

DUKE ENERGY FIELD SERVICES



SITE INVESTIGATION, REMEDIATION, AND FINAL C-141 CLOSURE DOCUMENTATION

V-8 GATHERING LINE RELEASE SITE

DEFS REF: V-8 GATHERING LINE 121302

UL-G (SW¼ OF THE NE¼) OF SECTION 07 T19S R32E

~12.7 MILES SOUTH-SOUTHWEST (191.2°) OF MALJAMAR

LEA COUNTY, NEW MEXICO

LATITUDE: N32°40'33.73

LONGITUDE: W103°48'18.88"

Duke = 229153
facility = APAC0602047676
incident = APAC0602047848
inspect = CPAC0602047804
application = pPAC0602047859

JULY 31, 2003

PREPARED BY: JCG

Environmental Plus, Inc.

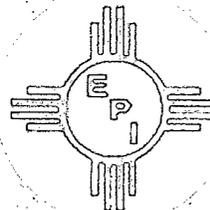
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✓
DUKE ENERGY FIELD SERVICES
370 17th Street
Suite 900
Denver, CO 80202
303 595 3331

September 19, 2003

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

**RE: V-8 Gathering Line 121302 Spill Site Closure Report
Unit G, Section 07, T19S, R32E
Duke Energy Field Services, LP
Lea County, NM**

Mr. Johnson:

Enclosed please find for your review, one copy of the V-8 Gathering Line 121302 closure report. The closure report summarizes the remedial activities associated with the clean up of the pipeline leak that occurred on December 12, 2002.

Based on the information provided in the above referenced closure report, DEFS would like to request no further action for this leak location.

If you have any questions regarding the information provided in the closure report, please give me a call at 303-605-1718.

Sincerely

Duke Energy Field Services, LP

A handwritten signature in black ink, appearing to read 'S. Weathers', written over a horizontal line.

Stephen Weathers
Sr. Environmental Specialist

cc: Lynn Ward, DEFS Midland
Environmental Files

Enclosure



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1.0 Introduction & Background

This report addresses the site investigation and remediation of the Duke Energy Field Services (DEFS) "V-8 Gathering Line 121302" natural gas gathering line remediation site. On December 12, 2002, Environmental Plus Inc., Eunice, NM (EPI) was notified by DEFS regarding a newly discovered natural gas and associated NGL release at this site. The initial C-141 Form submitted to the New Mexico Oil Conservation Division (NMOCD) of the NM Energy, Minerals and Natural Resources Department by Lynn Ward (December 13, 2002) reports a Natural Gas Liquid (NGL) release volume of 60 bbl with 40 bbl recovered. EPI responded the day of the notification and commenced GPS delineation, photography, flow path containment and characterization of the site. The site initially consisted of a ~2,400-ft² area with pooled NGL at the Point of Release with an associated 37,100-ft² overspray area (*see Plate 3, Attachments*). Remediation of this release site consisted of excavation and onsite blending of ~1400-yd³ of contaminated and clean soil (4500-ft² X 8-ft deep). Borehole soil analysis results indicated the presence of a confining structure at ~17-ft bgs. The presence of a substantial clay barrier commencing at ~17-ft bgs was confirmed with a test trench dug to ~18-ft bgs. Borehole drilling logs indicated "red-clay" material at 23-ft, thus the clay barrier is present to at least 23-ft bgs. A very conservative (benzene w/150-ft water table) 1000-year VADSAT Risk Assessment was performed for the site and the results indicate no risk to the aquifer with the presence of the clay barrier. NMOCD verbally approved "as is" closure of the site after confirmation of the natural clay barrier and VADSAT Risk Assessment results. Remediation of the site was completed on January 16, 2003.

The site is associated with the DEFS V-8 natural gas gathering pipeline. This release site is located in Unit Letter G, (SW¹/₄ of the NE¹/₄), Section 7, T19S, R32E, N32°40'33.73" and W103°48'18.88". The site is located ~12.7-miles south-southwest (191.2°) of Maljamar, NM. The property is owned by the Federal Bureau of Land Management (BLM). A site location map, site topographical map and a detailed GPS site diagram are included in the Attachments as *Plates 1, 2 and 3*.

The natural gas and associated NGL release at this site was discovered and reported on December 12, 2002. The Initial NMOCD C-141 Form was submitted on December 13, 2002 by Ms. Lynn Ward, DEFS Environmental Specialist. A supplemental C-141 document was submitted by EPI on December 23, 2002 to provide NMOCD with detailed site information. The leak was the result of a surface poly pipe rupture due to thermal expansion/contraction during the winter months. The pipeline was temporarily clamped and eventually replaced by DEFS personnel.

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 Querecho Plains physiographic subdivision, described by Nicholson & Clebsch as an area "covered almost entirely by dune sand which is stable or semi-stable over most of the area, but which locally drifts. The surface is very irregular and has no drainage features except at the edges of several playas. The sand is generally

underlain by Recent alluvium but in several places the sand forms topographic highs where it is underlain by a caliche surface. The thickness of the sand cover ranges from a few inches to a probable maximum of 20-feet”.

2.2 Ecological Description

The area is typical of the Upper Chihuahuan Desert Biome consisting primarily of hummocky sand hills covered with Harvard Shin Oak (*Quercus 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.

2.3 Area Ground Water

The unconfined ground water aquifer at this site is projected to be ~225-ft bgs based on water depth data obtained from the NM State Engineers Office data base. Ground water gradient in this area is generally to the southwest.

2.4 Area Water Wells

All recorded wells are greater than 1000 horizontal feet from the site.

2.5 Area Surface Water Features

No surface water bodies exist within 1000 horizontal feet of the 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 ground water 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)*
- ◆ *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 Xylenes (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 0 points with the soil remedial goals highlighted in the Site Ranking table presented on the following page.

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 = 0	Wellhead Protection Score= 0	Surface Water Score= 0	
Site Rank (1+2+3) = 0 + 0 + 0 = 0 points (for soil 0-125'bgs)			
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	1000 ppm	5000 ppm

4.0 Subsurface Soil Investigation

The initial excavation was extended to a depth of 8-ft bgs within the area displaying obvious visual or odorous indications of contamination. Since the initial remedial intent was to excavate, blend and backfill, the initial 2,400-ft² spill area was expanded to ~4,500-ft² to provide clean soil for blending and adequate volume to backfill with the blended soil. Due to the uneven nature of the subsurface caliche layer, the 8-ft bgs bottom-hole surface of the excavation had one area of red sand and one area of exposed caliche. Five-point composite bottom-hole samples of both materials were collected on January 3, 2003. The results of this sampling event indicated TPH levels in the range of 11,000-13,000 ppm and BTEX level in the range 72-92 ppm. Due to these contaminant concentrations present at the 8-ft bgs level, it was decided to vertically delineate the site with three boreholes.

Boreholes-1 & -2 were commenced from the 8-ft bottom-hole level on opposite sides of the point of release (POR). Borehole-3 was bored from the surface ~35-ft north of the POR (*Plate 3, Attachments*). Final depth of the borings was determined by field VOC readings (*Attachments, Plate 5*). The boring and sampling took place on January 10, 2003. The analyses results (*Plates 5-6, Attachments*) of the 1-10-03 sampling indicated the following:

- ◆ Borehole-1, immediately west of the POR was essentially free of contamination at the 13-ft and 18-ft intervals.
- ◆ Borehole-2 increased in contamination down to the 13-ft level (22,600 ppm TPH; 135 ppm BTEX), then declined to insignificant contaminant concentrations at the 18-ft and 23-ft levels.
- ◆ Borehole-3 displayed a TPH concentration of 800 ppm at the 2-ft bgs level, and undetectable levels below that.

The Borehole-2 contaminant profile (*Attachments, Plate 4*) clearly indicates the presence of a subsurface confining structure that is preventing the vertical migration of the contamination below the 18-ft bgs level. The presence of a confining clay barrier was confirmed on January 14, 2003 by digging a test trench down to the 18-ft bgs level. At 17-ft bgs, the top of a clearly visible layer of dense reddish clay was present. Based on the bore-log of Borehole-2, this clay layer extends at least to the 23-ft bgs level.

5.0 Ground Water Investigation

The projected depth to ground water at this site is ~225-ft bgs. Bottom composite samples (8-ft bgs) and borehole sampling data down to 23-ft bgs (*Attachments, Plates 4-6*) indicate an increasing contamination gradient down to a point between the 13-ft and 18-ft sample levels. The dramatic disappearance of CoC contamination between these two sample levels indicates the presence of a natural confining structure that is effectively preventing vertical contaminant migration. A test trench was excavated in the immediate vicinity of Borehole 2 to determine the nature and location of this natural impermeable layer. This trench confirmed the existence of a hard clay layer commencing at the 17-ft bgs level. The Borehole-2 log indicates “red sandy clay” at the 23-ft bgs level, thus it can be deduced that the thickness of the clay layer is at least 6-ft, probably more.

A conservative VADSAT 1000-year risk assessment was performed for this site (*see 6.0 below*) with the assumption that the 22,600 ppm TPH contaminated soil at the 13-ft bgs level would be left in place. The results of the risk assessment indicated “no risk” to a water table at 150-ft bgs. The excavation was backfilled with the stockpile of blended soil that had accumulated during the initial excavation of the site down to 8-ft bgs.

Based on the confirmed presence of a natural impermeable clay barrier at the 17-ft bgs level, a depth to water (if present) of >200-ft and a conservative 1000-year risk assessment that predicts “no impact”, there will be no need for further ground water investigation at this site.

6.0 VADSAT 1000-yr 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 ~225-feet deep at this site, there is no absolute empirical confirmation of this presumption. To allow for more conservancy in the VADSAT risk assessment modeling, the water table depth was artificially set at 150-feet for both the assessment models presented with this documentation.

Two assessments were run for this site: one with no clay barrier present and one with the presence of an impermeable clay barrier. Other than the presence of the clay barrier, the input parameters for each assessment are identical. The downstream receptors were set at 10-meter intervals (0-50 meters). 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 200-years and reach its peak concentration of 5.7×10^{-5} mg/L 150-years later (2353). 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 is projected to never reach the aquifer.

The raw data generated by the VADSAT program is included in the Attachments (*pages 22-24*). This data includes the parameters of the two models and the “no clay barrier” data points generated for the 1000-year span. A graphical representation of both assessment models that were generated is presented as *Plate 7, in the Attachments*.

6.0 Remediation Process

Remediation of the site commenced on December 12, 2002 and continued through January 16, 2003. Remedial activities at the site consisted of excavation, stockpiling and blending of ~1,400-yd³ of NGL contaminated and clean soil from the site (4,500-ft² X 8-ft). A composite sample of the blended soil was taken on January 10, 2003, for which laboratory analyses indicated a TPH concentration of ~300 ppm and undetectable levels of both BTEX and Benzene.

