NEED FINAL C-141

Chesapeake

DIESEL SPILL

SITE CHARACTERIZATION

RUTH 20-2 RELEASE SITE

REF: 160011

UL-D (NW¼ OF THE NW¼) OF SECTION 20, T16S, R36E

~2.4 MILES SOUTHWEST OF LOVINGTON

LEA COUNTY, NEW MEXICO

LATITUDE: N 32° 54' 48.03"   LONGITUDE: W 103° 22' 57.43"

FEBRUARY 2006

Chesapeake - 147179

PREPARED BY:

Environmental Plus, Inc.

2100 Avenue O

P.O. Box 1558

Eunice, NM 88231

Phone: (505)394-3481

FAX: (505)394-2601

jstegemoller@envplus.net

facility - fPAC0606228024

incident - nPAC0606228112   application - pPAC0606228494

Distribution List

Chesapeake- Ruth 20-2 Release Site (Ref. #160011)

Name	Title	Company or Agency	Mailing Address	e-mail
Larry Johnson	Environmental Engineer	New Mexico Oil Conservation Division-Hobbs	1625 French Drive Hobbs, NM 88240	lwjohnson@state.nm.us
Bradley Blevins	Field Supervisor	Chesapeake Energy	P.O. Box 190 Hobbs, NM 88240-0190	bblevins@chkenergy.com
Jace Marshall	Safety and Environmental Representative	Chesapeake Energy	6100 N. Western Ave Oklahoma, OK 73118	jmarshall2@chkenergy.com
Curtis Blake	Superintendent	Chesapeake Energy	P.O. Box 190 Hobbs, NM 88240-0190	cblake@chkenergy.com
Thaddeus Kostrubala	Environmental Engineer	New Mexico State Land Office-Sante Fe	310 Old Sante Fe Trail P.O. Box 1148 Sante Fe, NM 87504-1148	tkostrubala@slo.state.nm.us
Myra Meyers	District Resource Manager	New Mexico State Land Office-Sante Fe	2702-D North Grimes Hobbs, NM 88240	mmeyers@slo.state.nm.us
File	--	Environmental Plus, Inc.	P.O. Box 1558 Eunice, NM 88231	jolness@envplus.net

Standard of Care

Site Characterization

Ruth 20-2 Release Site

Ref: 160011

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 arrived at with currently accepted geologic, hydrogeologic and engineering practices at this time and location. The report was prepared or reviewed by a certified or registered EPI professional with a background in engineering, environmental and/or the natural sciences.

This report was prepared by:

Jason Stegemoller, M.S. Date

Environmental Scientist

This report was reviewed by:

Iain A. Olness, P.G. Date

Hydrogeologist

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APPENDICES

1.0 Summary

On June 3, 2005, a release of approximately 500 gallons of diesel fuel from a vandalized fuel line supplying a generator. Chesapeake Operating, Inc. (Chesapeake) immediately retained Environmental Plus, Inc. (EPI) to conduct emergency response measures at the release site. EPI personnel mobilized June 4, 2005, to excavate and stockpile diesel saturated soil on plastic as well as perform GPS surveying, photography and characterization of the site. Upon completion of initial excavation activities, three composite samples were collected from the base of the excavation and submitted to an independent laboratory for quantification of total petroleum hydrocarbons (TPH) and benzene, ethylbenzene, toluene and total xylenes (BTEX constituents). Analytical results for these samples indicated TPH concentrations ranging from 3,440 parts per million (ppm) to 8,790 ppm with an average concentration of 5,350 ppm remaining in the excavation. In addition, reported BTEX constituent concentrations ranged from 0.887 ppm to 3.11 ppm with an average concentration of 1.64 ppm (reference *Table 1*). The release entailed an area of approximately 3,150-square feet (ft^2) (reference *Figure 3*). The site is located approximately 2.4 miles southwest of Lovington, Lea County, New Mexico (reference *Figure 1*).

On June 8, 2005, EPI personnel initiated remediation activities. Excavation of hydrocarbon impacted soil continued until field analyses indicated remedial concentrations had been achieved. Field analyses were conducted utilizing a MiniRae photoionization detector (PID) equipped with a 9.7 electron volt lamp. Field analyses indicated organic vapor concentrations ranged from 10.1 ppm to 73.5 ppm, with an average concentration of 33.5 ppm. Confirmatory soil samples were collected from the excavation, placed in a laboratory provided container and submitted for quantification of TPH and BTEX constituents.

Analytical results indicated TPH concentrations were in excess of the NMOCD remedial threshold of 100 mg/Kg. On July 25, 2005, excavation activities resumed concentrating in the areas analytical results indicated contaminant levels were in excess of the NMOCD remedial thresholds. Excavation activities continued until soil sample field analyses indicated organic vapor concentrations were below remedial thresholds.

On July 11, 2005, a series of eleven soil samples were collected from the excavation floor at approximately 1-foot below ground surface (bgs) (reference *Figure 4*). A portion of each sample was placed in a laboratory provided container and set on ice for transport to an independent laboratory for quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors. Field analytical data indicated organic vapor concentrations ranged from 0.7 to 73.5 ppm (reference *Table 1*).

Laboratory analytical data indicated BTEX constituent concentrations were non-detectable (ND) at or above laboratory method detection limits in sample locations SP-1 through 11. TPH concentrations were reported to range from ND to 3,410 mg/Kg (reference *Table 1*).

Based on analytical data, excavation activities resumed in the areas where soil samples SP-5, 6, 9, 10 and 11 were collected (reference *Figure 4*). Upon confirmation via field analyses that impacted soil had been removed, soil samples were collected on July 26, 2005 from the excavation floor at these five locations. A portion of each sample was placed in a laboratory provided container and submitted to an independent laboratory for quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors. Field analytical data indicated organic vapor concentrations ranged from 0.6 to 3.0 ppm (reference *Table 1*).

Laboratory analytical data indicated BTEX constituent concentrations were ND at or above laboratory MDL. TPH concentrations in soil sample SP-5, 10 and 11 at 2-feet bgs were ND at or above laboratory MDL. Reported TPH concentrations in SP-6 were 138 mg/Kg and in SP-9 were 276 mg/Kg, in excess of the NMOCD remedial threshold of 100 mg/Kg (reference *Table 1* and *Figure 4*). The northern portion of the release site was backfilled after receipt of verbal approval from the NMOCD.

After further remedial excavation in the southern portion of the release site, a series of five soil samples (SP-12 through 16) were collected on September 6, 2005 from the excavation. A portion of each sample was placed in a laboratory provided container and submitted for laboratory quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapor concentrations. Field analyses indicated organic vapor concentrations ranged from 1.7 to 8.1 ppm (reference *Table 1*).

Laboratory analytical data indicated BTEX constituent concentrations were ND at or above laboratory MDL. Reported TPH concentrations were reported to range from ND to 24.5 mg/Kg, below the NMOCD remedial threshold of 100 mg/Kg (reference *Table 1*).

Approximately 340 cubic yards of hydrocarbon impacted soil was excavated and transported to Artesia Aeration for treatment. An equivalent amount of clean soil obtained from an off-site source was utilized to backfill the excavation.

This release site is located in Unit Letter D, (NW¼ of the NW¼), Section 20, T16S, R36E, N32° 54' 48.033" and W103° 22' 57.430". The site is approximately 2.4-miles southwest of Lovington, New Mexico on property owned by the State of New Mexico (reference *Figures 1* through *3*).

2.0 Site Description

2.1 Geological Description

The 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, describes the near surface geology of southern Lea County as "an intergrade of the Quaternary Alluvium (QA) sediments (i.e., fine to medium sand, with the mostly eroded Cenozoic Ogallala (CO) formation). Typically, the QA and CO formations in the area are capped by a thick interbed of caliche and generally overlain by sandy soil."

The release site is located in the High Plains physiographic subdivision, described by Nicholson & Clebsch as "a flat, gently sloping plain, treeless and marred only by slight undulations and covered with short prairie grass."

2.2 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 and 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.

