eott energy

RISK ASSESSMENT

AND

SITE CLOSURE PROPOSAL

NM STATE M BATTERY

EOTT REF: #2001-11095

UL-C NE¼ OF THE NW¼ OF SECTION 29 T22S R37E

~5 MILES SOUTH-SOUTHWEST (BEARING 198.4°) OF

EUNICE, LEA COUNTY, NEW MEXICO

LATITUDE: 32°22'02.82"N LONGITUDE: 103°11'10.40"W

APRIL 15, 2003

PREPARED BY:

Plains - 34053
Facility - fPAC0602638382
Inspect - ePAC0602638544
Incident - nPAC0602638584
Application - pPAC0602638744

John Good
Environmental Consultant
ENVIRONMENTAL PLUS, INC.
PO Box 1558
2100 Ave. O
Eunice, NM 88231
Phone: 505-394-3481
Fax: 505-394-2601
Cell: 505-390-9804
Email: enviplus1@aol.com

April 15, 2003

Mr. Larry Johnson
New Mexico Oil Conservation Division
1625 North French
Hobbs, New Mexico 88240

Subject: EOTT NM State M Battery Site (2001-11095)
Risk Assessment and Site Closure Proposal

Dear Mr. Johnson:

Environmental Plus, Inc. (EPI), on behalf of Mr. Frank Hernandez, EOTT Energy Co., submits the attached "**Risk Assessment and Closure Proposal**" for the above referenced leak site located on land owned by the State of New Mexico and leased to the Millard Deck Estate. The site is located in UL-C of Section 29 T22S R37E. The geographic location is 32°22'02.82"N and 103°11'10.40"W. The site is ~5 miles south-southwest (198.4°) of Eunice, Lea County, New Mexico. According to information obtained from the New Mexico Office of the State Engineer (NMOSE) database, ground water level beneath this site is conservatively estimated to be 65-ft below ground surface (bgs). The site matrix ranking for this site is 20 based on depth to ground water from lowest contaminant level of 0-50-ft.

The remedial action proposal for this site is to install a 2-ft compacted clay barrier over the current 10-ft bgs excavation that exhibits vadose zone contamination above the NMOCD remedial goals for hydrocarbon contamination at this site. A 1000-year VADSAT Risk Assessment was performed for this site incorporating conservative data parameters. The results of this VADSAT modeling indicate that the proposed placement of an impermeable layer above the zone of contamination will eliminate the risk of contaminant migration to the water table.

If there are any questions please call Mr. Ben Miller, or myself, at our office or at 505-390-0288 and 505-390-9804, respectively, or Mr. Frank Hernandez at 915-638-3799. All official written communications should be addressed to:

Mr. Frank Hernandez
EOTT Energy Co.
5805 E. Highway 80, Midland, Texas 79701
Midland, TX 79702

Sincerely,

John Good
EPI – Environmental Consultant

cc: Frank Hernandez, EOTT Energy Co.
William Von Drehle, EOTT Energy Co.
Ben Miller, EPI Vice President and General Manager
Sherry Miller, EPI President
Pat McCasland, EPI Technical Manager
file

ENVIRONMENTAL PLUS, INC.

Table of Contents

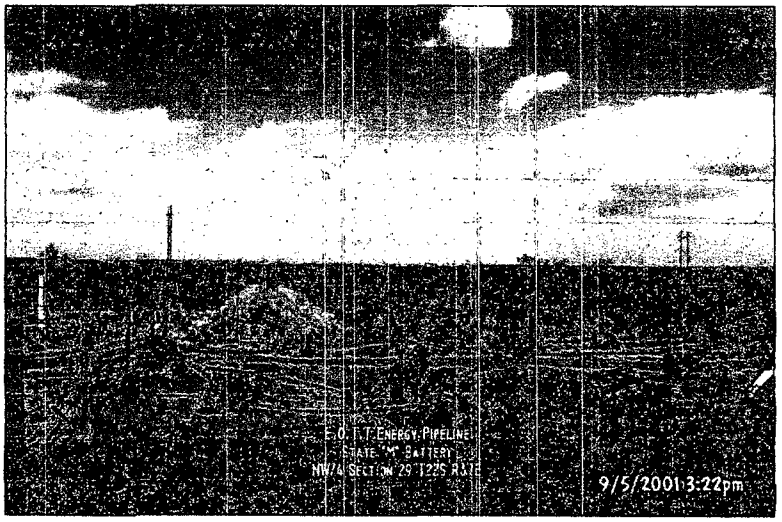
1.0 Introduction

This document addresses the initial site characterization, site excavation, vertical contaminant delineation and the proposal to close this site with the installation of an impermeable clay barrier. Environmental Plus, Inc. (EPI), Eunice, New Mexico commenced the initial site characterization and delineation process at this site on September 3, 2001. To date, the following remediation activities have taken place:

- GPS demarcation of the release site and relevant surface features. *(See Plate 3, Attachments)*
- Excavation and on-site stockpiling of ~650-yd^3 of contaminated soil. The 10-ft deep excavation had an approximate areal extent of 1,750-ft^2. *(See Plate 4, Attachments)*
- Drilling and sampling of 9 boreholes from the 2-ft bgs level down to 30-ft bgs within the extents of the excavation. *(See Plates 3,6,7,8 Attachments)*
- Excavation and stockpiling of ~650-yd^3 additional clean soil from the lateral extents of the primary excavation to shape it into a 85-ft X 45-ft rectangle. *(See Plate 5, Attachments)*

2.0 Background

Environmental Plus, Inc. (EPI) was notified by EOTT Energy Company (EOTT) on September 3, 2001 regarding a release and remediation project located immediately east of EOTT's State M Battery facility. The site is designated "NM State M Battery", and has the EOTT reference number of 2001-11095. The release is located on land owned by the State of New Mexico and leased to the Millard Deck Estate. There was no initial C-141 Form submitted for this project because the release volume was less than 5 bbl. An "Information Only" C-141 Form for this project has been prepared and is included in the attachments of this document.

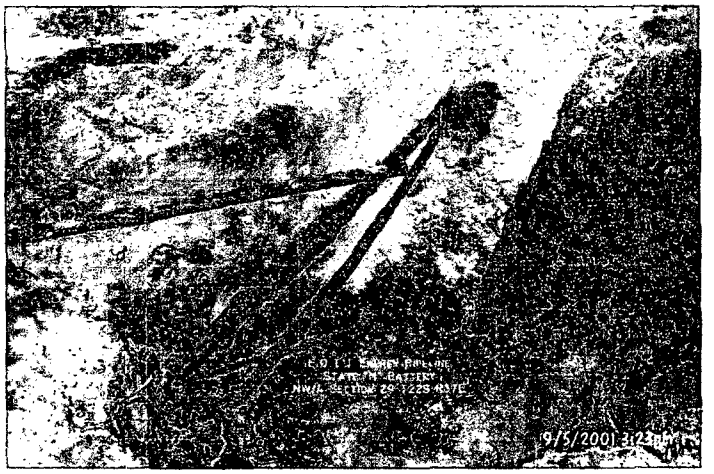


The initial response consisted of flow-path containment and recovery of 2 bbl of pooled crude oil. Vertical and horizontal delineation of the release extents was accomplished with the drilling and sampling of 9 boreholes (*Plate 3 – Attachments*). Approximate 650-yd^3 of contaminated soil was excavated and stockpiled on plastic extending southeast from the excavation (*Plate 4 – Attachments*). The original remedial plan for this project was to blend the stockpiled contaminated soil and return it to the excavation.

Borehole 9 exhibits a TPH concentration >500 ppm at a depth of 25-ft, thus it is a rational assumption that the remedial goal of 100 ppm cannot be achieved until the 30-35-ft depth is excavated in this area of the excavation. Deepening the excavation (presently at 10-ft bgs) an additional 25-ft is not cost-effective, nor practical as regards engineering and/or excavation safety.

EPI, on behalf of EOTT Energy, is proposing to extend the present, irregularly shaped excavation laterally to form a rectangular excavation (85-ft X 45-ft X 10-ft). The 650-yd^3 of stockpiled contaminated soil will then be placed on the bottom of the excavation, filling it up 4-5-ft. Once the

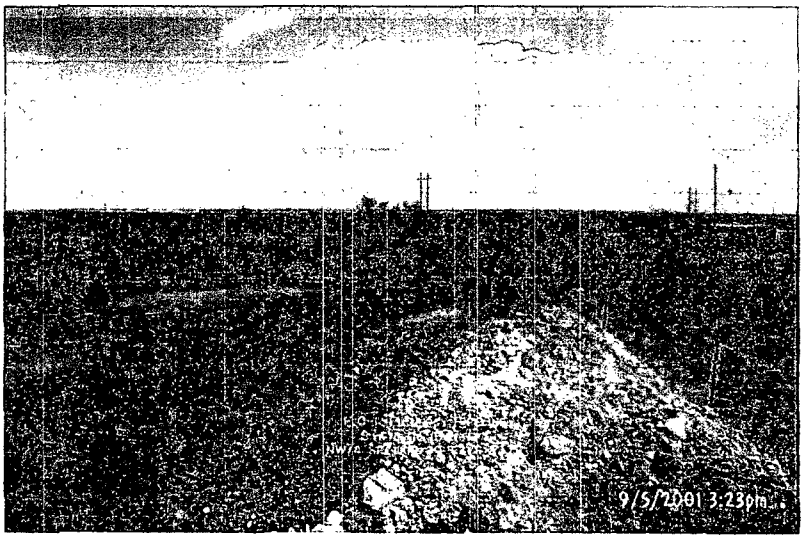
contaminated stockpile is occupying the bottom of the excavation, a 3-ft overlap will be excavated from the perimeter of the excavation sidewalls, and a 2-ft, compacted and certified clay barrier will be installed over the excavation. The final layer of backfill will be the clean soil removed when the excavation was transformed to the 85' X 45' rectangle. The 1000-year VADSAT Risk Assessment model for clay barrier closure of this site (*Plate 9 – Attachments*) predicts no risk to the water table (65-ft).