Bottom-hole and data from three boreholes (January 3, 2003 and January 10, 2003, respectively) indicated TPH concentrations of 12,750 ppm at 8-ft bgs; 22,600 ppm at 13-ft bgs; 60 ppm at 18-ft bgs; and 22 ppm at 23-ft bgs. This contaminant profile clearly suggested the existence of a confining structure between the 13-ft and 18-ft sample levels. An exploratory trench was dug from the bottom of the excavation (8-ft) down to 18-ft bgs, revealing the presence of a substantial clay zone beginning at 17-ft bgs. Laboratory analytical results indicated that the clay barrier was effectively preventing the vertical migration of the contaminants present. NMOCD was consulted regarding the discovery of the confining clay barrier and the risk assessment model developed for this site. NMOCD advised that the site could be closed without further expansion of the excavation.

The excavation was backfilled with the 1,400-yd³ of stockpiled blended material and then covered with an additional 3-feet of topsoil obtained from sandy hummocks within the pipeline right-of-way. The site was then smoothed and contoured on January 16, 2003.

The product overspray area (*Plate 3 – Attachments*) was evaluated on July 30, 2003 and shows no evidence of adverse effects. It appears to have fully recovered from the overspray effects. The site will be evaluated periodically to determine the necessity of reseeding and/or erosion control.

7.0 Closure Justification

This report documents successful implementation of the alternative Remediation Plan approved by NMOCD for this release site. The top 8-ft of soil contaminated above acceptable CoC remedial concentrations was excavated and blended to an average TPH concentration of 300 ppm. Contaminated soil left in place (8-ft to 17-ft bgs) is prevented from downward migration due to the confirmed presence of a naturally occurring clay barrier commencing at the 17-ft bgs subsurface level. A conservative VADSAT 3.0 1000-Year Risk Assessment run for the site predicts no ground water impact with the presence of the clay barrier. The excavation was backfilled with the blended spoils material (300 ppm TPH) and then covered with 3-ft of clean topsoil obtained onsite. The site was then smoothed and contoured to provide adequate drainage. Based on the data presented in this report, Environmental Plus, Inc., on behalf of Duke Energy Field Services, requests that the NMOCD require “no further action” at this site.

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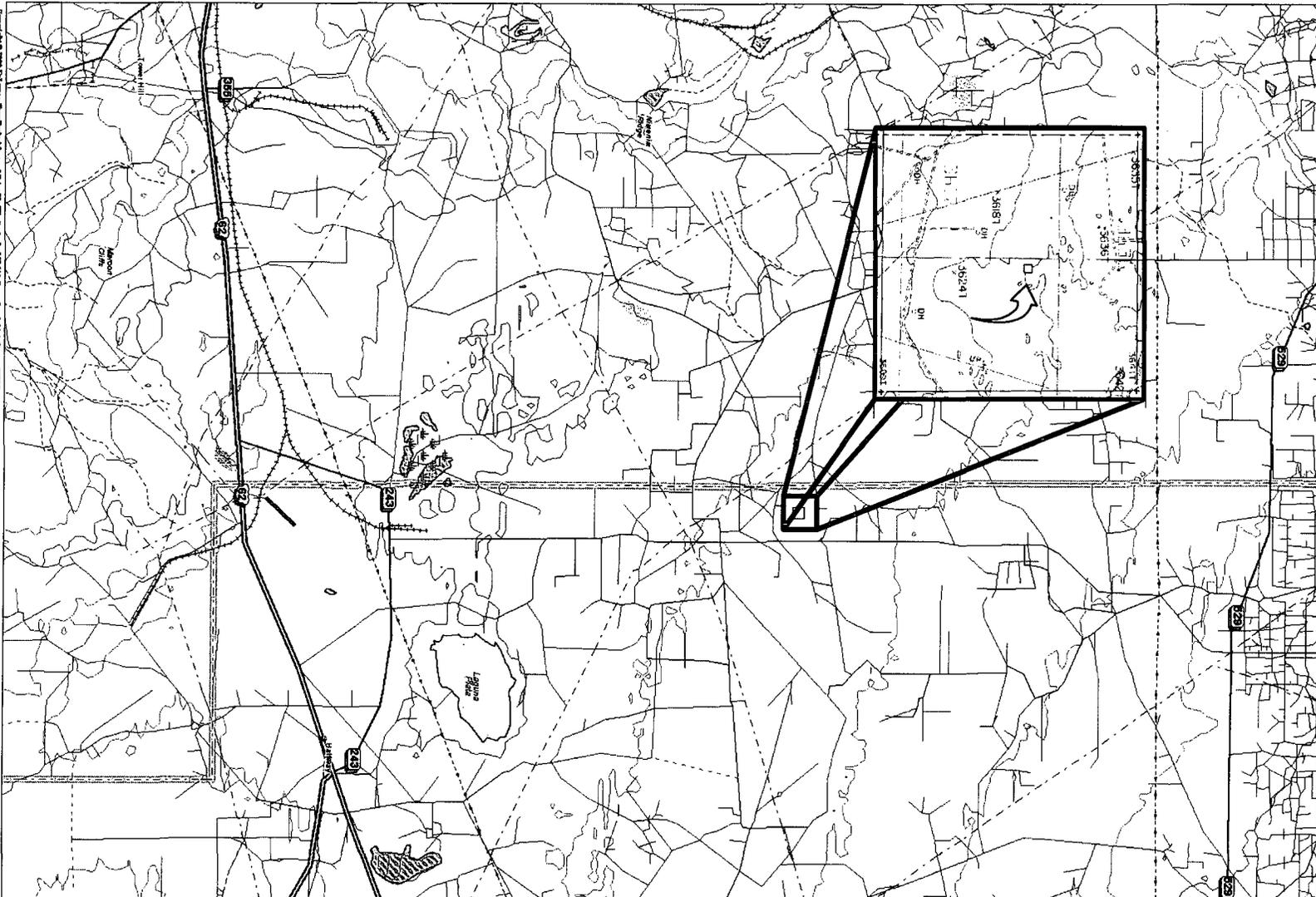


Plate 1: Release Site Location
 Duke Energy Field Services
 V-8 Gathering Line 121302

Lea County, New Mexico
 UL-G Section 07 T19S R32E
 N32 40'33.73" W103 48' 18.88"
 Elevation: 3630-ft amsl

DWG BY: John Good
 December - 2002

REVISED:



SHEET
 1 of 1



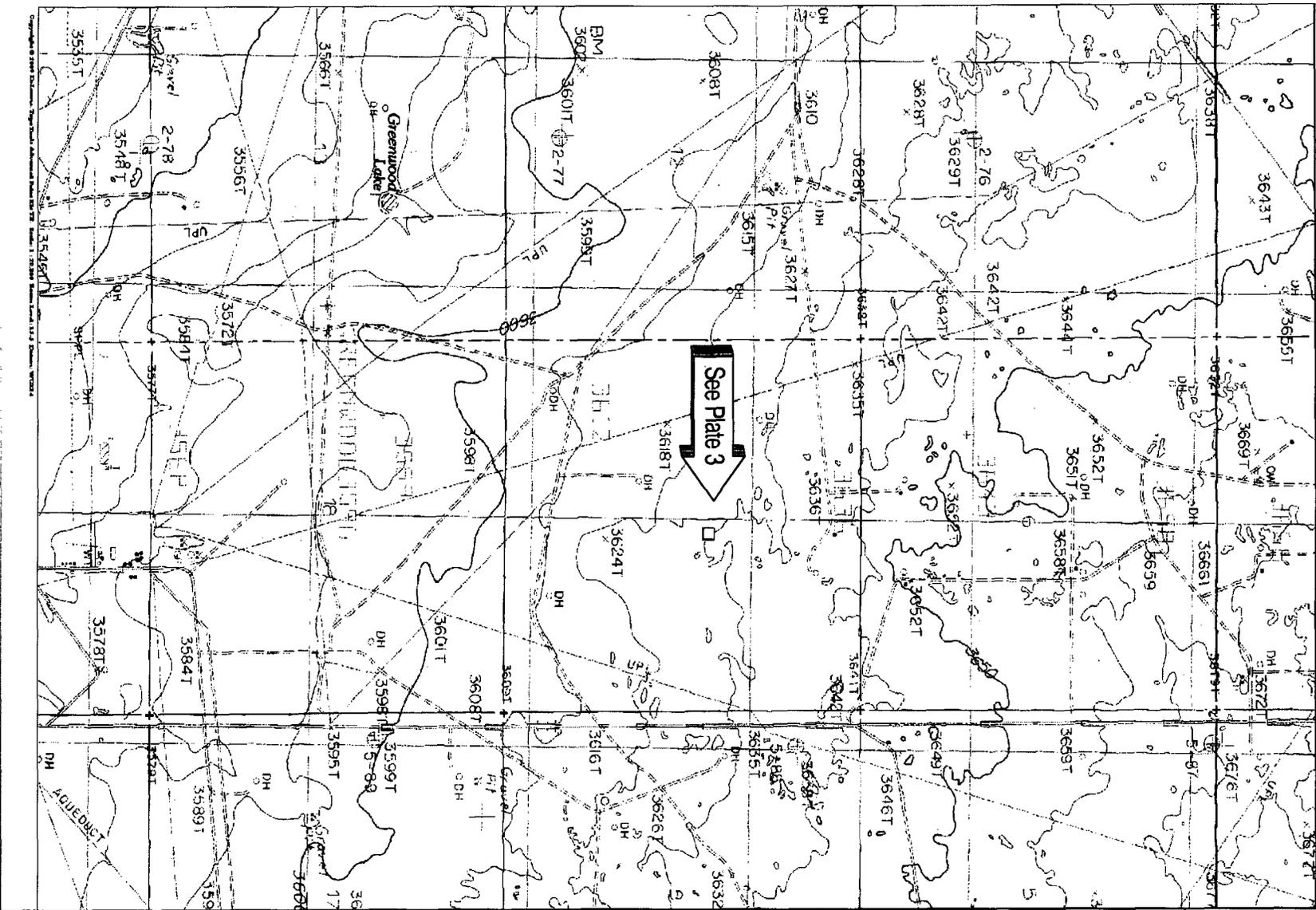


Plate 2: Release Site Topography
Duke Energy Field Services
V-8 Gathering Line 121302

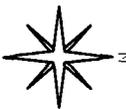
Lea County, New Mexico
UL-G Section 07 T19S R32E
N32 40'33.73" W103 48' 18.88"
Elevation: 3630-ft amsl

DWG BY: John Good
December - 2002

REVISED:



