Chesapeake

3.2.06 WTR 71'
① CHEK WTR TO UPGRADIENT
② IF NOT, INSTALL DOWNGRADIENT
FILL PIT & PLACE BARRIER

SITE CHARACTERIZATION

RUTH 20-2 DRILLING PIT

REF: 160016

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"**

DECEMBER 2005

Chesapeake - 147179

PREPARED BY:

Environmental Plus, Inc.

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application - pPAC0606227599

Standard of Care

Site Characterization

Ruth 20-2 Drilling Pit

Ref: 160016

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

Distribution List

Chesapeake- Ruth 20-2 (Ref. #160016)

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1.0 Summary

On July 5, 2005, Chesapeake Operating, Inc. retained Environmental Plus, Inc. (EPI) to perform site delineation, remediation and closure of the Ruth 20-2 drilling pit. This site is located approximately 2.4 miles southwest of Lovington, Lea County, New Mexico (reference *Figure 1*). EPI performed GPS surveying, photography and characterization of the site on July 11, 2005. The pit contents had been excavated prior to site delineation by EPI. The drilling pit entailed an area of approximately 28,000 square feet (ft^2) to a depth of 5-feet below ground surface (bgs) (reference *Figure 3*).

On September 8, 2005, a test trench was excavated by Sweatt Construction in the center of the pit and grab samples were collected from the pit floor and test trench by EPI personnel. 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 benzene, toluene, ethylbenzene and total xylenes (BTEX constituents), total petroleum hydrocarbon (TPH) and chloride concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors utilizing an MiniRae photoionization detector (PID) equipped with a 9.8 electron-volt (eV) lamp. Field analyses indicated organic vapor concentrations ranged from 2.5 to 8.3 parts per million (ppm). Analytical results indicated TPH and BTEX constituents were non-detectectable (ND) at or above laboratory method detection limits (MDL). Chloride concentrations were reported to range from 116 to 9,310 mg/Kg (reference *Table 1*).

On September 12, 2005, a soil sample was collected from the pit floor, placed in a laboratory provided container and set on ice for transport to an independent laboratory for quantification of chloride concentrations. Analytical results indicated a chloride concentration of 4,223 mg/Kg (reference *Table 1*).

On October 19, 2005, a soil boring (BH-1) was advanced through the pit floor to approximately 75-feet bgs. Soil samples were collected at 10-feet bgs to 70-feet bgs at 5-foot intervals. Additionally, soil samples were collected at 72-feet bgs (i.e., where groundwater was encountered) and 75-feet bgs. A portion of each sample was placed in a laboratory provided container and set on ice for transport to an independent laboratory. All soil samples were analyzed for chloride concentrations, additionally samples collected from BH-1 at 10 and 15-feet bgs were analyzed for TPH and BTEX constituent concentrations. The remaining portion of each sample was analyzed in the field for the presence of organic vapors utilizing a PID and chloride concentrations utilizing a LaMotte Chloride Test Kit. Field analytical results indicated that organic vapor concentrations ranged from 1.1 to 6.4 ppm and chloride concentrations ranged from 1,040 mg/Kg to >4,000 mg/Kg. Analytical results for indicated TPH and BTEX constituent concentrations at 10 and 15-feet bgs were ND at or above laboratory MDL. Chloride concentrations were reported to range from 768 to 4,800 mg/Kg (reference *Table 2*).

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 soil borings BH-1 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***
Site Rank (1+2+3) = 10 + 20 + 0 = 30 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 September 8, 2005, soil samples were collected from a test trench (SP-1) and the pit floor pit floor (SP-2, 3, 4 and 5). A portion of each sample was placed in a laboratory provided container and submitted to an independent laboratory for analyses. The remaining portion was analyzed in the field for the presence of organic vapors utilizing a PID. Field analyses indicated that organic vapor concentrations ranged from 2.5 to 8.3 ppm (reference *Table 1* and *Figure 4*).

Laboratory analytical data for the samples collected from the pit floor indicated TPH and BTEX constituent concentrations were ND at or above laboratory method detection limits (MDL), with the exception of soil sample from SP-4. This sample indicated TPH concentrations were 7.73 mg/Kg and BTEX constituent concentrations were 0.0386 mg/Kg. Chloride concentrations in the pit floor ranged from 116 to 9,310 mg/Kg (reference *Table 1* and *Figure 4*).

