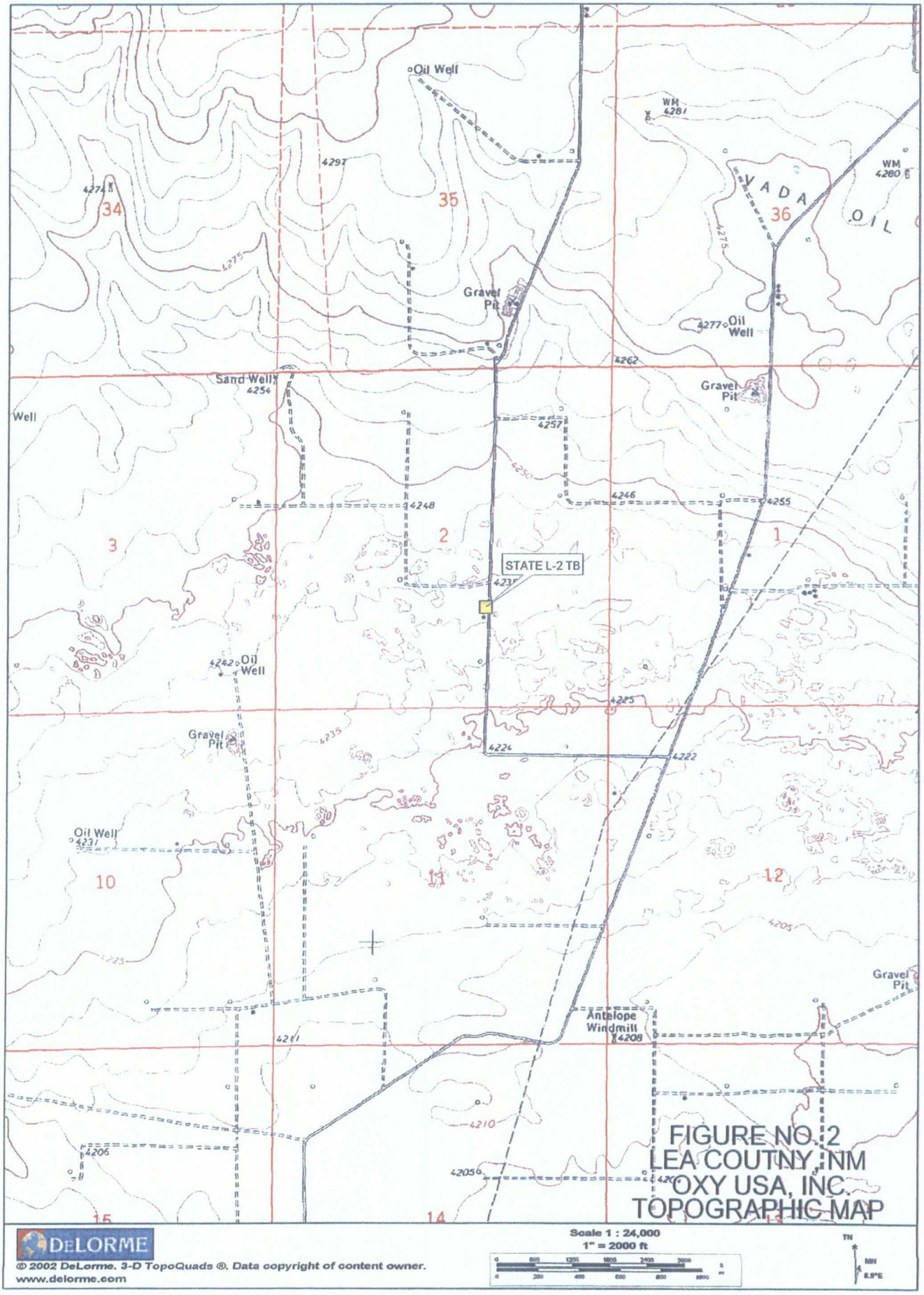
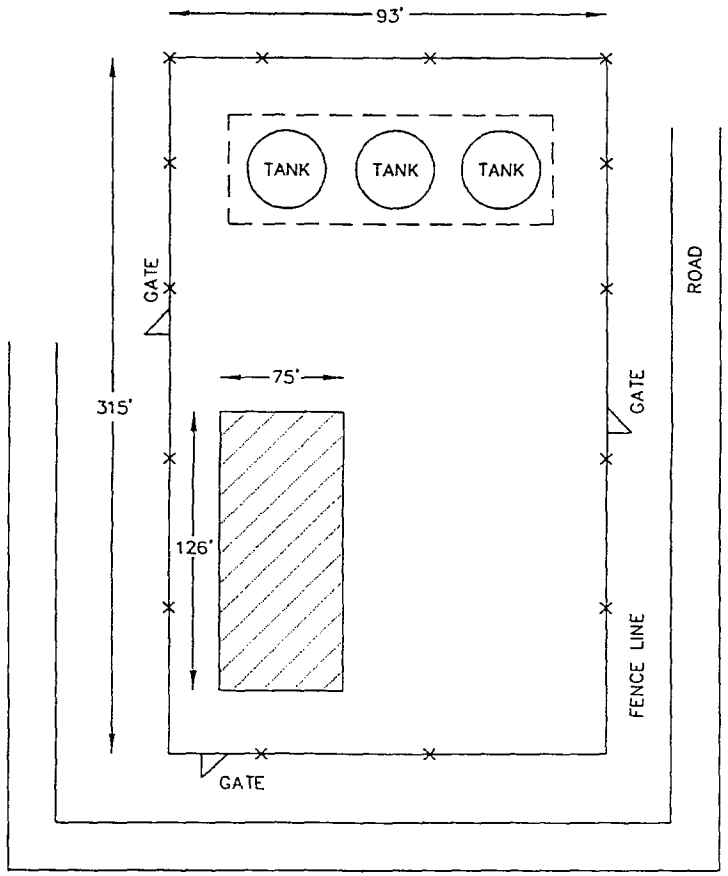