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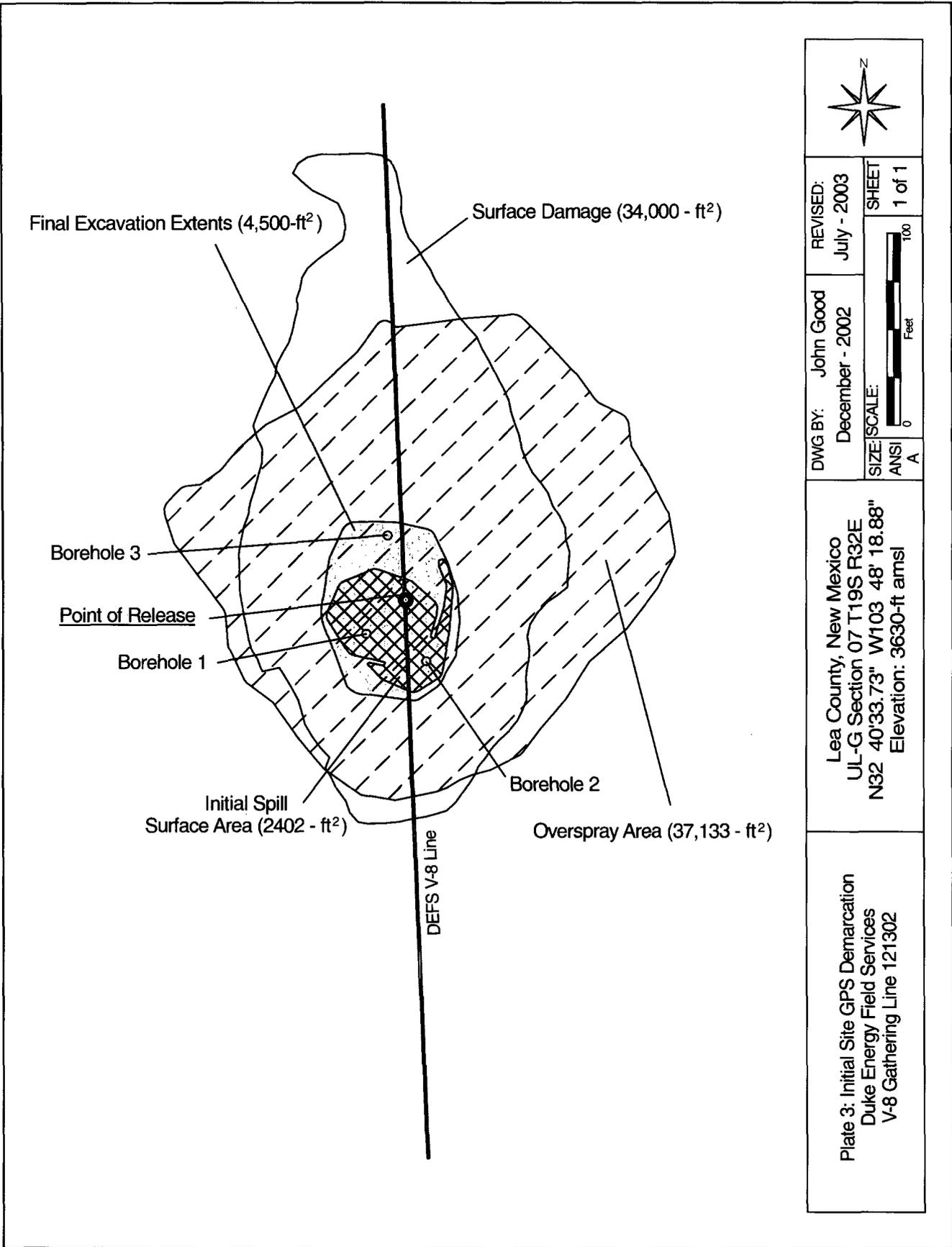
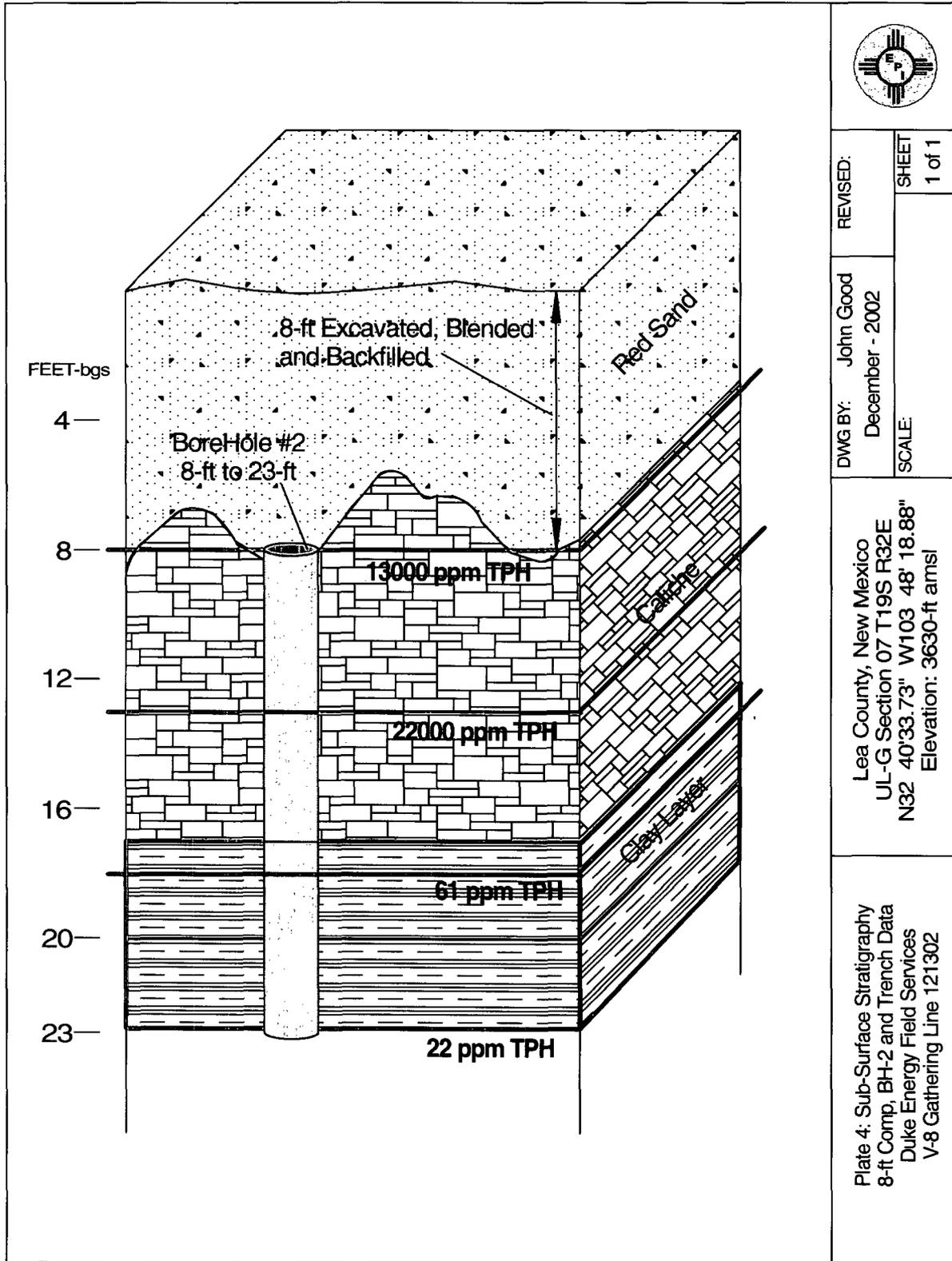


Plate 4: Sub-Surface Lithology & TPH Profile



	
DWG BY: John Good December - 2002	REVISED:
SCALE:	SHEET 1 of 1
Lea County, New Mexico UL-G Section 07 T19S R32E N32 40'33.73" W103 48' 18.88" Elevation: 3630-ft amsl	
Plate 4: Sub-Surface Stratigraphy 8-ft Comp, BH-2 and Trench Data Duke Energy Field Services V-8 Gathering Line 121302	

Plate 5: Soil Analytical Data Table

Duke Energy Field Services - V8 Line 121302- Excavation Sampling Results															
Bold highlighted cells indicate values in excess of the NMOCD remedial action guideline thresholds: TPH: 5000 mg/Kg; BTEX: 50 mg/Kg; Benzene: 10 mg/Kg; Cl: 250 ppm; SO4: 600 ppm															
Sample Date	Excavation Sampling Area	Depth (ft - bgs ¹)	SAMPLE ID#	VOC ppm	GRO ² mg/Kg	DRO ³ mg/Kg	TPH ⁴ mg/Kg	BTEX ⁵ mg/Kg	Benzene mg/Kg	Toluene mg/Kg	Ethyl Benzene mg/Kg	Total Xylenes mg/Kg	Cl mg/Kg	SO ₄ mg/Kg	pH
3-Jan	BottomHole - Sand	6-ft	SDV8010303 - Sand		2160	8863	11023	91.875	0.375	14.400	15.100	62.000	96	1312.0	7.82
3-Jan	BottomHole - Caliche	8-ft	SDV8010303 - Caliche		1350	11400	12750	72.649	0.289	8.390	5.470	58.500	256	12.4	7.47
10-Jan	BoreHole1 - South POR	13-ft	SDV811003BH1-13	2.9	10	10	20	0.030	0.005	0.005	0.005	0.015			
10-Jan	BoreHole1 - South POR	18-ft	SDV811003BH1-18	1.9	10	10	20	0.030	0.005	0.005	0.005	0.015			
10-Jan	BoreHole2 - Middle POR	13-ft	SDV811003BH2-13	697.0	4130	18500	22630	135.509	0.499	12.000	9.010	114.000			
10-Jan	BoreHole2 - Middle POR	18-ft	SDV811003BH2-18	13.3	10	51	61	0.030	0.005	0.005	0.005	0.015			
10-Jan	BoreHole2 - Middle POR	23-ft	SDV811003BH2-23	3.2	10	12	22	0.030	0.005	0.005	0.005	0.015			
10-Jan	BoreHole3 - North POR	2-ft	SDV811003BH3-2	15.0	10	779	789	0.032	0.005	0.005	0.005	0.017			
10-Jan	BoreHole3 - North POR	5-ft	SDV811003BH3-5	1.1	10	10	20	0.030	0.005	0.005	0.005	0.015			
10-Jan	BoreHole3 - North POR	10-ft	SDV811003BH3-10	1.6	10	37	47	0.030	0.005	0.005	0.005	0.015			
10-Jan	Blended Spoils Pile		SDV811003BSPC	21.9	10	295	305	0.041	0.005	0.005	0.005	0.026			

¹ bgs = below ground surface ² GRO - Gasoline Range Organics (Detection Limit = 10 mg/Kg) ³ DRO - Diesel Range Organics (Detection Limit = 10 mg/Kg)
⁴ TPH - Total Petroleum Hydrocarbon (GRO+DRO) ⁵ BTEX = Sum of Benzene, Toluene, Ethyl Benzene (Detection Limits = 0.005 mg/Kg) and Total Xylenes (Detection Limit = 0.015 mg/Kg)
 Note: Reported detection limits are considered "de minimus" values and are included in the TPH and BTEX summations.