3.0 Site Description

3.1 Site Location

The EOTT "NM State M Battery" site is located in UL-C of Section 29 T22S R37E. The site is approximately 2300-ft from the west section line and 4317-ft from the south section line. The Latitude and Longitude coordinates are: 32°22'02.82"N; 103°11'10.40"W. The land is owned by the State of New Mexico and leased to the Millard Deck Estate. *(see Attachments, Plates 1, 2 and 3)*



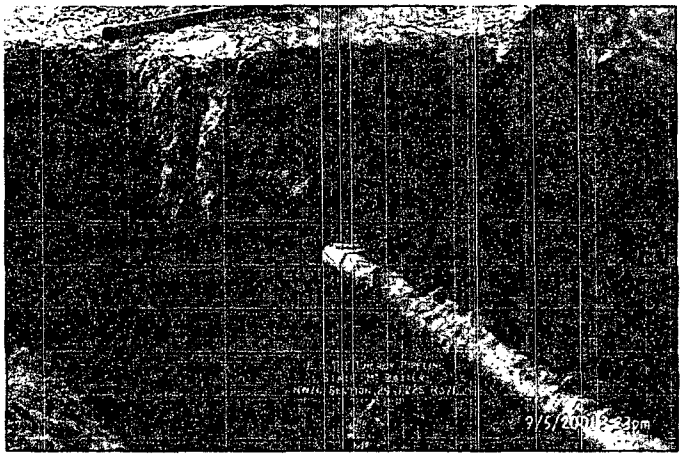
3.2 Geohydrology

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 Eunice Plain 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 cover ranges from 2-5 feet in most areas to as much as 20-30 feet in drift areas.

The subsurface at the site is composed of a hard caliche base covered with 5-6 feet of reddish sand/clay topsoil. The presence of ground water in this area of Lea County is best described as intermittent. Based on data obtained from the Office of the State Engineer, a conservative estimate of ground water depth at this site, if present, would be 65-ft bgs.

3.3 Ecology

The area is typical of the Upper Chihuahuan Desert Biome consisting primarily of hummocky sand hills covered with Harvard Shin Oak (Querqus harvardi) interspersed with Honey Mesquite (Prosopis glandulosa) along with typical desert grasses, flowering annuals and flowering perennials. Mammals represented, include Orrd's and Merriam's Kangaroo Rat, 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 area. A survey of Listed, Threatened, or Endangered species was not conducted.



3.4 Area Water Wells and/or Surface Water Features

There are no water wells and/or surface water features within 1000-ft of the release site.

There are no surface water bodies within 1000-ft of the site.

4.0 NMOCD Site Ranking

Contaminant delineation and site characterization accomplished at this site indicate that the chemical parameters of the soil and ground water were characterized consistent with the characterization and remediation/abatement goals and objectives set forth in the New Mexico Oil Conservation Division (NMOCD) approved "***General Work Plan for Remediation of E.O.T.T. Pipeline Spills, Leaks and Releases in New Mexico, July 2000***" and the NMOCD guidelines published in the following documents:

- ***Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993)***
- ***Unlined Surface Impoundment Closure Guidelines (February 1993)***

Acceptable thresholds for **contaminants/constituents of concern** (CoCs), i.e., TPH^{8015m}, Benzene, and the mass sum of Benzene, Toluene, Ethyl Benzene, and total Xylene (BTEX), was determined based on the NMOCD Ranking Criteria as follows:

- Depth to Ground water, 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 ground water from the lower most contamination, the NMOCD ranking score for the site is 10 points with the soil remedial goals highlighted in the Site Ranking Matrix presented as Table 1.

Table 1 - Site Ranking Matrix

1. Ground Water	2. Wellhead Protection Area	3. Distance to Surface Water
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***
Depth to GW 50 to 99 feet: *10 points*		**200-1000 horizontal feet: *10 points***
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***
Ground Water Score = 20	Wellhead Protection Score = 0	Surface Water Score= 0
Site Rank (1+2+3) = 20 + 0 + 0 = 20 points (for soil >15'bgs)		

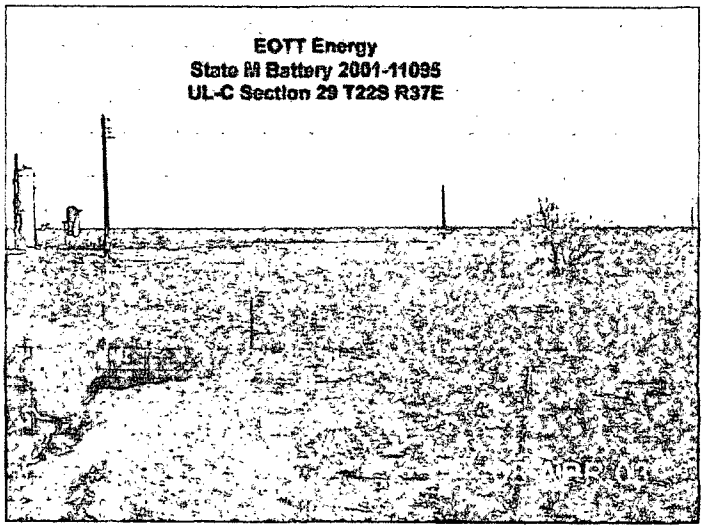
Total Site Ranking Score and Acceptable Remedial Goal Concentrations			
Parameter	20+	10	**0**
Benzene[1]	10 ppm	10 ppm	**10 ppm**
BTEX[1]	50 ppm	50 ppm	**50 ppm**
TPH	100 ppm	1000 ppm	**5000 ppm**
[1]100 ppm field VOC headspace measurement may be substituted for lab analysis			

5.0 Subsurface Soil Investigation

The subsurface soil analyses were accomplished on September 13-17, 2001 with the drilling and sampling of 9 boreholes (designated BH1-BH9) down to 30-ft bgs. Analyses results indicated that TPH and BTEX contamination above NMOCD remedial goals exists at the 15-30-ft depth zone within the area(s) delineated by Boreholes 8 and 9. *(Lab analyses results for this sampling event are included in the Attachments as Plates 6, 7 and 8).*

6.0 Ground Water Investigation

Ground water depth is conservatively projected to be 65-ft bgs at the site. The site was excavated to a maximum depth of 10-ft. All contaminated soil left within the excavation *(see Section 8.0 below)* will be covered with a 2-ft impermeable layer of compacted clay. The remaining volume of the excavation will be backfilled with clean caliche and topsoil. Based on the containment of the Constituents of Concern, VADSAT Risk Assessment Model and a remaining depth to ground water of >30-ft, there will be no need for further ground water investigation at this site.



7.0 VADSAT Risk Assessment

A very conservative 1000-year Risk Assessment of vertical hydrocarbon migration for this site was generated utilizing the American Petroleum Institute's VADSAT 3.0 software. Although the sampling protocol for this site does not show an inordinate presence of Benzene, it was the chemical species utilized to run the assessment because it is the lightest and fastest migrating of the chemical choices VADSAT offers. VADSAT calculates the Mean Infiltration Rate based on annual precipitation minus a runoff coefficient and the evaporation rate. This number must be positive, so VADSAT does not accommodate arid and semi-arid areas such as southeast NM where the evaporation rate exceeds the precipitation rate.

Although the water table is estimated to be 65-feet deep at this site, there is no empirical confirmation of this presumption. To allow for more conservancy in the VADSAT risk assessment modeling, the water table depth was set at 50-feet for both the assessment models presented with this site.

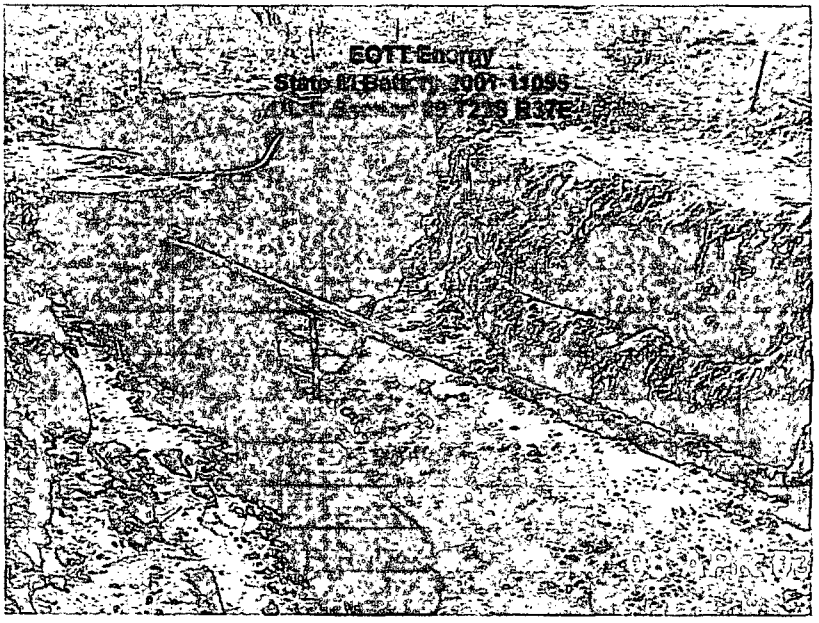
Two assessments were run for this site: one with no clay barrier present and one with a clay barrier present. Other than the presence of the clay barrier, the input parameters for each assessment are identical. The downstream receptors were set at 1-meter, 10-meters and 100-meters (X=1 X=10 X=100). The transverse offset (Y value) was set at 0-meters, and the depth into the aquifer (Z value) was set at 0.

