AP - 37

STAGE 1 & 2 WORKPLANS

DATE: 11/2003

IR-383

LinkEnergy

STAGE 1 AND STAGE 2 ABATEMENT PLAN

FOR THE

LOVINGTON DEEP 6"
Ref.# 2002-10312

SE¼ of the NE¼ Unit Letter H
Section 6, T17S, R36E,
~5 miles south Lovington
Lea County New Mexico
Latitude: 32° 52' 1.132" N Longitude: 103° 23' 16.570"W

November 2003

Prepared by

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1.0 INTRODUCTION

Environmental Plus, Inc. (EPI) on behalf of Frank Hernandez, District Environmental Supervisor, Link Energy, submits this Stage 1 and Stage 2 Abatement Plan to the New Mexico Oil Conservation Division for the continuing investigation and remediation of the Link Energy Lovington Deep 6" Ref.#2002-10312. This plan will serve as a "Work Plan Supplement" referenced in the draft "General Work Plan for Remediation of EOTT Pipeline Spills, Leaks, and Releases in New Mexico" approved by the New Mexico Oil Conservation Division (NMOCD) on August 1, 2000, and will supplement the previously submitted and approved work plan that addresses soil remediation at the site, i.e., EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003. During site delineation, phase separated hydrocarbon (PSH) was observed on the surface of the ground water at approximately ~65'bgs in excess of 20 NMAC 6.2.3103, i.e., "Non-aqueous phase liquid shall not be present floating atop or immersed within ground water, as can be reasonably measured." The NMOCD offices in Santa Fe and Hobbs, New Mexico were notified of the impact on December 30, 2002. The Stage 1 and Stage 2 Abatement Plans are being submitted together to facilitate coincident development of investigatory boreholes into monitor well or pollution abatement/extraction/fluid recovery well locations as site remediation progresses.

How much?

2.0 "RESPONSIBLE PERSON"

The "Responsible Person" for the Stage 1 and Stage 2 Abatement Plans is:

Mr. Frank Hernandez
District Environmental Supervisor
Link Energy
5805 East Highway 80
PO Box 1660
Midland, Texas 79702

3.0 STAGE 1 ABATEMENT PLAN

The initial form C-141 submitted to the NMOCD by Link Energy, formerly EOTT Energy, reported that approximately 25 bbls barrels of crude oil was released with 10 bbls barrels recovered. Initial remediation activities included excavation and disposal of 1,102 cubic yards (yd^3), i.e., contaminated soil within the visible spill area to approximately 3 feet below ground surface ('bgs). Subsequent to the initial response activities, ~10,500 yd^3 of visibly contaminated soil from ~3 in the flowpath to ~14'bgs in and around the leak origin was excavated and stockpiled on site. This soil was processed through a mechanical soil shredder to aerate and separate landfarmable soil from rock and is now temporarily stockpiled on site. The soil remediation work plan approved by the NMOCD in August 2003, i.e., EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003, provides details of the soil investigation and proposes to isolate the remaining crude oil source term by installing an engineered and tested clay barrier supported by a computer simulated risk assessment using the American Petroleum Institute (API) VADSAT 3.0 computer model.

3.1 BACKGROUND

The Link Energy site reference identification number is #2002-10312. The crude oil leak was discovered, repaired, and reported on 12-12-02@ 10:00 AM and estimated to be approximately 25 bbls barrels with 10 bbls barrels recovered.

3.2 INITIAL SPILL MITIGATION

Environmental Plus, Inc. of Eunice, New Mexico responded to release and mitigated the spill. Link personnel repaired the leak.

3.3 STAGE 1 ABATEMENT PLAN OBJECTIVES AS PER NEW MEXICO OIL CONSERVATION DIVISION REGULATION 19.E(3)

Using site delineation information, Link developed the EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003. This plan satisfies the requirements of the Stage I Abatement Plan and provides adequate information to develop the Stage II Abatement Plan, i.e., characterized the horizontal and vertical extents of hydrocarbon impact in the vadose zone and ground water and identified site-specific geologic and hydrologic metrics. The Quality Assurance Plan included as Attachment III, guided implementation of critical protocols and ensured credibility and usability of all data and information. The primary objective of this investigation was to collect adequate information to bound the vertical and horizontal extent of crude oil contamination in the vadose zone and initially determine the areal distribution in the ground water underlying the site. This Abatement Plan provides the following information;

- Designates "responsible person" relative to plan submittal
- Describes and maps site, provides historical information including previous investigations
- Characterizes Site:
  1. Define Geology and Hydrogeology, i.e., Hydraulic Conductivity, Transmissivity, and Storativity
  2. Determine vertical and horizontal extent and magnitude of vadose-zone and ground water contamination.
     a) Collect discrete soil samples with a sample probe from depths as necessary below ground surface (bgs) to determine vertical extent of hydrocarbon contamination.
     b) Screen all samples using a Photoionization Detector (PID) and record results.
     c) Analyze all samples for Total Petroleum Hydrocarbon (TPH^{8015m}), i.e., Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) using EPA method 8015M and Benzene, Toluene, Ethyl Benzene, and m, o, & p Xylenes (BTEX) using EPA method 8020.
     d) Samples may be collected from the interval exhibiting the highest TPH^{8015m} concentrations for synthetic precipitate leaching procedure (SPLP) analyses for TPH^{8015m} and BTEX.
  3. Determine rate and direction of contaminant migration.
  4. Provide inventory of water wells inside and within one (1) mile from the perimeter of the three-dimensional body where the standards are exceeded.
  5. Provide location and number of wells actually or potentially affected by the impact.
  6. Define surface-water hydrology.
  7. Determine seasonal stream flow characteristics.
  8. Determine ground water/surface water relationships.
  9. Determine the vertical and horizontal extent and magnitude of contamination and impacts to surface water and stream sediments.

- Establish Monitoring Program
  1. Sampling station locations
  2. Sampling frequencies
- Establish a Quality Assurance Plan consistent with 20 NMAC 6.3107.B and 20 NMAC 6.1 for all work pursuant to this abatement plan.
- Submit a schedule of Stage 1 abatement plan activities, i.e., submission of quarterly progress reports and the detailed final site investigation report.

3.3.1 Project Organization and Responsibility

Environmental Plus, Inc., Eunice, New Mexico (EPI) conducted the field investigation with Link personnel providing operational support and coordination. AnalySys, Inc. of Austin, Texas performed the laboratory analyses and provided analytical reports.

3.3.2 Project Safety

Hazards at this site included the following;

- Moving equipment
- Buried pipelines
- Rotary Equipment
- Highway ingress/egress
- Excavation
- Potential Hydrogen Sulfide Gas

Prior to drilling or excavation, NEW MEXICO ONE CALL was and will be notified of activities, which will then provide a list of Companies they will notify and a ONE CALL confirmation number. Employees and subcontractors will be required to confirm current training in these hazards. Standard personal protective equipment will include;

- Personal H_2S Monitor
- Safety glasses with side shields
- Hard-hat
- Steel Toed Boots/Shoes and gloves

3.3.3 Site Description

Driving Directions: From the intersection of New Mexico State Roads 18 and 82 in Lovington, New Mexico, go south on 18 for 7.0 miles, then right on Lea County Stiles Road 6.6 miles, then right 0.7 miles to work location.

3.3.3.1 Historical Use

The area has been used historically for livestock grazing and access to oil and gas production facilities.

3.3.3.2 Legal Description

The site is owned by Darr Angell and located ~5 miles south of Lovington, Lea County, New Mexico in the SE¼ of the NE¼ in Unit Letter H of Section 6, T17S, R36E at latitude 32° 52' 1.132" N and longitude 103° 23' 16.570"W. .

3.3.3.3 Photographic documentation

Photographs are provided in Attachment II.

3.3.3.4 Ecological Description

The area is typical of the transition between the High Plains and the Upper Chihuahuan Desert Biomes consisting primarily of flat to gently rolling hills covered with desert grasses and shrubs interspersed with Harvard Shin Oak (Querqus harvardi) and Honey Mesquite (Prosopis glandulosa). Mammals represented, include Orrd's and Merriam's Kangaroo Rat, Deer Mouse, White Throated Wood Rat, Cottontail Rabbit, Black Tailed Jackrabbit, Pronghorn Antelope and the Mule Deer. Reptiles, Amphibians, and Birds are numerous and typical of area. A survey of Listed, Threatened, or Endangered species was not conducted.

3.3.4 Environmental Media Characterization

Chemical parameters of the soil and ground water were and will be characterized consistent with the New Mexico Oil Conservation Division (NMOCD) guidelines published in the following documents as applicable;

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

Normally acceptable thresholds for contaminants of concern (CoC), i.e., TPH and BTEX are determined based on the following;

- 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 down gradient surface water bodies.

However, site specific risk based thresholds may be developed and supported with a conservative risk assessment.

3.3.4.1 Area Ground Water Levels

Ground water was encountered at ~65'bgs during the preliminary site investigation and is consistent with the New Mexico Office of the State Engineer records database.

3.3.4.2 Water Well Inventory

The New Mexico Office of the State Engineer records water well L09892 approximately 4,500 feet southwest of the site with a 1982 water level of 50'bgs, well L05225, water level 80'bgs, is 2,100 feet north, and well L01723 1800 feet southeast of the site, is listed but does not show a water level. No water wells appear to be currently at risk from the impact at the site. Area wells are plotted on the USGS topographical map in Attachment I.

NMOSE Well Number	Tws	Rng	Sec	q	Q	q	Zn	Easting	Northing	Date	Well 'bgs	Water 'bgs
L02339	16S	35E	36	1	3		13	648084	3638919	9/12/1953	82	50
L09953	17S	35E	1	4	2	1	13	649226	3637015	9/25/1987	150	50
L09944	16S	35E	36	4	4		13	649302	3638127	8/17/1987	90	55
L09892	17S	36E	6	3	1	3	13	649630	3636820	1/30/1987	135	50

NMOSE Well Number	Tws	Rng	Sec	q	Q	q	Zn	Easting	Northing	Date	Well 'bgs	Water 'bgs
L04442	16S	36E	31	1			13	649895	3639143	5/25/1960	90	62
L02145	16S	36E	31	3	2		13	650076	3638543	4/7/1953	120	78
L05225	16S	36E	31	4	4		13	650889	3638154	9/18/1963	110	80
L06875	16S	36E	32	1	4	1	13	651579	3639074	11/16/1971	131	90
L06695	16S	36E	32	2	2		13	652479	3639392	6/17/1970	90	45
L05616	17S	36E	4	3	2		13	653324	3636994	5/2/1965	130	65
L01723	17S	36E	5	3	1	1	13	651211	3637049	?	?	?
L01723 S	17S	36E	5	3	2	4	13	651813	3636858	?	?	?
L01723 S-2	17S	36E	5	3	2	1	13	651613	3637058	?	?	?
L01723 S-3	17S	36E	5	4	1	2	13	652215	3637067	?	?	?

3.3.4.3 Water Wells Actually or Potentially Affected by the Impact

There are no known water wells currently at risk from the crude oil impact.

3.3.4.4 Aquifer Recharge

Soil borings identified a 6" surface layer of sandy clay loam, underlain by a 20' thick interbed of indurated and fractured caliche that overlays the fine grained sand of the Ogallala Formation. No impermeable clay interbeds were encountered down to saturation, suggesting that the upper most unconfined aquifer is capable of being recharged from the surface.

