SITE CLOSURE REPORT

LANGLEY GREER OIL #2

EPI REF: #160071

NMOCD: 1RP#1059

UL-D (NW¼ OF THE NW¼) OF SECTION 21, T 22 S, R 36 E

~8 MILES SOUTHWEST OF EUNICE,

LEA COUNTY, NEW MEXICO

LATITUDE: N 32° 22' 48.60" LONGITUDE: W 103° 16' 38.33"

JANUARY 2008

PREPARED BY:

ENVIRONMENTAL PLUS, INC.
2100 AVENUE O
EUNICE, NEW MEXICO 88231

PREPARED FOR:

Chesapeake

Distribution List

Site Closure Report

Langley Greer Oil #2

NMOCD Ref. 1RP#1059: EPI Ref. #160071

Name	Title	Company or Agency	Mailing Address	e-mail
Larry Johnson	Environmental Engineer	New Mexico Oil Conservation Division – Hobbs	1625 N. French Drive Hobbs, NM 88240	larry.johnson@state.nm.us
Bradley Blevins	Field Supervisor	Chesapeake Operating, Inc.	P.O. Box 190 Hobbs, NM 88240-0190	bblevins@chkenergy.com
Harlan Brown	Senior Environmental Representative	Chesapeake Operating, Inc.	6100 N. Western Avenue Oklahoma City, OK 73118	hbrown@chkenergy.com
Lowell Cypert	Property Owner	- -		
File	- -	Environmental Plus, Inc.	P.O. Box 1558 Eunice, NM 88231-1558	dduncan@envplus.net

STANDARD OF CARE

Site Closure Report

Langley Greer Oil #2

NMOCD Ref. 1RP #1059: EPI Ref. #160071

The information provided in this report was collected consistent with the New Mexico Oil Conservation Division (NMOCD) *Guidelines for Remediation of Leaks, Spills and Releases* (August 13, 1993), the NMOCD *Unlined Surface Impoundment Closure Guidelines* (February, 1993) and the Environmental Plus, Inc. (EPI) *Standard Operating Procedures and Quality Assurance/Quality Control Plan.* The conclusions are based on field observations and laboratory analytical reports as presented in the report. Recommendations follow NMOCD guidance and represent the professional opinions of EPI staff. These opinions were derived using currently accepted geologic, hydrogeologic and engineering practices at this time and location. The report was prepared or reviewed by a certified or registered professional with a background in engineering, environmental and/or natural sciences.

This report was prepared by:

Michael H. Stewart P.E., C.P.G
Geological Engineer

Date

This report was reviewed by:

David P. Duncan
Civil Engineer

Date

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1.0 PROJECT SYNOPSIS

Site Specific:

- ***Company Name:*** Chesapeake Operating, Inc.
- ***Facility Name:*** Langley Greer Oil #2
- ***Project Reference:*** NMOCD Ref. 1RP #1059: EPI Ref. #160071
- ***Company Contacts:*** Bradley Blevins
- ***Site Location:*** WGS84 N32° 22' 48.60"; W103° 16' 38.33"
- ***Legal Description:*** Unit Letter-D, (NW¼ of the NW¼), Section 21, T 22 S, R 36 E
- ***General Description:*** Approximately 8-miles southwest of Eunice, New Mexico
- ***Elevation:*** 3,535-ft amsl
- ***Land Ownership:*** Lowell Cypert
- ***EPI Personnel:*** Project Consultant – David Duncan
  Site Foreman – Sebastian Romero and Danny Deaton

Release Specific:

- ***Product Released:*** Produce water
- ***Volume Released:*** 90-bbl
- ***Volume Recovered:*** Zero (0)
- ***Time of Occurrence:*** Unknown
- ***Time of Discovery:*** September 24, 2006
- ***Release Source:*** Leak from a pipeline
- ***Initial Surface Area Affected:*** Release Area ~ 2,100-ft^2 ; Overspray Area none

Remediation Specific:

- ***Final Vertical extent of contamination:*** 13-feet below ground surface (bgs)
- ***Water wells within 1,000-ft:*** None
- ***Private domestic water sources within 200-ft:*** None
- ***Depth to Groundwater:*** ~180 feet bgs
- ***Surface water bodies within 1,000-ft:*** None
- ***NMOCD Site Ranking Index:*** Zero (0) points (>100-ft to top of water table)
- ***Remedial goals for Soil:*** TPH – 5,000 mg/Kg; BTEX – 50 mg/Kg; Benzene – 10 mg/Kg; Chloride residuals may not be capable of impacting groundwater above NMWQCC Ground Water Standards of 250 mg/L.
- ***RCRA Waste Classification:*** Exempt
- ***Remediation Option Selected:*** a) Excavated contaminated soil above NMOCD remedial goals to a depth of thirteen (13) with repository at a State approved disposal facility; b) advancement and sampling of soil borings with laboratory analyses documenting residual chloride concentrations of impacted soil above NMOCD remedial threshold goals; c) installation of 20-mil polyethylene liner in locations where residual soils exceed NMOCD remediation goals d) backfill excavation with caliche overlain with topsoil to original ground surface; e) graded area to promote natural drainage; and f) seeded disturbed area with a blend preferred by the property owner
- ***Disposal Facility:*** Sundance Services, Inc. (Eunice, NM)
- ***Volume disposed:*** ~ 582-yd^3
- ***Project Completion Date:*** January 29, 2007

2.0 SITE AND RELEASE INFORMATION

2.1 ***Describe the land use and pertinent geographic features within 1,000 feet of the site.***
The release site is located within the confines of an established oil field. Surrounding land is used for grazing purposes

2.2 ***Identify and describe the source or suspected source(s) of the release.***
An existing pipeline located near a tank battery leaked produced water onto the surface. Leak migrated approximately 150 feet along a narrow shallow depression (reference *Figure 3*)

2.3 ***What was the volume of the release? (if known):*** 90 ***barrels***

2.4 ***What was the volume recovered ? (if known)***: Zero (0) bbls recovered

2.5 ***When did the release occur? (if known):*** September 24, 2006

2.6 ***Geological Description***
United States Geological Survey (USGS) Ground-Water Report 6, *"Geology and Ground-Water Conditions in Southern Lea County, New Mexico" (A. Nicholson and A. Clebsch, 1961)* includes the site within its study boundaries. The release site is located in the Eunice physiographic subdivision, described by Nicholson & Clebsch as an area "underlain by a hard caliche surface and is almost entirely covered by reddish-brown dune sand." The thickness of the sand ranges from 2-5 feet in most areas to as much as 20-30 feet in drift areas.

Plate 1 from Nicholson and Clebsch shows that the release site underlain by the saturated Tertiary and Quaternary rocks of the High Plains Aquifer. Plate 1 shows the base of the High Plains Aquifer at approximately 3,275 feet amsl or approximately 260 feet of Tertiary deposits. The site lies outside the boundaries of the recent alluvium associated with Monument Draw.

2.7 ***Ecological Description***
The area is typical of the Upper Chihuahuan Desert Biome consisting primarily of sandy soil covered with short semi-arid grasses, interspersed with Honey Mesquite, annual and perennial forbs. Mammals represented include Orrd's and Merriam's Kangaroo Rats, Deer Mouse, White Throated Wood Rat, Cottontail Rabbit, Black Tailed Jackrabbit, Mule Deer, Bobcat, Red Fox and Coyote. Reptiles, amphibians and birds are numerous and typical of the area. A survey of *Listed*, *Threatened* or *Endangered* species was not conducted.

2.8 ***Area Groundwater***
Perched groundwater was not encountered during the advancement of SB-1 (38-ft bgs), SB-2 (24-ft bgs), SB-3 (24-ft bgs) and SB-4 (52-ft bgs). The uppermost groundwater at this site is projected to be ~198-ft bgs based on water depth data obtained from the New Mexico State Engineers Office and United States Geological Survey (USGS) data base (reference *Table 1*). Nelson and Clebsch shown potentiometric surface of water in the High Plains aquifer at 3,355 feet amsl or approximately 180 feet bgs a value which agrees well with the USGS database.

2.9 Area Water Wells

No public water supply wells, private, domestic fresh water wells or springs used by less than five (5) households for domestic or stock watering purposes exist within 1,000-feet of the release site. However, one (1) permitted well is located within one (1) mile radius of the release site (reference *Figure 2* and *Table1*). The depth to water in this well was measured at 170 feet bgs. This well is listed as a stock watering well with no structures at the reported location based upon examination of satellite imagery from Google Earth

2.10 Area Surface Water Features

No surface water features exist within 1,000- feet of the release site (reference *Figure 2*).