The results of the computer risk assessment modeling for the site without a clay barrier in place indicate that benzene present would reach the top of the aquifer directly under the site in approximately 100-years and reach its peak concentration of 9.63 X 10-4 mg/L 100-years later. The computer risk assessment modeling of the site with the clay barrier in place shows a flat-line of 0 values for the 1000-year period modeled, thus the contaminant migration would never reach the aquifer.

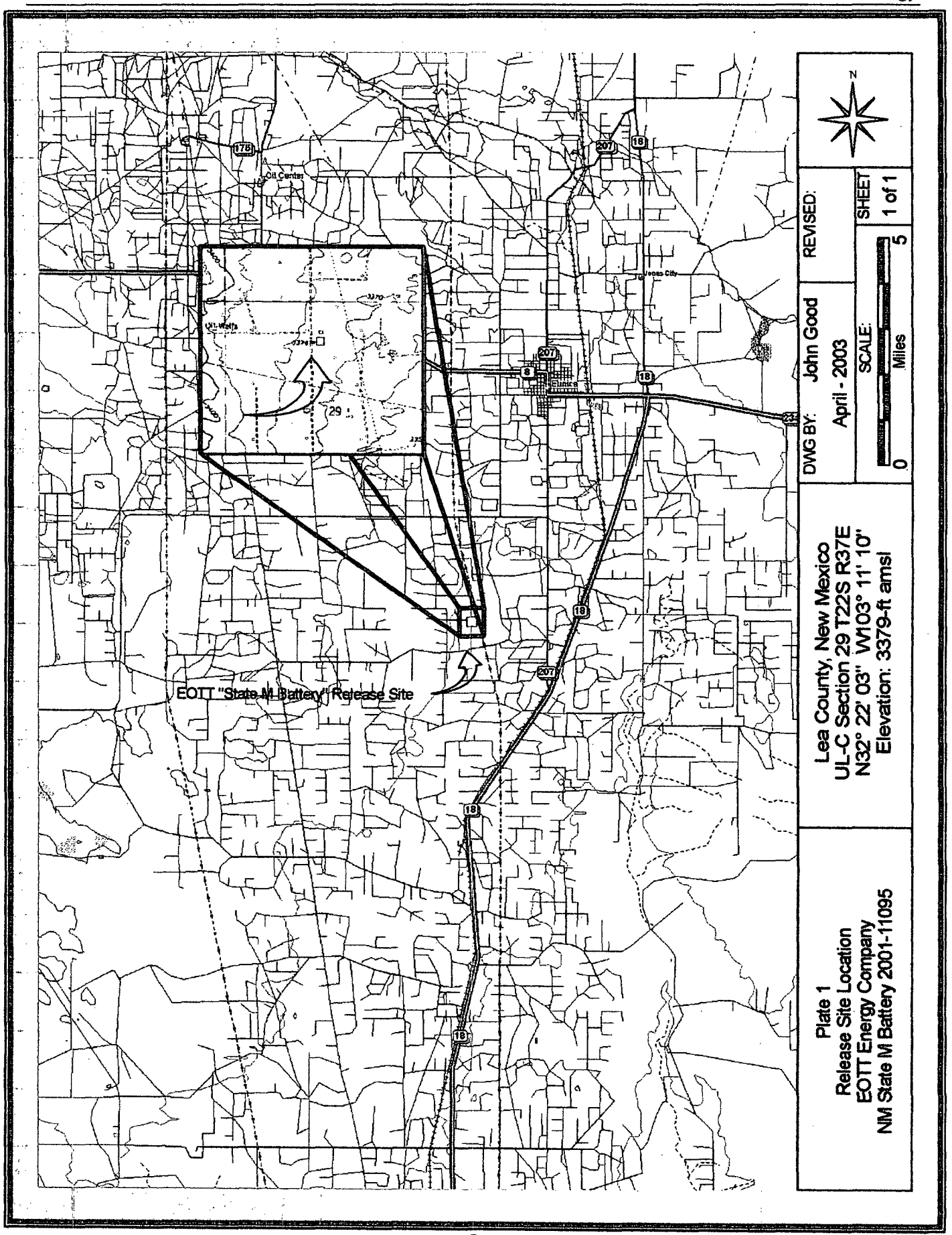
The raw data generated by the VADSAT program is included in the Attachments (pages 17-19). This data includes the parameters of the two models and the data points generated for the 1000-year span. Plate 9 is the graphical representation of both assessment models that were generated.

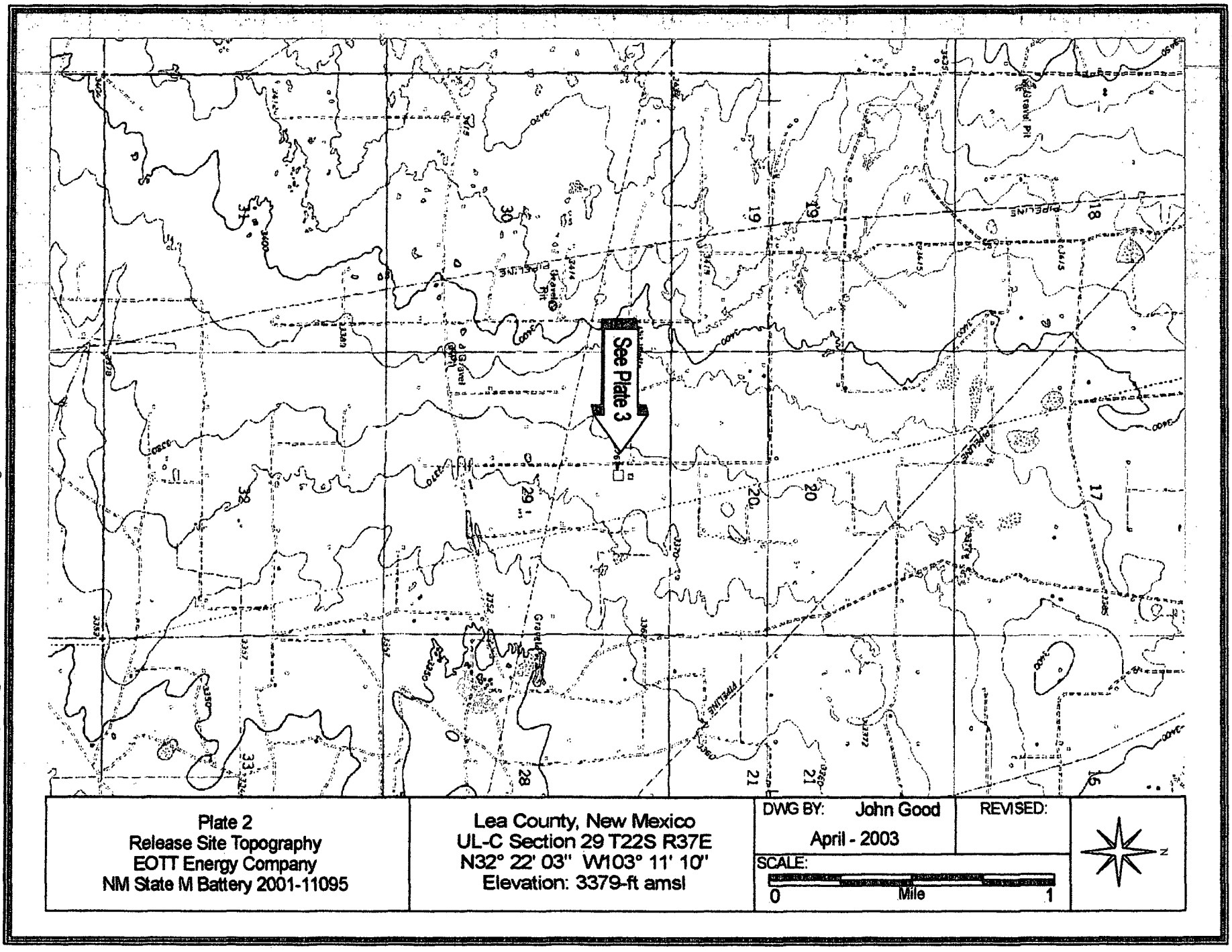
8.0 Closure Proposal

Based upon the VADSAT Risk Assessment model for this site which predicts no ground water impact with the placement of an impermeable layer, EOTT Energy proposes to contract with EPI for the placement of a 2-ft compacted clay barrier, with 5-ft overlap, over the contaminated soil in the excavation. The clay barrier will be placed in two stages, 1-ft thickness in each stage. After each 1-ft layer of clay is placed, it will be compacted and tested for compaction percentage by Pettigrew and Associates, Hobbs, NM. After the clay barrier is in place and certified, the remainder of the excavation will be backfilled with the clean caliche and topsoil previously removed from the excavation, smoothed and then contoured.