On September 12, 2005, a soil sample (SCR91205SP-6) was collected from the pit floor, placed in a laboratory provided container and submitted to an independent laboratory for quantification of chloride concentrations. Laboratory analytical data indicated chloride concentrations were 4,223 mg/Kg (reference *Table 1* and *Figure 4*).

The vertical extent of contamination from the drill pit materials was determined via a soil boring (BH-1) completed to a depth of 75-ft bgs on October 19, 2005. During the advancement of the soil boring, soil samples were collected at 10-feet bgs (i.e., 5-feet below the bottom of the pit) and 5-foot intervals to a depth of 70-feet. Additional samples were collected at 72 and 75-feet bgs. A portion of each sample was placed in a laboratory provided container and submitted for laboratory

analyses of TPH and BTEX constituent concentrations in the samples collected at 10 and 15-feet bgs and chloride concentrations in all samples. The remaining portion of each sample was analyzed in the field for organic vapor and chloride concentrations. Field analyses indicated organic vapor concentrations ranged from 1.1 to 6.4 ppm and chloride concentrations ranged from 1,040 to >4,000 mg/Kg (reference *Figure 5*).

Laboratory analytical from the soil samples collected from soil boring BH-1 indicated TPH and BTEX constituent concentrations in the samples collected at 10 and 15-feet bgs were non-detectable at or above laboratory MDL. Reported chloride concentrations for the soil samples collected from BH-1 ranged from 768 to 4,800 mg/Kg (reference *Table 1*).

5.0 Groundwater Investigation

Groundwater was encountered at approximately 72-feet bgs during the advancement of soil boring BH-1. Field analyses indicated organic vapor concentrations in the soil samples collected from BH-1 ranged from 1.1 to 6.4 ppm (reference *Table 1*).

Confirmatory laboratory analytical results for soil samples collected from the pit floor (i.e., SP-1, 2, 3, 4 and 5) indicated that TPH and BTEX constituents were non-detectable at or above laboratory MDL, with the exception of SP-4. Analytical data from SP-4 indicated xylene (p/m) was 0.0386 mg/Kg and TPH was estimated at 7.73 mg/Kg, below the NMOCD remedial threshold for each respective analyte. All other analytes in SP-4 were non-detectable at or above laboratory MDL. (reference *Table 1* and *Appendix I*).

6.0 Summary of Results

Drill pit materials were excavated prior to EPI delineation activities. Laboratory and field analytical data indicated TPH and BTEX constituent concentrations in the pit floor and subsurface to approximately 75-feet bgs were below the NMOCD hydrocarbon remedial thresholds. Reported chloride concentrations in the pit floor ranged from 116 to 9,310 mg/Kg. Soil boring analytical data indicated chloride concentrations ranged from 768 to 4,800 mg/Kg (reference *Table 1*).