3.0 NMOCD SITE RANKING

Contaminant delineation and remedial work completed at this site indicate that the chemical parameters of the residual soil and the hydraulic separation of the groundwater from the surface impacts were consistent with the characterization and remediation/abatement goals and objectives set forth in the following New Mexico Oil Conservation Division (NMOCD) publications:

- ***Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993)***
- ***Unlined Surface Impoundment Closure Guidelines (February, 1993)***
- ***Pit and Below-Grade Tank Guidelines (November, 2004)***

Acceptable thresholds for contaminants/constituents of concern (CoC) were determined based on the NMOCD Ranking Criteria as follows:

- *Depth to Groundwater (i.e., distance from the lower most acceptable concentration to groundwater);*
- *Wellhead Protection Area (i.e., distance from fresh water supply wells);*
- *Distance to Surface Water Body (i.e., horizontal distance to all down gradient surface water bodies).*

Based on the distance of the site from permitted area water wells, surface water bodies, and depth to groundwater from the lower most contamination, the NMOCD ranking score for the site is Zero (0) points with the soil remedial goals highlighted in the Site Ranking table presented below:

1. GROUNDWATER	2. WELLHEAD PROTECTION AREA	3. DISTANCE TO SURFACE WATER
Depth to GW <50 feet: 20 points	If <1,000' from water source, or <200' from private domestic water source: *20 points*	<200 horizontal feet: *0 points*
Depth to GW 50 to 99 feet: *10 points*		200-1,000 horizontal feet: *10 points*
Depth to GW >100 feet: 0 points	If >1,000' from water source, or >200' from private domestic water source: *0 points*	>1,000 horizontal feet: *0 points*
Site Rank (1+2+3) = 0 + 0 + 0 = 0 points		

Total Site Ranking Score and Acceptable Remedial Goal Concentrations			
Site Ranking	20 or >	10	0
Benzene[1]	10 ppm	10 ppm	10 ppm
BTEX[1]	50 ppm	50 ppm	50 ppm
TPH	100 ppm	1,000 ppm	5,000 ppm

[1] A field soil vapor headspace measurement of 100 ppm can be substituted in lieu of laboratory analyses for benzene and BTEX.

4.0 EXCAVATED SOIL INFORMATION

4.1 ***Was soil excavated for off-site treatment or disposal?*** ☒ *Yes* ☐ *No*

Date excavated: September 26, 2006 through January 24, 2007

Total volume removed: ~582 cubic yards

4.2 ***Indicated soil treatment type:***

- ☒ ***Disposal***
- ☐ ***Land Treatment***
- ☐ ***Composting/Biopiling***
- ☐ ***Other*** ( )

Name and location of treatment/disposal facility:
Sundance Services, Inc.
P.O. Box 1737
Eunice, NM 88231

5.0 SAMPLING INFORMATION

5.1 Briefly describe the field screening methods used to distinguish contaminated from uncontaminated soil.

Organic Vapor Concentrations – A Photoionization Detector (PID) was not used during field soil sampling events as the release constituted brine water.

Chloride Concentrations – A LaMotte Chloride Test Kit (Titration Method) was utilized for field analyses of chloride concentration.

5.2 Briefly describe the soil analytical sampling and handling procedures used.

Soil samples were collected during characterization activities by advancing four (4) soil borings utilizing a hollow core drill. Soil samples were collected initially at eight (8) feet bgs as the boreholes were advanced from bottom of the excavated area. Sampling continued generally on five (5) foot increments thereafter to respective total depths (TD) as shown in *Table 2*.

Upon collecting each soil sample, a portion was immediately put into an approved sample container, labeled and placed on ice for submittal to an independent laboratory under standard Chain-of-Custody protocol for quantification of chloride and sulfate concentrations. The uppermost two (2) soil samples from each soil boring were also analyzed for total petroleum hydrocarbons (TPH) in the gasoline, diesel and oil ranges as well as benzene, toluene, ethylbenzene and total xylenes (BTEX). Remaining portions of each soil sample were analyzed in the field for chlorides utilizing methods described in Section 5.0, ***Sampling Information***, Subsection 5.1.

5.3 Discuss sample locations and provide rationale for their locations.

Four (4) soil borings were advanced within the confines of the release site between September 29, 2006 and October 4, 2006. The borings were advanced following initial excavation activities. Total depths of the borings were: SB-1 (38-ft bgs), SB-2 (24-ft bgs), SB-3 (24-ft bgs) and SB-4 (52-ft bgs). Soil boring locations were chosen at locations which demonstrated elevated chloride concentrations (reference *Figure 4*).

Soil sampling results indicated chloride concentrations above regulatory threshold goal of 250 mg/kg extended deeper than practicable excavation within the limited areas. Soil samples collected in the easterly and westerly sectors of the excavation bottom demonstrated high levels of chloride concentrations (reference *Table 3*). Chesapeake received permission from the NMOCD on January 18, 2007 to install 20-mil polyethylene liner in these areas to abate downward migration of residual chlorides.

6.0 ANALYTICAL RESULTS

6.1 Describe the vertical and horizontal extent and magnitude of soil contamination.

The 8-foot and 13-foot soil samples collected from borings SB-1, SB-2, SB-3 and SB-4 were submitted for analyses of BTEX and TPH [GRO (C6-C12), DRO (C12-C28) and ORO (C28-C35)]. None of the samples contained detectable concentrations of these constituents, *(reference Table 2).*

Chloride concentrations in mg/Kg are summarized in *Table #3* with samples exceeding the equivalent 250 mg/l remedial threshold goals highlighted in bold text.

As some impacted areas were excavated to a depth of thirteen (13) feet bgs soil samples at SB-1 and SB-3 indicate residual soils are at or near the remediation threshold goals. Chloride concentration in SB-2 attenuated to 170 mg/kg at twenty-three (23) feet bgs. Removing the overlying chloride mass, absence of free liquids, placement of the 20-mil polyethylene liners and placement of clean overburden material alleviates potential for substantial long term impacts at this location.

SB-4 soil samples collected nearest the release point contained elevated chloride concentrations to total depth of the soil boring (~52-feet bgs). Again, excavating to thirteen (13) feet bgs removed a substantial quantity of chloride mass. In addition, the source area is very limited in size (estimated at a maximum of 300 ft^2). More importantly, placement of polyethylene liners prevents long term infiltration of in situ chlorides to groundwater (~180-feet bgs).

Based upon the above information, EPI concludes residual chlorides present in soil will not elevate chloride concentrations in groundwater above NMWQCC Ground Water Standards.

6.2 Is surface soil contamination present at the site (i.e., soil in the uppermost two feet that is visibly stained, contaminated at greater than 10 ppm (PID) or hydrocarbon saturated)?

☐ *yes* ☒ *no*

If yes, attach a site map identifying extent(s) of surface soil contamination.

7.0 DISCUSSION

7.1 ***Discuss the risks associated with the remaining soil contamination:***

The possibility of groundwater contamination from chlorides is remote due to depth of groundwater (~180-ft bgs), dense caliche formation overlaying groundwater bearing strata and installation of polyethylene liners in the excavation bottom.

Measurable concentrations of hydrocarbon constituents were not present in soils within the excavated area and pose minimal potential of impacting groundwater.

7.2 ***Discuss the risks associated with the impacted groundwater:*** Not applicable

7.3 ***Discuss other concerns not mentioned above:*** Not applicable

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 ***Recommendation for the site:***

- ☒ *Site Closure*
- ☐ *Additional Groundwater Monitoring*
- ☐ *Corrective Action*

8.2 ***Base the recommendation above on Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993). Describe below how you applied the policy to support your recommendation. If closure is recommended, please summarize significant site investigative events and describe how site-specific risk issues have been adequately addressed or minimized to acceptable low risk levels.***

Chloride impacted soil above NMOCD remedial thresholds were excavated to a depth of thirteen (13) feet bgs. Hydrocarbon constituents were not detected in soil samples. Residual chlorides above 250 mg/kg remediation threshold goal are present. However, they are hydraulically isolated by a thick layer of dense caliche extending from bottom of excavation to groundwater depth of 180-feet bgs.

Soil impacted above the NMOCD remedial thresholds goals was disposed at Sundance Services, Inc., (Eunice, New Mexico).

In accordance with Chesapeake Operating, Inc., specifications, polyethylene liners were installed in the excavation bottom in areas where chloride remediation threshold goals were exceeded. Installation of polyethylene liners effectively removed potential for water infiltration and transportation of chlorides deeper into subsurface strata.

8.3 ***If additional groundwater and monitoring is recommended, indicate the proposed monitoring schedule and frequency. Conduct quarterly monitoring until the NMOCD responds to this report.*** Not applicable

8.4 ***If corrective action is recommended, provide a conceptual approach.*** Not applicable