2.3 Area Groundwater

The unconfined groundwater aquifer at this site is projected to be ~71-ft bgs based on water depth data obtained from the New Mexico State Engineers Office and the United States

Geological Survey data base. Groundwater was encountered at approximately 72-ft bgs during the advancement of a soil boring advanced during delineation activities of the adjacent Ruth 20-2 drilling pit on October 19, 2005.

2.4 Area Water Wells

There are two water supply wells (L 00209C and USGS #1) located within a 1,000 foot radius of the release site (reference *Figure 2* and *Table 3*).

2.5 Area Surface Water Features

There are no surface water bodies within a 1,000-foot radius of the release site.

3.0 NMOCD Site Ranking

Contaminant delineation and remedial work done at this site indicate that the chemical parameters of the soil and the physical parameters of the groundwater were characterized 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);*** and
- ***Unlined Surface Impoundment Closure Guidelines (February 1993)***

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 the ground water);*
- *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 proximity of the site to protectable area water wells, surface water bodies, and depth to groundwater from the lower most contamination, the NMOCD ranking score for the site is 30 points with the soil remedial goals highlighted in the Site Ranking table presented below.

1. Ground Water	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: *20 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***

Total Site Ranking Score and Acceptable Remedial Goal Concentrations			
Parameter	**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 may be substituted for a laboratory analysis of the benzene and BTEX concentration limits.

4.0 Subsurface Soil Investigation

On June 8, 2005, 5-point composite soil samples were collected from the release area after diesel saturated soil had been excavated. Soil samples were placed in a laboratory provided container and submitted for laboratory quantification of TPH and BTEX constituent concentrations. Laboratory analytical data indicated TPH concentrations ranged from 3,440 to 8,970 mg/Kg, in excess of the NMOCD remedial threshold of 100 mg/Kg. BTEX concentrations ranged from 0.921 to 3.11 mg/Kg, below the NMOCD remedial threshold of 50 mg/Kg (reference *Table 1*).

On July 11, 2005, a series of 11 soil samples were collected after remedial excavation of hydrocarbon impacted soil to approximately 1-foot bgs. Upon collection, a portion of each sample was placed in a laboratory provided container and set on ice for transport to an independent laboratory for quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors. Field analyses indicated organic vapor concentrations ranged from 10.1 to 73.5 mg/Kg. Laboratory analytical results indicated BTEX constituent concentrations were ND at or above laboratory MDL in SP-1 through 11. Reported TPH concentrations in SP-1 and SP-7 were ND at or above laboratory MDL. TPH concentrations in all other sample locations (i.e., SP-2, 3, 4, 5, 6, 8, 9, 10 and 11) ranged from 90.4 to 3,410 mg/Kg (reference *Table 1* and *Figure 4*).

On July 26, 2005, soil samples were collected after further excavation in the area of SP-5, 6, 9, 10 and 11. A portion of each sample was placed in a laboratory provided container and submitted to an independent laboratory for quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors. Field analyses indicated organic vapor concentrations ranged from 0.5 to 3.0 ppm. Laboratory analytical data indicated BTEX concentrations were ND at or above laboratory MDL. Reported TPH concentrations ranged from ND to 276 mg/Kg (reference *Table 1* and *Figure 4*).

On September 6, 2005, soil samples SP-12 through 16 were collected from the excavation. A portion of each sample was placed in a laboratory provided container and submitted to an independent laboratory for quantification of TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors. Field analyses indicated organic vapor concentrations ranged from 1.7 to 8.1 ppm. Laboratory analytical data indicated BTEX constituent concentrations were ND at or above laboratory MDL. Reported TPH concentrations were ND at or above laboratory MDL, with the exception of sample SP-12. Reported TPH concentrations in SP-12 were 24.5 mg/Kg, below the NMOCD remedial threshold of 100 mg/Kg (reference *Table 1* and *Figure 4*).

5.0 Groundwater Investigation

Groundwater was encountered at approximately 72-ft bgs during the advancement of a soil boring (BH-1) advanced during delineation activities of the adjacent Ruth 20-2 drilling pit on October 19, 2005.

Confirmatory laboratory analytical results for soil samples SP-1, 4, 5, 7, 10, 11, 12, 13, 14, 15 and 16 indicated that TPH and BTEX constituents were non-detectable at or above laboratory MDL, with the exception of SP-12. Analytical data from SP-4 indicated TPH was 24.5 mg/Kg, below the NMOCD remedial threshold of 100 mg/Kg (reference *Table 1* and *Appendix I*).

6.0 Summary of Results

Approximately 340 cubic yards of hydrocarbon-impacted soil was excavated and transported to Artesia Aeration for treatment. An equivalent amount of clean soil was transported from an off-site

source and utilized to backfill the excavation. The northern portion of the excavation was backfilled upon approval from the NMOCD. The final extent of excavated area comprised approximately 3,130-square feet to a maximum depth of 6-feet bgs. Laboratory analytical results indicated BTEX constituent concentrations were ND at or above laboratory MDL. Reported TPH concentrations were below the NMOCD remedial threshold of 100 mg/Kg (reference *Table 1*).