FIGURES

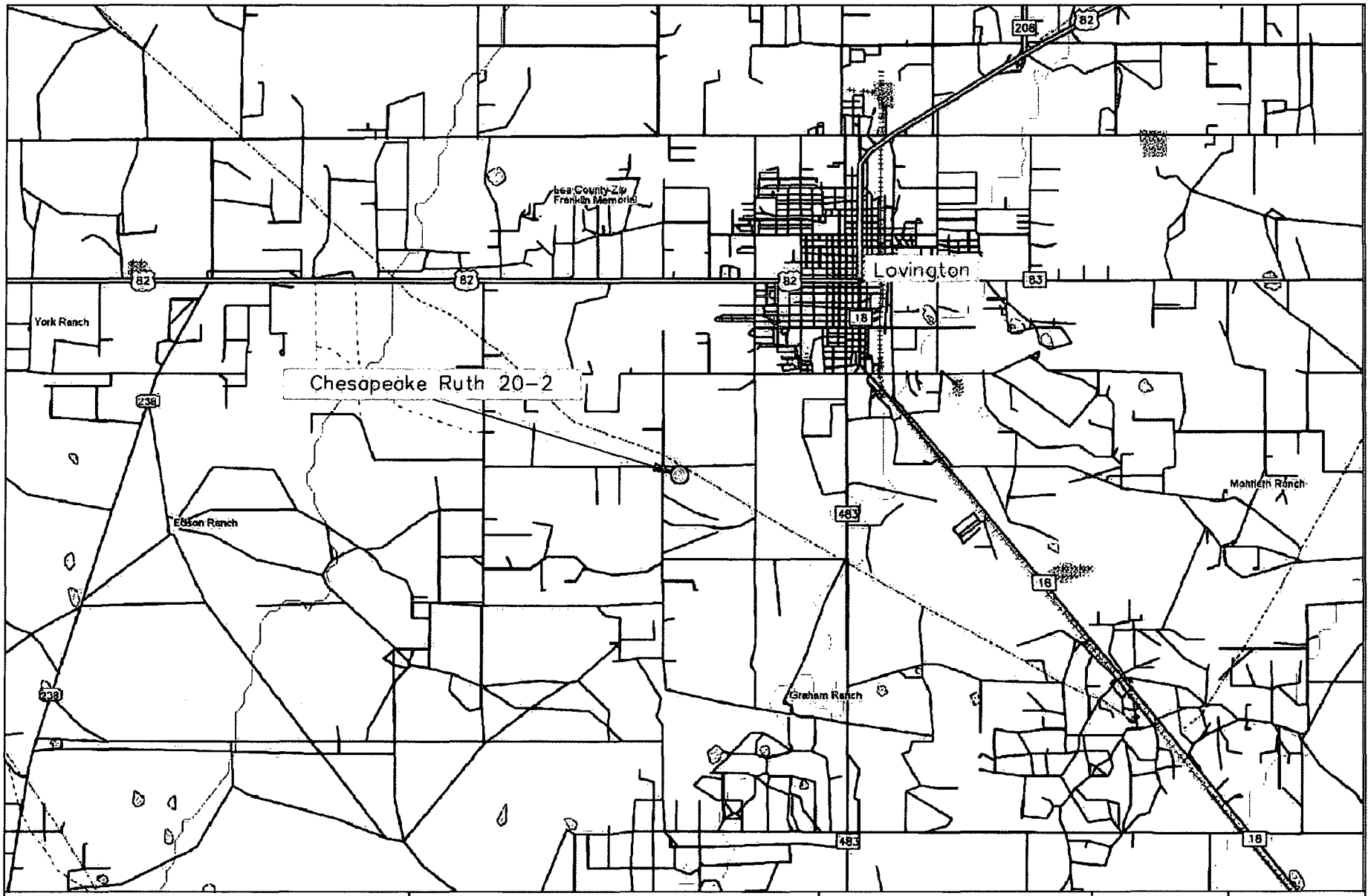

Figure 1
Site and Well Location Map
Chesapeake Energy
Ruth 20-2

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:

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Miles

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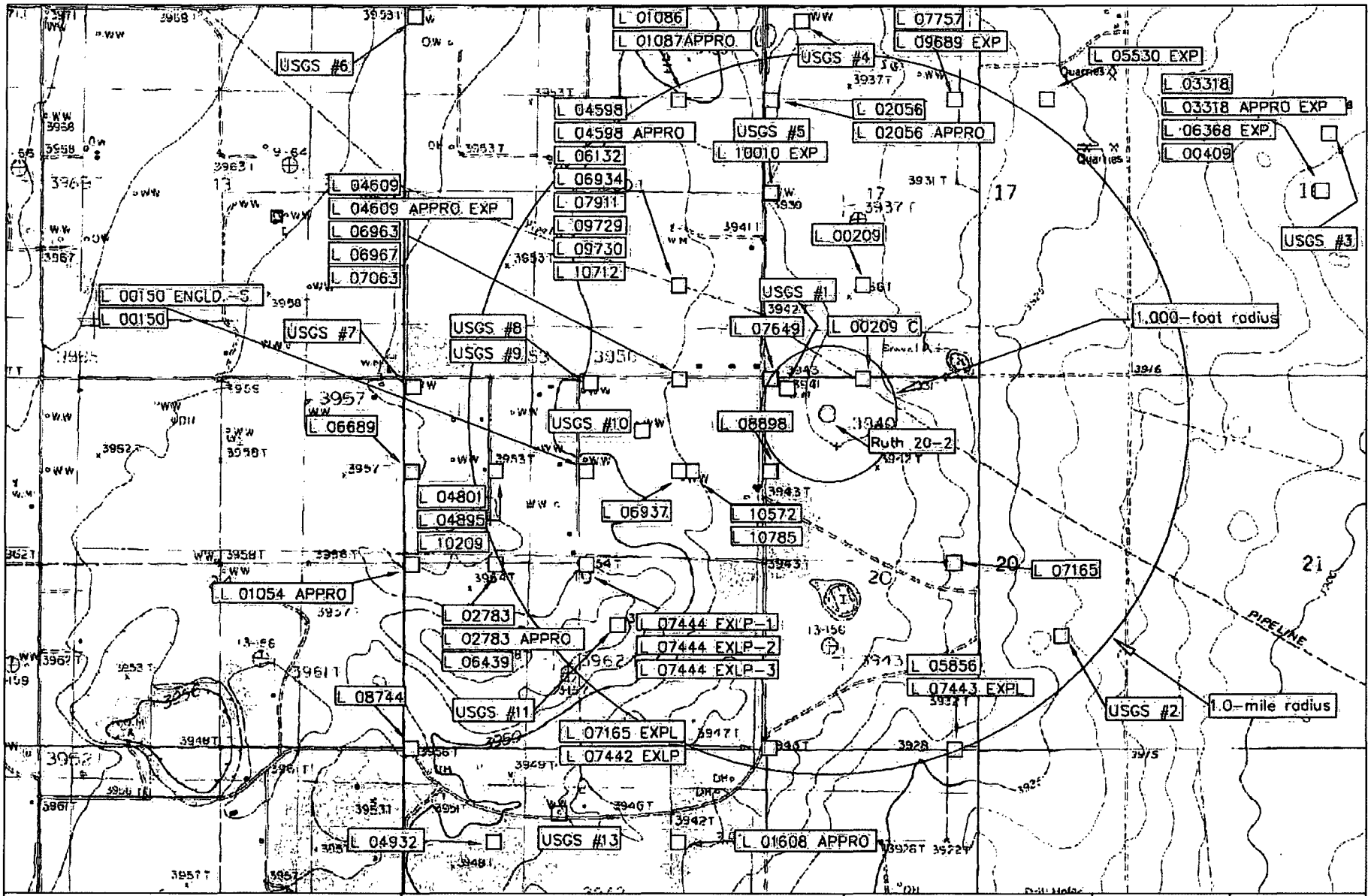