Attachments: (*pages 8-21*)


EOTT "State M Battery" Release Site
Plate 1
Release Site Location
EOTT Energy Company
NM State M Battery 2001-11095
Lea County, New Mexico
UL-C Section 29 T22S R37E
N32° 22' 03" W103° 11' 10"
Elevation: 3379-ft amsl
DWG BY: John Good
April - 2003
REVISED:
SCALE:
0
5
Miles
SHEET
1 of 1
N
Jal
Jones City
Eunice
Oil Center
29



State M Battery (2001-11095)

E.O.T.T. Energy

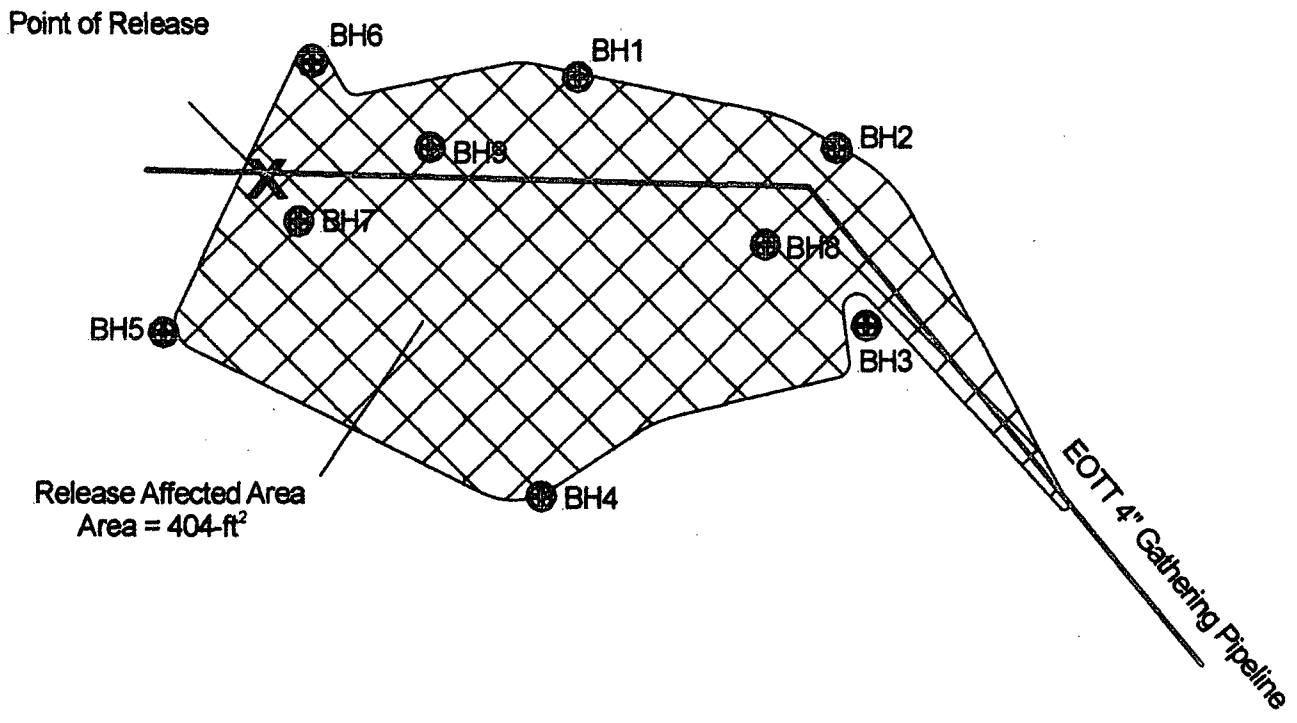


Plate 3: Initial Site GPS Demarcation ***EOTT Energy Co.*** ***NM State M Battery 2001-11095***	Lea County, New Mexico UL-C Section 29 T22S R37E 32°22'03"N 103°11'10"W Elevation: 3379-ft amsl	DWG BY: John Good August - 2002	REVISED: April - 2003	SHEET 1 of 1	N
		SCALE: 0 Feet 10		SIZE: ANSI A	

State M Battery (2001-11095)

E.O.T.T. Energy

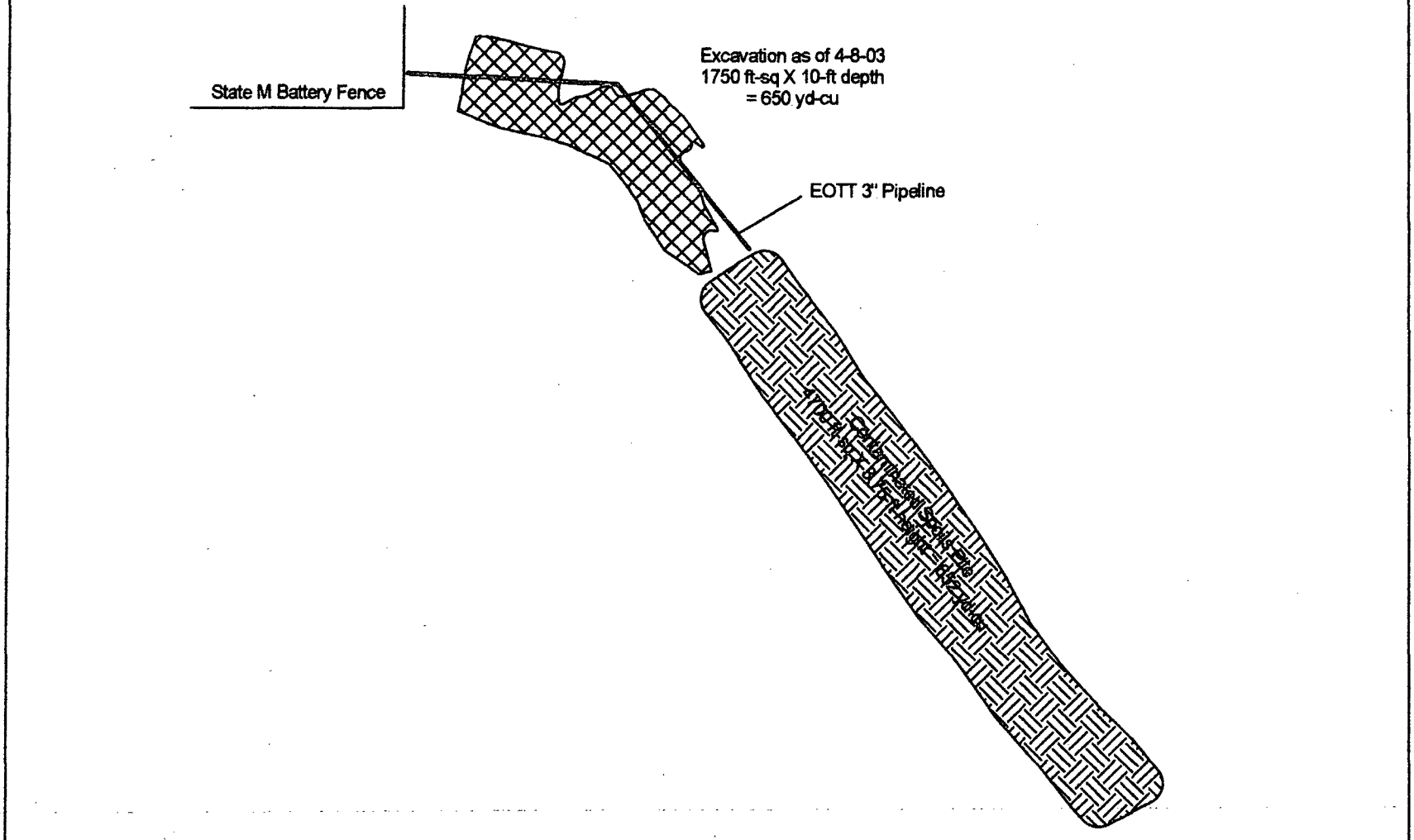


Plate 4: Apr-03 Site GPS Demarcation ***EOTT Energy Co.*** ***NM State M Battery 2001-11095***	Lea County, New Mexico UL-C Section 29 T22S R37E 32°22'03"N 103°11'10"W Elevation: 3379-ft amsl	DWG BY: John Good April - 2003	REVISED:	SHEET 1 of 1
		SCALE: 0 Feet 100		SIZE: ANSI A

N

State M Battery (2001-11095)