3.3.4.5 Depth to Ground Water Calculation

The NMOCD requires the site be ranked to determine which soil TPH threshold will apply and defines depth to ground water as, "the vertical distance from the lowermost contaminants to the seasonal high water elevation of the ground water." The uppermost occurrence of ground water is at ~65'bgs'bgs. The lower most contamination occurs at the interface of the vadose zone and the water table. The calculated NMOCD depth to ground water is essentially 0.0' bgs.

3.3.4.6 Ground Water Gradient

The monitor wells installed at the site were surveyed and the ground water gradient calculated to be to the southwest. Refer to the ground water gradient map and engineered survey in Attachment I.

3.3.4.7 Wellhead Protection Area

There are no water wells within 1000' horizontal feet of the site.

3.3.4.8 Distance to Nearest Surface Water Body

There are no surface water bodies within 1000' horizontal feet of the site.

3.3.4.9 Seasonal Stream Flow Characteristics

There are no streams or well defined drainages located near the site.

3.3.5 Delineation of Nature, Extent, and Magnitude of Contamination (19NMAC15.A.19.E(3)(b)(i), (ii))

Refer to the previously submitted document, EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003, for delineation details.

3.3.5.1 Highly Contaminated/Saturated Soils

The highly contaminated/saturated soils occurred in the near surface and have either been disposed of off-site or attenuated by the mechanical shredding process.

3.3.5.2 Unsaturated Contaminated Soils

The soil in the spoils pile is contaminated above the NMOCD guideline thresholds for the COCs but is unsaturated.

3.3.5.3 Ground Water Contamination

The ground water at this site is impacted.

3.3.5.4 Other Relevant Media Contamination

Other than the soil and ground water, there are no other media contaminated.

3.3.5.5 Background (Up-gradient) Sample Results

A near surface background soil sample has not been collected up gradient of the site but is assumed to be unimpacted. To bound the areal extents of the dissolved phase hydrocarbon plume, a single up-gradient, one down-gradient, and two transverse gradient monitor wells are being proposed.

3.3.6 Identification of Remedial Action Levels

Remedial goals for soil in this area are based on NMOCD site ranking and is based on ground water proximity.

3.3.6.1 Site Ranking

The area has the following score and site ranking;

Depth to Groundwater / >50' = 10 DEPTH TO G/W is 0.0; SCORE OF 20
Wellhead Protection Area / >200' = 0
Distance to Surface Water Body / >200' = 0
Site Ranking = ~~10~~ 20

3.3.6.2 Remedial Action Levels

The typical remedial action objectives for soil at this site without the installation of an engineered migration barrier according to the NMOCD guidelines would be as follows.

- TPH – 1000 mg/Kg
- BTEX – 50 mg/Kg
- Benzene – 10 mg/Kg

The New Mexico Water Quality Control Commission (WQCC) ground water Maximum Contaminant Levels for the CoCs will apply to site ground water, i.e.;

- Benzene - 0.01 mg/L
- Ethylbenzene - 0.75 mg/L
- Xylenes Total - 0.62 mg/L
- Toluene - 0.75 mg/L

3.3.7 Proposed Borehole Sampling Locations

A large portion of the contaminated soil has been removed from the surface and subsurface. Additional boreholes will be primarily utilized to identify and bound the CoC ground water impact.

3.3.8 Monitoring Program (19NMAC15.A.19.E(3)(c)

The ground water will be monitored quarterly. The Ground Water Monitoring Program will be a part of the Stage 2 Abatement Plan. The monitor wells installed at the site will be sampled at least quarterly for the BTEX compounds. Product extracted/recovered volumes will be routinely logged and reported along with disposition information. The remediation systems installed at the site will be checked at least every two weeks. Data will be summarized into an annual report documenting progress and status and submitted to the NMOCD Environmental Bureau Santa Fe and Hobbs offices.

3.3.9 Schedule for Stage 1 Abatement Plan Implementation

The NMOCD approved soil remediation work plan, i.e., EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003 has been partially implemented with completion planned in the near future. The subsurface soil investigation delineated the vertical and horizontal extents of hydrocarbon contamination and is complete.

4.0 Stage 2 Abatement Plan

The objective of the Stage 2 Abatement Plan will be to abate soil and ground water contamination to acceptable levels as delineated and identified during site delineation. The information collected to date provides information sufficient to select an abatement strategy and develop a plan for the site.

4.1 Preliminary Soil Investigation and Remediation Strategy

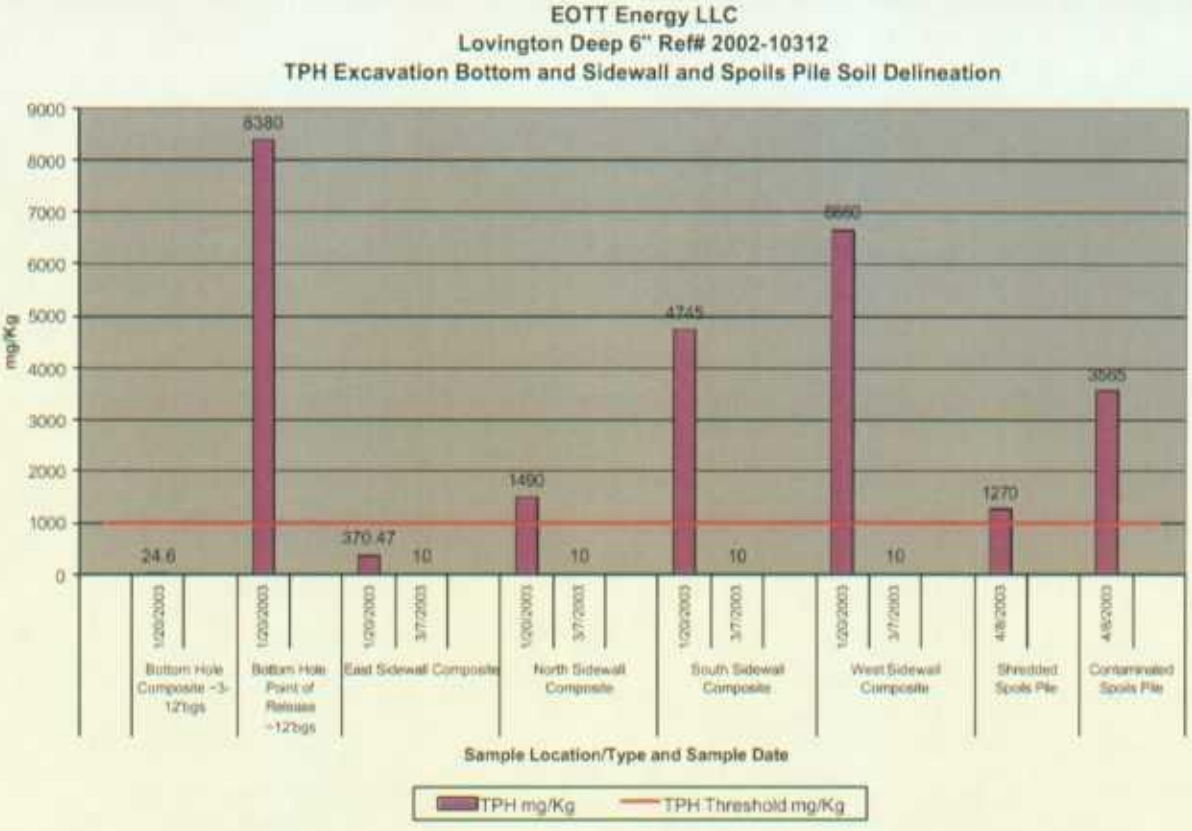
Based on information collected during the preliminary soil delineation phase of the project, Link proposes to isolate the remaining crude oil source term by installing an engineered and tested clay barrier supported by a computer simulated risk assessment using the American Petroleum Institute VADSAT 3.0 computer model. The comprehensive risk assessment is provided in the Link document approved by the NMOCD in September 2003, Soil Remediation and Risk Assessment Proposal for the Lovington Deep 6", Ref. # 2002-10312, July 21, 2003. General information is summarized below.

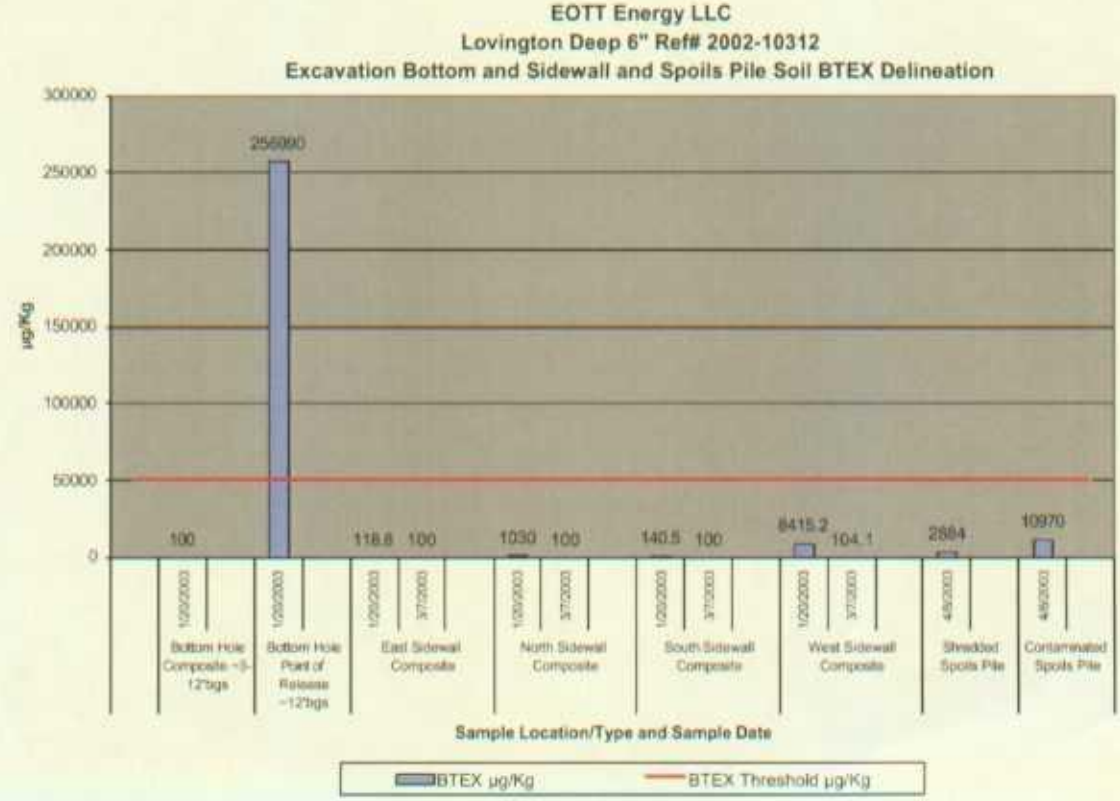
How Deep?