Figure 2
Site and Well Location Map
Chesapeake Energy Corporation
Ruth 20–2

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

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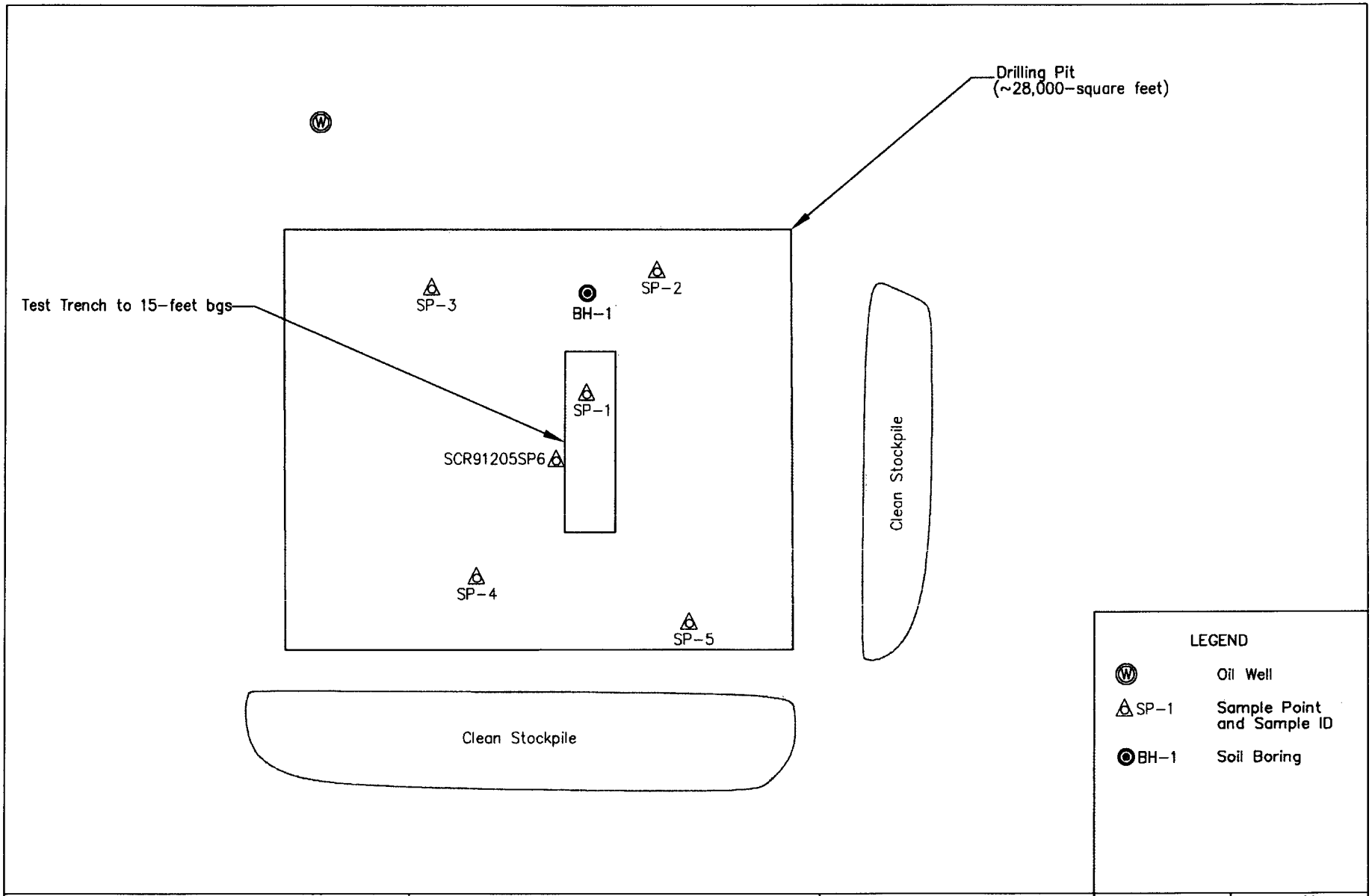

Figure 3 Site and Sample Location Map Chesapeake Energy Ruth 20-2	Lea County, New Mexico NW 1/4 of the NW 1/4, Sec. 20, T16S, R36E N 32 54' 48.0" W 103° 22' 57.4" Elevation: 3,938 feet amsl	DWG By: Jason Stegemoller November 2005 0 50 100 Feet	REVISED: SHEET 1 of 1 N

TABLES

TABLE 1

Summary of Soil Sample Field Analyses and Laboratory Analytical Results

Chesapeake Energy Ruth 20-2 Release Site (Ref.# 160016)

Sample ID	Depth (feet)	Sample Date	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)	Chloride (mg/Kg)
SP-1	15	08-Sep-05	3.1	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	9,310
SP-2	5	08-Sep-05	2.5	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	313
SP-3	5	08-Sep-05	4.4	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	400
SP-4	5	08-Sep-05	7.0	<0.0250	<0.0250	<0.0250	0.039	0.039	<10.0	7.73 [1]	<10.0	247
SP-5	5	08-Sep-05	8.3	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	116
SCR91205SP6	5	12-Sep-05	--	--	--	--	--	--	--	--	--	4,223
NMOCD Remedial Thresholds			**100**	**10**				**50**			**100**	**250** [3]

[1] *Analyte detected but below the reporting limit; therefore, result is an estimated concentration*

[2] *- = Not Analyzed*

[3] *Chloride residuals may not be capable of impacting groundwater above the NMWQCC groundwater standard of 250 mg/L.*