E.O.T.T. Energy

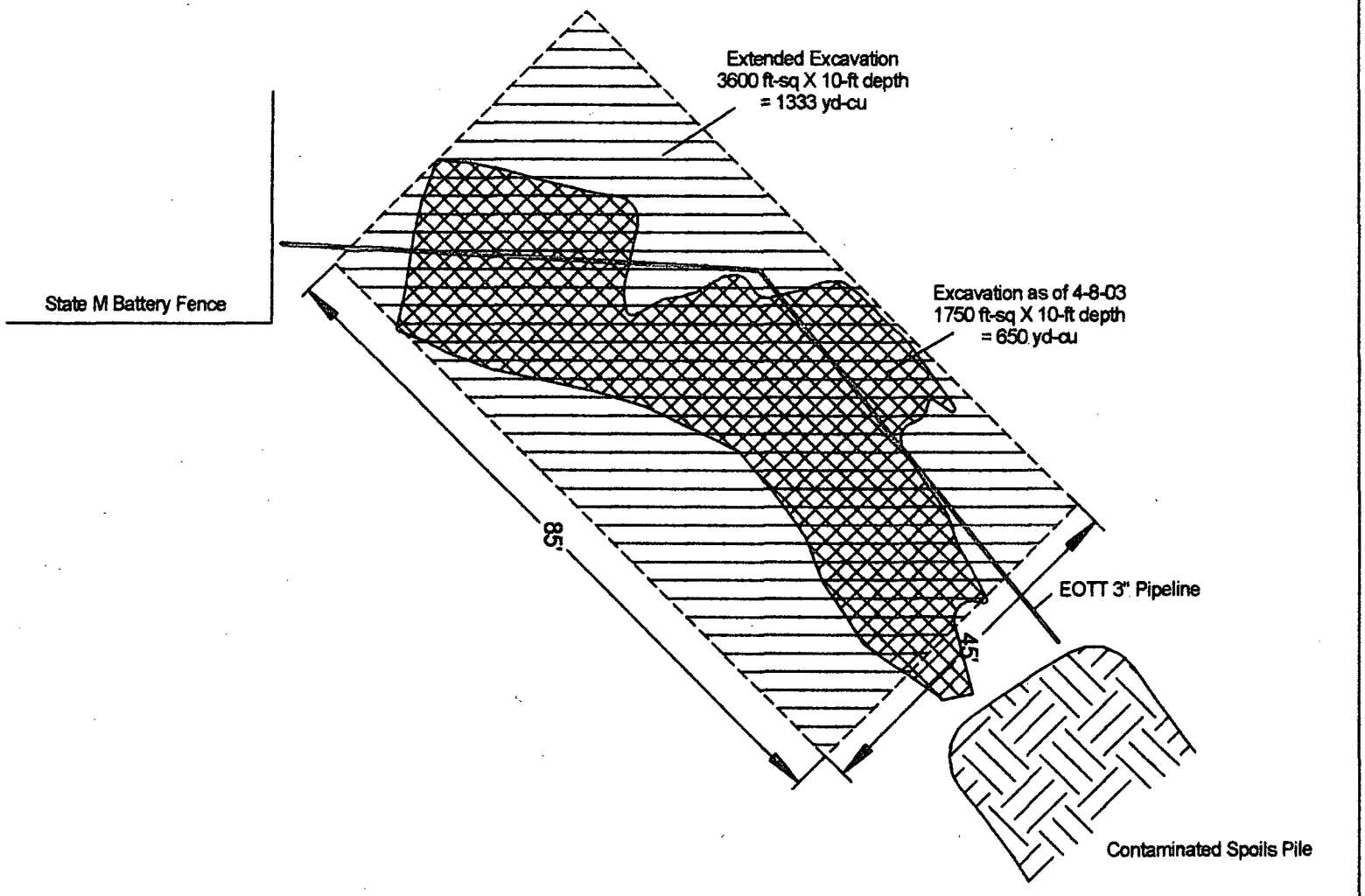
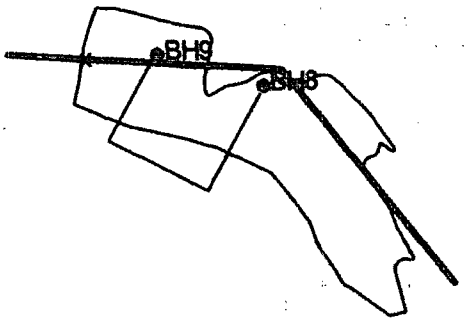


Plate 5: Proposed Expanded Excavation ***EOTT Energy Co.*** ***NM State M Battery 2001-11095***	Lea County, New Mexico UL-C Section 29 T22S R37E 32°22'03"N 103°11'10"W Elevation: 3379-ft amsl	DWG BY: John Good April - 2003	REVISED:	SHEET 1 of 1	N
		SCALE: 0 Feet 50		SIZE: ANSI A	



TPH ppm

>3,000

>2,500

>2,000

>1,500

>1,000

>500

0-500

Feet from Surface

BH9 BH8

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

DWG BY: John Good
April - 2003

REVISED:

SCALE:

SHEET 1 of 1

Lea County, New Mexico
UL-C Section 29 T22S R37E
32°22'03"N 103°11'10"W
Elevation: 3379-ft amsl

Plate 6
Boreholes 8-9 Contaminant Cross-Section
EOTT Energy Company
NM State M Battery 2001-11095

EOTT Energy Co. - State M Ref.# (2001-11095) - Borehole Sampling Results

Bold highlighted cells indicate values in excess of the NMOCD remedial action guideline thresholds: TPH = 100/1000 mg/Kg; Benzene = 10 mg/Kg; BTEX = 50 mg/Kg

Sample Date	Excavation Sampling Area	Depth (ft - bgs[1])	SAMPLE ID#	VOC[2] ppm	GRO[3] mg/Kg	DRO[4] mg/Kg	TPH[5] mg/Kg	BTEX[6] mg/Kg	Benzene mg/Kg	Toluene mg/Kg	Ethyl Benzene mg/Kg	Total Xylenes mg/Kg
9/13/01	BH-1	2	ESM91301BH1-2'	1.5	5	5	10	1.277	0.194	0.215	0.220	0.648
9/13/01		5	ESM91301BH1-5'	0.7	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		10	ESM91301BH1-10'	0.7	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		15	ESM91301BH1-15'	0.3	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01	BH-2	2	ESM91301BH2-2'	1.1	5	12	17	0.100	0.020	0.020	0.020	0.040
9/13/01		5	ESM91301BH2-5'	0.8	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		10	ESM91301BH2-10'	0.3	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		15	ESM91301BH2-15'	0.2	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01	BH-3	2	ESM91301BH3-2'	0.8	6	5	11	0.100	0.020	0.020	0.020	0.040
9/13/01		5	ESM91301BH3-5'	0.5	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		10	ESM91301BH3-10'	0.6	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		15	ESM91301BH3-15'	0.4	10	5	15	0.100	0.020	0.020	0.020	0.040
9/13/01	BH-4	2	ESM91301BH4-2'	0.9	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		5	ESM91301BH4-5'	0.5	5	5	10	0.101	0.020	0.020	0.020	0.041
9/13/01		10	ESM91301BH4-10'	0.7	5	5	10	0.100	0.020	0.020	0.020	0.040
9/13/01		15	ESM91301BH4-15'	0.5	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01	BH-5	2	ESM91401BH5-2'	19	5	5	10	0.174	0.020	0.035	0.037	0.083
9/14/01		5	ESM91401BH5-5'	3.8	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01		10	ESM91401BH5-10'	3	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01		15	ESM91401BH5-15'	2.7	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01	BH-6	2	ESM91401BH6-2'	104.6	**1670**	**3410**	**5080**	35.610	0.100	3.810	8.820	22.880
9/14/01		5	ESM91401BH6-5'	30.9	5	18	23	0.100	0.020	0.020	0.020	0.040
9/14/01		10	ESM91401BH6-10'	17.5	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01		15	ESM91401BH6-15'	9.4	5	6	11	0.100	0.020	0.020	0.020	0.040
9/14/01	BH-7	2	ESM91401BH7-2'	43.6	12	192	204	0.101	0.020	0.020	0.020	0.041
9/14/01		5	ESM91401BH7-5'	34.7	5	29	34	0.100	0.020	0.020	0.020	0.040
9/14/01		10	ESM91401BH7-10'	7.9	5	5	10	0.100	0.020	0.020	0.020	0.040
9/14/01		15	ESM91401BH7-15'	7.1	5	6	11	0.100	0.020	0.020	0.020	0.040
9/17/01	BH-8	15	ESM91701BH8-15'	158	**402**	**2540**	**2942**	2.751	0.100	0.498	0.598	1.555
9/17/01		20	ESM91701BH8-20'	95.4	77	**358**	**435**	0.654	0.020	0.084	0.150	0.420
9/17/01		25	ESM91701BH8-25'	37.9	5	12	17	0.100	0.020	0.020	0.020	0.040
9/17/01		30	ESM91701BH8-30'	9.7	5	5	10	0.100	0.020	0.020	0.020	0.040
9/17/01	BH-9	20	ESM91701BH9-20'	10.7	5	68	73	0.100	0.020	0.020	0.020	0.040
9/17/01		25	ESM91701BH9-25'	10	28	**562**	**590**	0.100	0.020	0.020	0.020	0.040

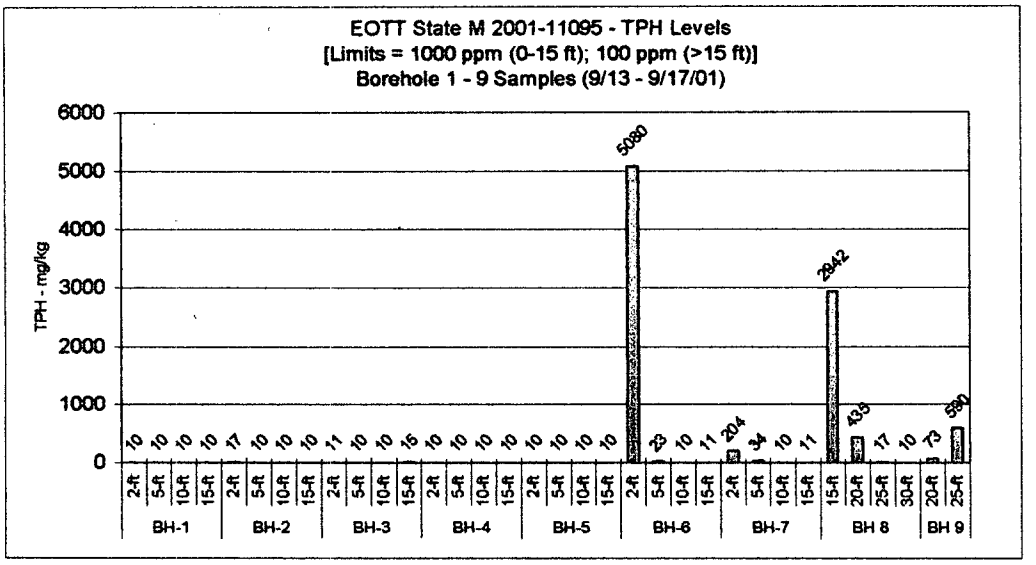
[1] bgs = below ground surface [2] VOC = Volatile Organic Constituents; (note: 100 ppm Isobutylene calibration gas = 101 ppm)