4.1.1 Subsurface Soil Investigation

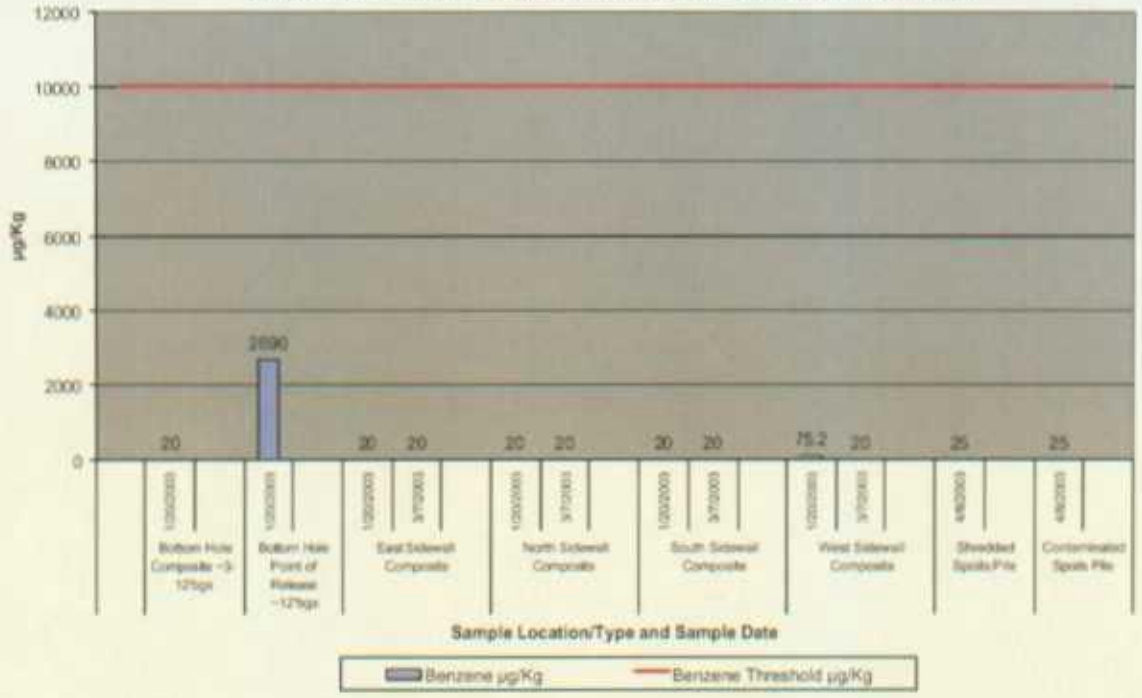
The initial investigation advanced and sampled 6 boreholes, 5 of which were converted into observation/monitor wells. Soils observed from Borehole 1 (BH1), the leak origin borehole impacted to the ground water interface where product was observed floating atop the aquifer. BH1 was developed into a 4" PVC case recovery well. BH2, BH4, BH5, and BH6 were advanced and sampled at perimeter locations and, to bound the extent of the PSH and dissolved phase hydrocarbon impact, installed as observation/monitor wells, i.e., MW2 (~65' southeast transverse gradient), MW3 (150' down gradient), MW4 (~125 southeast transverse gradient), and MW5 (~100' northwest up gradient). Refusal was initially encountered at BH3 with BH4 being successfully advanced in the same area. Soil sample analytical data in these soil borings were below the NMOCD soil remedial guideline thresholds. During excavation of the contaminated soil, the horizontal extent of CoC impact was observed to taper from the visible surface spill perimeter to the area immediately below the leak origin. The top surface of the contaminated soil vertical column at 10'bgs is 8,018 ft^2 in the south end of the 19,230 ft^2 excavation. The excavation bottom outside the contaminated soil column area and the sidewalls tested to be at acceptable levels for the CoCs. The

site map showing excavation and soil column areas is included in Attachment I. The analytical results are presented and summarized in Attachment III and illustrated below.

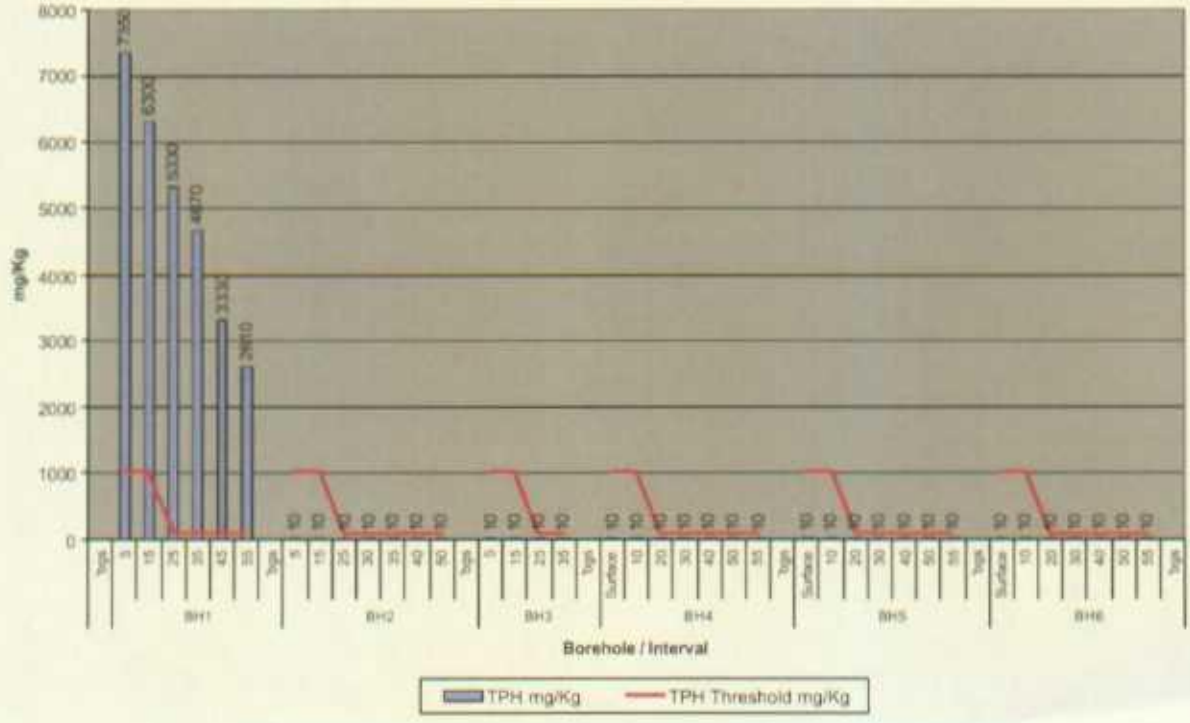




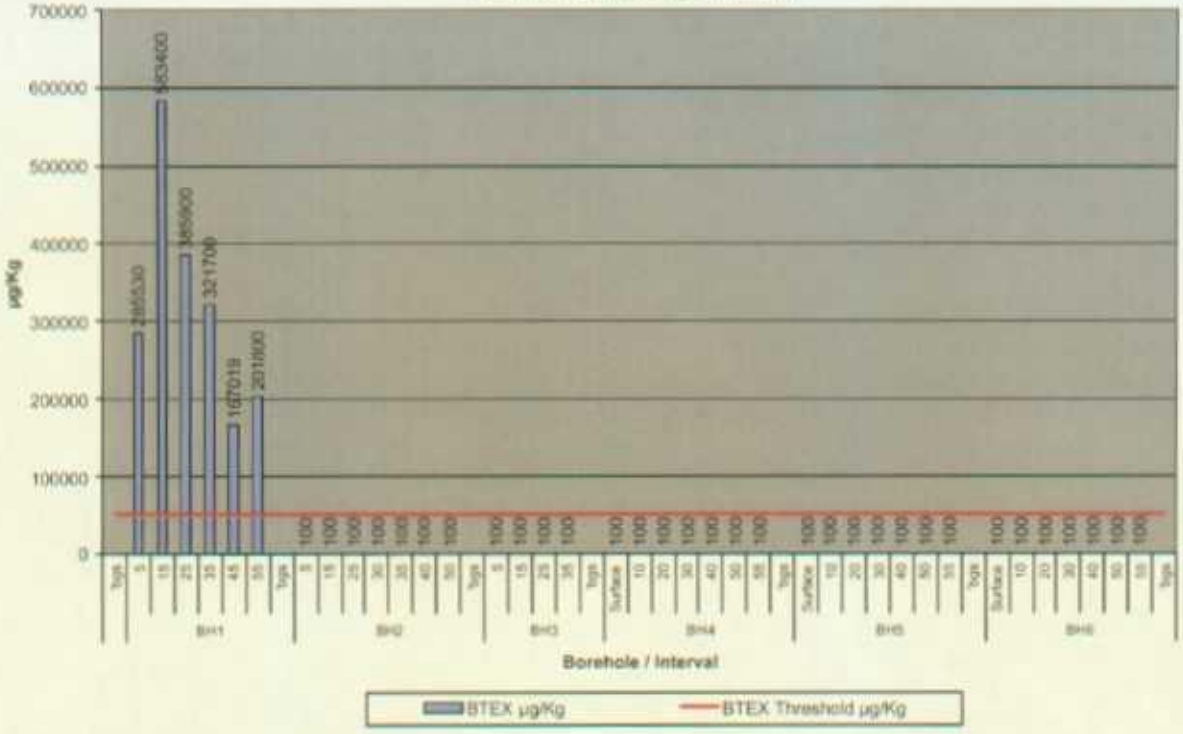
EOTT Energy LLC
Lovington Deep 6" Ref# 2002-10312
Excavation Bottom and Sidewall and Spoils Pile Soil Benzene Delineation



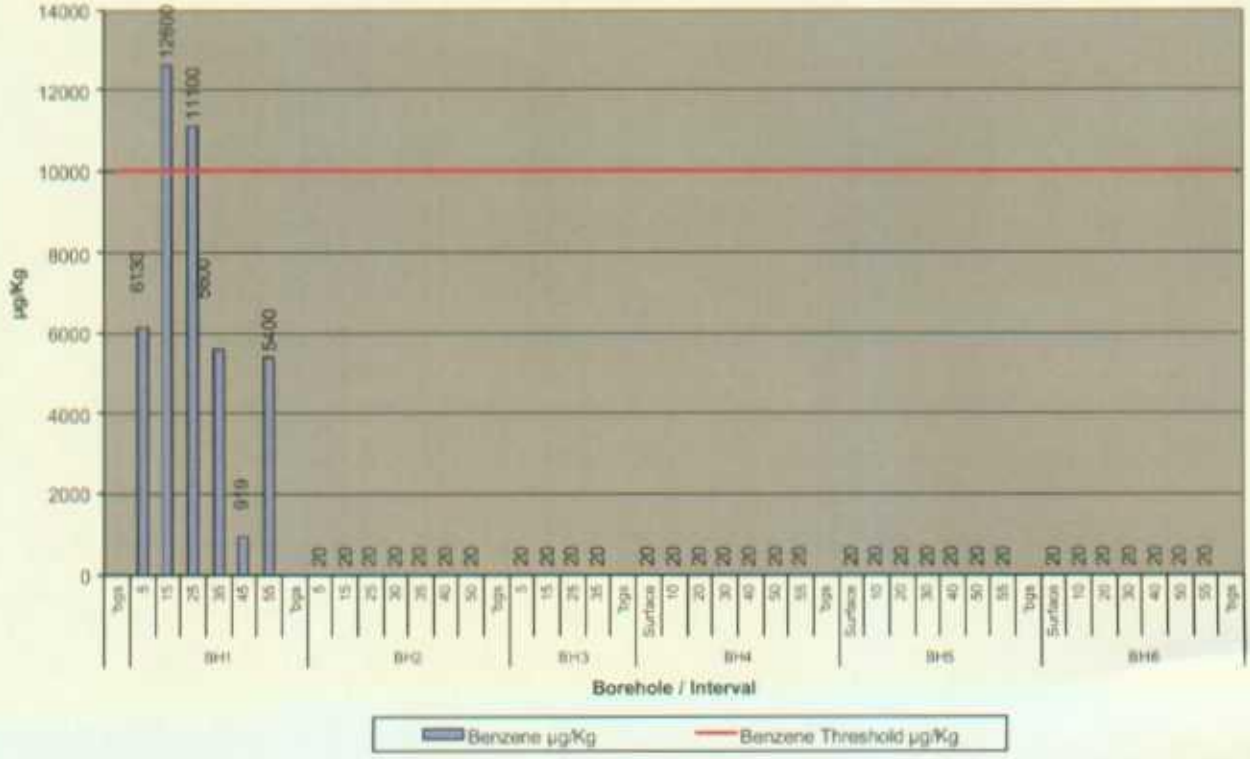
EOTT Energy LLC
Lovington Deep 6" Ref# 2002-10312
TPH Borehole Soil Delineation