FIGURE NO. 2
LEA COUTNY, NM
OXY USA, INC.
TOPOGRAPHIC MAP



EXCAVATED & CAPPED AREA

NOTE: DRAWING TAKEN FROM AES PLAT DATED 1/27/06

NOT TO SCALE

FIGURE NO. 3

LEA COUNTY, NEW MEXICO

OXY USA, INC.
STATE L

DATE: 7/14/08
DWN. BY: RC
FILE: C:\POGO\2617\STATE L

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

TABLES

Table 1
Pogo Producing Company
STATE L TANK BATTERY
Lea County, New Mexico

Sample ID	Date Sampled	Sample Number	TPH (mg/kg)			Benzene (mg/L)	Toluene (mg/L)	Ethlybenzene (mg/L)	Xylene (mg/L)	Chloride (mg/L)
			C6-C12	C12-C35	Total					
MW-1	9/6/2006	102408	-	-	-	**0.524**	**0.849**	**0.273**	**1.26**	**6060**
	5/15/2007	124645	-	-	-	**0.043**	<0.001	**0.003**	<0.001	**12,700**

(-) not analyzed

APPENDIX A

Water Well Data
Average Depth to Groundwater (ft)
Oxy USA - State L-2 Tank Battery

9 South 32 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21 **39**	22	23	24 **69**
30	29	28	27	26	25
31	32	33	34	35	36

9 South 33 East

6 **54**	5	4	3	2	1
7	8 **63**	9	10	11	12
18	17 **57**	16	15	14 **40**	13
19	20	21 **184**	22	23 **30**	24
30	29 **54**	28 **49**	27	26	25
31	32	33	34 **30**	35	36 **42**

9 South 34 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17 **47**	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

10 South 32 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25 **44**
31	32	33 **54**	34	35	36

10 South 33 East

6	5	4	3	2 **Site**	1
7	8	9	10	11	12 **39**
18 **22**	17	16 **34**	15	14 **35**	13 **33**
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33 **33**	34	35	36

10 South 34 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20 **31**	21	22	23	24
30	29	28	27	26	25
31	32 **68**	33	34	35	36 **43**

88 New Mexico State Engineers Well Reports

105 USGS Well Reports

90 Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6)

Geology and Groundwater Resources of Eddy County, NM (Report 3)

34 NMOCD - Groundwater Data