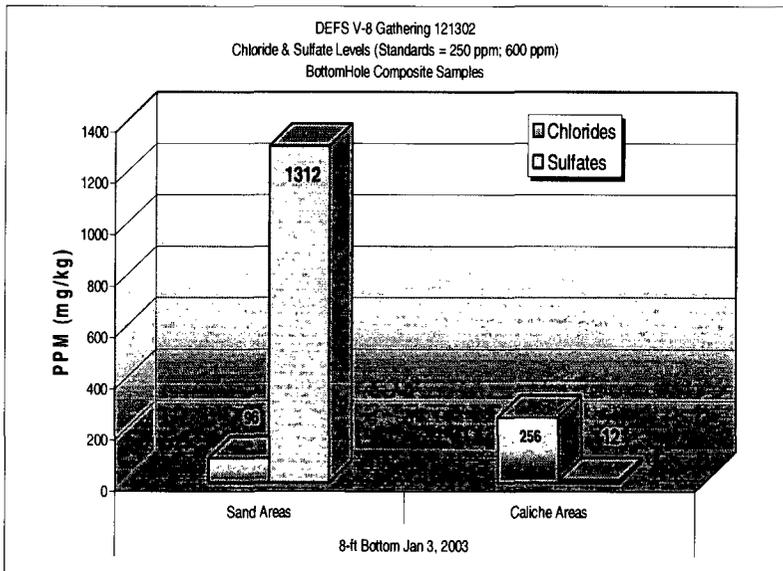
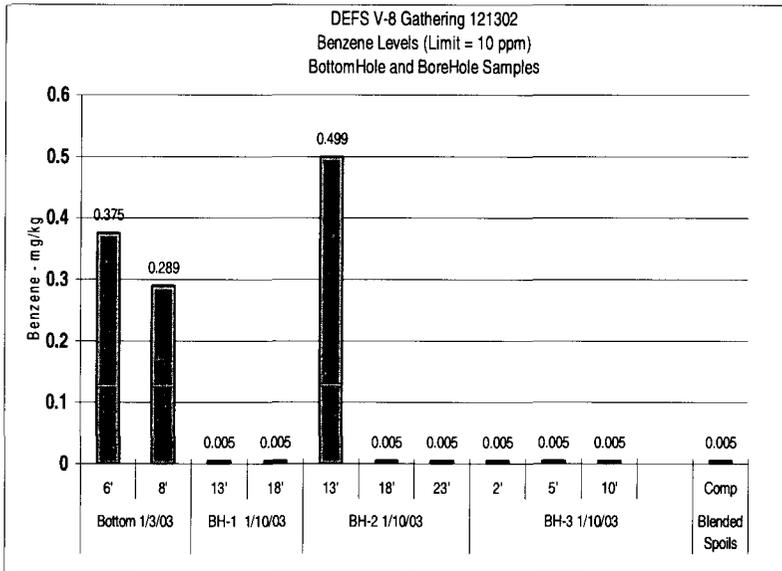
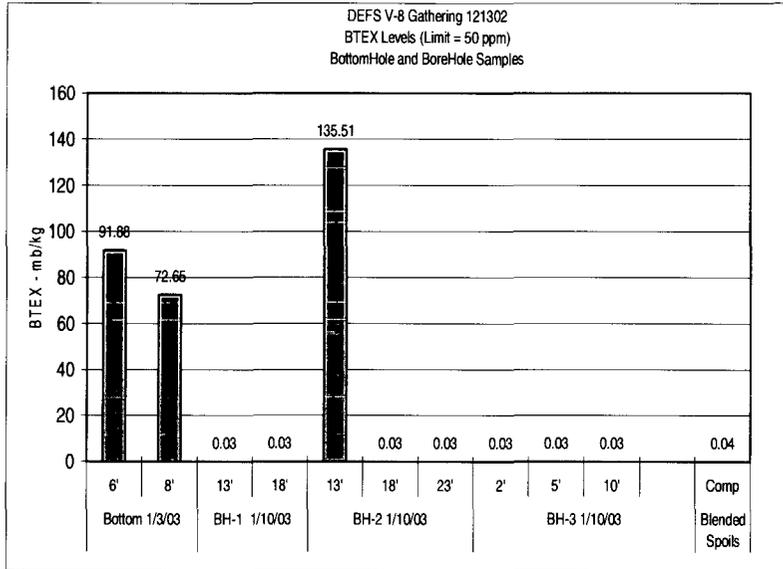
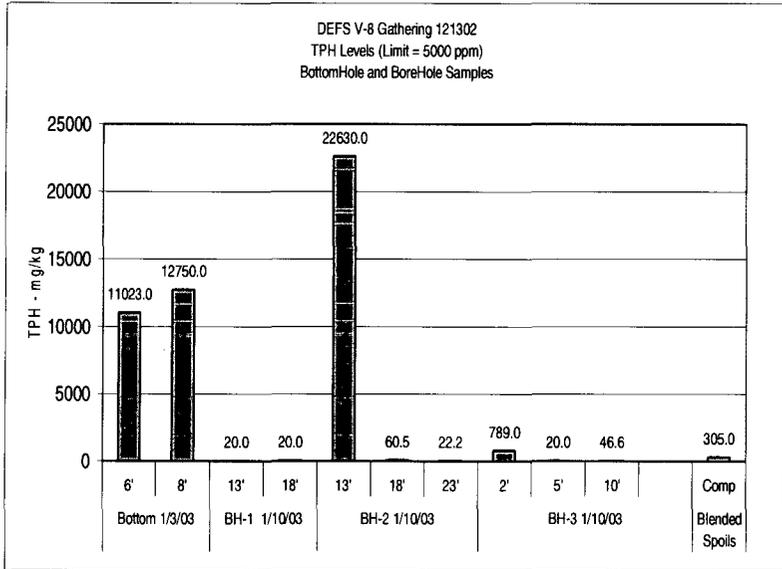


Plate 6: Soil Analytical Data Charts – TPH, BTEX, Chlorides and Sulfates

Laboratory Analyses



PHONE (815) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
 PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
 ENVIRONMENTAL PLUS, INC.
 ATTN: JOHN GOOD
 P.O. BOX 1558
 EUNICE, NM 88231
 FAX TO: (505) 394-2801

Receiving Date: 01/03/03
 Reporting Date: 01/07/03
 Project Number: DUKE ENERGY FIELD SERVICES
 Project Name: V-8 GATHERING 121302
 Project Location: UL-C SEC7 T188 R32E

Sampling Date: 01/03/03
 Sample Type: SOIL
 Sample Condition: COOL & INTACT
 Sample Received By: BC
 Analyzed By: BC

LAB NO.	SAMPLE ID	GRO (C ₆ -C ₁₀) (mg/Kg)	DRO (>C ₁₀ -C ₂₈) (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		01/08/03	01/08/03	01/08/03	01/08/03	01/08/03	01/08/03
H7375-1	SDV8010303-SAND	2180	8893	0.375	14.4	16.1	62.0
H7375-2	SDV8010303-CALICHE	1350	11400	0.289	8.39	5.47	58.8
Quality Control		789	799	0.089	0.094	0.097	0.284
True Value QC		800	800	0.100	0.100	0.100	0.300
% Recovery		98.1	99.9	88.9	94.2	97.1	94.7
Relative Percent Difference		0.6	1.0	3.9	3.7	10.6	7.6

METHODS: TPH GRO & DRO - EPA SW-846 8015 M; BTEX - SW-846 8260.

Burgess J. A. Cooke, Ph. D.

1/7/03
 Date

H7375BT.XLS

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.



PHONE (815) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603

PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

**ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: JOHN GOOD
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601**

Receiving Date: 01/03/03

Reporting Date: 01/06/03

Project Owner: DUKE ENERGY FIELD SERVICES

Project Name: V-8 GATHERING 121302

Project Location: UL-C SEC7 T19S R32E

Sampling Date: 01/03/03

Sample Type: SOIL

Sample Condition: COOL & INTACT

Sample Received By: BC

Analyzed By: AH

LAB NUMBER	SAMPLE ID	CF (mg/Kg)	SO ₄ (mg/Kg)	pH (s.u.)
ANALYSIS DATE		01/06/03	01/06/03	01/06/03
H7375-1	SDV8010303-SAND	96	1312*	7.82
H7375-2	SDV8010303-CALICHE	256	12.4	7.47
Quality Control		980	50.20	6.98
True Value QC		1000	50.00	
% Recovery		98.0	100	
Relative Percent Difference		2.0	0.7	

METHODS: 600/4-79-020	4500-CFB*	375.4	150.1
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*Standard Methods

Note: Analyses performed on 1:4 w:v aqueous extracts.

* Matrix interference (color) observed.

Amy Hill
Chemist

1-6-03
Date

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analysis. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, or any other persons arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.



PHONE (816) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603

PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
 ENVIRONMENTAL PLUS, INC.
 ATTN: PAT McCASLAND
 P.O. BOX 1558
 EUNCE, NM 88231
 FAX TO: (505) 394-2601

Receiving Date: 01/10/03
 Reporting Date: 01/11/03
 Project Owner: DUKE ENERGY FIELD SERVICES
 Project Name: DUKE V-8
 Project Location: NOT GIVEN

Sampling Date: 01/10/03
 Sample Type: SOIL
 Sample Condition: COOL & INTACT
 Sample Received By: AH
 Analyzed By: BC

LAB NO.	SAMPLE ID	GRO (C ₈ -C ₁₀) (mg/Kg)	DRO (>C ₁₀ -C ₂₈) (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		01/10/03	01/10/03	01/10/03	01/10/03	01/10/03	01/10/03
H7394-1	SDV811003BH1-13'	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015
H7394-2	SDV811003BH1-18'	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015
H7394-3	SDV811003BH2-13'	4130	18600	0.489	12.0	9.01	114
H7394-4	SDV811003BH2-18'	<10.0	60.5	<0.005	<0.005	<0.005	<0.015
H7394-5	SDV811003BH2-23'	<10.0	12.2	<0.005	<0.005	<0.005	<0.015
H7394-6	SDV811003BH3-2'	<10.0	779	<0.005	<0.005	<0.005	0.017
H7394-7	SDV811003BH3-5'	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015
H7394-8	SDV811003BH3-10'	<10.0	38.6	<0.005	<0.005	<0.005	<0.015
H7394-9	SDV811003BSPC	<10.0	285	<0.005	<0.005	<0.005	0.028
Quality Control		723	799	0.107	0.108	0.108	0.310
True Value QC		800	800	0.100	0.100	0.100	0.300
% Recovery		90.4	99.8	107	105	108	103.0
Relative Percent Difference		3.1	4.1	2.4	5.2	6.0	4.8

METHODS: TPH GRO & DRO - EPA SW-846 8015 M; BTEX - SW-846 8260.