EOTT Energy LLC
Lovington Deep 6" Ref# 2002-10312
Borehole Soil BTEX Delineation



EOTT Energy LLC
Lovington Deep 6" Ref# 2002-10312
Borehole Soil Benzene Delineation



4.2 SOIL REMEDIATION AND RISK ASSESSMENT PROPOSAL

Impacted soil down to the 10'bgs interval has been excavated with 1,102 yd^3 disposed and the remaining 10,500 yd^3 processed through a mechanical shredder to separate rocks from landfarmable soil, as well as, agitate and aerate so as to homogenize and promote attenuation through blending and volatilization. The table below shows the relative effectiveness of the process;

	TPH^{8015m}	BTEX	Benzene
Units	mg/Kg	µg/Kg	µg/Kg
Processed Spoils Pile Soil	1270	2884	*<25*
Contaminated Spoils Pile Soil	3565	10970	*<25*

The excavation exposed the top of the contaminated soil column and effectively delineated the horizontal extent of crude oil impact in the near surface and provided a conceptual visualization of the remaining impacted area, i.e. an inverted cone with a defined area of 8,018 ft^2 tapering from ~10'bgs to ~65'bgs, the ground water interface. The perimeter soil borings suggesting no impact also support the conceptual model. Bottom and sidewall samples indicate that soil down to ~10'bgs around the contaminated soil column perimeter are at acceptable levels. Results from analysis of a grab sample from just beneath the surface in the center of the soil column are as follows;

	TPH^{8015m}	BTEX	Benzene
Units	mg/Kg	µg/Kg	µg/Kg
Excavation Bottom Point of Release	8380	256990	2690

The data is summarized and presented in Attachment III of the document titled, "Soil Remediation and Risk Assessment Proposal for the Lovington Deep 6", Ref. # 2002-10312, July 21, 2003.".

4.2.1 VADSAT version 3.0 Risk Assessment

Based on information collected during the soil delineation phase of the project, EOTT proposes to isolate the remaining crude oil impacted soil by installing an engineered and tested clay barrier supported by a computer simulated risk assessment using the American Petroleum Institute VADSAT 3.0 computer model. To ensure that the simulations are conservative, the highest TPH and BTEX mass concentrations were used to maximize force of transport. The BTEX mass was substituted for Benzene, the parameter of transport. Likewise, the infiltration rate was inputted as positive to accommodate the model, when in reality the local evaporation rate is negative. Given that the ground water has already been impacted by crude oil, the depth of contamination was set 5' above the ground water interface. The model input variables are presented in Attachment V.

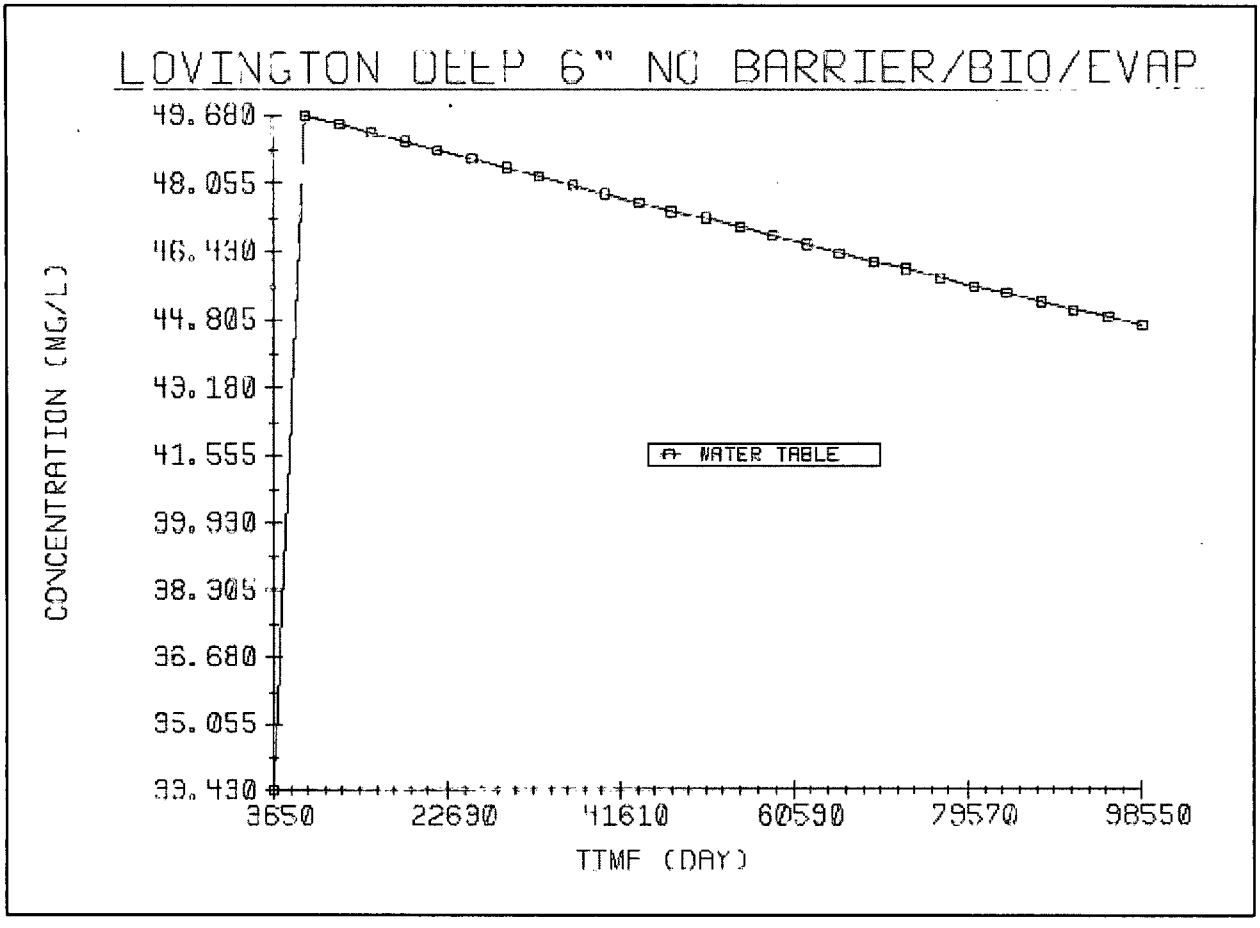
4.2.1.1 Simulations

Simulations were conducted under the following conditions;

- Barrier not present, No Bio-attenuation, No Evaporation
- Barrier present, No Bio-attenuation, No Evaporation
- Barrier present, with Bio-attenuation, with Evaporation

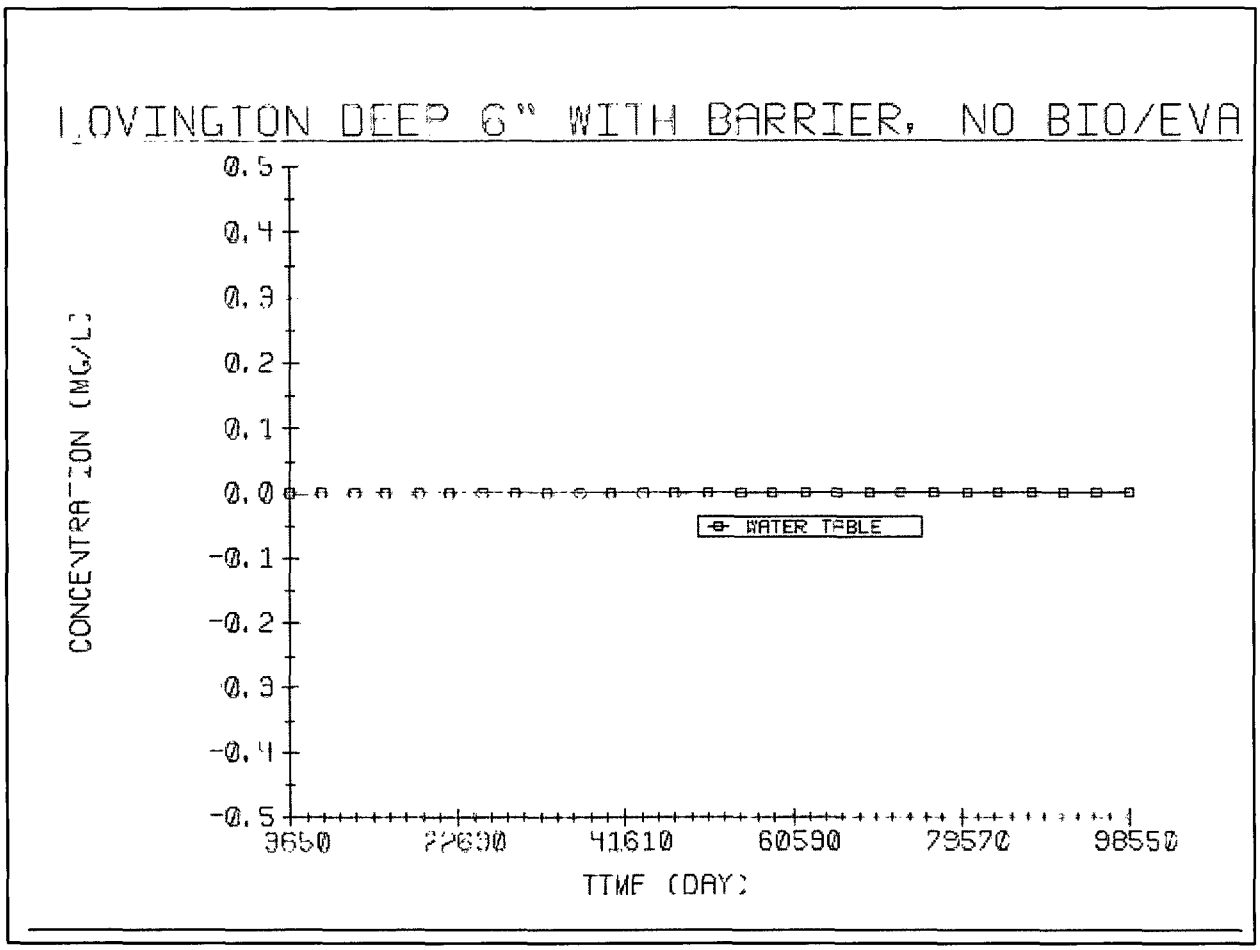
4.2.1.2 Simulation with No Barrier, Bio-decay, or Evaporation

This simulation shows that in 25-30 years, without an engineered barrier, bio-decay, or evaporation, the Benzene source term will impact the ground water at 49.680 mg/L and decrease linearly by dispersion. The chart below illustrates the results.