FIGURES

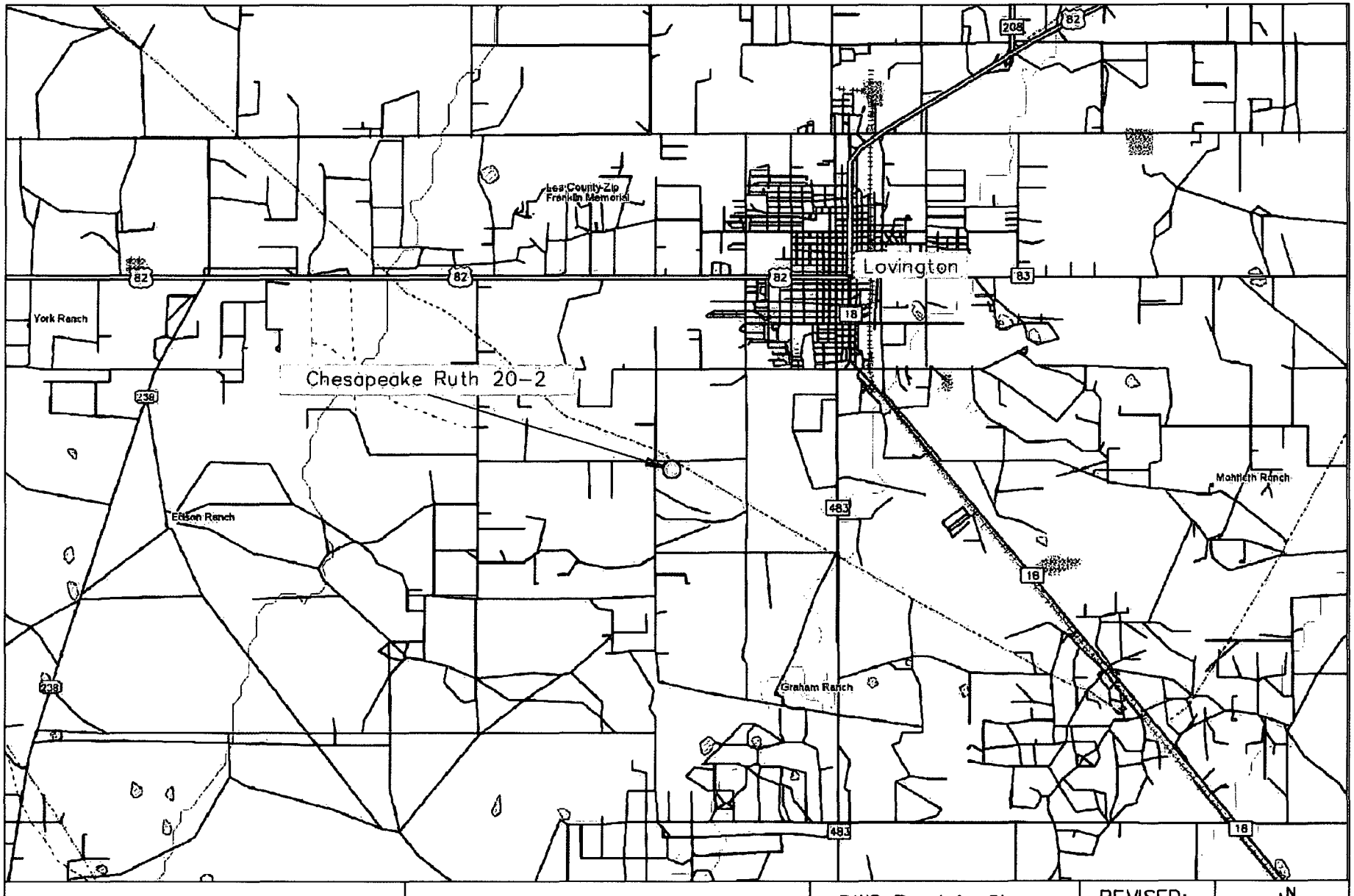

Figure 1 Site and Well Location Map Chesapeake Energy Ruth 20-2	Eddy County, New Mexico NE 1/4 of the NE 1/4, Sec. 03, T23S, R28E N 32° 20' 25.3" W 104° 04' 2.37" Elevation: 3,938 feet amsl	DWG By: Iain Olness June 2005	REVISED:	N
		0 1.5 3.0 Miles	SHEET 1 of 1	

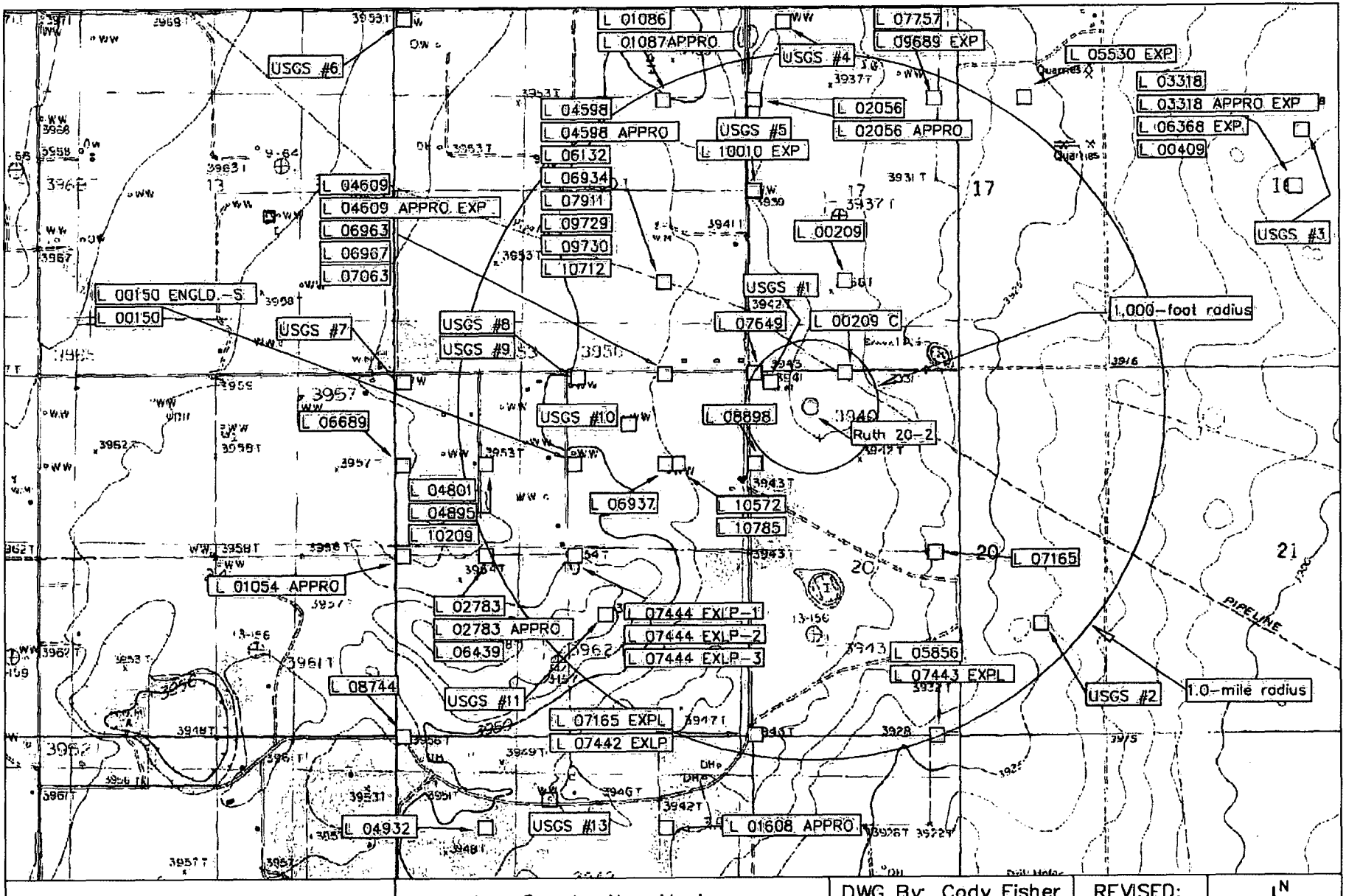

Figure 2
Site and Well Location Map
Chesapeake Energy Corporation
Ruth 20-2

Lea County, New Mexico
NW 1/4 of the NW 1/4, Sec. 20, T16S, R36E
N 32 54' 48.0" W 103° 22' 57.4"
Elevation: 3,938 feet amsl

DWG By: Cody Fisher
June 2005

REVISED:

SHEET
1 of 1

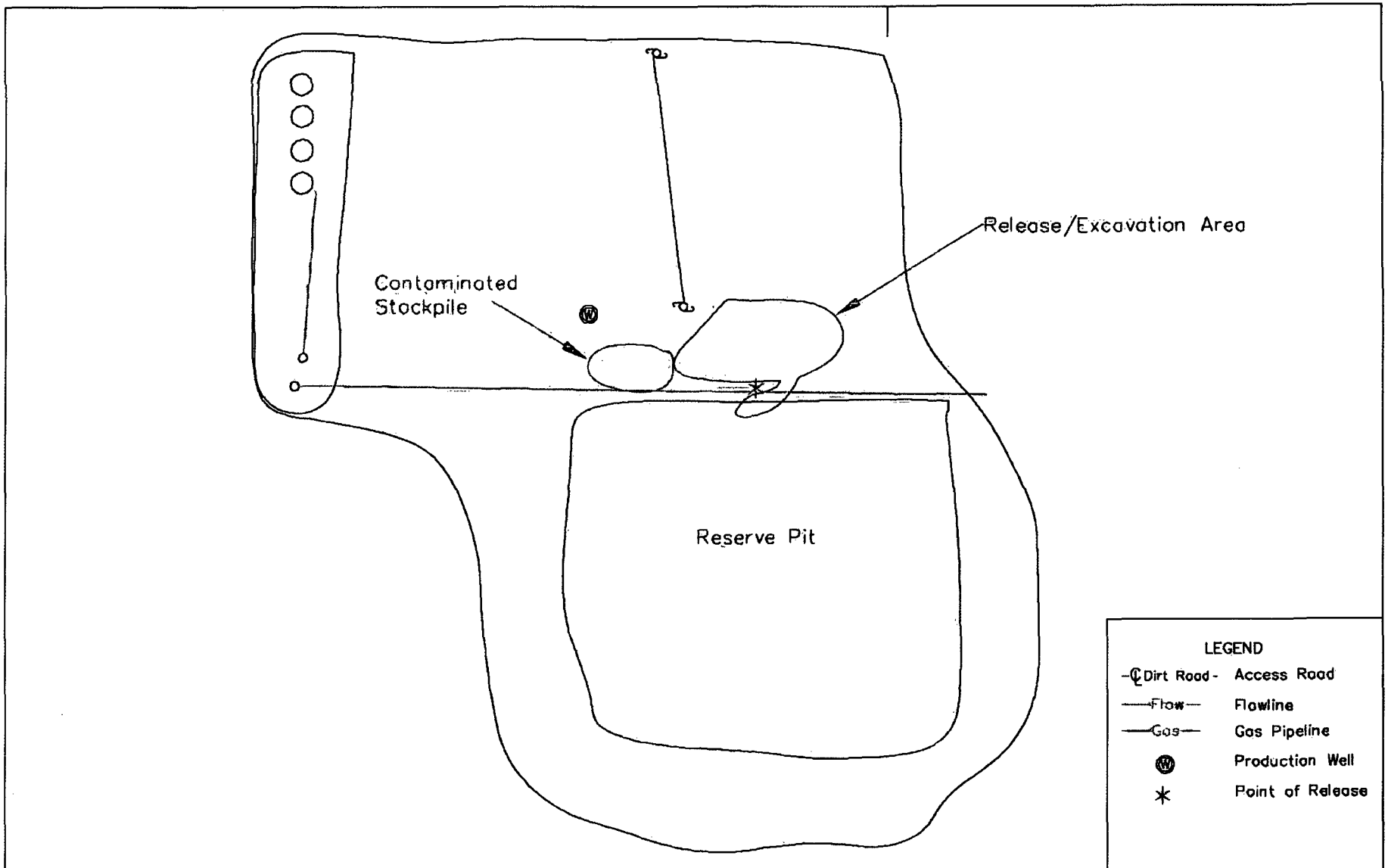

Figure 3 Site Map Chesapeake Energy Ruth 20–2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 20, T16S, R36E N 32° 54' 48.0" W 103° 22' 57.4" Elevation: 3,035 feet amsl	DWG By: Iain Olness June 2005	REVISED:	SHEET 1 of 1

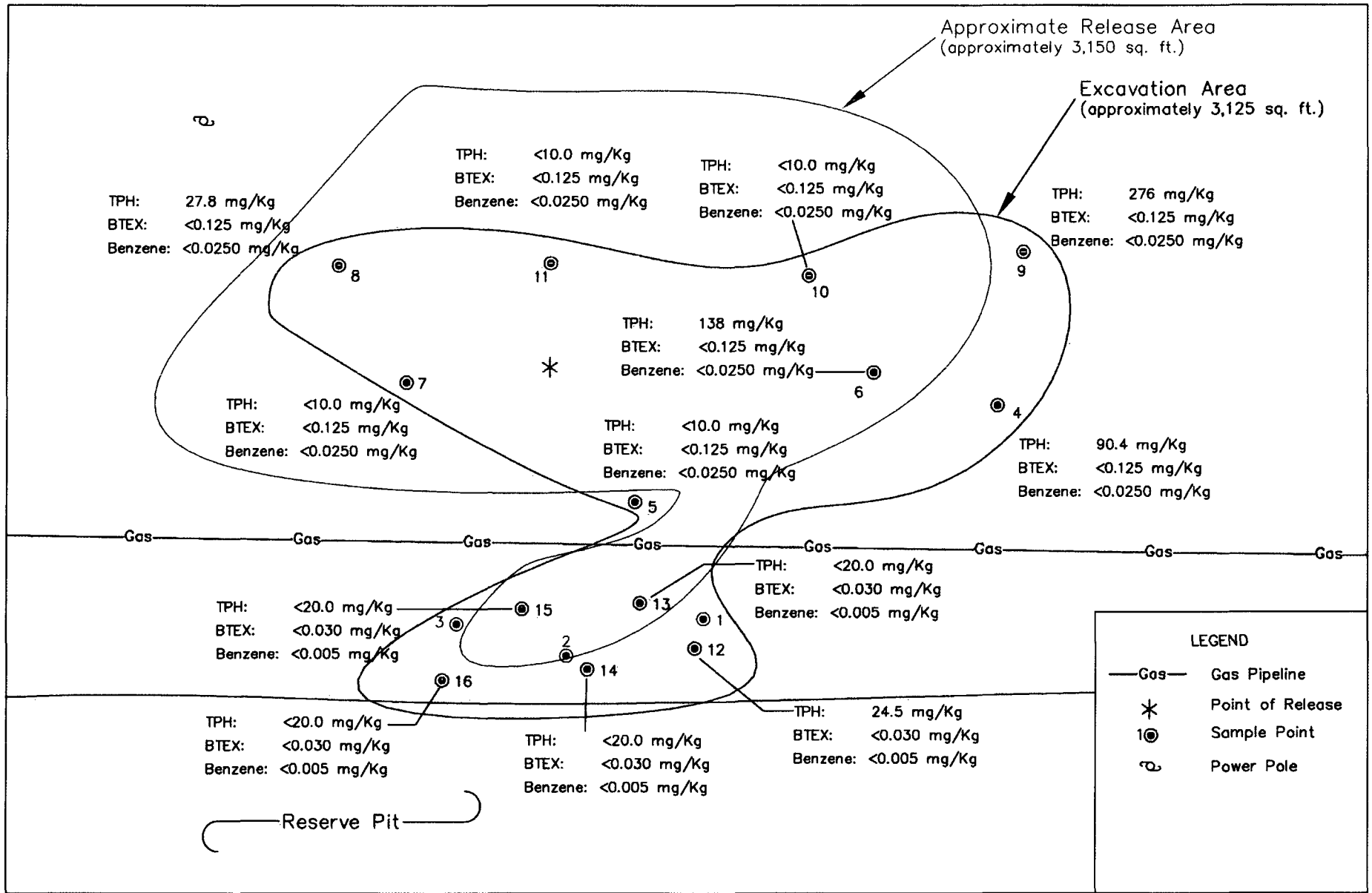

Figure 4 Sample Location Map Chesapeake Energy Ruth 20-2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 20, T16S, R36E N 32 54' 48.0" W 103° 22' 57.4" Elevation: 3,035 feet amsl	DWG By: Iain Olness August 2005	REVISED: JCS, Dec. 05	SHEET 1 of 1

TABLES

TABLE 1

Summary of Excavation Soil Field Analyses and Laboratory Analytical Results

Chesapeake Energy Ruth 20-2 Release Site (Ref.# 160011)

Sample ID	Depth (feet)	Sample Date	Soil Status	PID Reading (ppm)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	TPH (as gasoline) (mg/Kg)	TPH (as diesel) (mg/Kg)	Total TPH (mg/Kg)
Ruth 20-2 S. Flowpath	Comp	08-Jun-05	Excavated	NA	<0.0250	0.0711	0.510	2.53	3.11	1,590	7,200	**8,790**
Ruth 20-2 W. Half Pooling Area	Comp	08-Jun-05	Excavated	NA	<0.0250	0.0683	0.134	0.685	0.887	507	3,300	**3,810**
Ruth 20-2 E. Half Pooling Area	Comp	08-Jun-05	Excavated	NA	<0.0250	0.0518	0.0877	0.781	0.921	470	2,970	**3,440**
SP-1	1	11-Jul-05	Excavated	23.5	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	<10.0	<10.0
SP-2	1	11-Jul-05	Excavated	10.1	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	14.7	846	**861**
SP-3	1	11-Jul-05	Excavated	10.4	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	108	**108**
SP-4	1	11-Jul-05	In Situ	24.1	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	90.4	90.4
SP-5	1	11-Jul-05	Excavated	38.9	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	169	**169**
	2	26-Jul-05	In Situ	0.7	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	<10.0	<10.0
SP-6	1	11-Jul-05	Excavated	41.4	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	30.9	724	**755**
	6	26-Jul-05	In Situ	0.9	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	138	**138**
SP-7	1	11-Jul-05	In Situ	25.0	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	<10.0	<10.0
SP-8	1	11-Jul-05	In Situ	39.6	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	27.8	27.8
SP-9	1	11-Jul-05	Excavated	46.2	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	16.9	315	**332**
	6	26-Jul-05	In Situ	3.0	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	12.4	264	**276**

TABLE 1

Summary of Excavation Soil Field Analyses and Laboratory Analytical Results

Chesapeake Energy Ruth 20-2 Release Site (Ref.# 160011)