TABLE 2

Summary of Soil Sample Field Analyses and Laboratory Analytical Results

Chesapeake Energy Ruth 20-2 Release Site (Ref.# 160016)

Sample ID	Depth (feet)	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)	TPH (as gasoline) (mg/Kg)	TPH (as diesel) (mg/Kg)	Total TPH (mg/Kg)	Chloride (mg/Kg)
BH-1	10	19-Oct-05	5.4	1,360	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	961
	15	19-Oct-05	4.7	1,360	<0.0250	<0.0250	<0.0250	<0.0250	<0.10	<10.0	<10.0	<10.0	1,190
	20	19-Oct-05	3.7	1,280	--	--	--	--	--	--	--	--	972
	25	19-Oct-05	6.4	1,280	--	--	--	--	--	--	--	--	980
	30	19-Oct-05	3.2	1,040	--	--	--	--	--	--	--	--	989
	35	19-Oct-05	1.6	1,520	--	--	--	--	--	--	--	--	1,260
	40	19-Oct-05	2.6	1,520	--	--	--	--	--	--	--	--	1,160
	45	19-Oct-05	2.3	1,120	--	--	--	--	--	--	--	--	1,010
	50	19-Oct-05	1.9	1,040	--	--	--	--	--	--	--	--	808
	55	19-Oct-05	1.3	1,040	--	--	--	--	--	--	--	--	768
	60	19-Oct-05	1.7	1,520	--	--	--	--	--	--	--	--	1,210
	65	19-Oct-05	2.0	4,000	--	--	--	--	--	--	--	--	3,680
	70	19-Oct-05	1.1	4,880	--	--	--	--	--	--	--	--	4,550
	72	19-Oct-05	1.8	>4,000	--	--	--	--	--	--	--	--	4,800
	75	19-Oct-05	--	--	--	--	--	--	--	--	--	--	3,220
NMOCD Remedial Thresholds			**100**		**10**				**50**			**100**	**250**[3]

[1] *Analyte detected but below the reporting limit; therefore, result is an estimated concentration*

[2] *-- = Not Analyzed*

[3] *Chloride residuals may not be capable of impacting groundwater above the NMWQCC groundwater standard of 250 mg/L*

TABLE 3

Well Data

Chesapeake Energy Ruth 20-2 Pit Closure (Ref. #160016)

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	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	146	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	70.84	
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° 55' 6.07"	W 103° 22' 5.08"		127	
L 00209 C	287.7	College of the SW Foundation	IRR	16 S	36 E	17 4 4 3	N 32° 55' 5.31"	W 103° 22' 5.08"		128	
L 02056	3	Noble Drilling Company	PRO	16 S	36 E	17 1 1 1	N 32° 55' 32.22"	W 103° 23' 6.68"	06-Mar-53	150	60
L 02056 APPRO		Noble Drilling Company		16 S	36 E	17 1 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	Berry Lee Hobbs	DOM	16 S	36 E	17 2 2 2	N 32° 55' 32.3"	W 103° 22' 19.98"			
L 07642	0	Hulda R. Heidel	PRO	16 S	36 E	17	N 32° 54' 52.96"	W 103° 23' 6.65"	05-Feb-77	140	
L 07737	3	Berry 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 2 2	N 32° 55' 32.27"	W 103° 22' 35.55"			
L 10010 EXP	0	Inexco Oil Company	PRO	16 S	36 E	17 2 1 3	N 32° 56' 09.18"	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-Jan-69	67.82	
L 01086	3	C C Chambers	DOM	16 S	36 E	18 2 2 2	N 32° 55' 8.19"	W 103° 23' 22.19"	02-Apr-51	95	
L 01087 APPRO	3	C C Chambers	DOM	16 S	36 E	18 2 2 2	N 32° 55' 8.19"	W 103° 23' 22.19"	02-Apr-51	75	
L 04598	3	Elmer H. Sumruld	DOM	16 S	36 E	18 4 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	21-Jan-62	136	75
L 04598 APPRO	3	Elmer H. Sumruld	DOM	16 S	36 E	18 4 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 06152	3	George Wayne Sumruld	DOM	16 S	36 E	18 4 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 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"	12-May-72	8	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 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 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 4 2	N 32° 55' 6.02"	W 103° 23' 22.17"			
L 10712	0	Chesapeake Operating	PRO	16 S	36 E	18 4 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-Jan-96	54.94	
L 01054 APPRO	3	George Spurs	DOM	16 S	36 E	19 1 2	N 32° 54' 26.72"	W 103° 24' 7.41"	15-Dec-50	75	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	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