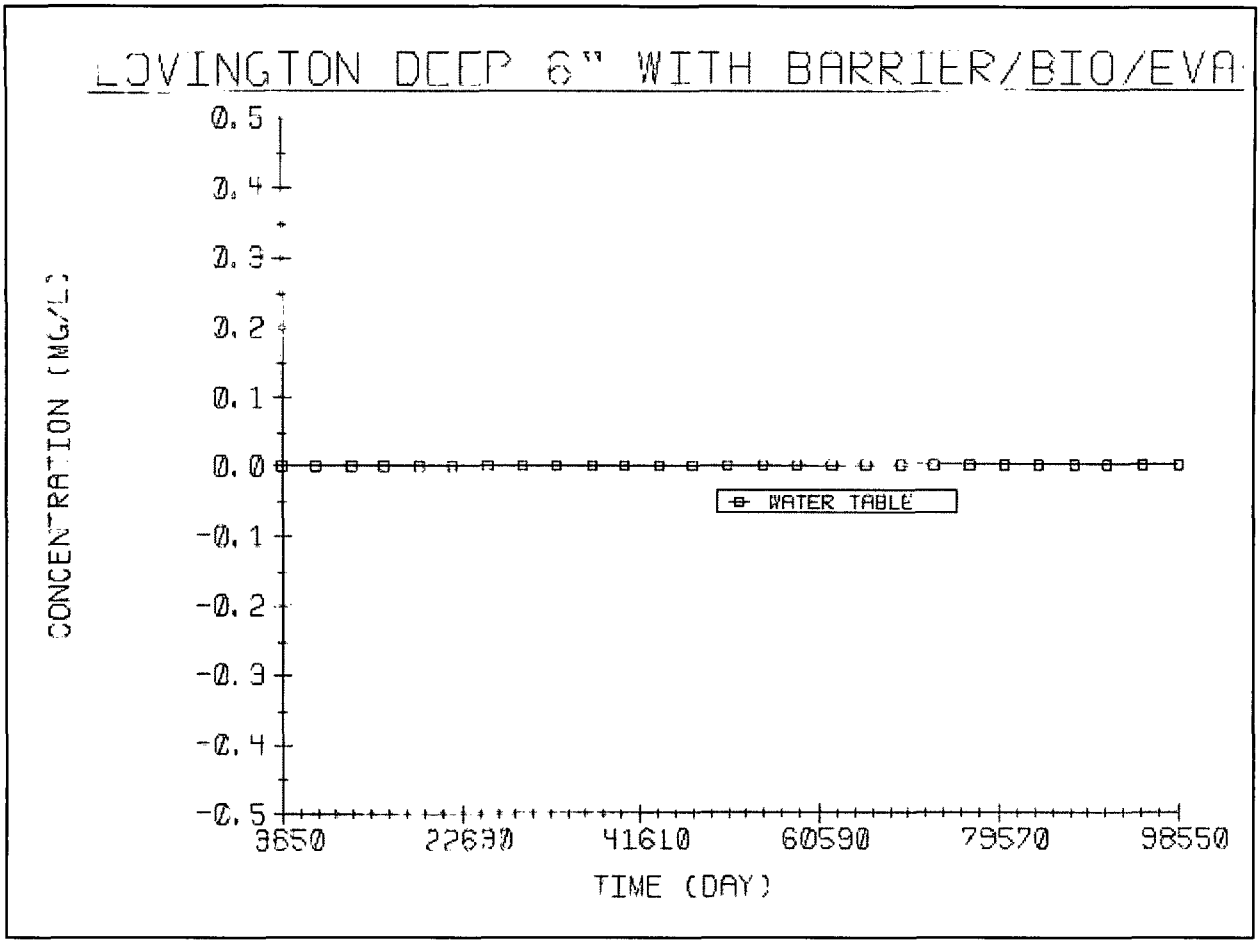
4.2.1.3 Simulation with Barrier, but no Bio-decay or Evaporation

This simulation indicates that the barrier alone will prevent the ground water from being impacted further. The chart below illustrates the results.



4.2.1.4 Simulation with Barrier, Bio-decay, and Evaporation

This is the most realistic simulation and supports the conclusion that the barrier and natural processes will prevent the remaining crude oil source term from increasing the current ground water contamination. The chart below illustrates the results.



4.2.2 Engineered Barrier Installation and Certification

The perimeter of the barrier will be at least 5' beyond the contaminated soil and be at least 1 feet thick after compaction and installed between the 9'bgs and 10'bgs intervals on top of the contaminated soil column. The barrier will be constructed of clay and compacted to 95% of the Proctor Density as determined by ASTM-D-698. The clay will be tested by an engineering firm to certify and verify acceptable compaction and moisture content. The lift will be tested in two locations at points central to each lateral half of the barrier. The clay barrier will be contoured to shed water.

4.2.3 Backfilling and Testing

After the clay barrier is certified as adequate, it is proposed to backfill the excavation with the remediated soil and rock. Every 1,000 yd^3 batch of soil will be tested to ensure that the Data Objectives in Section 6.9.2 of the previously submitted document, EOTT Energy Soil Remediation and Risk Assessment Proposal, Lovington Deep 6" Ref. # 2002-10312, July 21, 2003, have been achieved.

Prior to testing, approximately 1,000 yd^3 of contaminated soil will be spread into a 6" lift and a VOC headspace survey conducted at 5 points within the lift, i.e., the 4 quadrants and the center. If the VOC headspace of the samples from a lift are <100.0 ppm, the soil will be deemed acceptable for emplacement and emplaced in the excavation, if >100.0 ppm, then the two sites with the highest headspace reading will be grab sampled, refrigerated and sent to the laboratory for TPH^{8015m} and BTEX analysis. Soil that exceeds 2,000 mg/Kg TPH^{8015m} will be managed separately.

4.3 Product Recovery and Ground Water Remediation

The free phase hydrocarbon will be removed via extraction wells using a portable gasoline powered eductor type circulating recovery system. The number and locations of the extraction/recovery and monitoring wells are proposed below and utilize information collected during the preliminary site investigation. Recovered crude oil will be reintroduced into the Link pipeline system. It is proposed that the contaminated ground water will be remediated using ground water sparging.

4.3.1 Monitor Well numbering change

For administrative purposes, the initial monitor wells numbers are being permanently changed as follows;

Initial MW Number	Stage II Abatement Plan MW Number
MW1	MW2
MW2	MW3
MW3	MW5
MW4	MW4
MW5	MW1

4.3.2 Dissolved Phase Organics (BTEX) Plume Delineation

Link proposes to install 4 additional monitor wells to bound the BTEX plume identified during the initial ground water investigation. Refer to the Benzene Delineation map in Attachment I. The wells will be offset ~100' radially from MW1, MW2, MW4, and MW5. If this set of wells fails to adequately delineate the plume, additional monitor wells will be proposed and installed. Refer to the monitor well location map in Attachment I.

4.3.3 Product Recovery

Three additional recovery wells will be installed in a ring with a radius of 25 feet around the leak origin well for the purpose of recovering product and secondarily as ground water sparge wells after product has been adequately removed. Refer to the monitor well location map in Attachment I.

4.3.4 Ground Water Sparging

After the recoverable free phase product has been removed from the ground water interface, the extraction/recovery wells will be converted to air injection/sparge wells. Being screened in the upper 10 feet of the saturated zone of the subsurface, the injected oxygen will promote natural attenuation that can be monitored. This method will also aerate the contaminated smear and vadose zones and promote attenuation. Blower/compressor system design specifications will be provided to the NMOCD prior to installation.

4.3.5 Site Surface Restoration

During the spring of the year, the surface will be reseeded with grasses native to the area, i.e., blue gramma and black gramma or a seed mix agreeable with the landowner.

4.3.6 Abatement and Monitoring Schedule

Initial sampling of the monitor wells will be monthly with quarterly monitoring reports submitted to the NMOCD Environmental Bureau offices in Hobbs and Santa Fe, New Mexico. It is proposed to cease abatement of the ground water after receipt of 4 consecutive quarters of monitoring well data below regulatory limits. At that time the monitor wells will be abandoned.

4.3.7 Public Notification

Prior to issuance of the Public Notice, the following individuals and entities will be notified in writing of the Stage 1 and Stage 2 Abatement Plans.

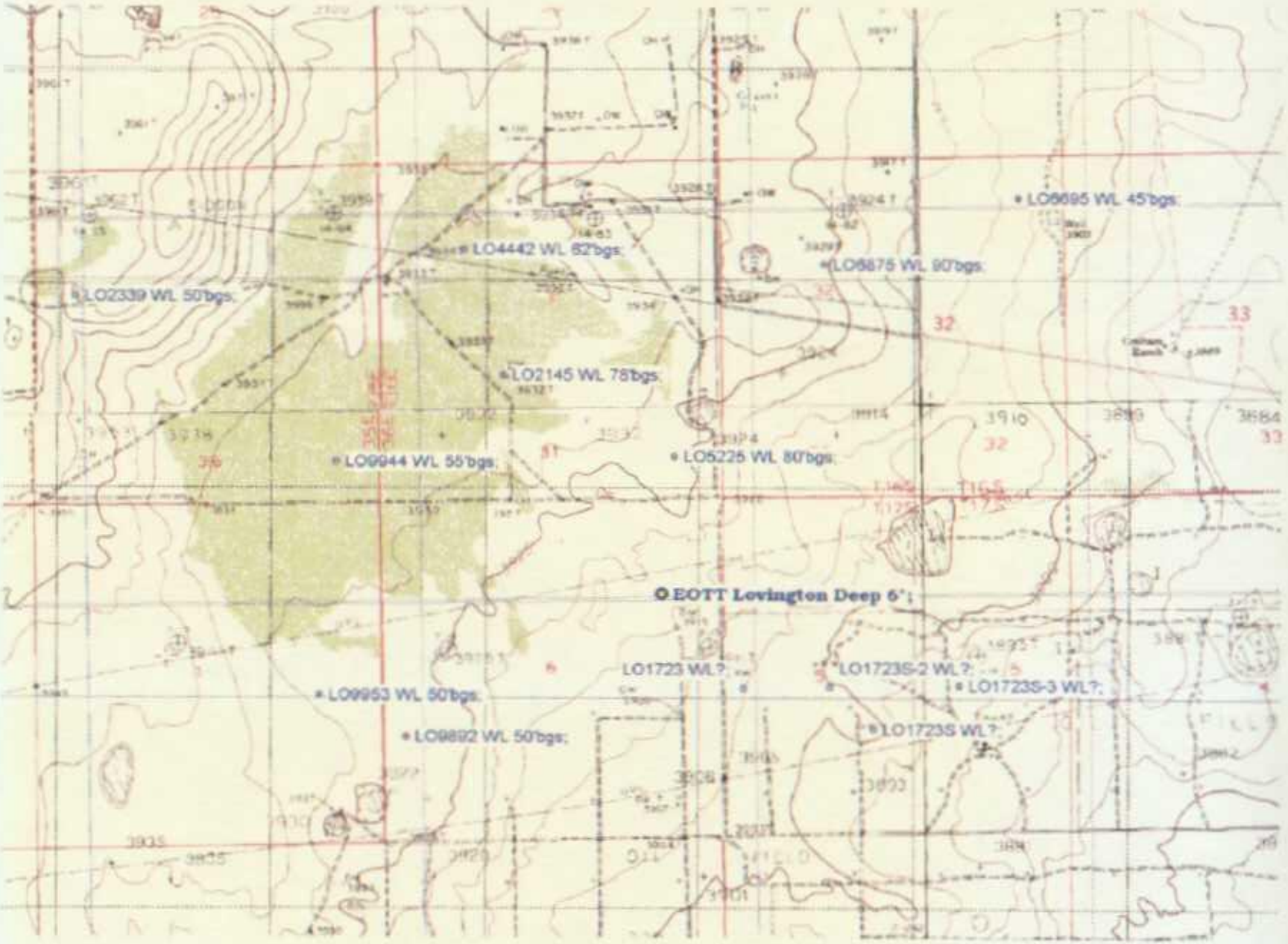
- Surface owners of record within one (1) mile of the perimeter of the affected area.
- The Lea County Commission
- Individuals or organizations requesting notification.
- The New Mexico Trustee for Natural Resources and other affected agencies.
- Other entities as directed by the Director of the New Mexico Energy Minerals and Natural Resources Department.