FIGURES

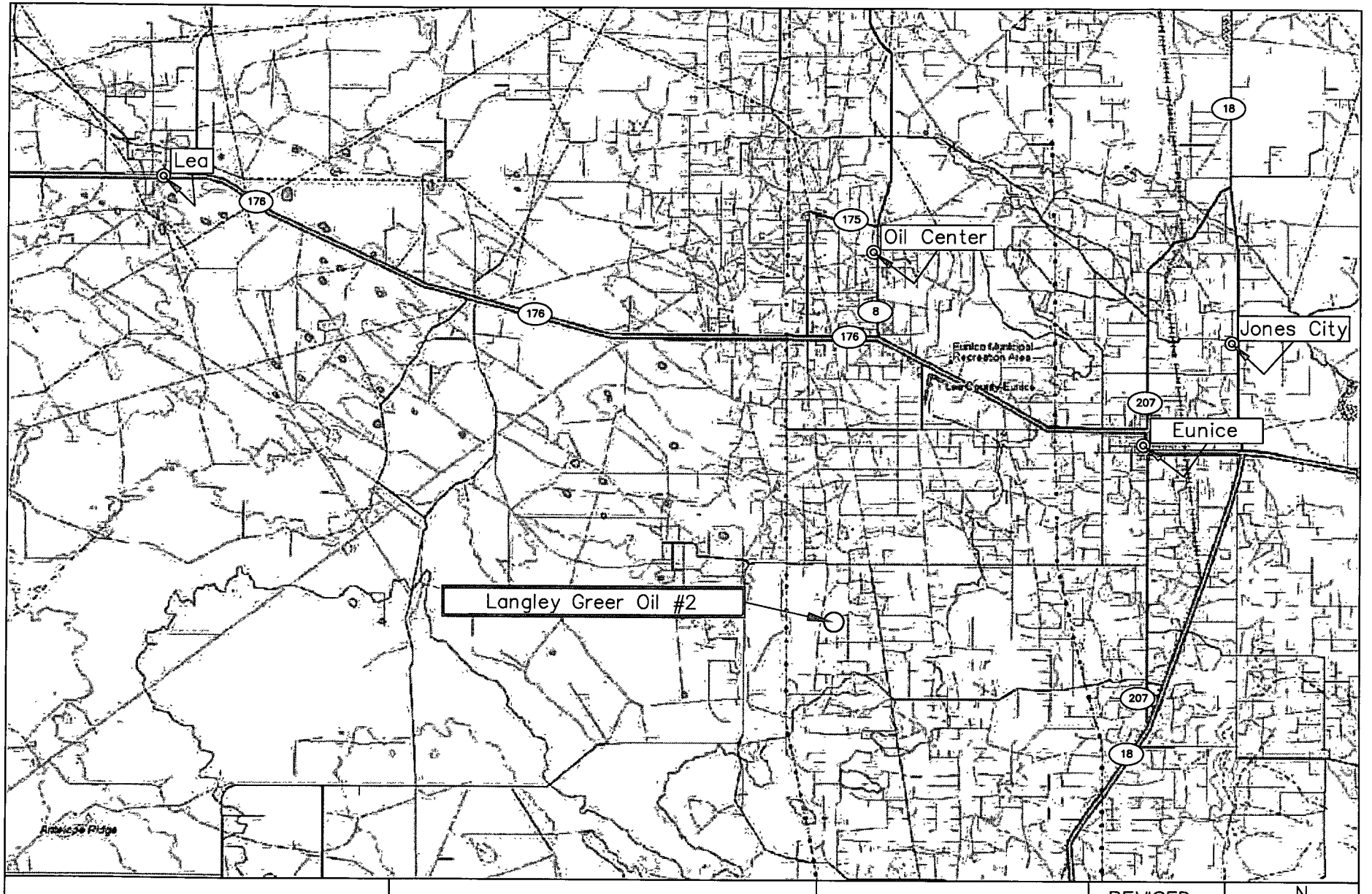


Figure 1 Area Map Chesapeake Energy Langley Greer Oil #2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 21, T22S, R36E N 32° 22' 48.60" W 103° 16' 38.33" Elevation: 3,535 feet amsl	DWG By: Daniel Dominguez September 2006	REVISED:	N
		0 3 6 Miles	SHEET 1 of 1	

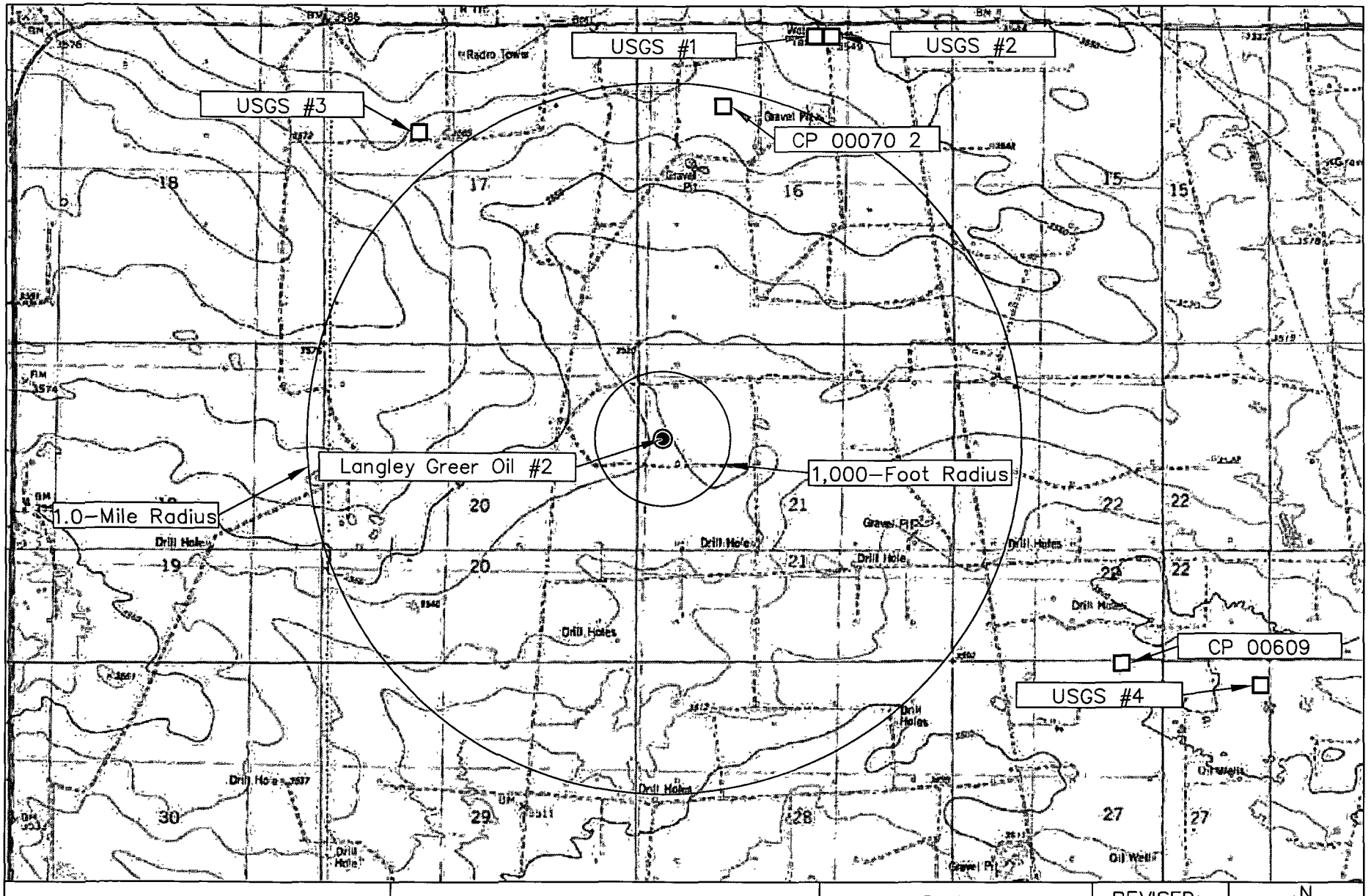


Figure 2
Site Map
Chesapeake Energy
Langley Greer Oil #2

Lea County, New Mexico
NW 1/4 of the NW 1/4, Sec. 21, T22S, R36E
N 32° 22' 48.60" W 103° 16' 38.33"
Elevation: 3,535 feet amsl

DWG By: Daniel Dominguez
September 2006

REVISED:

SHEET
1 of 1

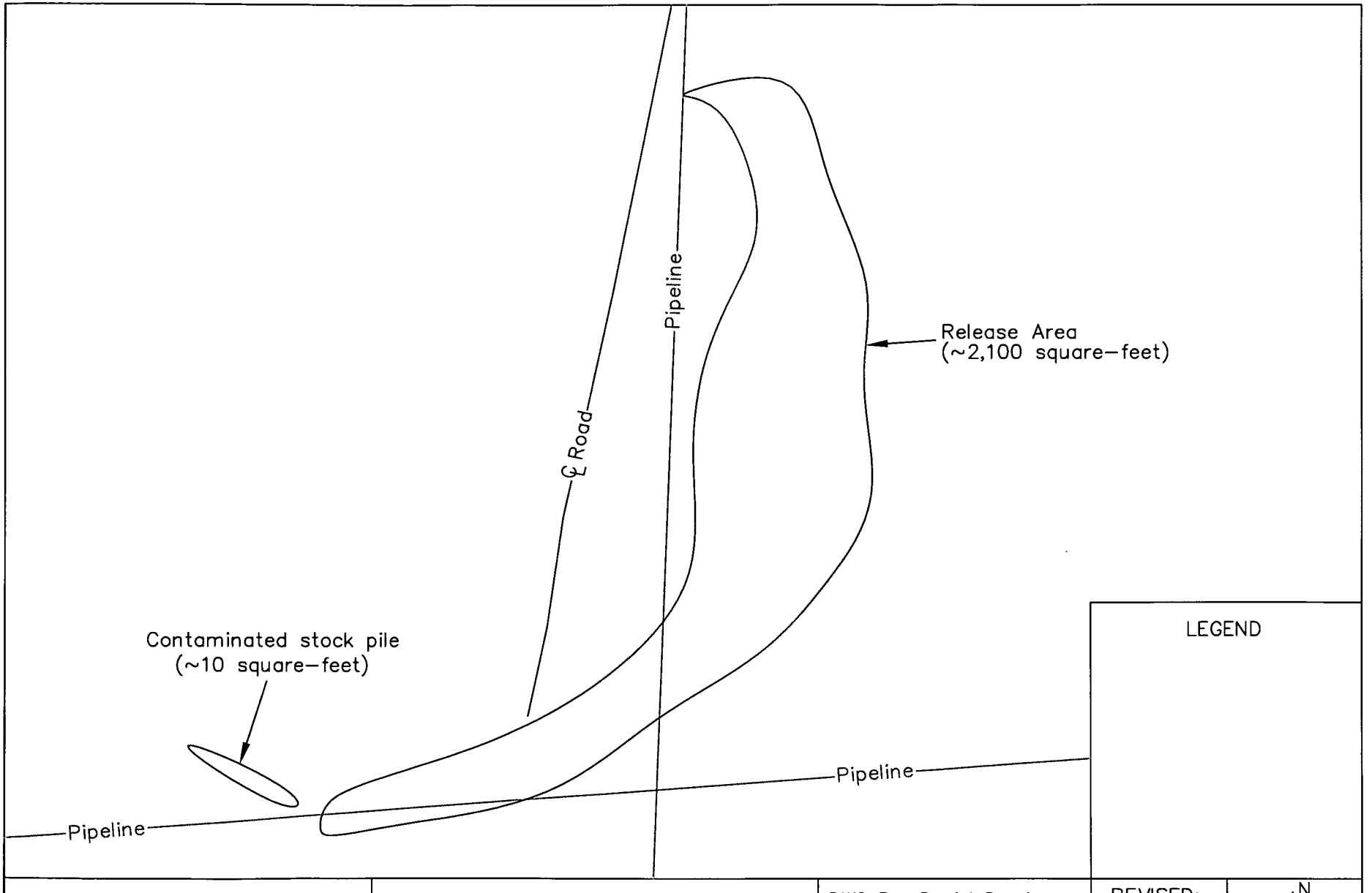


Figure 3 Site Map Chesapeake Energy Langley Greer Oil #2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 21, T22S, R36E N 32° 22' 48.60" W 103° 16' 38.33" Elevation: 3,535 feet amsl	DWG By: Daniel Dominguez September 2006	REVISED:	N
		0 20 40 Feet	SHEET 1 of 1	