Sample ID	Depth (feet)	Sample Date	Soil Status	PID Reading (ppm)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	TPH (as gasoline) (mg/Kg)	TPH (as diesel) (mg/Kg)	Total TPH (mg/Kg)
SP-10	1	11-Jul-05	Excavated	73.5	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	166	3,240	**3,410**
	2	26-Jul-05	In Situ	0.5	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	<10.0	<10.0
SP-11	1	11-Jul-05	Excavated	31.6	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	213	**213**
	2	26-Jul-05	In Situ	0.6	<0.0250	<0.0250	<0.0250	<0.0500	<0.125	<10.0	<10.0	<10.0
SP-12	3	06-Sep-05	In Situ	1.7	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	24.5	24.5
SP-13	6	06-Sep-05	In Situ	7.0	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	<10.0	<20.0
SP-14	3	06-Sep-05	In Situ	8.1	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	<10.0	<20.0
SP-15	6	06-Sep-05	In Situ	6.6	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	<10.0	<20.0
SP-16	3	06-Sep-05	In Situ	6.7	<0.005	<0.005	<0.005	<0.015	<0.030	<10.0	<10.0	<20.0
NMOCD Remedial Thresholds				**100**	**10**				**50**			**100**

[1] ***Bolded*** *values are in excess of NMOCD Remediation Thresholds*

[4] *NA=Not Applicable*

[3] *Chloride and sulfate residuals may not be capable of impacting local groundwater above the NMWQCC standards of 250 mg/L and 650 mg/L, respectively.*

TABLE 2

Well Data

Chesapeake Energy Ruth 20-2 (Ref. #160011)

Well Number	Diversion[A]	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Measured	Well Depth (ft bgs)	Depth to Water (ft bgs)
L 05856	3	Payne Enterprise	STK	16 S	36 E	20 4	N 32° 54' 0.66"	W 103° 22' 35.46"	05-Mar-66	106	70
L 07165	3	G. Cattle Company	STK	16 S	36 E	20 2 3 1	N 32° 54' 26.83"	W 103° 22' 35.47"			
L 07165 EXPL	0	G. Cattle Company	EXP	16 S	36 E	20	N 32° 54' 0.63"	W 103° 23' 6.6"			
L 07442 EXPL	0	G. Cattle Company	EXP	16 S	36 E	20	N 32° 54' 0.63"	W 103° 23' 6.6"			
L 07443 EXPL	0	G. Cattle Company	EXP	16 S	36 E	20 4	N 32° 54' 0.66"	W 103° 22' 35.46"			
L 08898	0	Roger C. Hanks	PRO	16 S	36 E	20 1 1 4	N 32° 54' 39.88"	W 103° 23' 6.64"	31-Jul-82	147	70
L 10572	3	Yates Petroleum	OIL	16 S	36 E	20 2 2 1	N 32° 54' 39.94"	W 103° 22' 19.91"	27-Jun-96	150	70
L 10785	0	Yates Petroleum	PRO	16 S	36 E	20 2 2 1	N 32° 54' 39.94"	W 103° 22' 19.91"	27-Jun-96	150	70
USGS #1				16 S	36 E	20 1 1 1			27-Feb-91		70.47
USGS #2				16 S	36 E	20 4 2 3			31-Mar-81		75.34
L 03318	3	T. M. Blackmon	DOM	16 S	36 E	16 2 3 1	N 32° 55' 19.33"	W 103° 21' 33.28"			
L 03318 APPRO EXP		T. M. Blackmon		16 S	36 E	16 2 3 1	N 32° 55' 19.33"	W 103° 21' 33.28"			
L 04487 APPRO	3	Kenneth Cox	DOM	16 S	36 E	16 2 2 2	N 32° 55' 32.49"	W 103° 21' 17.73"	01-Jun-60	110	82
L 06368 EXP	0	T. M. Blackmon	STK	16 S	36 E	16 2	N 32° 55' 19.33"	W 103° 21' 33.28"			
L 00409	0	Chesapeake Operating	PRO	16 S	36 E	16 2 3 1	N 32° 55' 19.33"	W 103° 21' 33.28"		193	
USGS #3				16 S	36 E	16 2 3 1			27-Feb-91		61.33
L 00209 B	303.9	College of the SW Foundation	IRR	16 S	36 E	17 3 2 3	N 32° 53' 6.07"	W 103° 22' 51.08"		127	
L 00209 C	287.7	College of the SW Foundation	IRR	16 S	36 E	17 4 3	N 32° 54' 53"	W 103° 22' 51.08"		128	
L 02056	3	Noble Drilling Company	PRO	16 S	36 E	17 1 1	N 32° 55' 32.22"	W 103° 23' 6.68"	06-Mar-53	130	60
L 02056 APPRO		Noble Drilling Company		16 S	36 E	17 1 1	N 32° 55' 32.22"	W 103° 23' 6.68"	06-Mar-53	130	60
L 04437	3	Roy Boland	DOM	16 S	36 E	17 3	N 32° 54' 52.96"	W 103° 23' 6.65"	30-May-60	120	95
L 04437 APPRO		Roy Boland		16 S	36 E	17 3	N 32° 54' 52.96"	W 103° 23' 6.65"	30-May-60	120	95
L 05530 EXP	0	Barry Lee Hobbs	DOM	16 S	36 E	17 2 2 2	N 32° 55' 32.3"	W 103° 22' 19.98"			
L 07649	0	Hilda R. Heidel	PRO	16 S	36 E	17	N 32° 54' 52.96"	W 103° 23' 6.65"	05-Feb-77	140	
L 07757	3	Barry Lee Hobbs	DOM	16 S	36 E	17 2 1 1	N 32° 55' 32.27"	W 103° 22' 35.55"	18-Jan-78	72	
L 09689 EXP	0	Calvin or Jo Ann Holloway	DOM	16 S	36 E	17 2 1 2	N 32° 55' 32.27"	W 103° 22' 35.55"			
L 10010 EXP	0	Inexco Oil Company	PRO	16 S	36 E	17 1 3	N 32° 55' 19.13"	W 103° 23' 6.67"			
USGS #4				16 S	36 E	17 1 1 1			26-Feb-91		63.24
USGS #5				16 S	36 E	17 1 3 3			16-Jun-69		67.82
L 01086	3	C.C. Chambers	DOM	16 S	36 E	18 2 2	N 32° 55' 32.19"	W 103° 23' 22.19"	02-Apr-51	75	
L 01087 APPRO	3	C.C. Chambers	DOM	16 S	36 E	18 2 2	N 32° 55' 32.19"	W 103° 23' 22.19"	02-Apr-51	75	
L 04598	3	Elmer H. Sumruld	DOM	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	21-Jan-62	136	75
L 04598 APPRO		Elmer H. Sumruld		16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	21-Jan-62	136	75
L 04609	3	George Wayne Sumruld	DOM	16 S	36 E	18 4 4 3	N 32° 54' 52.93"	W 103° 23' 22.16"			
L 04609 APPRO EXP		George Wayne Sumruld		16 S	36 E	18 4 4 3	N 32° 54' 52.93"	W 103° 23' 22.16"			
L 06132	3	George Wayne Sumruld	DOM	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	30-May-67	95	70
L 06934	3	E. H. Sumruld	DOM	16 S	36 E	18 4 2 1	N 32° 55' 6.02"	W 103° 23' 22.17"	12-May-72	118	68
L 06963	3	Ricky Jones	DOM	16 S	36 E	18 4 4 4	N 32° 54' 52.93"	W 103° 23' 22.16"	24-Aug-72	120	80
L 06967	0	Oscar V. Neidick	DOM	16 S	36 E	18 4 4 3	N 32° 54' 52.93"	W 103° 23' 22.16"			
L 07063	3	Odell Black	DOM	16 S	36 E	18 4 4 2	N 32° 54' 52.93"	W 103° 23' 22.16"	26-Apr-00	120	80
L 07911	0	Wayne Sumruld	STK	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"			
L 09729	0	E. H. Sumruld	EXP	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"			
L 09730	0	E. H. Sumruld	EXP	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"			
L 10712	0	Chesapeake Operating	PRO	16 S	36 E	18 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	01-Sep-97	165	60
USGS #6				16 S	36 E	18 1 1 1			26-Jun-96		54.94
L 01054 APPRO	3	George Spires	DOM	16 S	36 E	19 1 3	N 32° 54' 26.72"	W 103° 24' 7.41"	15-Dec-30	76	45
L 02783	3	Vernon N. Key	DOM	16 S	36 E	19 1 4 2	N 32° 54' 26.74"	W 103° 23' 53.17"	19-Feb-55	80	50
L 02783 APPRO		Vernon N. Key		16 S	36 E	19 1 4 2	N 32° 54' 26.74"	W 103° 23' 53.17"	19-Feb-55	80	50