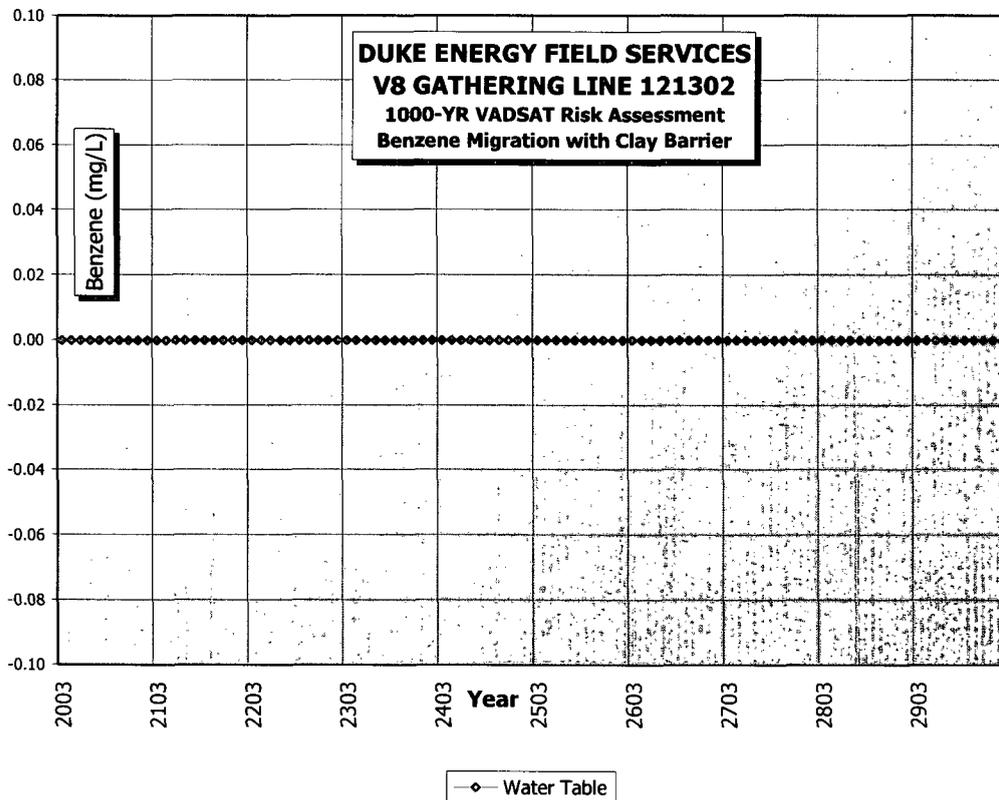
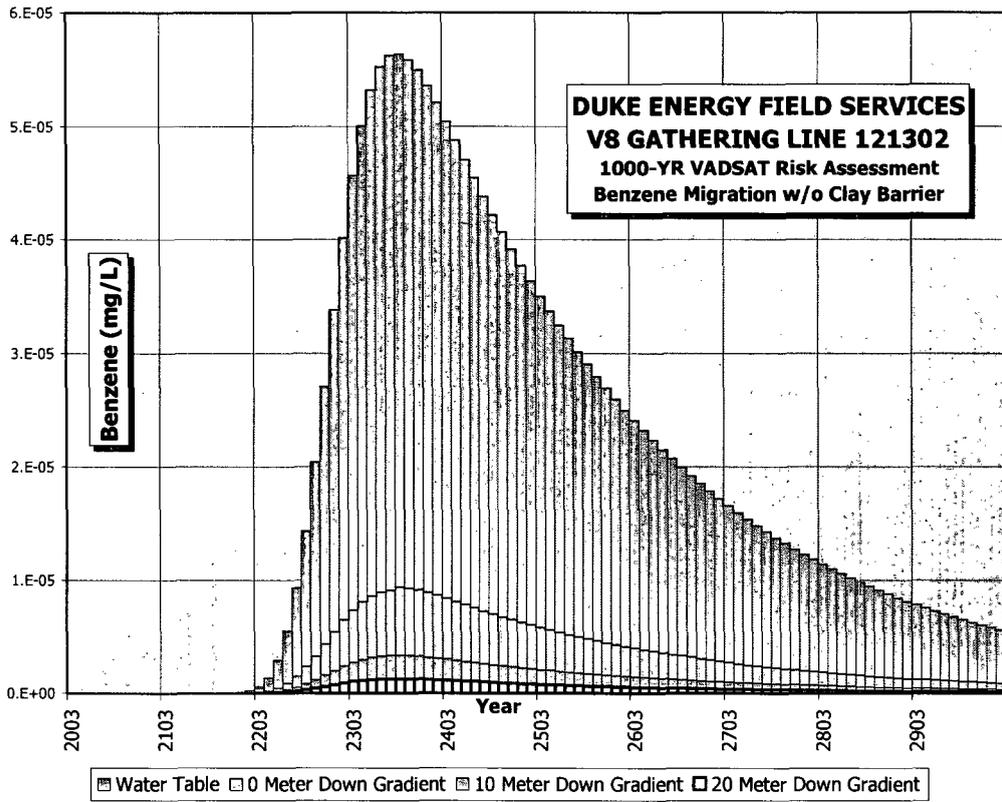
Burgess J. A. Cooke, Ph. D.

1/11/03
 Date

H7394.XLS

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Plate 8: VADSAT 3.0 1000-Yr Risk Assessment Charts



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: **DEFS V8 121302 w/o**
Barrier

SOURCE AND CHEMICAL DATA ****
 DEPTHM, MEAN THICKNESS OF WASTE ZONE
 (m) = 3.65760

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

AREAM, MEAN WASTE ZONE AREA (m²) =
 92.90300
 STDA, STD.DEV. OF WASTE ZONE AREA =
 0.00000

RLWM, MEAN LW RATIO (-) =
 1.00000
 STDRLW, STD.DEV. OF LW RATIO =
 0.00000

CVRTHM, MEAN VALUE OF COVER THICKNESS
 (m) = 1.52400
 CVRTHS, STD.DEV. OF COVER THICKNESS
 = 0.00000

KOCM, MEAN ORG. CARBON PARTITION COEF
 (cm³/g) = 83.20000
 STDKOC, STD.DEV. OF ORG.CARBON
 PARTITION COEF = 0.00000

FMOLM, MEAN INIT.VOL.FRAC. OF
 CONTAMINANT(-) = 0.00601
 FMOLSTD, STD.DEV. OF VOL.FRAC. OF
 CONTAMINANT = 0.00000

CMFM, MASS OF CONTAMINANT PER MASS OF
 WASTE(mg/kg) = 136.00000
 CMFSD, STD.DEV. OF MASS CONTAMINANT
 PER MASS WASTE = 0.00000

HCCONM, HYDCARBON MASS FRAC. IN WASTE
 (mg/kg) = 22630.00000
 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/cm³)
 = 0.87600

RHOG, AVERAGE DENSITY OF HYDROCARBON
 (g/cm³) = 0.90000

SOL, AQUEOUS SOLUB. OF CONTAMINANT
 (g/m³) = 1790.00000

HENRYC, HENRY'S CONSTANT (-) =
 0.23000

DIFFA, DIFFUSION COEF. IN FREE AIR (m²/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) = 60.96000

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) = 23.40000

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)	0.0	0.0	0.0
RECEPTOR(2)	10.0	0.0	0.0
RECEPTOR(3)	20.0	0.0	0.0
RECEPTOR(4)	30.0	0.0	0.0
RECEPTOR(5)	40.0	0.0	0.0
RECEPTOR(6)	50.0	0.0	0.0

BREAKTHROUGH CURVES

CONCENTRATIONS (MG/L) AT:

TIME WATER TABLE RECEPTORS (in order) (DAYS) BELOW THE SOURCE

3650.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 7300.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 10950.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 14600.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 18250.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 21900.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 25550.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 29200.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 32850.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 36500.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 40150.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 43800.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 47450.0000 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00
 51100.0000 0.1061E-11 0.1667E-12 0.5753E-13 0.2028E-13 0.9608E-14 0.5401E-14
 0.3377E-14
 54750.0000 0.2052E-10 0.3239E-11 0.1129E-11 0.4019E-12 0.1923E-12 0.1091E-12
 0.6885E-13
 58400.0000 0.2466E-09 0.3908E-10 0.1374E-10 0.4929E-11 0.2377E-11 0.1359E-11
 0.8643E-12
 62050.0000 0.2007E-08 0.3191E-09 0.1129E-09 0.4079E-10 0.1980E-10 0.1140E-10
 0.7291E-11
 65700.0000 0.1180E-07 0.1881E-08 0.6694E-09 0.2432E-09 0.1187E-09 0.6872E-10
 0.4421E-10
 69350.0000 0.5282E-07 0.8443E-08 0.3019E-08 0.1102E-08 0.5406E-09 0.3143E-09
 0.2032E-09
 73000.0000 0.1879E-06 0.3009E-07 0.1080E-07 0.3960E-08 0.1950E-08 0.1139E-08
 0.7388E-09
 76650.0000 0.5493E-06 0.8814E-07 0.3175E-07 0.1168E-07 0.5772E-08 0.3381E-08
 0.2202E-08
 80300.0000 0.1358E-05 0.2182E-06 0.7882E-07 0.2909E-07 0.1442E-07 0.8470E-08
 0.5531E-08
 83950.0000 0.2904E-05 0.4672E-06 0.1692E-06 0.6261E-07 0.3111E-07 0.1833E-07
 0.1200E-07
 87600.0000 0.5482E-05 0.8830E-06 0.3205E-06 0.1189E-06 0.5920E-07 0.3495E-07
 0.2293E-07