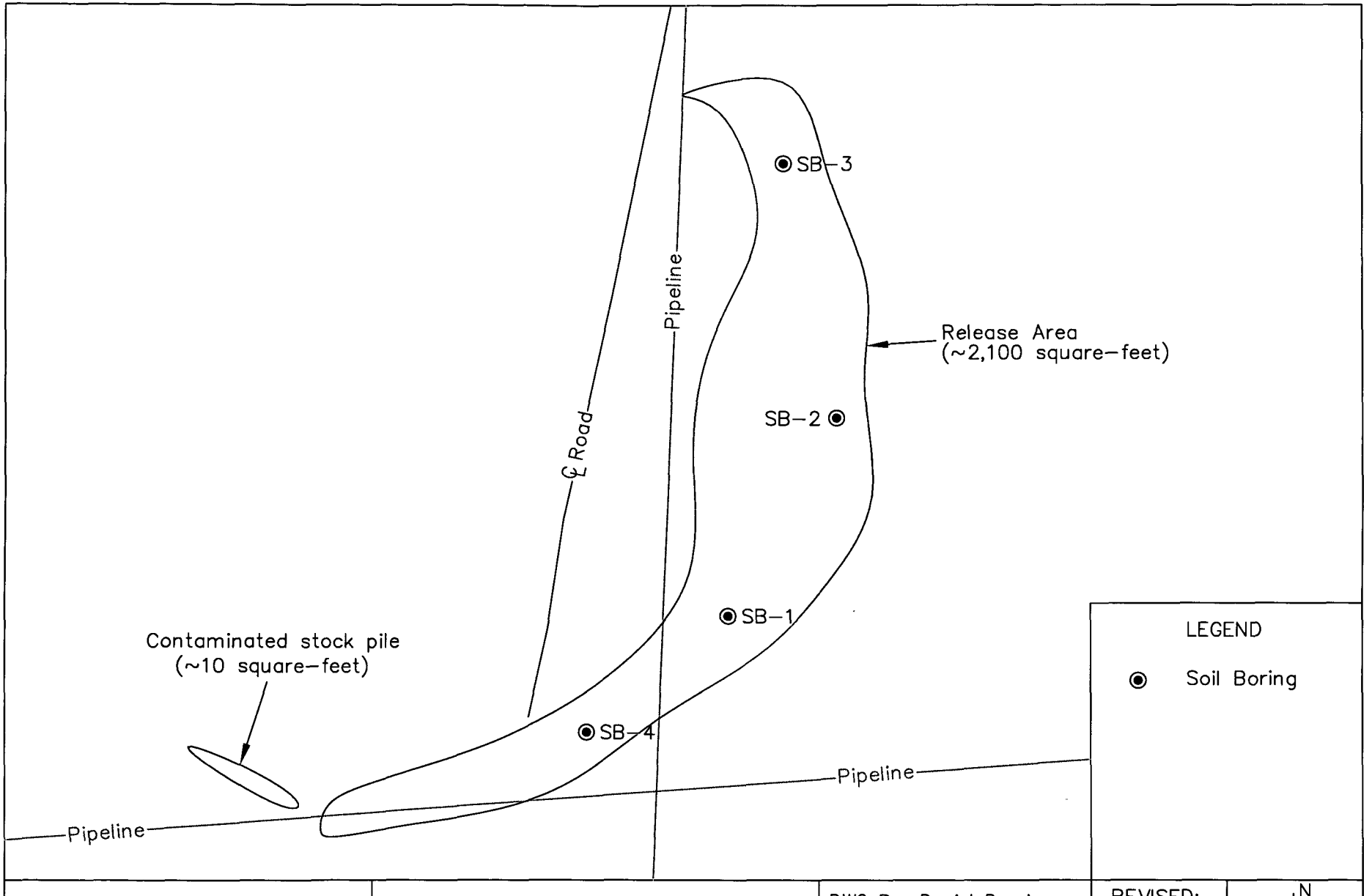


Figure 4 Soil Boring Map Chesapeake Energy Langley Greer Oil #2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 21, T22S, R36E N 32° 22' 48.60" W 103° 16' 38.33" Elevation: 3,535 feet amsl	DWG By: Daniel Dominguez September 2006	REVISED: Nov. 2006	N
		0 20 40 Feet	SHEET 1 of 1	

TABLES

TABLE 1

Well Data

Chesapeake Energy - Langley Greer Oil #2 (Ref. # 160071)

Well Number	Diversion[A]	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Measured	Surface Elevation[B]	Depth to Water (ft bgs)
CP 00070 2	3	MCVAY DRILLING CO.	STK	22S	36E	16 1 2 2	N32° 23' 42.95"	W103° 16' 26.28"	05-Oct-72	3,565	170
CP 00609	3	U. R CATTLE COMPANY	DOM	22S	36E	22 4 3 1	N32° 22' 11 77"	W103° 15' 9.23"	28-Jun-80	3,507	22
USGS #1				22S	36E	16 2 1 1			15-Feb-96	3,549	175 28
USGS #2				22S	36E	16 2 1 1			07-Mar-86	3,549	174.09
USGS #3				22S	36E	17 1 4 1			03-Dec-70	3,565	484.06
USGS #4				22S	36E	27 2 2 2			21-Jan-76	3,495	166 68
CP 00575	3	MILLARD DECK	STK	22S	36E	27 4 3	N32° 21' 19.49"	W103° 15' 9.39"	13-Nov-78	3,507	160
USGS #5				22S	36E	27 4 4 4			21-Feb-96	3,516	188.39

[A] = in acre feet per annum

[B] = Elevation interpolated from USGS topographical map based on referenced location

STK = 72-12-1 Livestock watering

DOM = 72-12-1 Domestic one household

quarters are 1=NW, 2=NE, 3=SW, 4=SE; quarters are biggest to smallest

Shaded areas indicate wells not shown on Figure 2

TABLE 2

Summary of Soil Boring Field Analyses and Laboratory Analytical Results

Chesapeake Operating - Langley Greer Oil #2 (Ref.# 160071)

Sample ID	Depth (feet)	Soil Status	Sample Date	PID Reading (ppm)	Field Chloride (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	Carbon Ranges C6-C12 (mg/Kg)	Carbon Ranges C12-C28 (mg/Kg)	Carbon Ranges C28-C35 (mg/Kg)	TPH (mg/Kg)	Sulfate (mg/Kg)	Chloride (mg/Kg)
SB-1	8	In situ	29-Sep-06	--	4,000	<0 0250	<0 0250	<0 0250	<0.050	<0 125	<10 0	<10.0	<10 0	<30.0	546	**3,230**
SB-1	13	In situ	29-Sep-06	--	1,680	<0.0250	<0 0250	<0 0250	<0.050	<0 125	<10 0	<10 0	<10 0	<30.0	232	**1,300**
SB - 1	18	In situ	29-Sep-06	--	1,200	--	--	--	--	--	--	--	--	--	62 8	162
SB-1	23	In situ	29-Sep-06	--	880	--	--	--	--	--	--	--	--	--	**639**	**286**
SB-1	28	In situ	13-Oct-06	--	400	--	--	--	--	--	--	--	--	--	154	225
SB-1	33	In situ	03-Oct-06	--	240	--	--	--	--	--	--	--	--	--	135	168
SB-1	38	In situ	03-Oct-06	--	240	--	--	--	--	--	--	--	--	--	118	94 3
SB-2	8	In situ	03-Oct-06	--	3,440	<0.0250	<0.0250	<0 0250	<0 050	<0 125	<10 0	<10 0	<10 0	<30 0	**2640**	**3,040**
SB-2	13	In situ	03-Oct-06	--	2,960	<0 0250	<0.0250	<0 0250	<0.050	<0 125	<10 0	<10 0	<10.0	<30 0	345	**3,380**
SB-2	18	In situ	03-Oct-06	--	3,200	--	--	--	--	--	--	--	--	--	162	**3,320**
SB-2	23	In situ	03-Oct-06	--	400	--	--	--	--	--	--	--	--	--	51 8	170
SB-3	8	In situ	03-Oct-06	--	200	<0.0250	<0 0250	<0 0250	<0.050	<0 125	<10 0	<10 0	<10 0	<30 0	12 7	8 50
SB-3	13	In situ	03-Oct-06	--	160	<0 0250	<0 0250	<0 0250	<0 050	<0 125	<10 0	<10 0	<10 0	<30 0	14 8	J[2 26]
SB-4	8	In situ	03-Oct-06	--	4,000+	<0 0250	<0 0250	<0 0250	<0 050	<0.0125	<10.0	<10.0	<10 0	<30.0	356	**9,540**
SB-4	13	In situ	03-Oct-06	--	4,000+	<0 0250	<0 0250	<0 0250	<0 050	<0 125	<10 0	<10.0	<10 0	<30 0	362	**10,100**
SB-4	18	In situ	03-Oct-06	--	4,000	--	--	--	--	--	--	--	--	--	193	**8,070**
SB-4	23	In situ	04-Oct-06	--	4,000+	--	--	--	--	--	--	--	--	--	200	**5,680**
SB-4	28	In situ	04-Oct-06	--	4,000+	--	--	--	--	--	--	--	--	--	219	**6,730**
SB-4	33	In situ	04-Oct-06	--	4,000+	--	--	--	--	--	--	--	--	--	164	**5,310**
SB-4	38	In situ	04-Oct-06	--	4,000+	--	--	--	--	--	--	--	--	--	166	**4,360**
SB-4	43	In situ	04-Oct-06	--	4,000+	--	--	--	--	--	--	--	--	--	180	**4,890**
SB-4	48	In situ	04-Oct-06	--	1,200	--	--	--	--	--	--	--	--	--	193	**1,080**
SB-4	52	In situ	04-Oct-06	--	1,200	--	--	--	--	--	--	--	--	--	160	**946**
NMOCD Remedial Thresholds				100		10				50				5,000	600	250