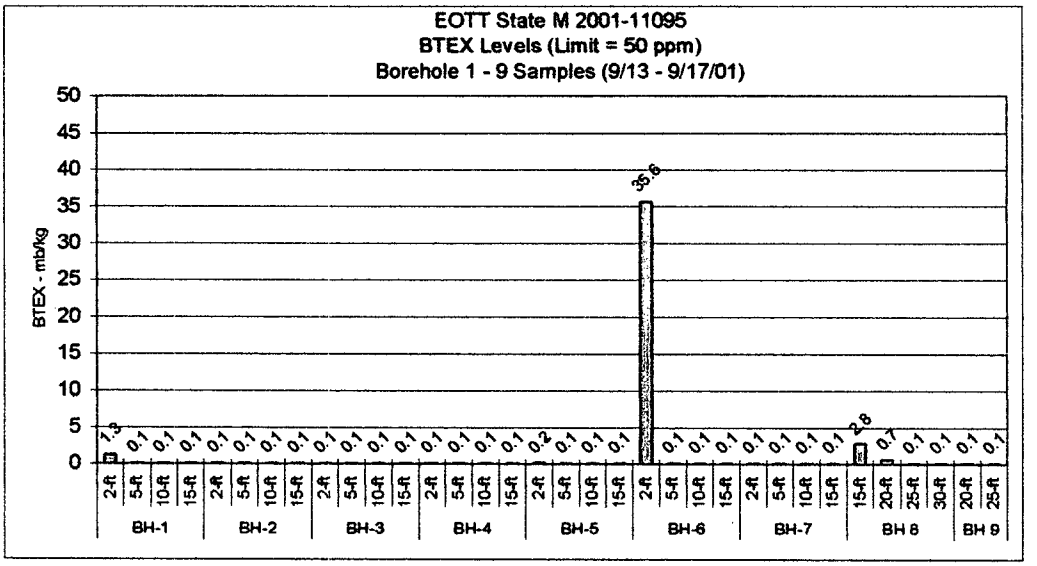
[3] GRO - Gasoline Range Organics (Detection Limit = 10 mg/Kg) [4] DRO - Diesel Range Organics (Detection Limit = 10 mg/Kg) [5] TPH - Total Petroleum Hydrocarbon (GRO+DRO)

[6] BTEX = Sum of CoC's (Detection Limits = 0.005 mg/Kg; 0.015 mg/Kg) Note: Reported detection limits are considered "de minimus" values and are included in the TPH and BTEX summations.

Plate 7 - Soil Analysis Results (TPH & BTEX)

Plate 8: Soil Analysis Charts





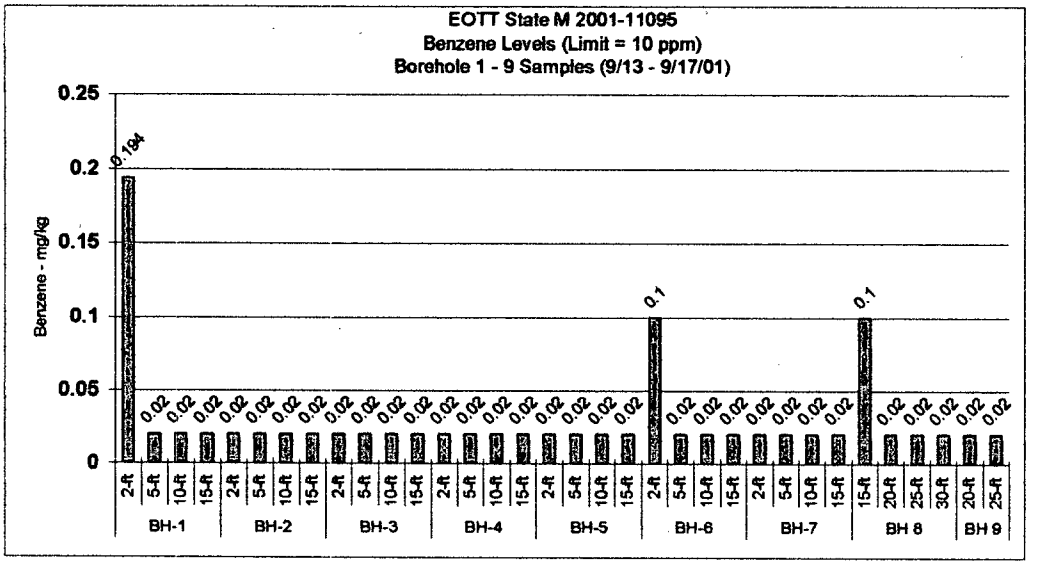
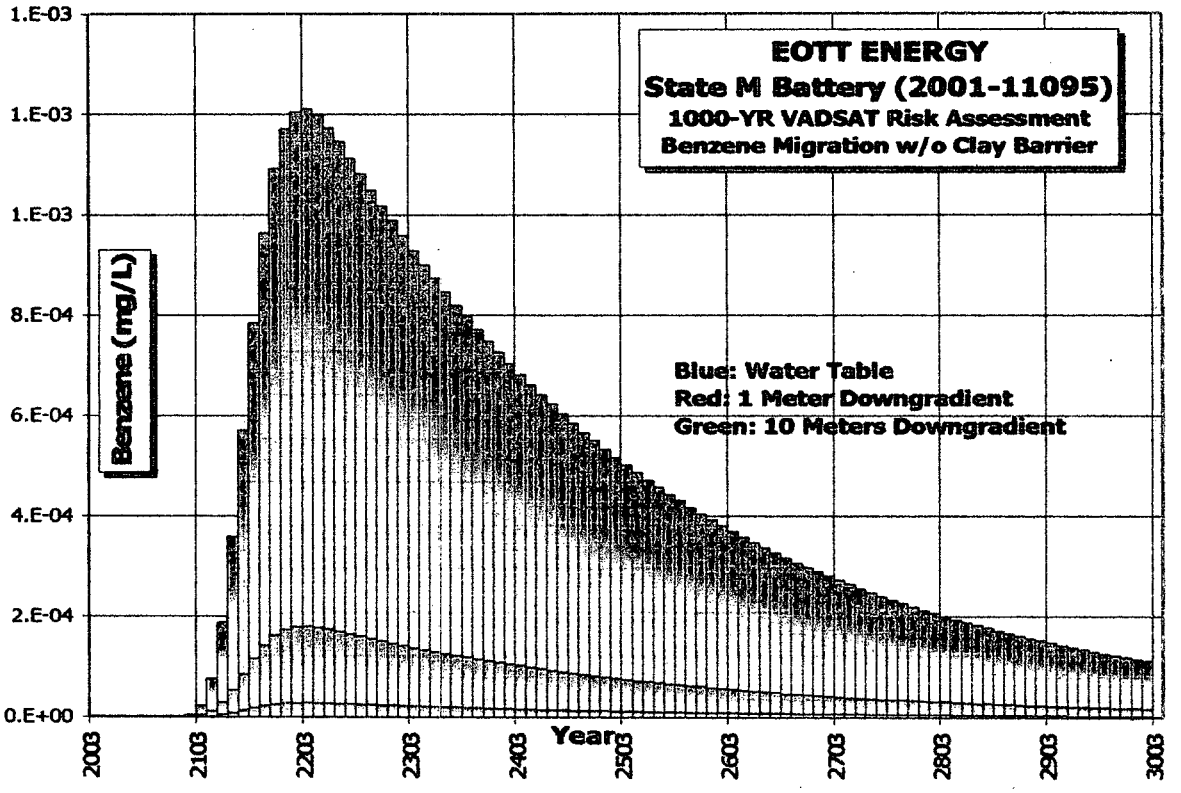
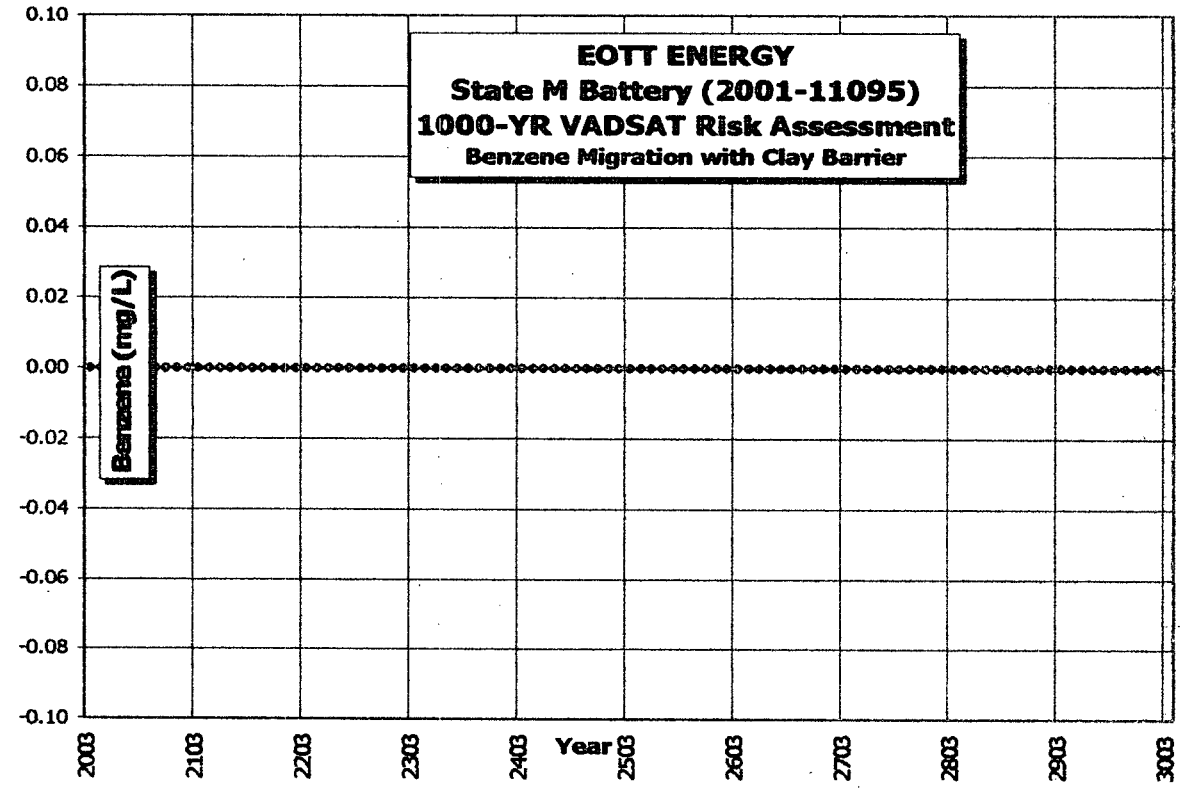