91250.0000 0.9288E-05 0.1498E-05 0.5447E-06 0.2024E-06 0.1010E-06 0.5974E-07 0.3927E-07
 94900.0000 0.1433E-04 0.2313E-05 0.8426E-06 0.3136E-06 0.1568E-06 0.9288E-07 0.6117E-07
 98550.0000 0.2039E-04 0.3294E-05 0.1202E-05 0.4479E-06 0.2242E-06 0.1331E-06 0.8775E-07
 ***** 0.2706E-04 0.4374E-05 0.1598E-05 0.5963E-06 0.2989E-06 0.1776E-06 0.1173E-06
 ***** 0.3382E-04 0.5469E-05 0.2000E-05 0.7472E-06 0.3749E-06 0.2230E-06 0.1474E-06
 ***** 0.4015E-04 0.6496E-05 0.2378E-05 0.8891E-06 0.4466E-06 0.2658E-06 0.1759E-06
 ***** 0.4564E-04 0.7388E-05 0.2706E-05 0.1013E-05 0.5090E-06 0.3033E-06 0.2008E-06
 ***** 0.5003E-04 0.8100E-05 0.2969E-05 0.1112E-05 0.5592E-06 0.3334E-06 0.2209E-06
 ***** 0.5322E-04 0.8619E-05 0.3161E-05 0.1184E-05 0.5959E-06 0.3555E-06 0.2357E-06
 ***** 0.5524E-04 0.8948E-05 0.3283E-05 0.1231E-05 0.6195E-06 0.3697E-06 0.2452E-06
 ***** 0.5623E-04 0.9111E-05 0.3344E-05 0.1254E-05 0.6314E-06 0.3769E-06 0.2501E-06
 ***** 0.5638E-04 0.9386E-05 0.3354E-05 0.1258E-05 0.6336E-06 0.3784E-06 0.2511E-06
 ***** 0.5587E-04 0.9303E-05 0.3325E-05 0.1247E-05 0.6284E-06 0.3753E-06 0.2491E-06
 ***** 0.5489E-04 0.9140E-05 0.3267E-05 0.1226E-05 0.6176E-06 0.3689E-06 0.2449E-06
 ***** 0.5358E-04 0.8923E-05 0.3190E-05 0.1197E-05 0.6032E-06 0.3603E-06 0.2393E-06
 ***** 0.5208E-04 0.8672E-05 0.3100E-05 0.1163E-05 0.5864E-06 0.3503E-06 0.2326E-06
 ***** 0.5045E-04 0.8402E-05 0.3004E-05 0.1127E-05 0.5682E-06 0.3395E-06 0.2254E-06
 ***** 0.4878E-04 0.8123E-05 0.2904E-05 0.1090E-05 0.5494E-06 0.3282E-06 0.2180E-06
 ***** 0.4709E-04 0.7843E-05 0.2804E-05 0.1052E-05 0.5304E-06 0.3169E-06 0.2105E-06
 ***** 0.4543E-04 0.7565E-05 0.2705E-05 0.1015E-05 0.5117E-06 0.3057E-06 0.2030E-06
 ***** 0.4379E-04 0.7293E-05 0.2608E-05 0.9786E-06 0.4933E-06 0.2948E-06 0.1958E-06
 ***** 0.4220E-04 0.7029E-05 0.2513E-05 0.9432E-06 0.4754E-06 0.2841E-06 0.1887E-06
 ***** 0.4067E-04 0.6772E-05 0.2421E-05 0.9088E-06 0.4581E-06 0.2737E-06 0.1818E-06
 ***** 0.3918E-04 0.6524E-05 0.2333E-05 0.8755E-06 0.4413E-06 0.2637E-06 0.1751E-06
 ***** 0.3774E-04 0.6285E-05 0.2247E-05 0.8434E-06 0.4252E-06 0.2540E-06 0.1687E-06
 ***** 0.3636E-04 0.6055E-05 0.2165E-05 0.8125E-06 0.4096E-06 0.2447E-06 0.1625E-06
 ***** 0.3502E-04 0.5832E-05 0.2085E-05 0.7826E-06 0.3945E-06 0.2357E-06 0.1566E-06
 ***** 0.3373E-04 0.5618E-05 0.2009E-05 0.7539E-06 0.3800E-06 0.2271E-06 0.1508E-06
 ***** 0.3249E-04 0.5412E-05 0.1935E-05 0.7262E-06 0.3661E-06 0.2187E-06 0.1453E-06
 ***** 0.3130E-04 0.5213E-05 0.1864E-05 0.6995E-06 0.3526E-06 0.2107E-06 0.1399E-06
 ***** 0.3015E-04 0.5021E-05 0.1795E-05 0.6738E-06 0.3396E-06 0.2029E-06 0.1348E-06
 ***** 0.2904E-04 0.4837E-05 0.1729E-05 0.6490E-06 0.3272E-06 0.1955E-06 0.1298E-06
 ***** 0.2797E-04 0.4659E-05 0.1666E-05 0.6251E-06 0.3151E-06 0.1883E-06 0.1251E-06
 ***** 0.2695E-04 0.4487E-05 0.1604E-05 0.6022E-06 0.3035E-06 0.1814E-06 0.1205E-06
 ***** 0.2595E-04 0.4323E-05 0.1545E-05 0.5800E-06 0.2924E-06 0.1747E-06 0.1160E-06
 ***** 0.2500E-04 0.4164E-05 0.1489E-05 0.5587E-06 0.2816E-06 0.1683E-06 0.1118E-06
 ***** 0.2408E-04 0.4011E-05 0.1434E-05 0.5382E-06 0.2713E-06 0.1621E-06 0.1077E-06
 ***** 0.2320E-04 0.3863E-05 0.1381E-05 0.5184E-06 0.2613E-06 0.1561E-06 0.1037E-06
 ***** 0.2234E-04 0.3721E-05 0.1330E-05 0.4993E-06 0.2517E-06 0.1504E-06 0.9989E-07
 ***** 0.2152E-04 0.3584E-05 0.1282E-05 0.4810E-06 0.2425E-06 0.1449E-06 0.9622E-07
 ***** 0.2073E-04 0.3453E-05 0.1234E-05 0.4633E-06 0.2336E-06 0.1396E-06 0.9268E-07
 ***** 0.1997E-04 0.3326E-05 0.1189E-05 0.4463E-06 0.2250E-06 0.1344E-06 0.8928E-07
 ***** 0.1924E-04 0.3204E-05 0.1145E-05 0.4299E-06 0.2167E-06 0.1295E-06 0.8599E-07
 ***** 0.1853E-04 0.3086E-05 0.1103E-05 0.4141E-06 0.2087E-06 0.1247E-06 0.8283E-07
 ***** 0.1785E-04 0.2972E-05 0.1063E-05 0.3989E-06 0.2011E-06 0.1201E-06 0.7979E-07
 ***** 0.1719E-04 0.2863E-05 0.1024E-05 0.3842E-06 0.1937E-06 0.1157E-06 0.7686E-07
 ***** 0.1656E-04 0.2758E-05 0.9861E-06 0.3701E-06 0.1866E-06 0.1115E-06 0.7403E-07
 ***** 0.1595E-04 0.2586E-05 0.9498E-06 0.3565E-06 0.1797E-06 0.1074E-06 0.7131E-07

***** 0.1536E-04 0.2491E-05 0.9149E-06 0.3434E-06 0.1731E-06 0.1034E-06 0.6869E-07
 ***** 0.1480E-04 0.2399E-05 0.8813E-06 0.3307E-06 0.1667E-06 0.9962E-07 0.6616E-07
 ***** 0.1426E-04 0.2311E-05 0.8489E-06 0.3186E-06 0.1606E-06 0.9596E-07 0.6373E-07
 ***** 0.1373E-04 0.2226E-05 0.8177E-06 0.3069E-06 0.1547E-06 0.9244E-07 0.6139E-07
 ***** 0.1323E-04 0.2144E-05 0.7876E-06 0.2956E-06 0.1490E-06 0.8904E-07 0.5913E-07
 ***** 0.1274E-04 0.2065E-05 0.7587E-06 0.2847E-06 0.1435E-06 0.8577E-07 0.5696E-07
 ***** 0.1227E-04 0.1989E-05 0.7308E-06 0.2743E-06 0.1383E-06 0.8261E-07 0.5487E-07
 ***** 0.1182E-04 0.1916E-05 0.7039E-06 0.2642E-06 0.1332E-06 0.7958E-07 0.5285E-07
 ***** 0.1139E-04 0.1846E-05 0.6781E-06 0.2545E-06 0.1283E-06 0.7665E-07 0.5091E-07
 ***** 0.1097E-04 0.1778E-05 0.6531E-06 0.2451E-06 0.1236E-06 0.7383E-07 0.4904E-07
 ***** 0.1057E-04 0.1713E-05 0.6291E-06 0.2361E-06 0.1190E-06 0.7112E-07 0.4723E-07
 ***** 0.1018E-04 0.1650E-05 0.6060E-06 0.2274E-06 0.1146E-06 0.6851E-07 0.4550E-07
 ***** 0.9803E-05 0.1589E-05 0.5837E-06 0.2191E-06 0.1104E-06 0.6599E-07 0.4383E-07
 ***** 0.9443E-05 0.1531E-05 0.5623E-06 0.2110E-06 0.1064E-06 0.6356E-07 0.4221E-07
 ***** 0.9096E-05 0.1474E-05 0.5416E-06 0.2033E-06 0.1025E-06 0.6123E-07 0.4066E-07
 ***** 0.8761E-05 0.1420E-05 0.5217E-06 0.1958E-06 0.9870E-07 0.5898E-07 0.3917E-07
 ***** 0.8439E-05 0.1368E-05 0.5025E-06 0.1886E-06 0.9507E-07 0.5681E-07 0.3773E-07
 ***** 0.8129E-05 0.1318E-05 0.4841E-06 0.1817E-06 0.9158E-07 0.5472E-07 0.3634E-07
 ***** 0.7830E-05 0.1269E-05 0.4663E-06 0.1750E-06 0.8821E-07 0.5271E-07 0.3501E-07
 ***** 0.7542E-05 0.1223E-05 0.4491E-06 0.1686E-06 0.8497E-07 0.5077E-07 0.3372E-07
 ***** 0.7265E-05 0.1178E-05 0.4326E-06 0.1624E-06 0.8185E-07 0.4891E-07 0.3248E-07
 ***** 0.6998E-05 0.1134E-05 0.4167E-06 0.1564E-06 0.7884E-07 0.4711E-07 0.3129E-07
 ***** 0.6741E-05 0.1093E-05 0.4014E-06 0.1506E-06 0.7594E-07 0.4538E-07 0.3014E-07
 ***** 0.6493E-05 0.1053E-05 0.3866E-06 0.1451E-06 0.7315E-07 0.4371E-07 0.2903E-07
 ***** 0.6255E-05 0.1014E-05 0.3724E-06 0.1398E-06 0.7046E-07 0.4210E-07 0.2796E-07
 ***** 0.6025E-05 0.9766E-06 0.3587E-06 0.1346E-06 0.6787E-07 0.4055E-07 0.2693E-07
 ***** 0.5803E-05 0.9407E-06 0.3456E-06 0.1297E-06 0.6538E-07 0.3906E-07 0.2594E-07
 ***** 0.5590E-05 0.9061E-06 0.3329E-06 0.1249E-06 0.6297E-07 0.3763E-07 0.2499E-07

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
New Mexico State Office
REPORT OF UNDESIRABLE EVENT

DATE OF OCCURRENCE/DISCOVERY: Thursday, December 12, 2002 TIME OF OCCURRENCE: Unknown

DATE REPORTED TO BLM: 12/20/2002 TIME REPORTED: _____

BLM OFFICE REPORTED TO (RESOURCE AREA/DISTRICT/OTHER): DISTRICT (CARLSBAD, NM)

LOCATION: (1/4 1/4) SW 1/4 of NE 1/4 of SECTION 7 T. 19S R. 32E MERIDIAN _____

COUNTY: LEA STATE: NEW MEXICO WELL NAME NA

OPERATOR: COMPANY NAME DUKE ENERGY FIELD SERVICES PHONE NO. 915-620-4207

CONTACT PERSON'S NAME Lynn Ward, Environmental Specialist, Duke Energy Fields Services

SURFACE OWNER: FEDERAL MINERAL OWNER: _____
(FEDERAL/INDIAN/FEE/STATE)

LEASE NO.: _____ RIGHT-OF-WAY NO.: _____

UNIT NAME / COMUNITIZATION AGREEMENT NO.: V-8 GATHERING LINE (associated with LUSK BOOSTER)

TYPE OF EVENT, CIRCLE APPROPRIATE ITEM(S):

BLOWOUT, FIRE, FATALITY, INJURY, PROPERTY DAMAGE, OIL SPILL, SALTWATER SPILL, OIL AND SALTWATER SPILL, TOXIC FLUID SPILL, HAZARDOUS MATERIAL SPILL, UNCONTROLLED FLOW OF WELLBORE FLUIDS, OTHER (SPECIFY): _____

CAUSE OF EVENT: NATURAL GAS PIPELINE RELEASE - 60 BBL NGL RELEASED; 40 BBL RECOVERED

HazMat Notified: (for spills) _____ NA

Law Enforcement Notified: (for thefts) _____ NA

CAUSE AND EXTENT OF PERSONAL INJURIES/CAUSE OF DEATH(S): NA

Safety Officer Notified: _____ NA

EFFECTS OF EVENT: 2400-ft² surface affected by liquid spill; 37,100-ft² surface affected by overspray

ACTION TAKEN TO CONTROL EVENT: DEFS personnel repaired pipeline, restricted lateral extent of surface flow with heavy equipment, recovered 2/3 of release volume. Environmental Plus, Inc, Eunice, NM contracted for site remediation.