-- = Not Analyzed

***Bold** values are in excess of NMOCD Remediation Threshold Goals*

TABLE 3

Summary of Soil Sample Laboratory Analytical Results

Chesapeake Operating - Langley Greer Oil #2 (Ref.# 160071)

Sample ID	Depth (feet)	Soil Status	Sample Date	PID Reading (ppm)	Field Chloride (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	Carbon Ranges C6-C12 (mg/Kg)	Carbon Ranges C12-C28 (mg/Kg)	Carbon Ranges C28-C35 (mg/Kg)	TPH (mg/Kg)	Chloride (mg/Kg)
EBH (13')	13	In situ	04-Jan-07	--	--	--	--	--	--	--	--	--	--	--	**6,718**
WBH (13')	13	In situ	04-Jan-07	--	--	--	--	--	--	--	--	--	--	--	**10,117**
NMOCD Remedial Thresholds				**100**		**10**				**50**				**5,000**	***250**

-- = Not Analyzed

***Bold** values are in excess of NMOCD Remediation Threshold Goals*

**Chloride residuals may not be capable of impacting local groundwater above NMWQCC Groundwater Standards of 250 mg/L*

APPENDICES

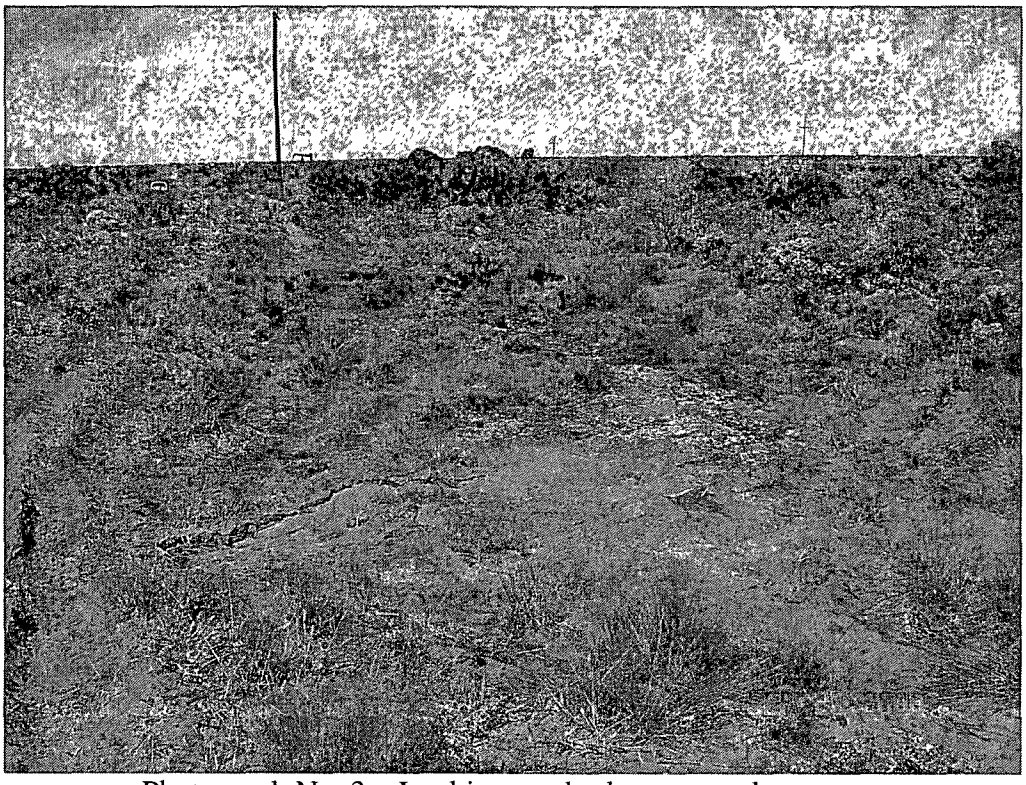
APPENDIX I

LABORATORY ANALYTICAL REPORTS
AND
CHAIN-OF-CUSTODY FORM

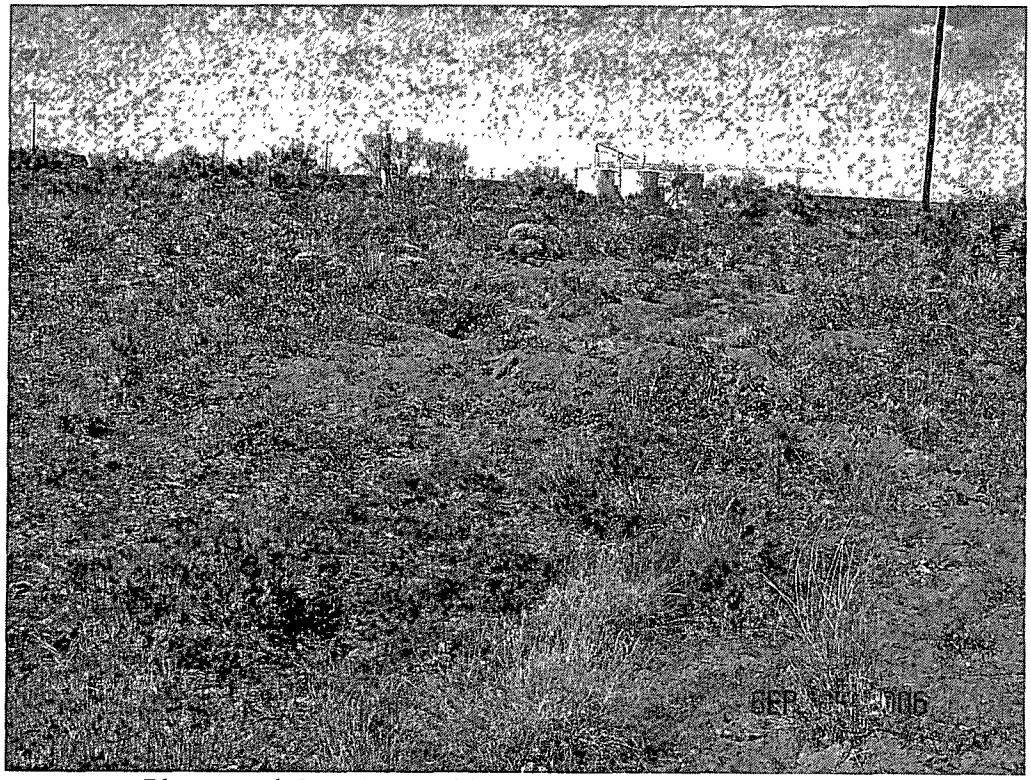
ANALYTICAL DATA INCLUDED ON ATTATCHED CD