TABLE 3

Well Data

Chesapeake Energy Ruth 20-2 Pit Closure (Ref. #160016)

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 Hannana	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' 39.85"	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' 0.59"	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 4 2 1 1			03-Mar-76		64.9
USGS #10				16 S	36 E	19 2 1 4			15-Feb-74		64.05
USGS #11				16 S	36 E	19 4 1 3			30-Sep-81		66.84
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' 22.67"	24-Oct-52	145	80
L 04912	3	George Spires	DOM	16 S	36 E	30 1 2	N 32° 53' 47.81"	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)
Shaded area indicates well locations shown on Figure 2
[A] = in acre feet per annum
IND = Industrial
IRR = Irrigation
DOM = Domestic
EXP = Exploration
STK = Livestock watering
OIL = Oil Production
PRO = Prospecting or Development of Natural Resources

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

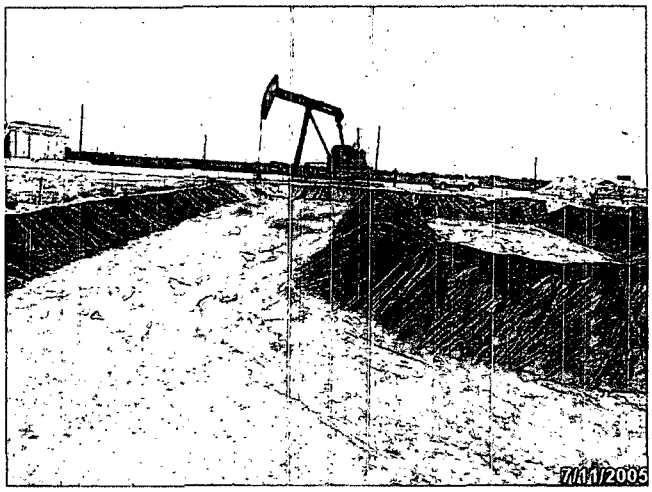

Photo #1: Pit area looking northerly.

Photo #2: Looking westerly at pit area and liner.

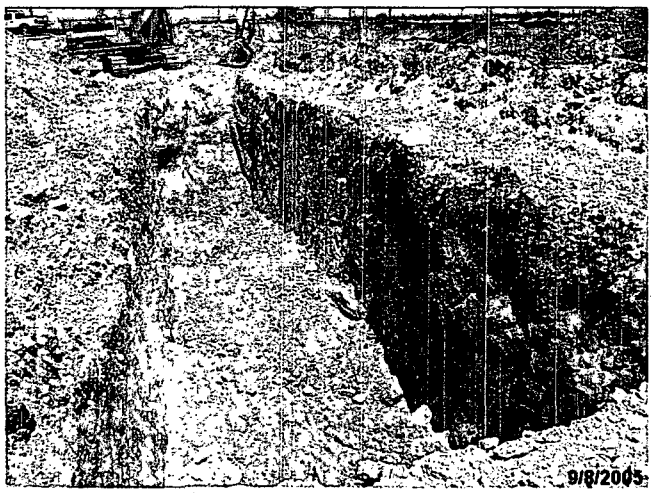

Photo #3: Looking southerly at test trench.


Photo #4: Looking westerly towards test trench.