TABLE 2

Well Data

Chesapeake Energy Ruth 20-2 (Ref. #160011)

Well Number	Diversion[A]	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Measured	Well Depth (ft bgs)	Depth to Water (ft bgs)
L 04801	3	George Spires	DOM	16 S	36 E	19 1 2	N 32° 54' 39.81"	W 103° 23' 53.18"			
L 04895	3	George Spires	DOM	16 S	36 E	19 1 2	N 32° 54' 39.81"	W 103° 23' 53.18"	05-May-62	100	
L 06439 EXP	0	Joe Grado	DOM	16 S	36 E	19 1 4 2	N 32° 54' 26.74"	W 103° 23' 53.17"			
L 06689 EXP	0	Walter Hannan	DOM	16 S	36 E	19 1 1 4	N 32° 54' 39.78"	W 103° 24' 7.4"			
L 06937	3	Dale Gandy	DOM	16 S	36 E	19 2 2 4	N 32° 54' 39.83"	W 103° 23' 22.15"	25-Apr-72	110	69
L 07444 EXPL-1	0	G. Cattle Company	EXP	16 S	36 E	19 2 3 1	N 32° 54' 26.76"	W 103° 23' 37.64"	13-Oct-75	130	
L 07444 EXPL-2		G. Cattle Company	EXP	16 S	36 E	19 2 3 1	N 32° 54' 26.76"	W 103° 23' 37.64"	13-Oct-75	140	
L 07444 EXPL-3		G. Cattle Company	EXP	16 S	36 E	19 2 3 1	N 32° 54' 26.76"	W 103° 23' 37.64"	14-Oct-75	178	120
L 08744	3	Roger Price	DOM	16 S	36 E	19 3 3	N 32° 54' 0.39"	W 103° 24' 7.42"		108	79
L 10209	3	Kenny Jackson	DOM	16 S	36 E	19 1 2 2	N 32° 54' 39.81"	W 103° 23' 53.18"	03-Aug-91	128	94
L 00150 ENGLD-S	0	Chesapeake Operating	PRO	16 S	36 E	19 2 1 3	N 32° 54' 39.83"	W 103° 23' 37.66"		80	
L 00150	0	Nearburg Producing Company	PRO	16 S	36 E	19 2 1 1	N 32° 54' 39.83"	W 103° 23' 37.66"		125	
USGS #7				16 S	36 E	19 1 1 1			31-Mar-81		59.25
USGS #8				16 S	36 E	19 2 1 1			16-Feb-61		59.9
USGS #9				16 S	36 E	19 2 1 1			03-Mar-76		64.9
USGS #10				16 S	36 E	19 2 1 4			15-Feb-71		64.05
USGS #11				16 S	36 E	19 4 1 3			30-Sep-81		66.54
L 03966	3	Robert Ralph Sims	DOM	16 S	36 E	21 2 4 4	N 32° 54' 26.96"	W 103° 21' 17.68"	18-Aug-58	95	60
L 03966 APPRO				16 S	36 E	21 2 2 4	N 32° 54' 40.06"	W 103° 21' 17.68"	18-Aug-58	95	60
L 05269	3	Ralph E. Collins	DOM	16 S	36 E	21 2 2 4	N 32° 54' 40.06"	W 103° 21' 17.68"	19-Oct-63	110	90
USGS #12				16 S	36 E	21 2 3 2			01-Feb-96		66.58
L 01608 APPRO	3	Lawton Oil Group	PRO	16 S	36 E	30 2 2	N 32° 53' 47.54"	W 103° 23' 22.07"	24-Oct-52	145	80
L 04932	3	George Spires	DOM	16 S	36 E	30 1 2	N 32° 53' 47.53"	W 103° 23' 53.08"	12-Jul-62	104	90
L 06334	0	Marcum Drilling Company	PRO	16 S	36 E	30 3 1 1	N 32° 53' 21.38"	W 103° 24' 7.28"	02-Jun-68	135	75
L 06334 (E) 1	0	Humble Oil & Refining Co.	PRO	16 S	36 E	30 3 1 1	N 32° 53' 21.38"	W 103° 24' 7.28"			
USGS #13				16 S	36 E	30 1 2 4			10-Mar-76		75.23

* = Data obtained from the New Mexico Office of the State Engineer Website (http://iwaters.ose.state.nm.us:7001/iWATERS/wr_RegisServlet1)
Well locations shown on Figure 2

[A] = in acre feet per annum
IND = Industrial
IRR = Irrigation
DOM = Domestic
EXP = Exploration
quarters are 1=NW, 2=NE, 3=SW, 4=SE; quarters are biggest to smallest

APPENDIX I

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORM

ANALYTICAL RESULTS NOT INCLUDED IN DRAFT COPY OF REPORT

APPENDIX II

PROJECT PHOTOGRAPHS

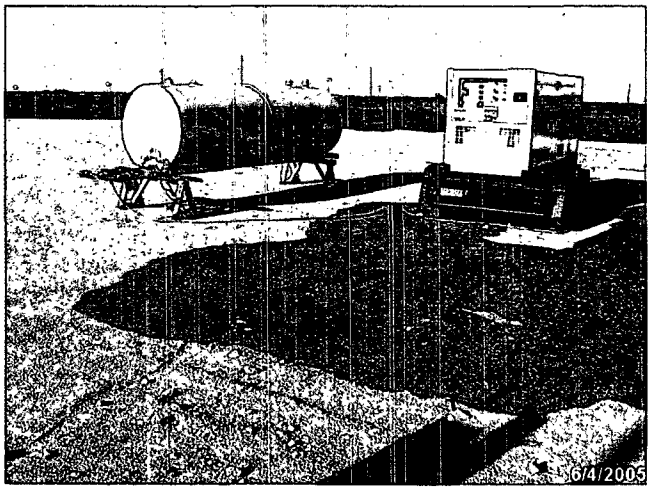

Photo #1: Looking northwesterly at diesel tank, generator and release area.

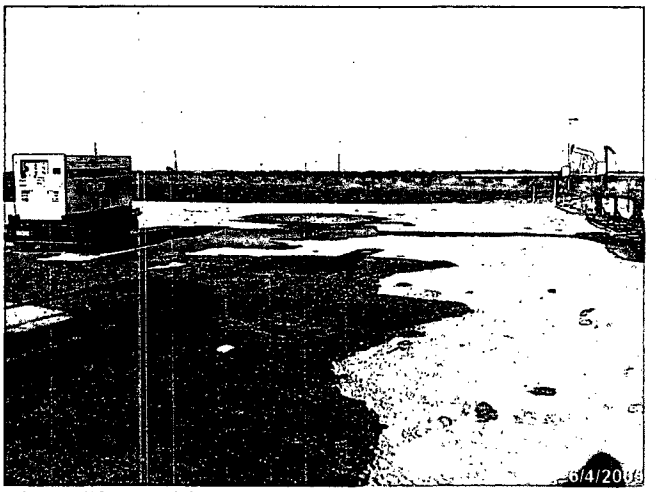
Photo #2: Looking westerly at release area.