APPENDIX II

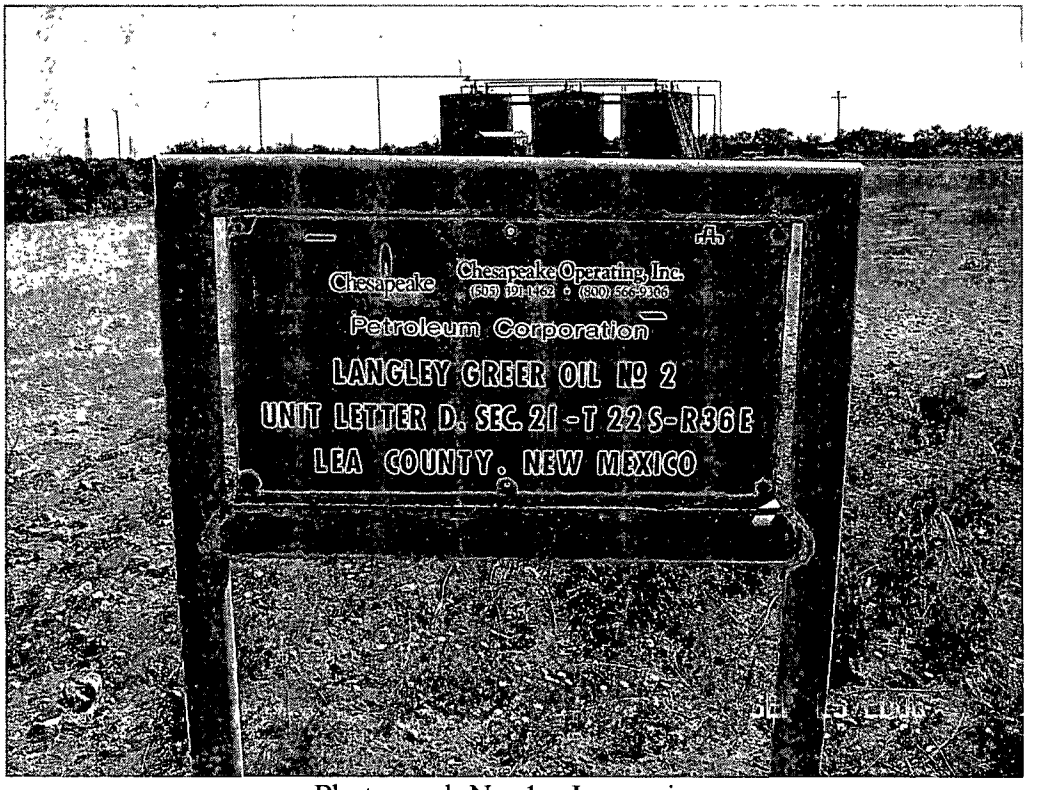
PROJECT PHOTOGRAPHS



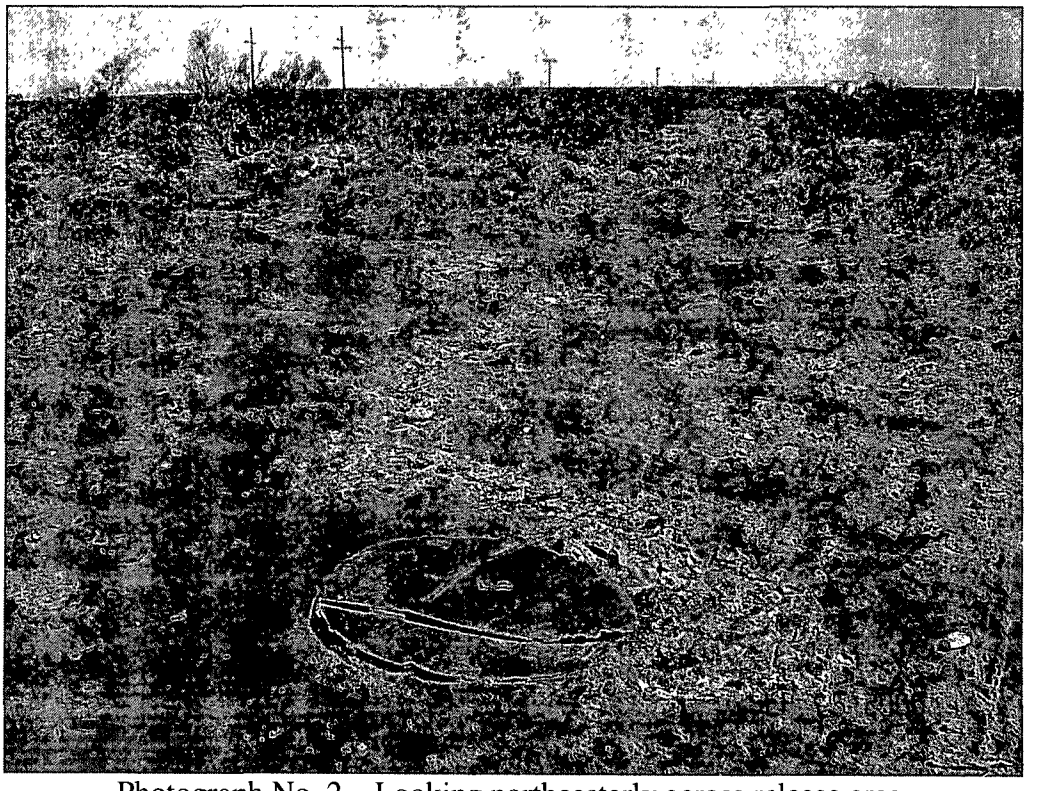
Photograph No. 3 – Looking northerly across release area.



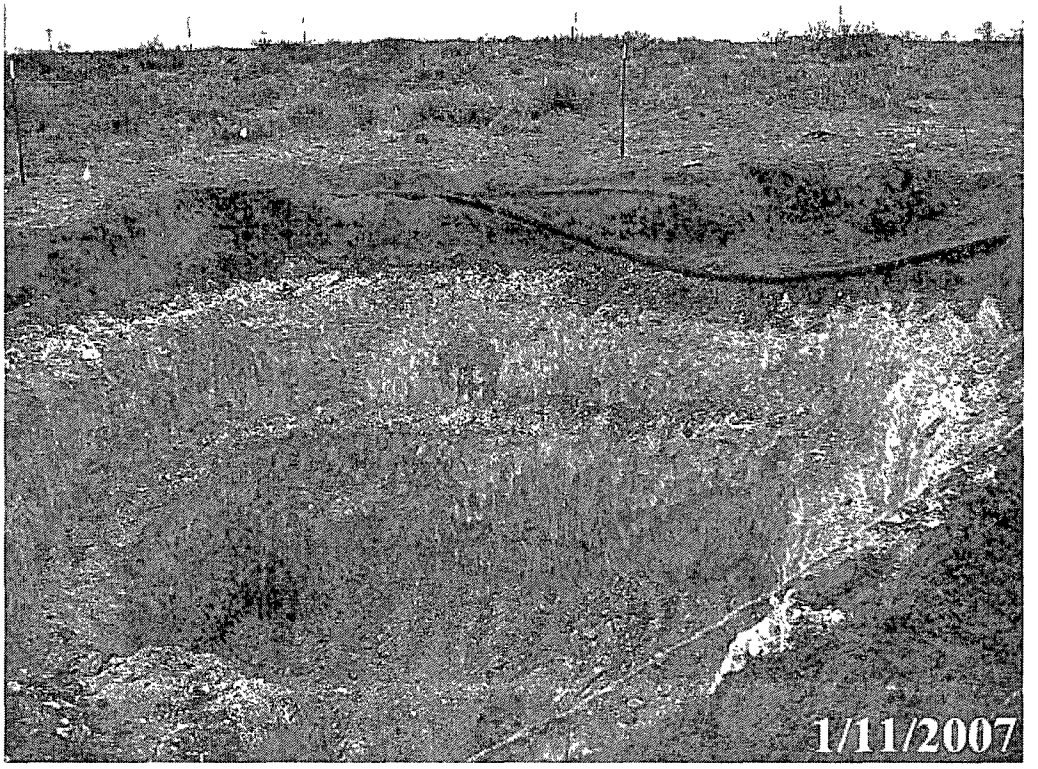
Photograph No. 4 – Looking northerly across release area.



Photograph No. 1 – Lease sign.



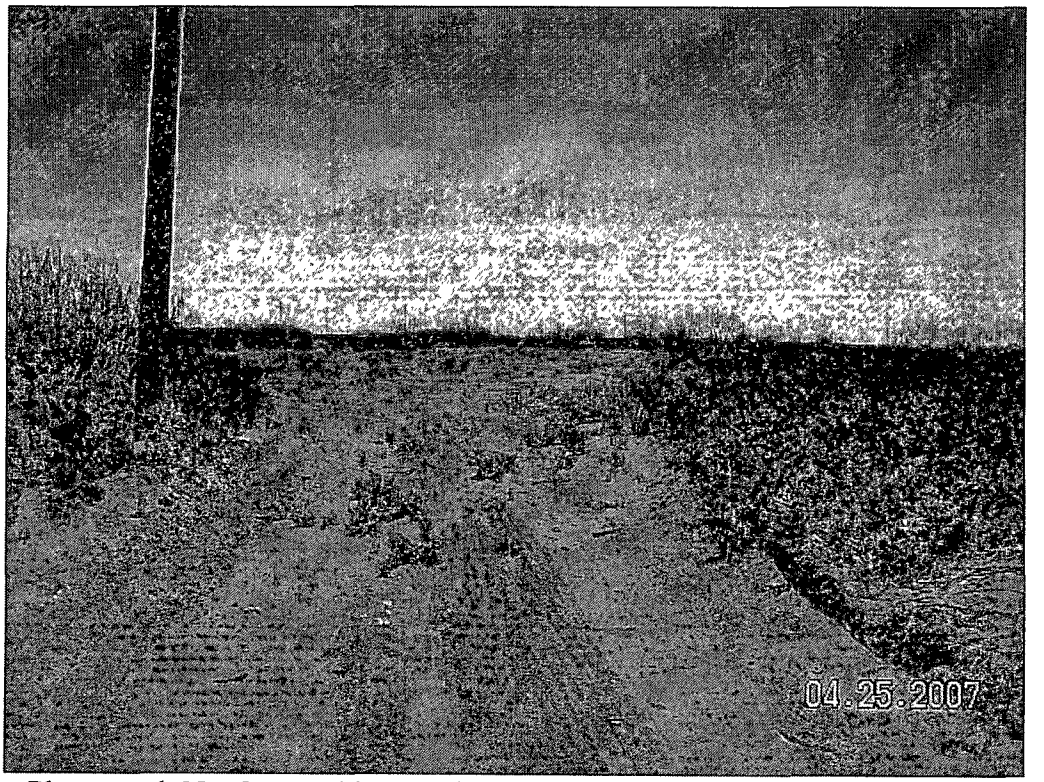
Photograph No. 2 – Looking northeasterly across release area.