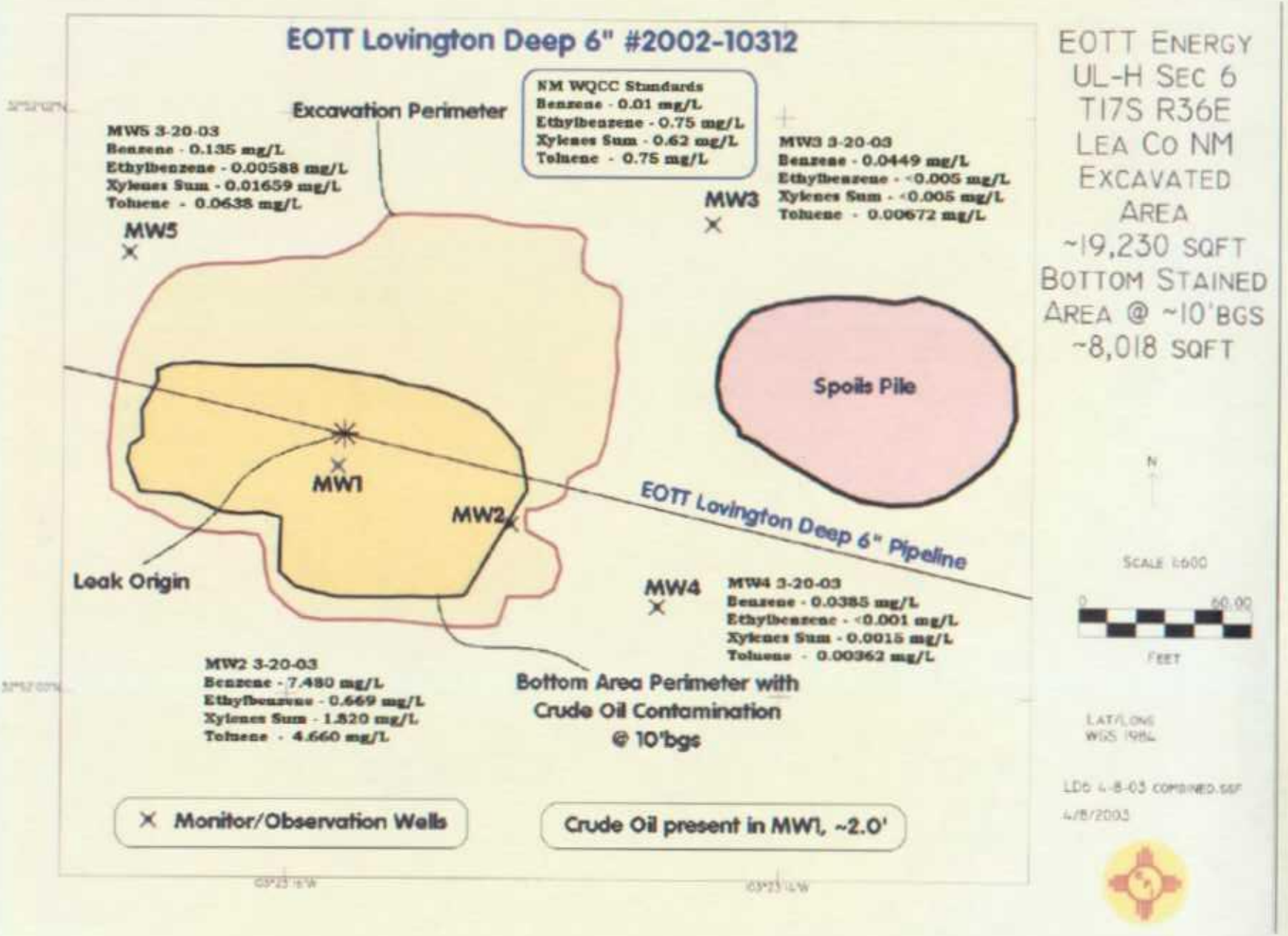
Within fifteen days after receiving notice from the NMOCD that the Stage 1 Abatement Plan or the Stage 2 Abatement Plan are administratively complete, Link Energy will issue public notice in newspapers with county and state wide circulation's, i.e., Hobbs Daily News Sun, Lovington Leader, and Albuquerque Journal.

The Public Notice will be developed to include:

- Name and address of the responsible person
- Location of the proposed abatement
- Descriptions of the source extent, release volume, and affected environmental media.
- Description of the Stage 1 and Stage 2 Abatement Plans
- Description of the procedure required by the Director before making a final determination.
- State that the abatement plan can be viewed at the Division office in Hobbs or electronically from a Division maintained site.
- State that the Director will consider the following comments and requests if received within 30 days after publication of the public notice.
    a) Written comments on the abatement plan
    b) For a Stage 2 abatement plan, written requests for a public hearing that includes reasons why a hearing should be held.
    c) Address and telephone number at which interested persons may obtain further information.

Attachment I: Figures and Maps


LO6695 WL 45'bgs.
LO4442 WL 82'bgs.
LO6875 WL 90'bgs.
LO2339 WL 50'bgs.
LO2145 WL 78'bgs.
LO9944 WL 55'bgs.
LO5225 WL 80'bgs.
EOTT Lovington Deep 6"
LO1723 WL?
LO1723S-2 WL?
LO1723S-3 WL?
LO9953 WL 50'bgs.
LO1723S WL?
LO9892 WL 50'bgs.



EOTT ENERGY
UL-H SEC 6
T17S R36E
LEA CO NM
EXCAVATED
AREA
~19,230 SQFT
BOTTOM STAINED
AREA @ ~10'BGS
~8,018 SQFT

N

SCALE 1:600

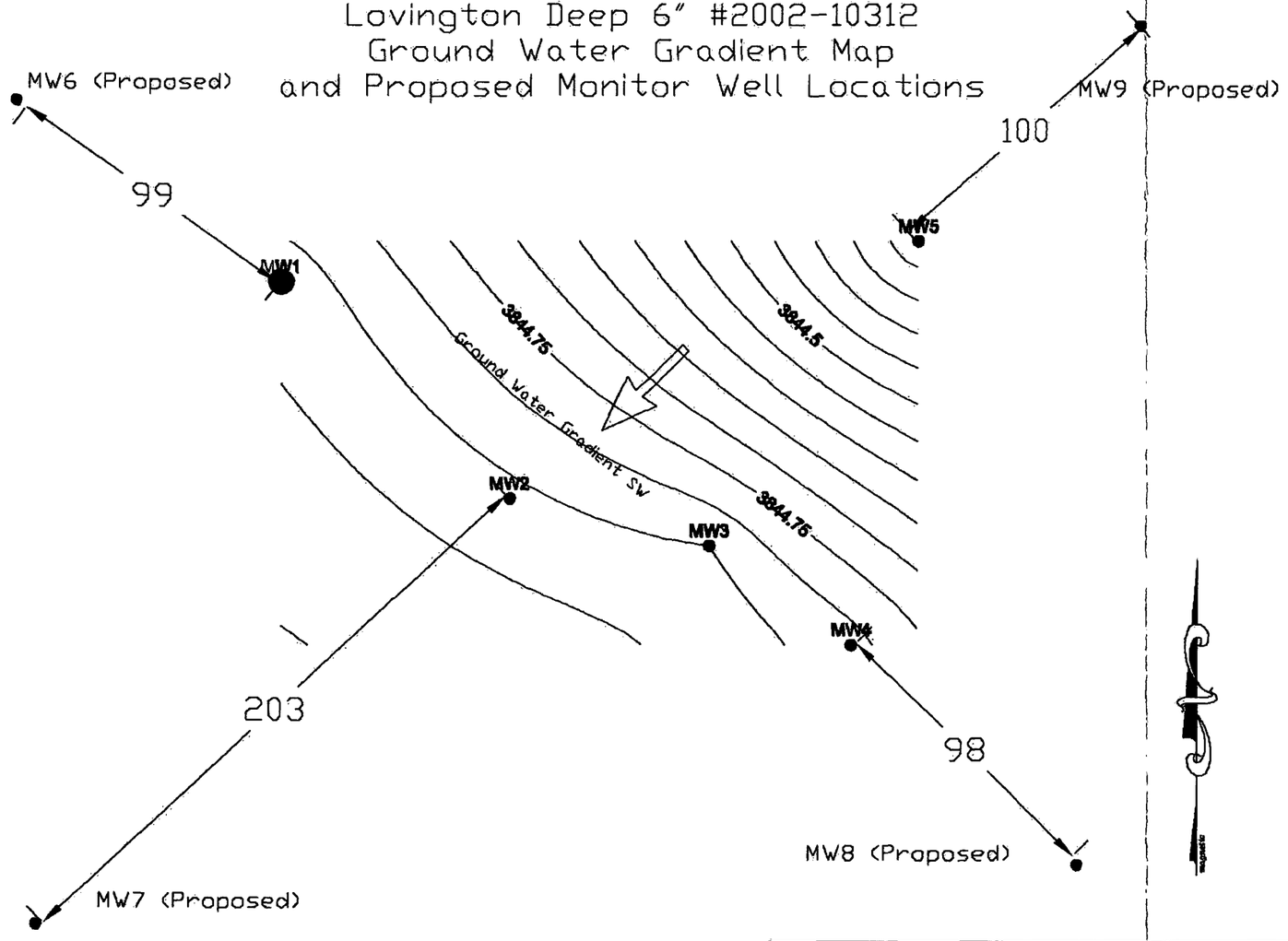
0 60.00

FEET

LAT/LONG
WGS 1984

LDG 4-8-03 COMBINED.SSF
4/8/2003

Link Energy
Lovington Deep 6" #2002-10312
Ground Water Gradient Map and Proposed Monitor Well Locations