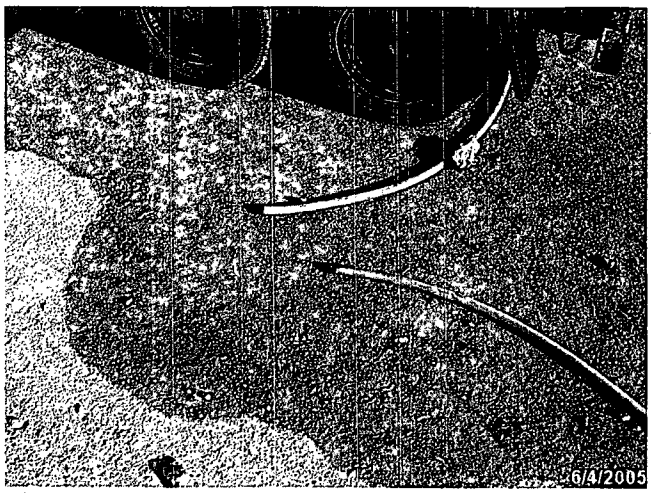

Photo #3: Looking down at point-of-release.

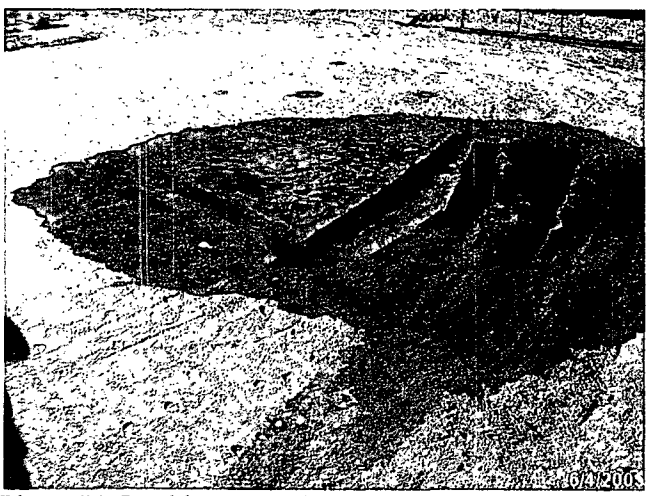
Photo #4: Looking at pooled diesel fuel on caliche pad.

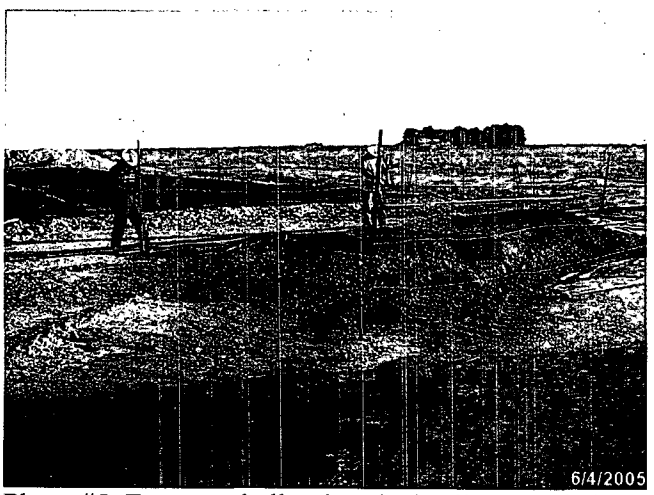

Photo #5: Excavated, diesel soaked soil stockpiled on plastic. Drilling pit is in background of photo.

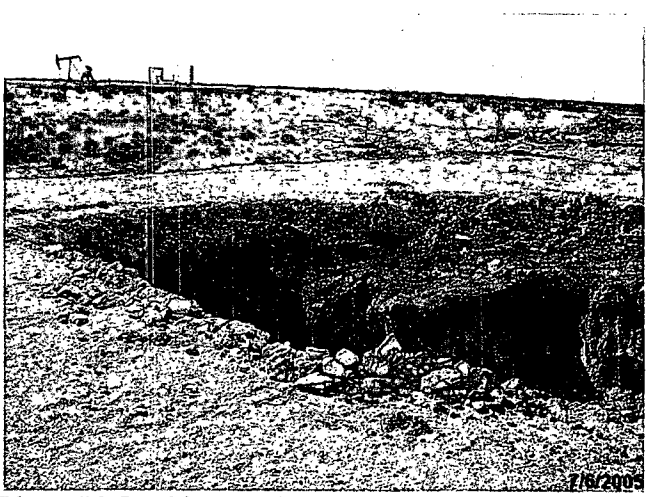
Photo #6: Looking southwesterly at excavation.

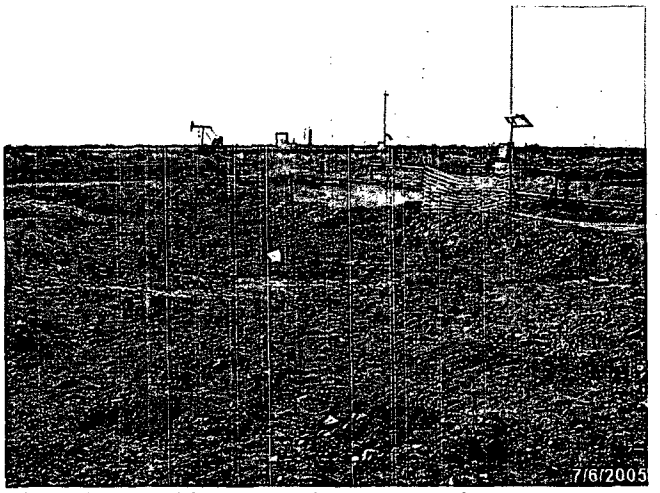

Photo #7: Looking westerly at excavation.

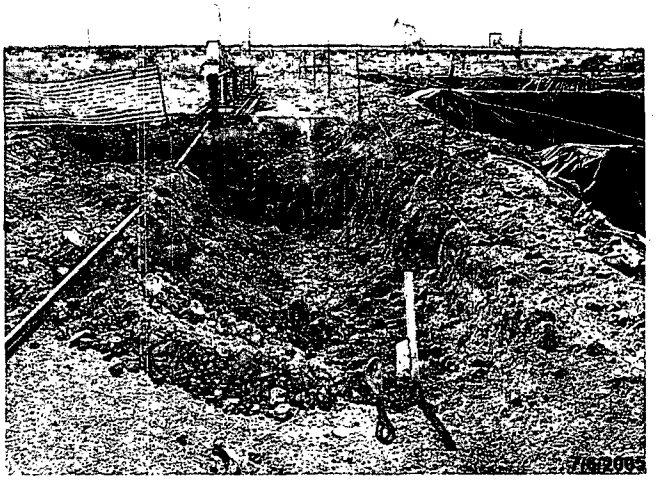
Photo #8: Looking westerly at excavation. Drilling pit is in right side of photo.

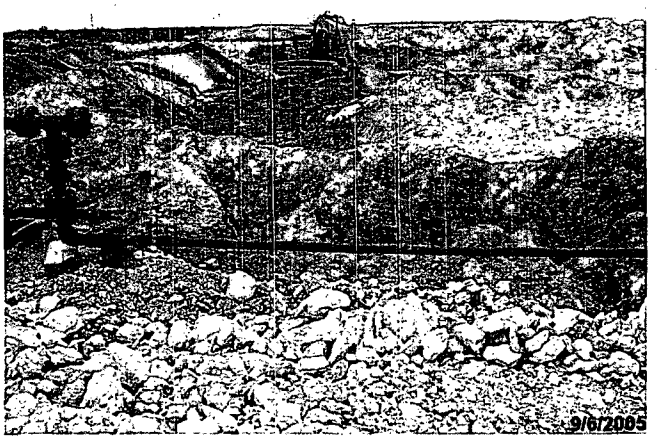

Photo #9: Looking northerly at excavation.