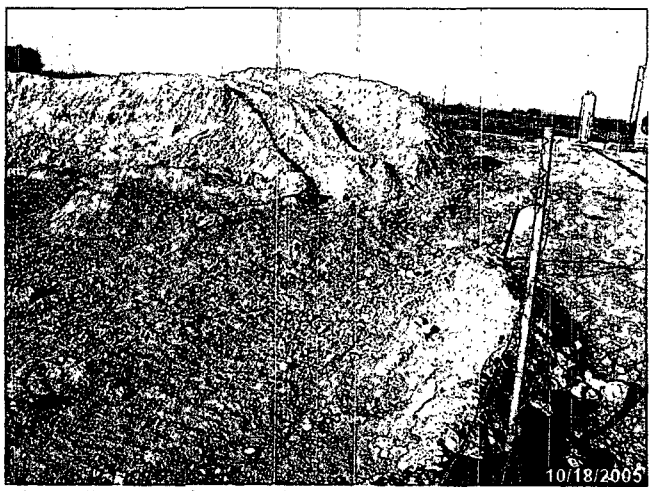

Photo #5: Looking northerly at clean stockpile.

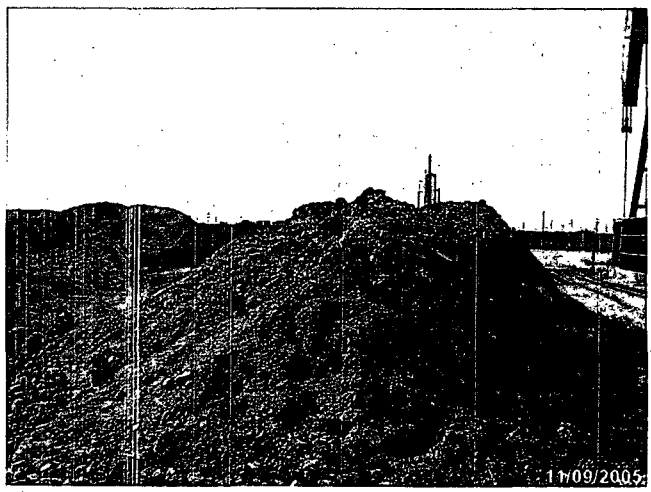

Photo #6: Looking northerly at clean stockpile.

APPENDIX III

Soil Boring Logs

Log Of Test Borings

(NOTE - Page 1 of 3)

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
							0	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
							35	
1054	PS	11		1.6	1,520	SM		
							40	
1203	PS	8		2.6	1,520	SM		
							45	
1220	PS	8		2.3	1,120	SM		
							50	
1230	PS	12		1.9	1,040	SM		
							55	
1241	PS	8		1.3	1,040	SM		
							60	
1316	PS	8		1.7	1,320	SM		

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

INFORMATIONAL COPY OF NMOCD C-103 FORM

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., 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-103
May 27, 2004

WELL API NO. 30-025-36866

5. Indicate Type of Lease STATE ☐ FEE ☒

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name
Ruth 20

1. Type of Well: Oil Well ☒ Gas Well ☐ Other

8. Well Number 002

2. Name of Operator
Chesapeake Operating, Inc.

9. OGRID Number 147179

3. Address of Operator P. O. Box 11050
Midland, TX 79702-8050

10. Pool name or Wildcat
Lovington;UpperPenn, West

4. Well Location
Unit Letter D : 523 feet from the North line and 841 feet from the West line
Section 20 Township 16S Range 36E NMPM County Lea

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*
3940 GR

Pit or Below-grade Tank Application ☐ or Closure ☒

Pit type Drilling **Depth to Groundwater** 70' **Distance from nearest fresh water well** 1000+ **Distance from nearest surface water** 1000+

Pit Liner Thickness: 12 mil **Below-Grade Tank: Volume** 12,129 bbls; **Construction Material**

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	P AND A ☐
PULL OR ALTER CASING ☐	MULTIPLE COMPL ☐	CASING/CEMENT JOB ☐	
OTHER:Close Pit ☒		OTHER: ☐	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Chesapeake, respectfully, request permission to close the drilling pit for this well. We will abide by the NMOCD Guidelines per B3b

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☒, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE Brenda Coffman TITLE Regulatory Analyst DATE 07/11/2005

Type or print name Brenda Coffman E-mail address:bcoffman@chkenergy.com Telephone No. (432)687-2992

For State Use Only

APPROVED BY: ORIGINAL SIGNED BY GARY W. WINK TITLE OC FIELD REPRESENTATIVE II/STAFF MANAGER DATE JUL 14 2005

Conditions of Approval (if any):