LENGTH OF TIME TO CONTROL BLOWOUT OR FIRE: _____

VOLUMES DISCHARGED: OIL net 20 bbl WATER _____ GAS _____

OTHER AGENCIES NOTIFIED: New Mexico Oil Conservation Division - Hobbs District Office (Larry Johnson and Johnny Robinson), 12/12/02, 3:25 PM.

District I

1625 N. French Dr., Hobbs, NM 88240

State of New Mexico

Energy Minerals and Natural Resources

Form C-141

Revised June 10, 2003

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

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

Release Notification and Corrective Action

OPERATOR

 Initial Report Final Report

Name of Company		DUKE ENERGY FIELD SERVICES			Contact		Paul Mulkey			
Address		11525 W. Carlsbad Hwy. Hobbs, NM 88240			Telephone No.		505-397-5716			
Facility Name		V-8 Gathering Line 121302			Facility Type		Natural Gas Gathering Pipeline (poly)			
Surface Owner		Bureau of Land Management			Mineral Owner		NA		Lease No.	NA
LOCATION OF RELEASE										
Unit Letter	Section	Township	Range	Feet from South Line	Feet from West Line	Longitude	Latitude	County:		
G	7	19S	32E	3054	2760	W103° 48' 18.88"	N32° 40' 33.73"	Lea		
NATURE OF RELEASE										
Type of Release					Volume of Release		Volume Recovered			
Natural Gas release and associated NGL's					60 bbl		40 bbl			
Source of Release					Date and Hour of Occurrence		Date and Hour of Discovery			
Natural Gas Pipeline (poly)					12/12/2002		12/12/02			
Was Immediate Notice Given?					If YES, To Whom?					
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required					Johnny Robinson; NMOCD-Hobbs					
By Whom?					Date and Hour					
Lynn Ward - DEFS					12/12/02 3:25 PM					
Was a Watercourse Reached?					If YES, Volume Impacting the Watercourse.					
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					NA					
If a Watercourse was Impacted, Describe Fully.*										
NA										
Describe Cause of Problem and Remedial Action Taken.*										
Loss of poly pipeline integrity due to thermal expansion/contraction. Pipeline was repaired by temporary clamping with ultimate section replacement by DEFS.										
Describe Area Affected and Cleanup Action Taken.*										
~2400-ft² surface area affected + ~37,100-ft² overspray. 40 bbl of ~60 bbl release recovered. RCRA Exempt Non-hazardous contaminated soil excavated (4,500-ft² X 8-ft bgs) and blended onsite by EPI. Backfilled with blended soil material plus 3-ft clean topsoil layer. (GPS Diagram Plate 3 attached)										
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: Paul Mulkey					Approved by District Supervisor:					
Title: Construction/Maintenance Superintendent					Approval Date:		Expiration Date:			
E-mail Address: pdmulkey@duke-energy.com					Conditions of Approval: <input type="checkbox"/> Attached.					
Date: 7/31/03 Phone: 505-397-5716										



Incident Date and NMOCD Notified?

12/12/02

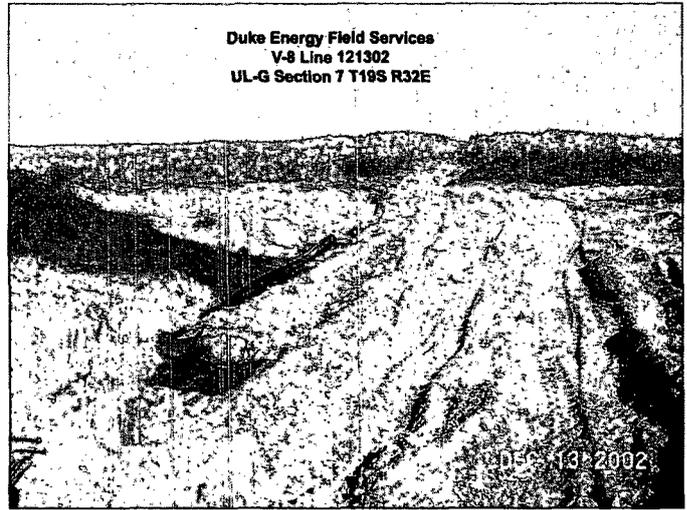
12/12/02 3:25 PM

SITE: V-8 Gathering Line 121302		Assigned Site Reference # 121302	
Company: DUKE ENERGY FIELD SERVICES			
Street Address: 5805 East Highway 80			
Mailing Address: 11525 W. Carlsbad Hwy.			
City, State, Zip: Hobbs, NM 88240			
Representative: Paul Mulkey			
Representative Telephone: 505-397-5716			
Telephone:			
Fluid volume released (bbls): 60	Recovered (bbls): 40		
>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: # 121302			
Source of contamination: Natural Gas Pipeline (poly)			
Land Owner, i.e., BLM, ST, Fee, Other: Bureau of Land Management 620 E. Green St, Carlsbad, NM 88220			
LSP Dimensions: ~40' X 40' (GPS Site Diagram attached)			
LSP Area: ~2400 -ft ²			
Location of Reference Point (RP):			
Location distance and direction from RP:			
Latitude: N32° 40' 33.73"			
Longitude: W103° 48' 18.88"			
Elevation above mean sea level: 3630 -ft amsl			
Feet from South Section Line: 3054			
Feet from West Section Line: 2760			
Location - Unit and 1/4 1/4: UL- G		SW 1/4 of NE 1/4	
Location - Section: 7			
Location - Township: 19S			
Location - Range: 32E			
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): 225			
Depth (ft) of contamination (DC): 17			
Depth (ft) to ground water (DG - DC = DtGW): 208			
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	If >1000' from water source, or, >200' from private domestic water source: 0 points	200-100 horizontal feet: 10 points	
If Depth to GW >100 feet: 0 points		>1000 horizontal feet: 0 points	
Ground water Score: 0	Wellhead Protection Area Score: 0	Surface Water Score: 0	
Site Rank (1+2+3) = 0			
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

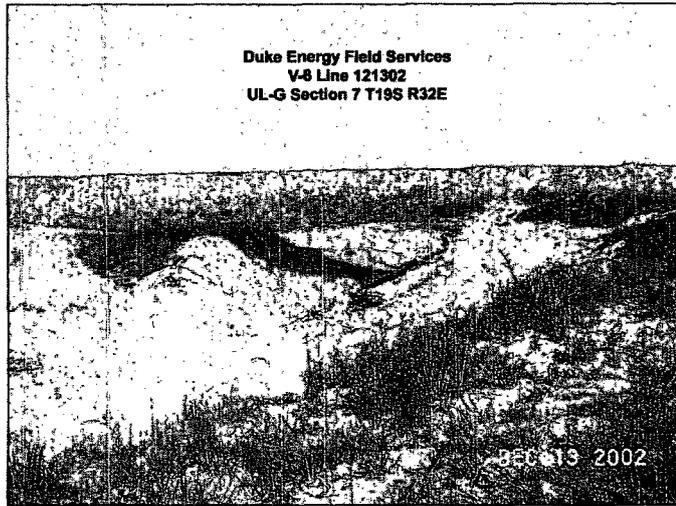
¹100 ppm field VOC headspace measurement may be substituted for lab analysis



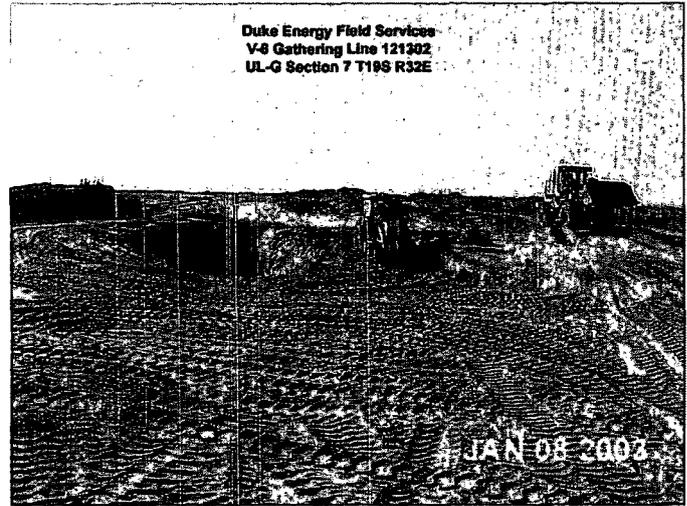
Initial Response; angle from west showing overspray