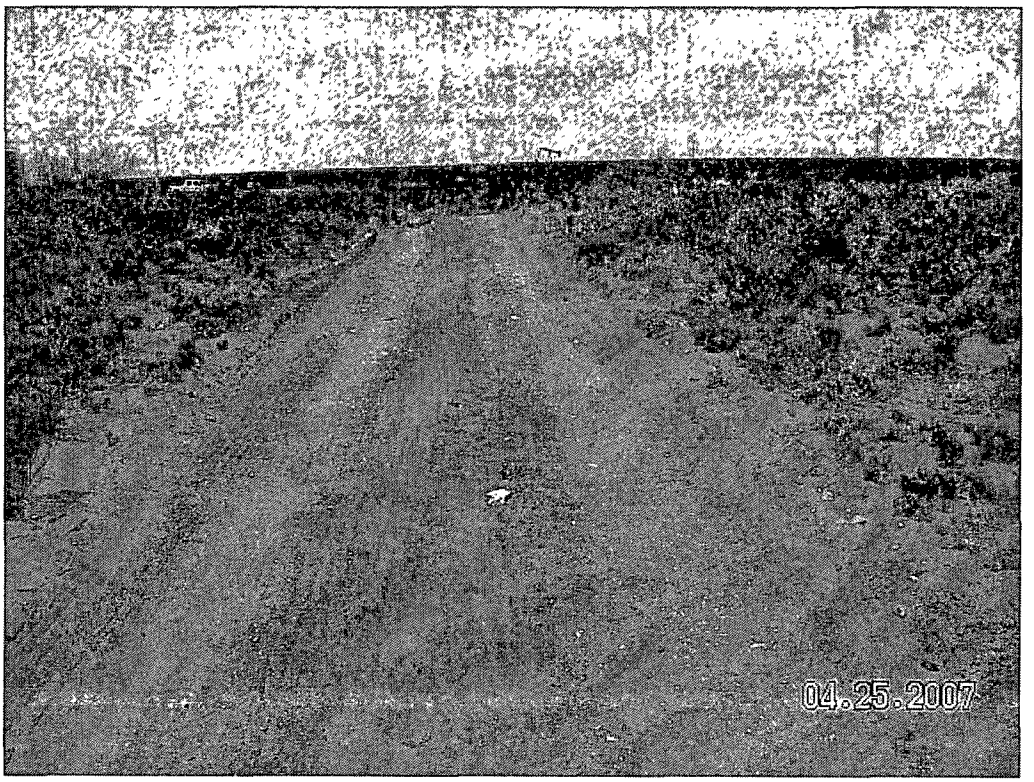
Photograph No. 5 – Looking southerly across excavation area.

Photograph No. 6 – Looking westerly across excavation area.

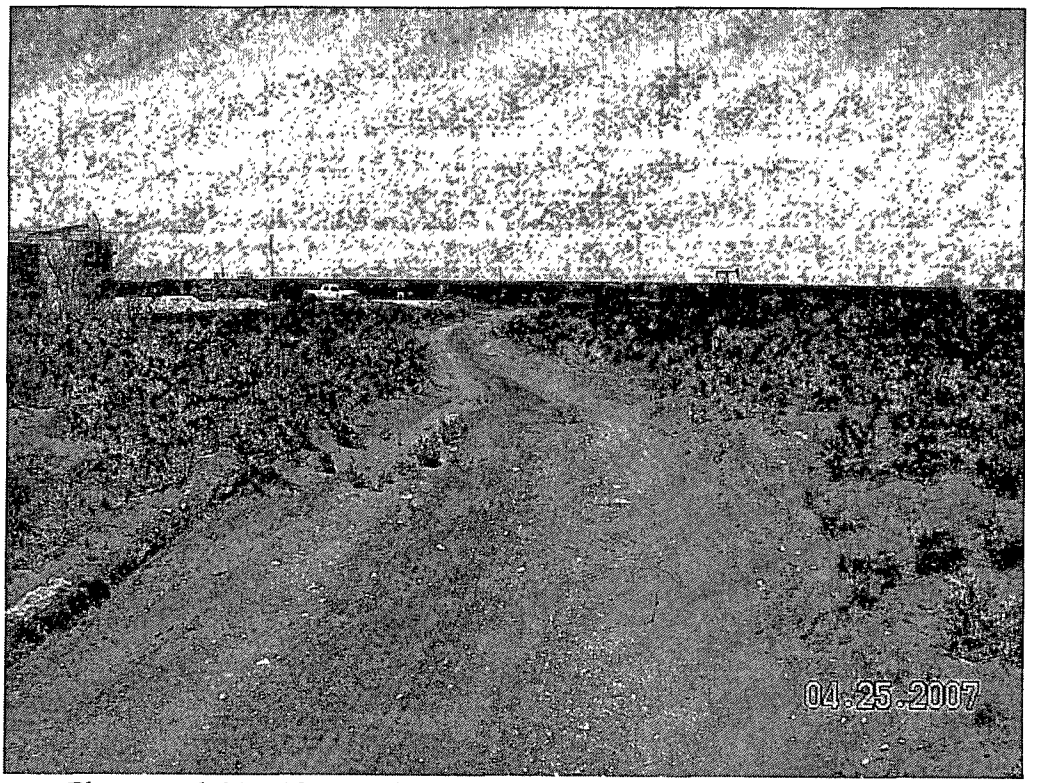
Photograph No. 7 – Looking westerly across excavation area.



Photograph No. 8 – Looking southerly across remediated and reseeded site.



Photograph No. 9 – Looking northerly across reseeded right-of-way.



Photograph No. 10 – Looking northerly across reseeded right-of-way.

APPENDIX III

SOIL BORING LOGS

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-1 | Surface Elevation: 3,079-feet amsl

Start Date: 9-29-06 Time: 0700 hrs

Completion Date: 10-3-06 Time: 1100 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								Bottom of Excavation
							5	
0740	DC		little		4,000			8' RED SAND/Caliche
							10	
0758	SS	8	little		1,680			13' TAN SAND/Caliche
							15	
0840	SS	4	little		1,200			18' SANDSTONE, Tan, Dense
							20	
1020	SS	6	no		880			23' SANDSTONE, Tan, Dense
							25	
0901	SS	8	no		400			28' SANDSTONE, Brown
							30	
0940	SS	6	no		240			33' SANDSTONE, Whitish, Very Dense
							35	

Log Of Test Borings

(NOTE - Page 2 of 2)

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-1

Surface Elevation: 3,535-feet amsl

Start Date: 9-29-06 Time: 0700 hrs

Completion Date: 10-3-06 Time: 1100 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
1031	SS	3	no		240			38' SANDSTONE, Whitish, Very Dense
								End of Soil Boring at 38' bgs - Refusal
							40	
							45	
							50	
							55	
							60	
							65	

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
-	-	-	-	-	-
-	-	-	-	-	-

Drilling Method: Auger

Backfill Method: Bentonite

Field Representative: G/F

Log Of Test Borings

(NOTE - Page 1 of 1)

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-2 | Surface Elevation: 3,535-feet amsl

Start Date: 10-3-06 Time: 1110 hrs

Completion Date: 10-3-06 Time: 1515 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								3' Bottom of Excavation
							5	
1115	SS	8	moiste		3,440			8' RED CLAY, Sand
							10	
1125	SS	8	damp		2,960			13' SANDSTONE, Reddish Brown
							15	
1200	SS	4	little		3,200			18' SANDSTONE, Tan, Very Dense
							20	
1315	SS	4	no		400			23' SANDSTONE, Tan, Very Dense
								End of Soil Boring at 24' bgs - Refusal
							25	
							30	

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
-	-	-	-	-	-
-	-	-	-	-	-

Drilling Method: Auger

Backfill Method: Bentonite

Field Representative: G/F

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-3 | Surface Elevation: 3,535-feet amsl

Start Date: 10-3-06 Time: 1540 hrs

Completion Date: 10-3-06 Time: 1600 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								3' Bottom of Excavation
1545	SS	10	no		200		5	8' SAND, Brown/Red
							10	
1553	SS	10	no		160			13' SANDSTONE, Reddish
							15	End of Soil Boring at 24' bgs
							20	
							25	
							30	

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
-	-	-	-	-	-
-	-	-	-	-	-

Drilling Method: Auger

Backfill Method: Bentonite

Field Representative: G/F

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-4 | Surface Elevation: 3,079-feet amsl

Start Date: 10-3-06 Time: 1610 hrs

Completion Date: 10-4-06 Time: 1720 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								Bottom of Excavation
								Caliche
							5	
0630	SS	8	moiste		>4,000			8' SAND, Tan
							10	
1700	SS	8	moiste		>4,000			13' SANDSTONE, Tan
								SANDSTONE, Very Dense
							15	
1800	SS	6	moiste		>4,000			18' SANDSTONE, Very Dense
							20	
1200	SS	6	little		>4,000			23' SANDSTONE, Very Dense
							25	
1301	SS	6	yes		>4,000			28' SANDSTONE, Very Dense
							30	
1335	SS	8	yes		>4,000			33' SANDSTONE, Tan
							35	

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
CONSULTING AND
REMEDIAL CONSTRUCTION
EUNICE, NEW MEXICO
505-394-3481