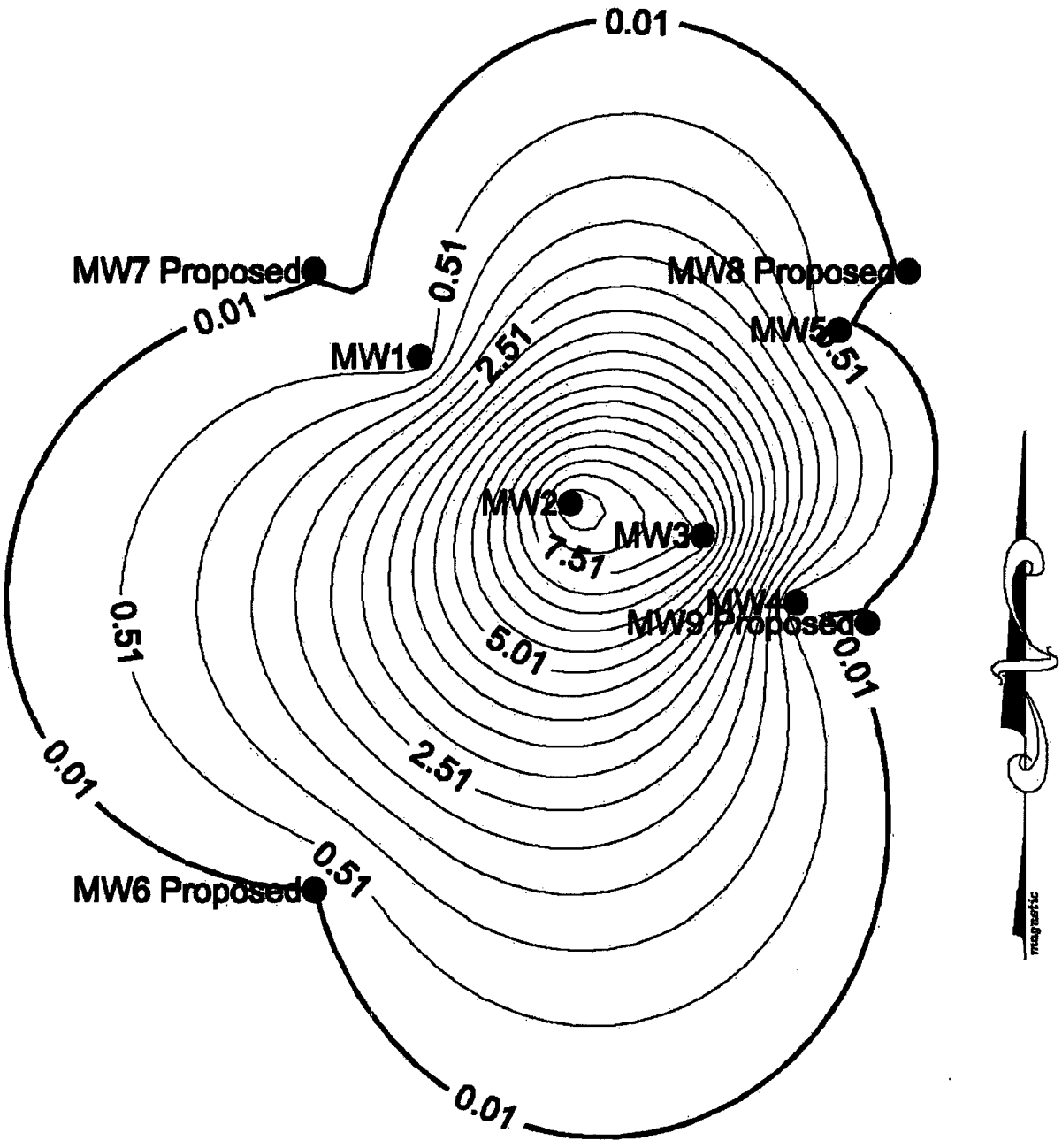
GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

DRAWN BY:	PWM	DATE:	11-9-03
CHECKED BY:	PWM	DRAWING NO.:	2a
JOB NO.:	#2002-10312	SHEET	1 OF 1

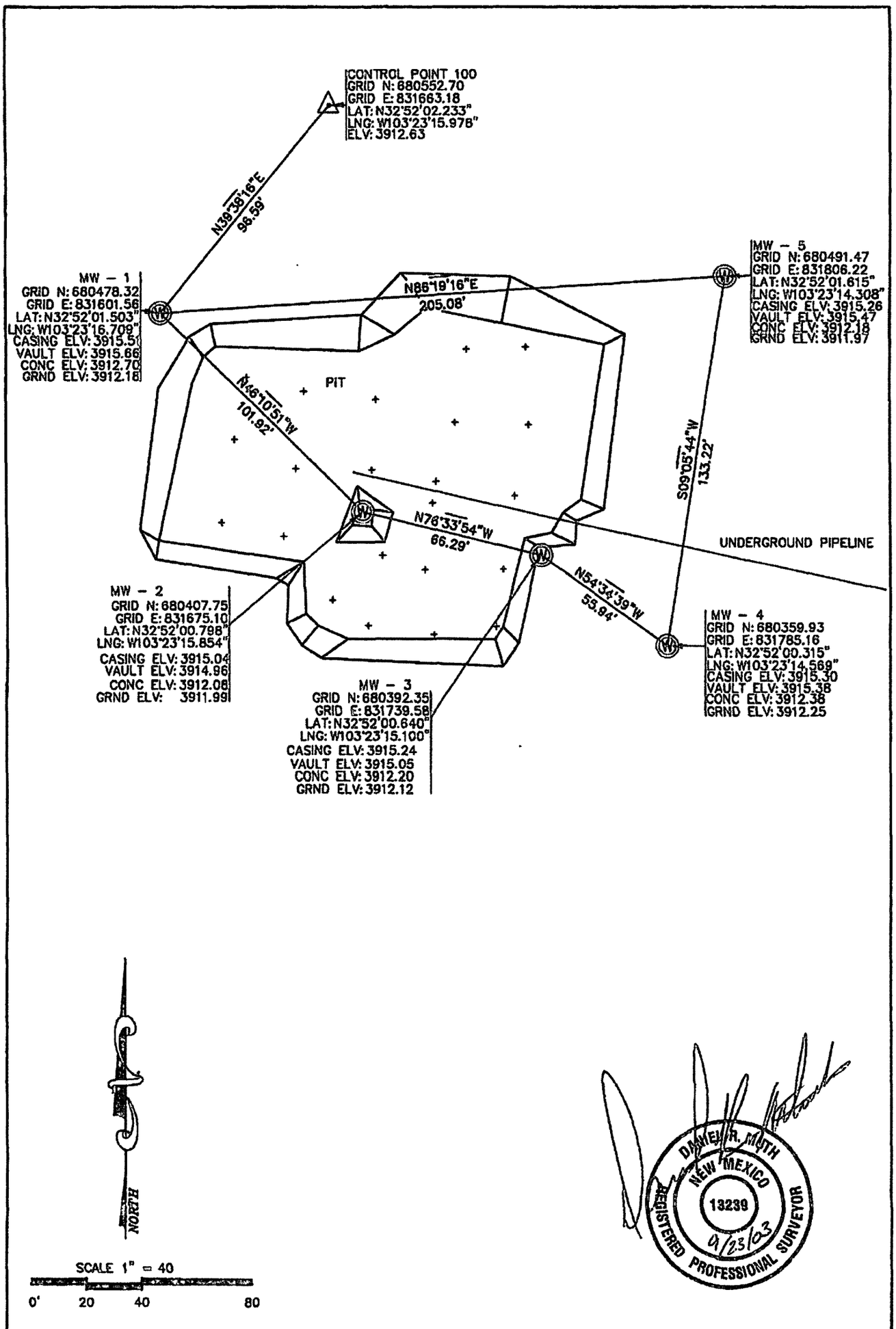
Link Energy
Lovington Deep 6" #2002-10312
Benzene Gradient Map
Gradient Values are in mg/Liter



GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

DRAWN BY:	PWM	DATE:	11-9-03
CHECKED BY:	PWM	DRAWING NO.:	2b
JOB NO.:	#2002-10312	SHEET	1 of 1



PETTIGREW AND ASSOCIATES			INDEXING INFORMATION FOR COUNTY CLERK	PLAT OF MONITOR WELL SURVEY FOR ENVIRONMENTAL PLUS INC. EUNICE, NM.			
1110 N. GRIMES HOBBS, N.M. 88240 (505) 393-5827			OWNER: DAR ANGLE LOC: SE1/4, SE1/4 T17SR36E, SEC. 6	PROJ. No.	2003.1109	DRN BY:	DRM
0	9/23/03	PLOTTED		DWG	ACAD EPI MW4\..\EPI MW4.DWG		
00	9/23/03	PRELIMINARY PLAT		BOOK	LEA CO. #1	SHT.	1
9/23/03		DATE OF SURVEY					
REV	DATE	DESCRIPTION					

Attachment II: Site Photographs


EOTT Energy Pipeline
Lovington Deep 6"
Lea County New Mexico
12/12/2002 11:09am


12/12/2002 12:20pm

Lovington Deep 6" (looking west)

Attachment III: Quality Assurance Plan

1.0 QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Plan (QAP) will ensure the quality and usability of information and data used to support a successful site investigation and subsequent environmental management decisions.

1.1.1 Data Quality Objectives

For analytical information derived from samples, the following quality controls will be documented and verified. If data is within the specifications it will be deemed quantitative and acceptable for use in making environmental management decisions.

- Laboratory data must have extraction recovery for TPH, BTEX and general chemistry parameters =30.0%. Or a "%Extraction Accuracy " between 70 and 130%.
- Laboratory data must have <30% Relative Percent Difference or a "%Instrument Accuracy" between 70 and 130%.
- Field headspace analyses must be supported with instrument calibration data and calibration gas certification.

1.1.2 Methodology

Collecting representative site samples and information requires that the sampling and observational processes and procedures be implemented within strict bounds. These control procedures will further ensure the quality of site data and information and are consistent with the EOTT standard operating procedures as referenced in the NMOCD approved "General Work Plan for Remediation of EOTT Pipeline Spills, Leaks, and Releases in New Mexico." Likewise, personnel will implement standard environmental and occupational safety protocols.

1.1.2.1 Borehole Drilling, Lithologic Sampling, Logging, and Abandonment

Boreholes will be located strategically to best determine vertical and horizontal extent of contamination in the vadose zone and ground water. Borelogs will be developed for each boring noting site lithology. Likewise, laboratory samples may be collected to determine more detailed lithologic characteristics, i.e., porosity, transmissivity, etc. Each borehole not developed into a permanent monitor well will be plugged with Sodium Bentonite in accordance with the NMOCD guidelines.

1.1.2.1.1 General Drilling Procedures

The investigation will use the Environmental Plus, Inc. drill rig with hollow stem auger and "thin-wall probe" method of discrete sampling.

1.1.2.1.2 Soil Sampling and Logging

Upon advancing to the desired sampling interval the probe will be extended through the end of the hollow stem auger and pushed into the soil matrix to collect the sample. As the 1.5" X 48" stainless steel probe with a vinyl sampling sleeve is detached from the sampling bar, it will be immediately placed on the rack and logged. A 4 oz. sample will then be decanted into the sample jar for refrigeration and preparation with the remainder (~1 Kg) placed in a 1 gallon Ziplock bag, warmed to ambient ~ 70-80 °F and VOC Headspace concentration measured and recorded. All pertinent information will be recorded on the field borelog data sheet.