Plate 9- VADSAT Risk Assessment Charts





VADSAT Data (without a clay barrier)

Year	Water Table	1 Meter Down Gradient	10 Meter Down Gradient	100 Meter Down Gradient
2003	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2013	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2023	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2033	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2043	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2053	5.99E-13	8.48E-14	1.13E-14	4.18E-17
2063	2.60E-10	3.73E-11	5.15E-12	2.61E-14
2073	1.89E-08	2.73E-09	3.87E-10	2.44E-12
2083	4.19E-07	6.11E-08	8.80E-09	6.46E-11
2093	4.07E-06	5.96E-07	8.69E-08	7.15E-10
2103	2.18E-05	3.21E-06	4.72E-07	4.22E-09
2113	7.54E-05	1.11E-05	1.64E-06	1.57E-08
2123	1.87E-04	2.75E-05	4.10E-06	4.11E-08
2133	3.60E-04	5.31E-05	7.93E-06	8.27E-08
2143	5.71E-04	8.44E-05	1.27E-05	1.36E-07
2153	7.84E-04	1.16E-04	1.74E-05	1.91E-07
2163	9.63E-04	1.43E-04	2.14E-05	2.39E-07
2173	1.09E-03	1.62E-04	2.44E-05	2.75E-07
2183	1.17E-03	1.73E-04	2.61E-05	2.98E-07
2193	1.21E-03	1.79E-04	2.70E-05	3.09E-07
2203	1.21E-03	1.80E-04	2.71E-05	3.12E-07
2213	1.20E-03	1.78E-04	2.68E-05	3.09E-07
2223	1.17E-03	1.74E-04	2.63E-05	3.03E-07
2233	1.15E-03	1.70E-04	2.56E-05	2.96E-07
2243	1.11E-03	1.65E-04	2.49E-05	2.88E-07
2253	1.08E-03	1.60E-04	2.42E-05	2.80E-07
2263	1.05E-03	1.55E-04	2.35E-05	2.71E-07
2273	1.02E-03	1.51E-04	2.28E-05	2.63E-07
2283	9.86E-04	1.46E-04	2.21E-05	2.55E-07
2293	9.57E-04	1.42E-04	2.14E-05	2.48E-07
2303	9.28E-04	1.37E-04	2.08E-05	2.40E-07
2313	9.00E-04	1.33E-04	2.01E-05	2.33E-07
2323	8.72E-04	1.29E-04	1.95E-05	2.26E-07
2333	8.46E-04	1.25E-04	1.89E-05	2.19E-07
2343	8.20E-04	1.22E-04	1.84E-05	2.12E-07
2353	7.96E-04	1.18E-04	1.78E-05	2.06E-07
2363	7.72E-04	1.14E-04	1.73E-05	2.00E-07
2373	7.48E-04	1.11E-04	1.67E-05	1.94E-07
2383	7.26E-04	1.08E-04	1.62E-05	1.88E-07
2393	7.04E-04	1.04E-04	1.57E-05	1.82E-07
2403	6.82E-04	1.01E-04	1.53E-05	1.77E-07
2413	6.62E-04	9.80E-05	1.48E-05	1.71E-07
2423	6.42E-04	9.51E-05	1.44E-05	1.66E-07
2433	6.22E-04	9.22E-05	1.39E-05	1.61E-07
2443	6.03E-04	8.94E-05	1.35E-05	1.56E-07
2453	5.85E-04	8.67E-05	1.31E-05	1.51E-07
2463	5.67E-04	8.41E-05	1.27E-05	1.47E-07
2473	5.50E-04	8.15E-05	1.23E-05	1.42E-07
2483	5.34E-04	7.91E-05	1.19E-05	1.38E-07
2493	5.18E-04	7.67E-05	1.16E-05	1.34E-07

Year	Water Table	1 Meter Down Gradient	10 Meter Down Gradient	100 Meter Down Gradient
2503	5.02E-04	7.44E-05	1.12E-05	1.30E-07
2513	4.87E-04	7.21E-05	1.09E-05	1.26E-07
2523	4.72E-04	6.99E-05	1.06E-05	1.22E-07
2533	4.58E-04	6.78E-05	1.02E-05	1.18E-07
2543	4.44E-04	6.58E-05	9.93E-06	1.15E-07
2553	4.30E-04	6.38E-05	9.62E-06	1.11E-07
2563	4.17E-04	6.18E-05	9.33E-06	1.08E-07
2573	4.05E-04	6.00E-05	9.05E-06	1.05E-07
2583	3.92E-04	5.81E-05	8.78E-06	1.02E-07
2593	3.81E-04	5.64E-05	8.51E-06	9.85E-08
2603	3.69E-04	5.47E-05	8.25E-06	9.55E-08
2613	3.58E-04	5.30E-05	8.00E-06	9.26E-08
2623	3.47E-04	5.14E-05	7.76E-06	8.98E-08
2633	3.37E-04	4.99E-05	7.53E-06	8.71E-08
2643	3.26E-04	4.84E-05	7.30E-06	8.44E-08
2653	3.17E-04	4.69E-05	7.08E-06	8.19E-08
2663	3.07E-04	4.55E-05	6.86E-06	7.94E-08
2673	2.98E-04	4.41E-05	6.66E-06	7.70E-08
2683	2.89E-04	4.28E-05	6.46E-06	7.47E-08
2693	2.80E-04	4.15E-05	6.26E-06	7.24E-08
2703	2.71E-04	4.02E-05	6.07E-06	7.02E-08
2713	2.63E-04	3.90E-05	5.89E-06	6.81E-08
2723	2.55E-04	3.78E-05	5.71E-06	6.60E-08
2733	2.48E-04	3.67E-05	5.54E-06	6.40E-08
2743	2.40E-04	3.56E-05	5.37E-06	6.21E-08
2753	2.33E-04	3.45E-05	5.21E-06	6.02E-08
2763	2.26E-04	3.34E-05	5.05E-06	5.84E-08
2773	2.19E-04	3.24E-05	4.90E-06	5.66E-08
2783	2.12E-04	3.15E-05	4.75E-06	5.49E-08
2793	2.06E-04	3.05E-05	4.60E-06	5.33E-08
2803	2.00E-04	2.96E-05	4.47E-06	5.17E-08
2813	1.94E-04	2.87E-05	4.33E-06	5.01E-08
2823	1.88E-04	2.78E-05	4.20E-06	4.86E-08
2833	1.82E-04	2.70E-05	4.07E-06	4.71E-08
2843	1.77E-04	2.62E-05	3.95E-06	4.57E-08
2853	1.71E-04	2.54E-05	3.83E-06	4.43E-08
2863	1.66E-04	2.46E-05	3.71E-06	4.30E-08
2873	1.61E-04	2.39E-05	3.60E-06	4.17E-08
2883	1.56E-04	2.31E-05	3.49E-06	4.04E-08
2893	1.51E-04	2.24E-05	3.39E-06	3.92E-08
2903	1.47E-04	2.18E-05	3.28E-06	3.80E-08
2913	1.42E-04	2.11E-05	3.18E-06	3.68E-08
2923	1.38E-04	2.05E-05	3.09E-06	3.57E-08
2933	1.34E-04	1.98E-05	2.99E-06	3.46E-08
2943	1.30E-04	1.92E-05	2.90E-06	3.36E-08
2953	1.26E-04	1.87E-05	2.82E-06	3.26E-08
2963	1.22E-04	1.81E-05	2.73E-06	3.16E-08
2973	1.18E-04	1.75E-05	2.65E-06	3.06E-08
2983	1.15E-04	1.70E-05	2.57E-06	2.97E-08
2993	1.11E-04	1.65E-05	2.49E-06	2.88E-08

VADSAT Risk Assessment Criteria and Data

VADSAT Version 3.0

A Monte Carlo Model for Assessing the Effects of Soil Contamination on Groundwater Quality

Developed by:
Environmental Systems and Technologies Inc.
Blacksburg, Virginia
Tel: 703-552-0685, Fax: 703-951-5307