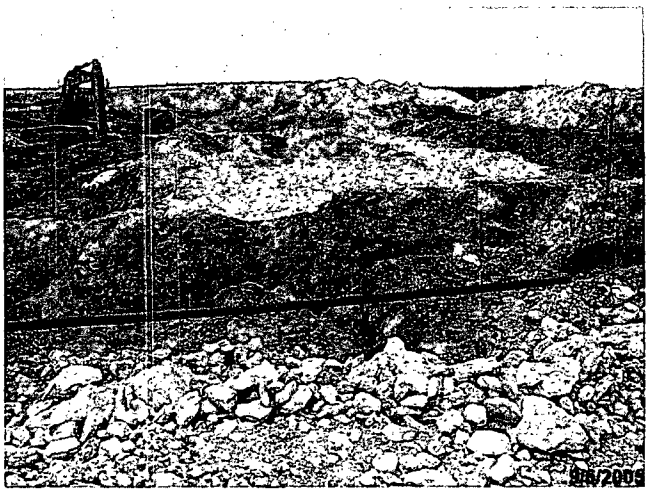
Photo #10: Looking northwesterly at excavation.

APPENDIX III

SOIL BORING LOG

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160016

Project Name: Chesapeake Ruth 20-2 Pit Closure

Location: UL-D, Section 20, Township 16 South, Range 36 East

Boring Number: BH-1 | Surface Elevation: 3,938-feet amsl

Start Date: 10/19/05 Time: 1030 hrs

Completion Date: 10/19/05 Time: 1350 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								1' Sandy Loam Topsoil
								CALICHE, White to Tan, Hard
							5	
1030	PS	6		5.4	1,360		10	
1035	PS	12		4.7	1,360	SM	15	SAND, White to Tan to Red, Fine to Coarse Grained
1038	PS	7		3.7	1,280	SP	20	Sand turns to Red
1043	PS	8		6.4	1,280	SP	25	Sand turns to White
1050	PS	12		3.2	1,040	SM	30	

Water Level Measurements (feet)

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

Drilling Method: HSA 3.5" ID

Backfill Method: Bentonite

Field Representative: JR

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160016

Project Name: Chesapeake Ruth 20-2 Pit Closure

Location: UL-D, Section 20, Township 16 South, Range 36 East

Boring Number: BH-1 | Surface Elevation: 3,938-feet amsl

Start Date: 10/19/05 Time: 1030 hrs

Completion Date: 10/19/05 Time: 1350 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								SAND, White to Tan to Red, Fine to Coarse Grained
1054	PS	11		1.6	1,520	SM	35	
1203	PS	8		2.6	1,520	SM	40	
1220	PS	8		2.3	1,120	SM	45	
1230	PS	12		1.9	1,040	SM	50	
1241	PS	8		1.3	1,040	SM	55	
1316	PS	8		1.7	1,320	SM	60	

Water Level Measurements (feet)

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

Drilling Method: HSA 3.5" ID

Backfill Method: Bentonite

Field Representative: JR

Log Of Test Borings

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES
EUNICE
505-394-3481

Project Number: 160016

Project Name: Chesapeake Ruth 20-2 Pit Closure

Location: UL-D, Section 20, Township 16 South, Range 36 East

Boring Number: BH-1 | Surface Elevation: 3,938-feet amsl

Start Date: 10/19/05 Time: 1030 hrs

Completion Date: 10/19/05 Time: 1350 hrs

Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	Chloride Analysis (mg/Kg)	U.S.C.S. Symbol	Depth (feet)	Description
								SAND, White to Tan to Red, Fine to Coarse Grained
1320	PS	10		2.0	4,000	SM	65	
1327	PS	10		1.1	4,880	SM	70	
1343	PS	12	Damp	1.8	>4,000	SM		
1350	PS	12	Wet	--	--	SM	75	
								End of Soil Boring at 76' bgs
							80	
							85	
							90	

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
10/19/05	1343	-	-	-	72'
-	-	-	-	-	-

Drilling Method: HSA 3.5" ID

Backfill Method: Bentonite

Field Representative: JR

APPENDIX IV

SITE METRICS FORM AND INFORMATIONAL NMOCD C-141 FORM

Chesapeake
Information and Metrics

Incident Date:	NMOCD Notified:
03 June 2005	4 June 2005

Site: BRC Federal Well #1 Battery	**Assigned Site Reference #:** ~~1~~60010
Company: Chesapeake Energy	
Street Address: 5014 Carlsbad Highway	
Mailing Address: 5014 Carlsbad Highway	
City, State, Zip: Hobbs, New Mexico 88240	
Representative: Bradley Blevins	
Representative Telephone: (505) 391-1462 ext. 24	
Telephone:	
Fluid volume released (bbls): 500 gallons	**Recovered (bbls):** 0 gallons

>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: Ruth 20-2	
Source of contamination: Fuel line supplying diesel to a generator was vandalized and all the diesel fuel was released onto the surface.	
Land Owner, i.e., BLM, ST, Fee, Other: State of New Mexico	
LSP Dimensions: 75 feet by 45 feet	
LSP Area: ≈3,150 ft²	
Location of Reference Point (RP):	
Location distance and direction from RP:	
Latitude: N 32° 54' 48.033"	
Longitude: W 103° 22' 57.430"	
Elevation above mean sea level: 3,938	
Feet from South Section Line:	
Feet from West Section Line:	
Location- Unit or ¼¼: NW¼ of the NW¼	**Unit Letter:** D
Location- Section: 20	
Location- Township: T16S	
Location- Range: R36E	
Surface water body within 1000 ' radius of site: none	
Domestic water wells within 1000' radius of site: none (USGS #1 as illustrated on Figure 2)	
Agricultural water wells within 1000' radius of site: two (College of the Southwest irrigation well – L 00209C and USGS #1, as illustrated on Figure 2)	
Public water supply wells within 1000' radius of site: none	
Depth from land surface to ground water (DG): 50 to 100 feet	
Depth of contamination (DC): < 10 feet	
Depth to ground water (DG – DC = DtGW): 50 to 100 feet	

1. Ground Water	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*		200-100 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) = 30 points

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
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, N.M. 88240	**Telephone No.:** (505) 391-1462 ext. 24
Facility Name: Ruth 20-2	**Facility Type:** Tank Battery

Surface Owner: State of New Mexico - Leased by Dale Gandy	**Mineral Owner:** State of New Mexico	**Lease No.:** V0-4719-0000

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
D	20	16 S	36 E					Lea

Latitude: N 32° 54' 48.033" **Longitude:** W 103° 22' 57.430"

NATURE OF RELEASE

Type of Release: Diesel Fuel	**Volume of Release:** 500 gallons	**Volume Recovered:** 0 gallons
Source of Release: Tank	**Date and Hour of Occurrence:** 03 June 2005, time unkown	**Date and Hour of Discovery:** 04 June 2005
Was Immediate Notice Given? ☐ Yes ☐ No ☒ Not Required	**If YES, To Whom?** Not Applicable	
By Whom? Not Applicable	**Date and Hour:** Not Applicable	
Was a Watercourse Reached? ☐ Yes ☒ No	**If YES, Volume Impacting the Watercourse:** Not Applicable	

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

Describe Cause of Problem and Remedial Action Taken.* The site was vandalized and the fuel line from the diesel tank to the generator was cut and all the diesel allowed to flow onto the caliche pad. Soil impacted above the NMOCD remedial thresholds has been excavated and transported to a State approved treatment facility.

Describe Area Affected and Cleanup Action Taken.* Approximately 3,150 square feet of surface area was impacted by the release, all of which was on the caliche pad at the site. Approximately 340-cubic yards of hydrocarbon impacted soil above the NMOCD remedial guidelines was excavated and transported to Artesia Aeration for treatment. An equivalent amount of clean soil was obtained from an off-site source and utilized to backfill the excavation. NMOCD remedial thresholds for the site were: 10 mg/Kg for benzene, 50 mg/Kg for BTEX and 100 mg/Kg for TPH.

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: Bradley Blevins	**Approved by District Supervisor:**	
Title: Field Technician	**Approval Date:**	**Expiration Date:**
E-mail Address: bblevins@chkenergy.com	**Conditions of Approval:**	**Attached** ☐
Date: **Phone:** (505) 391-1462 ext. 24		

*** Attach Additional Sheets If Necessary**