1.1.2.1.3 Monitor and Pollution Abatement Well Installation

Boreholes exhibiting contamination from the surface to ground water will be abandoned. Those advanced down gradient of the site for the purpose of plume delineation and found to be unimpacted will be completed and developed as monitor wells. Some boreholes may be temporarily abandoned, i.e., covered but not plugged, for future development as pollution abatement wells. The New Mexico State Engineers Office will be notified in writing of all pollution abatement well installations. All monitor and pollution abatement wells will be installed and developed in accordance with the NMOCD guidelines.

1.1.2.1.4 Ground Water Sampling

Ground water will be sampled within 24 hours of well development using a new and certifiably clean one-liter weighted baler. The water will be immediately decanted into the appropriate containers and prepared for ascension to the laboratory.

1.1.2.1.5 Borehole Abandonment

The boreholes will be filled with a mixture of distilled water and Sodium Bentonite and a wooden marker denoting the borehole number driven into the center of each backfilled hole.

1.1.2.2 Sample Handling

Soil and water samples will be collected and prepared in accordance with accepted ASTM and EPA SW846 methods.

1.1.2.3 Sampling protocols

1. Decontaminate sampling equipment and area with Alconox distilled water after each sample.
2. Prepare samples and refrigerate as soon as practicable.

Duplicates or blanks may be submitted to the laboratory to establish reproducibility and identify laboratory contamination, respectively.

1.1.2.4 Sample Containers

Laboratory and field analyses of soil and water require specific containers and are listed in the matrix below.

	TPH	BTEX	VOC Headspace	Metals	PAH	General Chemistry
Soil	4 oz. Jars with Teflon seal	4 oz. Jars with Teflon seal	1-gallon Ziplock® bags			
Water	1 liter amber glass w/HCL	2-40 ml VOA vials w/ HCL		16 oz. Plastic w/ 1ml HNO_3	1 liter Amber Glass	1 liter Plastic

1.1.2.5 Sample Custody

All analytical request forms will be completed and signatured by EPI as sampler. EPI personnel will ascension the samples to the AnalySys, Inc. sample-receiving personnel under chain-of-custody signature.

1.1.2.6 Quality Control Samples

Quality control samples will be analyzed to ensure data quality.

1.1.2.6.1 Field Blank

A field blank for soil or water is not deemed necessary.

1.1.2.6.2 Equipment Blank

None will be collected.

1.1.2.6.3 Field Duplicate or Co-located Samples

For water and soil samples, one duplicate or co-located sample will be collected for analysis every 10^{th} sample.

1.1.2.6.4 Trip Blank

A laboratory prepared trip blank will accompany each water sample batch.

1.1.2.7 Field Measurements

The VOC Headspace concentration for each soil sample will be measured. The instrument used will be the Ultra-Rae PID manufactured by Rae Systems. The calibration gas will be 100.0 ppm isobutylene standard from Scott Specialty Gases, Freemont, Colorado.

1.1.2.7.1 Equipment Calibration and Quality Control

The PID will be calibrated at least 3 times daily and checked with the calibration gas hourly. When a check with the calibration gas indicates the instrument reading is 10 ppm too high or low it will be calibrated. Variation in the daytime ambient temperature will cause the variation.

1.1.2.7.2 Equipment Maintenance and Decontamination

All sampling and survey equipment will be routinely decontaminated between samples. Nitrile gloves will be worn and changed with each sampling iteration.

1.1.2.7.3 Ground Water Level Measurements

Ground water levels will be taken with an accurate water level meter at each borehole where ground water is encountered and may require the use of an interface meter. Levels will be recorded as "feet below ground surface" to the nearest ".1 ft."

1.1.2.8 Analyses

Soil and ground water will be analyzed in accordance with the following EPA Methods.

The analytical suite for soil samples will include;

- TPH (EPA method 8015M)
- BTEX (EPA method 8020 or equivalent)
- SPLP for selected samples

The analytical suite for water samples will include:

- TPH (EPA method 8015B)
- BTEX (EPA method 8021B)
- Total Dissolved Solids (EPA method 150.1)
- PAH (EPA method 8270)

1.1.2.9 Sample Identification

Sample identification numbers will be designated as follows;

Site: Link Energy Lovington Deep 6"	Geoprobe	Borehole #	Interval bgs	Qualification: Cutting/Probe Sample
LELD6	GP	1	20'	C or P

Example: LELD6GP1-20C

1.1.2.10 Data Evaluation

All data will be reviewed based on the Data Quality Objectives in section 3.8.1.

Attachment IV: NMOCD Form C-141 and Site Information and Metrics Form

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

Release Notification and Corrective Action

OPERATOR "INFORMATION ONLY NON-REPORTABLE" ☒ Initial Report ☐ Final Report

Name of Company	Contact
EOTT Energy Pipeline	Frank Hernandez
Address 5805 East Highway 80 / P.O. Box 1660, Midland, TX 79703	Telephone No. 915.638.3799
Facility Name: Lovington Deep 6"	Facility Type Crude Oil Pipeline

Surface Owner	Mineral Owner	Lease No.
Darr Angell		

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County: Lea Lat.: 32°52'1.132"N Lon:103°23'16.570"W
H	6	17S	36E					

NATURE OF RELEASE

Type of Release Crude Oil	Volume of Release 25 bbls	Volume Recovered 10 bbls
Source of Release 6" steel pipeline	Date and Hour of Occurrence 12-12-02 8:00 AM	Date and Hour of Discovery 12-12-02 10:00 AM
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Paul Sheeley and Sylvia Dickie, Hobbs NMOCD (left messages) Confirmed with Sylvia Dickie at 11:45 AM 12-12-02	
By Whom? Pat McCasland (Environmental Plus, Inc.)	Date and Hour: NMOCD notified on 12-12-02 10:30 AM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
The cause of the leak was internal/external corrosion. The contaminated soil was stockpiled on a plastic barrier. Disposing at South Monument SWF

Describe Area Affected and Cleanup Action Taken.*

Spill Area = ~6,000 ft² Near surface soil will be characterized in accordance with 40 CFR 261 and with NMOCD approval, disposed of in a NMOCD approved facility. The site will be delineated and remediated.

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: Frank Hernandez	OIL CONSERVATION DIVISION	
Printed Name: Frank Hernandez	Approved by District Supervisor:	
Title: District Environmental Supervisor	Approval Date:	Expiration Date:
Date: December 12, 2002 Phone: 915.638.3799	Conditions of Approval:	Attached ☐

* Attach Additional Sheets If Necessary

EOTT Energy Pipeline Site Information and Metrics	**Incident Date and NMOCD Notified?** Discovered 12-12-02 NMOCD verbally notified on 12-12-02
SITE: Lovington Deep 6"	Assigned Site Reference #: #2002-10312
Company: EOTT Energy Pipeline	
Street Address: 5805 East Highway 80	
Mailing Address: P.O. Box 1660	
City, State, Zip: Midland, Texas 79703	
Representative: Frank Hernandez, District Environmental Supervisor	
Representative Telephone: 915.638.3799	
Telephone:	
Fluid volume released (bbls): 25 bbls	Recovered (bbls): 10
>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: Lovington Deep 6"	
Source of contamination: 6" Steel Crude Oil Pipeline	
Land Owner, i.e., BLM, ST, Fee, Other: Darr Angell	
LSP Dimensions 140' X 75'	
LSP Area: Spill Area ~6,000 ft^2	
Location of Reference Point (RP)	
Location distance and direction from RP	
Latitude: 32° 52' 1.132"N	
Longitude: 103° 23' 16.570"W	
Elevation above mean sea level: ~3,918 'amsl	
Feet from South Section Line	
Feet from West Section Line	
Location- Unit or ¼¼: UL-H SE ¼ of the NE ¼	
Location- Section: 6	
Location- Township: 17S	
Location- Range: 36E	
Surface water body within 1000 ' radius of site: None	
Domestic water wells within 1000' radius of site: None	
Agricultural water wells within 1000' radius of site: None	
Public water supply wells within 1000' radius of site: None	
Depth from land surface to ground water (DG) ~65.0'below ground surface	
Depth of contamination (DC) – ?	
Depth to ground water (DG – DC = DtGW) - 0'bgs	

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 = 10	*Wellhead Protection Area Score= 0*	*Surface Water Score= 0*
Site Rank (1+2+3) = 10		

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	**1000 ppm**	5000 ppm

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

Site Name: Lovington Deep 6" Site
Remediation Plan: 1R-383
Company: EOTT (Co. rep. – Frank Hernandez)
Contractor: Environmental Plus, Inc. (Pat McCasland)
Date Inspected: September 23, 2003 by Ed Martin, Larry Johnson and Paul Sheeley

Groundwater at 62'. Six feet of product on water. It is proposed that a clay barrier be installed and the site backfilled. Recovery system in place. Contractor wants to convert monitor wells to air sparge wells. Abatement plan to be submitted by 11/15/03. Four monitor wells on site.

ENVIRONMENTAL PLUS, INC.
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES

August 15, 2003

Mr. Wayne Price
New Mexico Energy Minerals and Natural Resources Department
Oil Conservation Division, Environmental Bureau
P.O. Box 6429
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject: Soil Closure Proposal

Re: EOTT Energy LLC Lovington Deep 6" Ref.# 2002-10312
UL-H SE¼ of the NE¼ of Section 6 T17S R36E
Latitude: 32° 52' 1.132"N Longitude: 103° 23' 16.570"W
Land owner: Darr Angell

Mr. Price,

Enclosed herewith, please find two copies of the report titled, "Soil Remediation and Risk Assessment Proposal for the EOTT Energy LLC Lovington Deep 6" Ref.#2002-10312, July 21, 2003." Environmental Plus, Inc. (EPI) of Eunice, NM is submitting this proposal on behalf of Mr. Frank Hernandez, District Environmental Supervisor for EOTT Energy LLC. The report discusses the soil and ground water investigation carried out under the New Mexico Oil Conservation Division approved **"General Work Plan for Remediation of E.O.T.T. Pipeline Spills, Leaks, and Releases in New Mexico, July 2000"** and proposes a remediation strategy for the excavated soil and a risk assessment that simulates the proposed isolation of the unexcavated impacted soil. The risk assessment relies on the installation of an oversized engineered barrier to isolate the remaining impacted soil.

All official communication should be addressed to;

Mr. Frank Hernandez, E.O.T.T. Energy LLC
P.O. Box 1660
Midland, Texas 79703 e-mail: frank.hernandez@eott.com

If there are any questions please call Mr. Ben Miller or myself at the office or at 505.390.0288 and 505.390.7864, respectively, or Mr. Frank Hernandez at 915.638.3799.

Sincerely,

Pat McCasland
EPI Technical Services Manager

cc: William Von Drehle, EOTT w/enclosure
Jeff Dann, EOTT w/enclosure
Frank Hernandez, EOTT w/enclosure
Ben Miller, EPI Vice President and General Manager
Sherry Miller, EPI President
file

ENVIRONMENTAL PLUS, INC.

P.O. BOX 1558 ◦◦◦ 2100 WEST AVE. O ◦◦◦ EUNICE, NEW MEXICO 88231
TELEPHONE 505◦394◦3481 FAX 505◦394◦2601