For
The American Petroleum Institute
1995

PROJECT TITLE:EOTT STATE M BATTERY

SOURCE AND CHEMICAL DATA ****
DEPTHM, MEAN THICKNESS OF WASTE ZONE (m) = 6.09600

DEPSTD, STD.DEV. OF THICKNESS OF WASTE ZONE = 0.00000

AREAM, MEAN WASTE ZONE AREA (m^2) = 18.58100
STDA, STD.DEV. OF WASTE ZONE AREA = 0.00000

RLWM, MEAN L/W RATIO (-) = 1.00000
STDRLW, STD.DEV. OF L/W RATIO = 0.00000

CVRTHM, MEAN VALUE OF COVER THICKNESS (m) = 3.04800
CVRTHS, STD.DEV. OF COVER THICKNESS = 0.00000

KOCM, MEAN ORG. CARBON PARTITION COEF (cm^3/g)= 83.20000
STDKOC, STD.DEV. OF ORG.CARBON PARTITION COEF= 0.00000

FMOLM, MEAN INIT.VOL.FRAC. OF CONTAMINANT(-) = 0.00034
FMOLSTD, STD.DEV. OF VOL.FRAC. OF CONTAMINANT= 0.00000

CMFM, MASS OF CONTAMINANT PER MASS OF WASTE(mg/kg) = 1.00000
CMFSD, STD.DEV. OF MASS CONTAMINANT PER MASS WASTE = 0.00000

HCCONM, HYDCARBON MASS FRAC. IN WASTE (mg/kg)= 2900.00000
HCCONS, STD OF HYDCARBON MASS FRAC. IN WASTE = 0.00000

CHEMICAL SPECIES benzene

MOLW, MOLECULAR WT. OF CONTAMINANT (g/mole) = 78.10000

AVERMW, AVG. MOL. WT. OF OILY WASTE (g/mole) = 100.00000

RHO, DENSITY OF CONTAMINANT (g/cm^3) = 0.87600

RHOG, AVERAGE DENSITY OF HYDROCARBON (g/cm^3)= 0.90000

SOL, AQUEOUS SOLUB. OF CONTAMINANT (g/m^3) = 1790.00000

HENRYC, HENRY'S CONSTANT (-) = 0.23000

DIFFA, DIFFUSION COEF. IN FREE AIR (m^2/day) = 0.77000

HYDROGEOLOGICAL PROPERTIES

** UNSATURATED ZONE INPUT PARAMETERS **
GAMMAM, MEAN UNSAT ZONE DECAY COEF (1/day) = 0.00010
STDGAM, STD.DEV. OF UNSAT ZONE DECAY COEF = 0.00000

UNFOCM, MEAN UNSAT ZONE ORGANIC CARBON FRACTION (-) = 0.00000
UNFOCS, STD.DEV. OF UNSAT ZONE ORGANIC CARBON FRAC. = 0.00000

FKSW, MEAN SAT. CONDUCTIVITY (m/day) = 0.02900
STDFKS, STD.DEV. OF SAT. CONDUCTIVITY = 0.000

DISTM, MEAN DEPTH TO GROUNDWATER (m) = 15.24000
STDDST, STD.DEV. OF DEPTH TO GROUNDWATER = 0.00000

UNPORM, MEAN VADOSE ZONE POROSITY (-) = 0.38000
SUNPOR, STD.DEV. OF VADOSE ZONE POROSITY = 0.00000

PARNM, MEAN VALUE OF VG PARAMETER N (-) = 1.23000
SDPARN, STD.DEV. OF VG PARAMETER N = 0.00000

RESWCM, MEAN RESIDUAL WATER CONTENT (-) = 0.01110
RESWCS, STD.DEV. OF RESIDUAL WATER CONTENT = 0.00000

ALFINM = 0, UNSAT DISPERSIVITY CALCULATED INTERNALLY
** SATURATED ZONE INPUT PARAMETERS **

LAMBW, MEAN SAT. ZONE DECAY COEFF. (1/day) = 0.00010
SLAMB, STD.DEV. OF SAT. ZONE DECAY COEFF. = 0.00000

PORM, MEAN SAT. ZONE POROSITY (-) = 0.20000
STDPOR, STD.DEV. OF SAT. ZONE POROSITY = 0.00000

FOCM, MEAN SAT. ZONE ORG. CARBON FRAC. (-) = 0.00000
STDFOC, STD.DEV. SAT. ZONE ORG. CARBON FRAC.= 0.00000

ALRLTM, MEAN DISPERS, RATIO LONG/TRANSV. (-) = 3.00000
SALRLT, STD.DEV. OF DISP. RATIO LONG/TRANSV. = 0.00000

ALRTVM, MEAN DISPERS. RATIO TRANSV/VERT. (-) = 87.00000
SALRTV, STD.DEV. OF DISP. RATIO TRANSV/VERT. = 0.00000

CONDS, SAT. HYDRAULIC COND. (m/day) = 1.03000
SCONDS, STD.DEV. OF SAT HYDRAULIC COND. = 0.00000

GRADS, HYDRAULIC GRADIENT (m/m) = 0.02700
SGRADS, STD.DEV. OF HYDRAULIC GRADIENT = 0.00000

HMEAN, MEAN AQUIFER THICKNESS (m) = 15.24000
STDH, STD.DEV. OF AQUIFER THICKNESS = 0.00000

QINM, MEAN INFILTRATION RATE (m/day) = 0.00011
QINSTD, STD.DEV. OF INFILTRATION RATE = 0.00000

LOCATION OF RECEPTORS:

	X (M)	Y (M)	Z (M)
RECEPTOR(1)	1.0	0.0	0.0
RECEPTOR(2)	10.0	0.0	0.0
RECEPTOR(3)	100.0	0.0	0.0

C141 (Information Only)

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 March 17, 1999

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

Information Only - C141 (non-required submittal)

OPERATOR

☐ Initial Report ☐ Final Report

Name of Company	Contact
EOTT Energy Pipeline LP	**Frank Hernandez**
Address	Telephone No.
P.O. Box 1660 Midland, TX 79702	**(713) 253-7006**
Facility Name	Facility Type
State M Battery	**Crude Oil Gathering Line**

Surface Owner	Mineral Owner	Lease No.
State of New Mexico	**NA**	**NA**

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from South Line	Feet from West Line	Longitude	Latitude	County:
C	**29**	**22S**	**37E**	**4317**	**2300**	**103°11'10"W**	**32°22'03"N**	**Lea**

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Crude Oil Release and associated components	**4 bbl**	**2 bbl**
Source of Release	Date and Hour of Occurrence	Date and Hour of Discovery
4" Steel Crude Oil Pipeline	**9/3/2001**	**9/3/2001 4:30 PM**
Was Immediate Notice Given? ☐ Yes ☐ No ☑ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☑ No	If YES, Volume Impacting the Watercourse. **NA**	

If a Watercourse was Impacted, Describe Fully.*
NA

Describe Cause of Problem and Remedial Action Taken.*
Internally Corroded 4" pipeline (Eunice Gathering), repaired with clamp.

Describe Area Affected and Cleanup Action Taken.*
Area = 404-ft^2. Ground water occurs at ~65-ft bgs. The Site Rank is 20. Contaminated soil above the site remedial goals was excavated and stockpiled on-site by Environmental Plus, Inc., Eunice, NM. Remedial Goals: TPH = 100 ppm; BTEX = 50 ppm; Benzene = 10 ppm.

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: **John Good**	Approved by District Supervisor:	
Title: **EPI - Environmental Consultant**	Approval Date:	Expiration Date:
Date: **4/14/03** Phone: **(505)394-3481**	Conditions of Approval:	☐ Attached

Site Metrics Form

eott energy

Incident Date and NMOCD Notified?
9/3/2001 4:30 PM

SITE: State M Battery			Assigned Site Reference 2001-11095
Company:	EOTT Energy Pipeline LP		
Street Address:	5805 East Highway 80		
Mailing Address:	P.O. Box 1660		
City, State, Zip:	Midland, TX 79702		
Representative:	Frank Hernandez		
Representative Telephone:	(713) 253-7006		
Telephone:			
Fluid volume released (bbls):	4	Recovered (bbls):	2
>25 bbls: Notify NMOCD verbally within 24 hrs and submit form C-141 within 15 days.			
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:	2001-11095		
Source of contamination:	4" Steel Crude Oil Pipeline		
Land Owner, i.e., BLM, ST, Fee, Other:	State of New Mexico State Land Office, Santa Fe		
LSP Dimensions:	36' X 20' Site diagrams attached		
LSP Area:	404 -ft^2		
Location of Reference Point (RP):			
Location distance and direction from RP:			
Latitude:	32°22'03"N		
Longitude:	103°11'10"W		
Elevation above mean sea level:	3379 -ft amsl		
Feet from South Section Line:	4317		
Feet from West Section Line:	2300		
Location - Unit and 1/4 1/4:	UL- C	NE 1/4 of NW 1/4	
Location - Section:	29		
Location - Township:	22S		
Location - Range:	37E		
Surface water body within 1000' radius of Site:	0		
Surface water body within 1000' radius of Site:	0		
Domestic water wells within 1000' radius of Site:	0		
Domestic water wells within 1000' radius of Site:	0		
Agricultural water wells within 1000' radius of Site:	0		
Agricultural water wells within 1000' radius of Site:	0		
Public water supply wells within 1000' radius of Site:	0		
Public water supply wells within 1000' radius of Site:	0		
Depth (ft) from land surface to ground water (DG):	65		
Depth (ft) of contamination (DC):	30		
Depth (ft) to ground water (DG - DC = DtGW):	35		

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
Ground water Score: 20	*Wellhead Protection Area Scor* 0	*Surface Water Score:* 0
Site Rank (1+2+3) = 20		

Total Site Ranking Score and Acceptable 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	1000 ppm	5000 ppm

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