Project Number: 160071

Project Name: Chesapeake-Langley Greer Oil #2

Location: UL-D, Section 21, Township 22 South, Range 36 East

Boring Number: SB-4 | Surface Elevation: 3,535-feet amsl

Start Date: 10-3-06 Time: 1610 hrs

Completion Date: 10-4-06 Time: 1720 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
1359	SS	8	yes		>4,000		40	38' SANDSTONE, Tan
1428	SS	6	yes		>4,000		45	43' SANDSTONE, Very Dense
1501	SS	6	little		1,200		50	48' SANDSTONE, Very Dense
1602	SS	6	little		1,200		55	52' SANDSTONE, Very Dense End of Soil Boring at 52' bgs - Refusal
							60	
							65	

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
-	-	-	-	-	-
-	-	-	-	-	-

Drilling Method: Auger

Backfill Method: Bentonite

Field Representative: G/F

APPENDIX IV

INFORMATION AND METRICS FORM
COPY OF INITIAL NMOCD FORM C-141
FINAL NMOCD FORM C-141

Chesapeake
Information and Metrics

Incident Date: 24 September 2006	**NMOCD Notified:** 26 September 2006

Site: Langley Greer Oil #2	**Assigned Site Reference :** #160071
Company: Chesapeake Energy	
Street Address: 1616 West Bender	
Mailing Address: P.O. Box 190	
City, State, Zip: Hobbs, New Mexico 88240	
Representative: Bradley Blevins	
Representative Telephone: (505) 391-1462 ext. 6224	
Telephone:	
Fluid volume released (bbls): 90bbls	**Recovered (bbls):** Zero (0)
>25 bbls: Notify NMOCD verbally within 24 hrs and submit form C-141 within 15 days. (Also applies to unauthorized releases >500 mcf Natural Gas)	
5-25 bbls: Submit form C-141 within 15 days (Also applies to unauthorized releases of 50-500 mcf Natural Gas)	
Leak, Spill, or Pit (LSP) Name: Langley Greer Oil #2	
Source of contamination:	
Land Owner, i.e., BLM, ST, Fee, Other: Lowell Cypert	
LSP Dimensions: 100 feet by 21 feet	
LSP Area: ~2,100 ft^2	
Location of Reference Point (RP):	
Location distance and direction from RP:	
Latitude: N 32° 22' 48.60"	
Longitude: W 103° 16' 38.33"	
Elevation above mean sea level: 3,535 feet	
Feet from North Section Line:	
Feet from East Section Line:	
Location- Unit or ¼¼: NW¼ of the NW¼	**Unit Letter:** D
Location- Section: 21	
Location- Township: T22S	
Location- Range: R36E	
Surface water body within 1000 ' radius of site: none	
Domestic water wells within 1000' radius of site: none	
Agricultural water wells within 1000' radius of site: none	
Public water supply wells within 1000' radius of site: none	
Depth from land surface to groundwater (DG): ~172 feet	
Depth of contamination (DC): unknown	
Depth to groundwater (DG – DC = DtGW): ~172 feet	

1. Groundwater	2. Wellhead Protection Area	3. Distance to Surface Water Body
If Depth to GW <50 feet: *20 points*	If <1000' from water source, or;<200' from private domestic water source: *20 points*	<200 horizontal feet: *20 points*
If Depth to GW 50 to 99 feet: *10 points*		200-1000 horizontal feet: *10 points*
If Depth to GW >100 feet: *0 points*	If >1000' from water source, or; >200' from private domestic water source: *0 points*	>1000 horizontal feet: *0 points*
Site Rank (1+2+3) =0+0+0= 0		

Total Site Ranking Score and Acceptable Concentrations

Parameter	>19	10-19	0-9
Benzene[1]	10 ppm	10 ppm	10 ppm
BTEX[1]	50 ppm	50 ppm	50 ppm
TPH	100 ppm	1,000 ppm	5,000 ppm

[1]100 ppm field VOC headspace measurement may be substituted for lab analysis

District I
1625 N French Dr., Hobbs, NM 88240
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1301 W Grand Avenue, Artesia, NM 88210
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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 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company: Chesapeake Energy	**Contact:** Bradley Blevins
Address: P.O. Box 190, Hobbs, NM 88240	**Telephone No.:** (505) 391-1462 ext. 6224
Facility Name: Langley Greer Oil #2	**Facility Type:** Tank Battery

Surface Owner: Lowell Cypert	**Mineral Owner:**	**Lease No.:**

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
D	21	22S	36E					Lea

Latitude: N 32° 22' 48.60" **Longitude:** W 103° 16' 38.33"

NATURE OF RELEASE

Type of Release: Brine water	**Volume of Release:** 90 bbls	**Volume Recovered:** none
Source of Release: Line from tank battery	**Date and Hour of Occurrence:** Unknown	**Date and Hour of Discovery:** 24 September 2006 @ 1:00 p.m.
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	**If YES, To Whom?** Larry Johnson, NMOCD	
By Whom? Bradley Blevins	**Date and Hour:** 26 September 2006 @ 7 am	
Was a Watercourse Reached? ☐ Yes ☒ No	**If YES, Volume Impacting the Watercourse:** Not Applicable	

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

Depth to water: ~172 bgs

Describe Cause of Problem and Remedial Action Taken.* Brine water pipeline developed a leak; pipeline was shut down and pipe repaired

Describe Area Affected and Cleanup Action Taken.* Approximately 2,100 square-feet of visible surface area were impacted by the release. Approximately 3-ft. of impacted soil was excavated from the release area and disposed at a State approved disposal facility. Soil borings will be advanced to delineate the vertical extent of impacted soil. Based on laboratory analytical data from soil sample collected during the advancement of the soil borings, a remediation proposal will be developed and submitted to the NMOCD.

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: Bradley Blevins	OIL CONSERVATION DIVISION
Printed Name: Bradley Blevins	**Approved by District ~~Supervisor~~** ENVIRO ENGR
Title: Field Supervisor	**Approval Date:** 6-27-07 **Expiration Date:** 8-27-07
E-mail Address: bblevins@chkenergy.com	**Conditions of Approval:** FINAL REPORT DUE BY **Attached** ☐
Date: 6-21-07 **Phone:** (505) 391-1462 ext. 6224	

* **Attach Additional Sheets If Necessary**

pPAC0627639210

RP#1059 Closed

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 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company: Chesapeake Energy	**Contact:** Bradley Blevins
Address: P.O. Box 190, Hobbs, NM 88240	**Telephone No.:** (505) 391-1462 ext. 6224
Facility Name: Langley Greer Oil #2	**Facility Type:** Tank Battery

Surface Owner: Lowell Cypert	**Mineral Owner:**	**Lease No.:**

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
D	21	22S	36E					Lea

Latitude: N 32° 22' 48.60" **Longitude:** W 103° 16' 38.33"

NATURE OF RELEASE

Type of Release: Brine water	**Volume of Release:** 90 bbls	**Volume Recovered:** none
Source of Release: Line from tank battery	**Date and Hour of Occurrence:** Unknown	**Date and Hour of Discovery:** 24 September 2006 @ 1:00 p.m.
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	**If YES, To Whom?** Larry Johnson, NMOCD	
By Whom? Bradley Blevins	**Date and Hour:** 26 September 2006 @ 7 am	
Was a Watercourse Reached? ☐ Yes ☒ No	**If YES, Volume Impacting the Watercourse:** Not Applicable	

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Depth to water: ~172 bgs

Describe Cause of Problem and Remedial Action Taken.* Brine water pipeline developed a leak; pipeline was shut down and pipe repaired

Describe Area Affected and Cleanup Action Taken.* a) Excavated contaminated soil above NMOCD remedial goals to a depth of thirteen (13) with repository at a State approved disposal facility; b) advancement and sampling of soil borings with laboratory analyses documenting residual chloride concentrations of impacted soil above NMOCD remedial threshold goals; c) installation of 20-mil polyethylene liner in locations where residual soils exceed NMOCD remediation goals d) backfill excavation with caliche overlain with topsoil to original ground surface; e) graded area to promote natural drainage; and f) seeded disturbed area with a blend preferred by the property owner.

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: Bradley Blevins	OIL CONSERVATION DIVISION	
Printed Name: Bradley Blevins	**Approved by District Supervisor:**	
Title: Field Supervisor	**Approval Date:**	**Expiration Date:**
E-mail Address: bblevins@chkenergy.com	**Conditions of Approval:**	**Attached** ☐
Date: 2-5-08 **Phone:** (505) 391-1462 ext. 6224		

*** Attach Additional Sheets If Necessary**

District I
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Form C-141
Revised October 10, 2003

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Release Notification and Corrective Action

OPERATOR

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Address: P.O. Box 190, Hobbs, NM 88240	**Telephone No.:** (505) 391-1462 ext. 6224
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Surface Owner: Lowell Cypert	**Mineral Owner:**	**Lease No.:**

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NATURE OF RELEASE

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Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	**If YES, To Whom?** Larry Johnson, NMOCD	
By Whom? Bradley Blevins	**Date and Hour:** 26 September 2006 @ 7 am	
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Signature: Bradley Blevins	OIL CONSERVATION DIVISION	
Printed Name: Bradley Blevins	**Approved by District Supervisor:** Johnson ENVIRONMENTAL ENGINEER	
Title: Field Supervisor	**Approval Date:** 2/6/08	**Expiration Date:**
E-mail Address: bblevins@chkenergy.com	**Conditions of Approval:**	**Attached** ☐
Date: 2-5-08 **Phone:** (505) 391-1462 ext. 6224		

*** Attach Additional Sheets If Necessary**