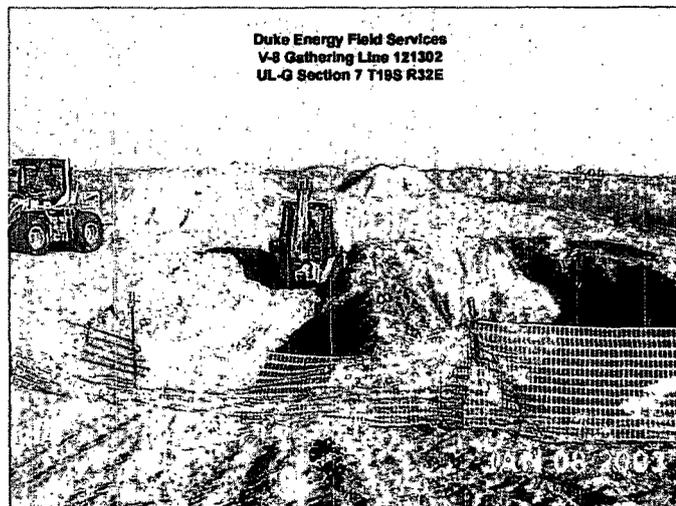
Initial Response; angle from south



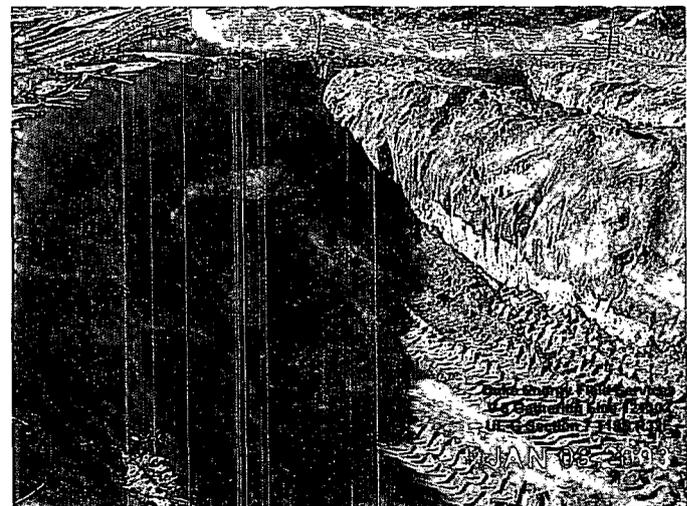
Initial Response; angle from south



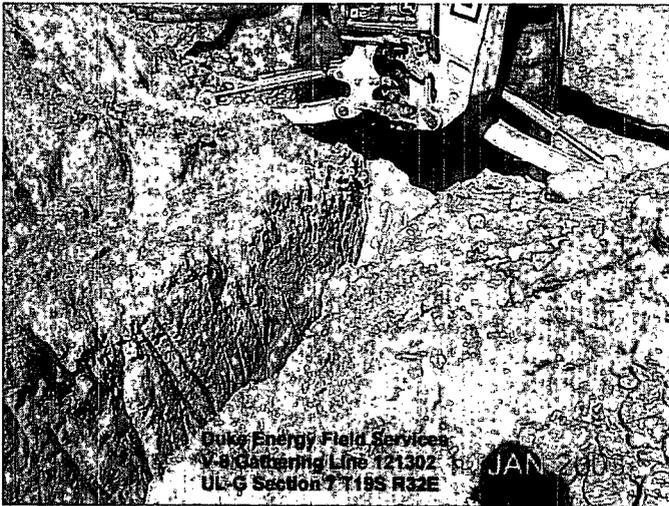
Excavation progress; angle from north



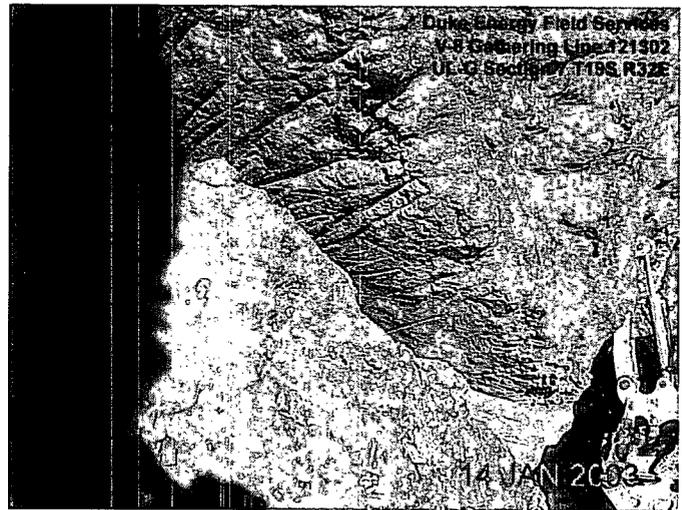
Excavation and blended soil stockpiles; angle from south



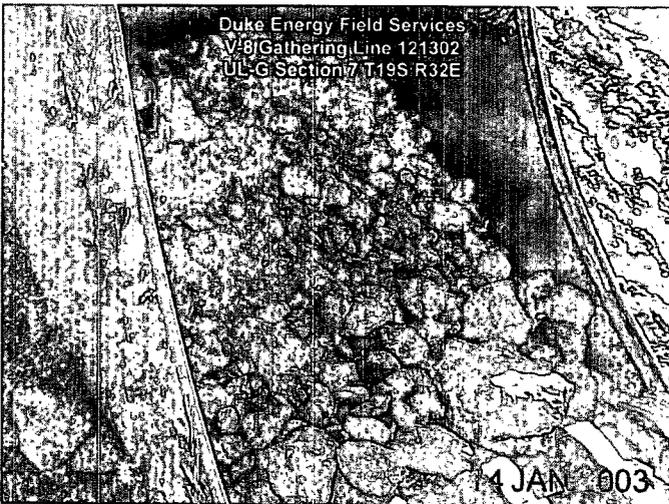
Excavation 8-ft bottom showing irregular caliche/sand interface



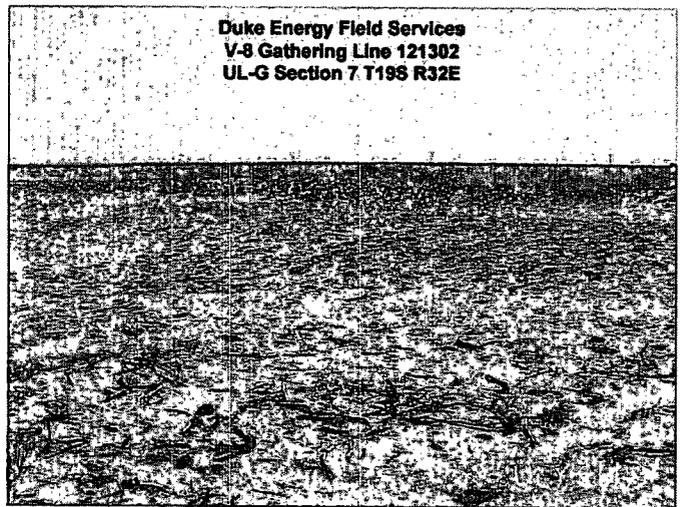
18-ft test trench being excavated



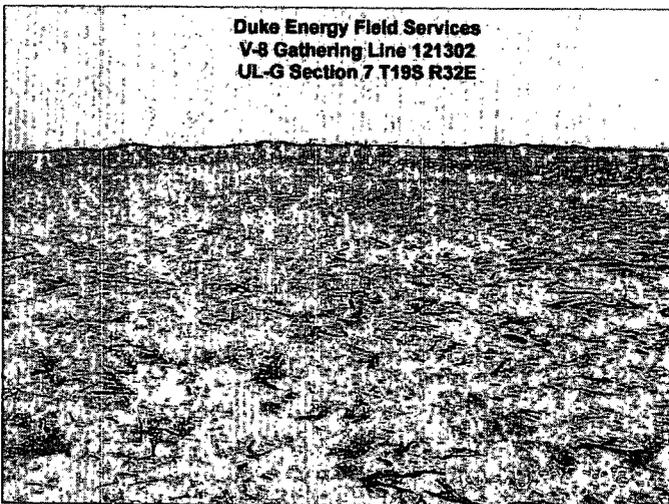
Bottom of trench (above date stamp)



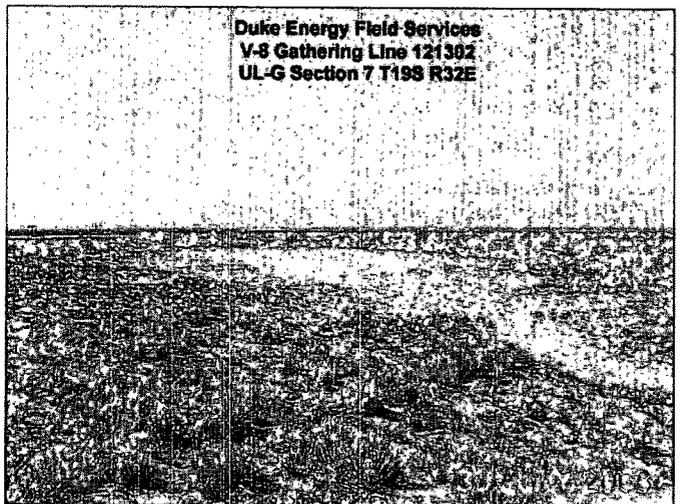
Clay material from 17' - 18' level



Final cover; angle from west



Final cover; angle from south



Panoramic view of site from north



ENVIRONMENTAL PLUS, INC. ~~Micro-Blaze~~ ~~Micro-Blaze Out~~
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES

December 23, 2002

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

Subject: Duke Energy Field Services V-8 Line 121302 Site Initial C-141 and Remediation Plan

Dear Mr. Johnson:

Environmental Plus, Inc. (EPI), on behalf of Mr. Paul Mulkey, Duke Energy Field Services, submits the attached New Mexico Oil Conservation Division Form C-141 for the above referenced leak site located on Federal Bureau of Land Management land. The release volume is estimated to be 60 bbl of NGL with 40 bbl recovered. The site is located in the SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ (Unit Letter G), Section 07, Township 19 South, and Range 32 East. The geographic location is N32°40'33.73"; W103°48'18.88". The site is ~ 12.7 miles south-southwest (bearing 191.2°) from Maljamar, 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 ~65-feet below ground surface (based on the water depth of one recorded well in UL-F immediately west of the release site). The site matrix ranking for this site is 10 due to the depth to ground water from lower contaminant level being between 50-ft and 100-ft.

The remedial action plan for this site is to delineate and characterize the soil contamination within the affected area of the natural gas and liquids release, excavate, dispose of and/or blend and attenuate on-site the RCRA exempt contaminated soils, and backfill the excavation with clean soil obtained on-site and/or off-site from private or public sources. Any RCRA exempt contaminated soils excavated and removed from the site will be disposed of in EPI's approved land farm located south of Eunice, NM.

The Constituents of Concern (CoC's) and associated NMOCD acceptable remedial levels are as follows:

- BTEX⁸⁶²⁰ (Benzene, Toluene, Ethyl Benzene, and Xylenes): 50 mg/kg
- TPH^{8015m} (Total Petroleum Hydrocarbon): 1000 mg/kg
- Benzene⁸⁶²⁰: 10 mg/kg

It is EPI's standard operating procedure to evaluate natural gas release sites for the presence of elevated levels of SO₄⁻ and Cl⁻ ions. These inorganic contaminants are often present in subsurface soils associated with sour gas releases and/or releases containing a brine component. Chloride and sulfate contamination of the soil will be evaluated relative to NMWQCC Ground Water Standards, 250 mg/ml and 600 mg/ml respectively.

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. Paul Mulkey at (505) 397-5716. All official written communications should be addressed to:

Mr. Paul Mulkey
Duke Energy Field Services
11525 West Carlsbad Highway
Hobbs, New Mexico 88240

Sincerely,

John Good
EPI Environmental Consultant

cc: Paul Mulkey, Duke Energy Field Services, w/enclosure
Ben Miller, EPI Vice President and General Manager
Sherry Miller, EPI President
file

ENVIRONMENTAL PLUS, INC.

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

Initial Report Final Report

Name of Company: Duke Energy Field Services; Contact: Paul Mulkey; Address: 11525 W. Carlsbad Hwy, Hobbs, NM 88240; Telephone No.: 505-397-5716; Facility Name: V-8 Gathering Line; Facility Type: Natural Gas Pipeline

Surface Owner: BLM; Mineral Owner: NA; Surface Lessor: NA

LOCATION OF RELEASE

Table with 9 columns: Unit Letter (G), Section (7), Township (19S), Range (32E), Feet from South Line (3054), Feet from West Line (2760), Longitude (W103:48:18.88), Latitude (N32:40:33.73), County (Lea)

NATURE OF RELEASE

Type of Release: Natural Gas and associated liquid components; Volume of Release: 60 bbl; Volume Recovered: 40 bbl; Source of Release: Natural Gas Pipeline (Poly); Date and Hour of Occurrence: 12/12/2002; Date and Hour of Discovery: 12/12/02; 12:15 PM; Was Immediate Notice Given? Yes; By Whom? Lynn Ward; Date and Hour: 12/12/02; 3:25 PM; Was a Watercourse Reached? No; If a Watercourse was Impacted, Describe Fully.*: NA

Describe Cause of Problem and Remedial Action Taken.*
Loss of pipeline integrity due to thermal expansion/contraction of pipeline. Pipeline was repaired and 40 bbl of NGL recovered.

Describe Area Affected and Cleanup Action Taken.*
~2400-ft2 surface area affected; 40-bbl of NGL recovered. RCRA Exempt Non-hazardous contaminated soil above remedial goals will be excavated and disposed of by EPI.

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.

Signature: John Good; Printed Name: John Good; Title: Environmental Consultant, Environmental Plus, Inc. - Eunice, NM; Date: 12/23/02; Phone: 505-394-3481; OIL CONSERVATION DIVISION; Approved by District Supervisor; Approval Date; Expiration Date; Conditions of Approval; Attached

Attach Additional Sheets If Necessary

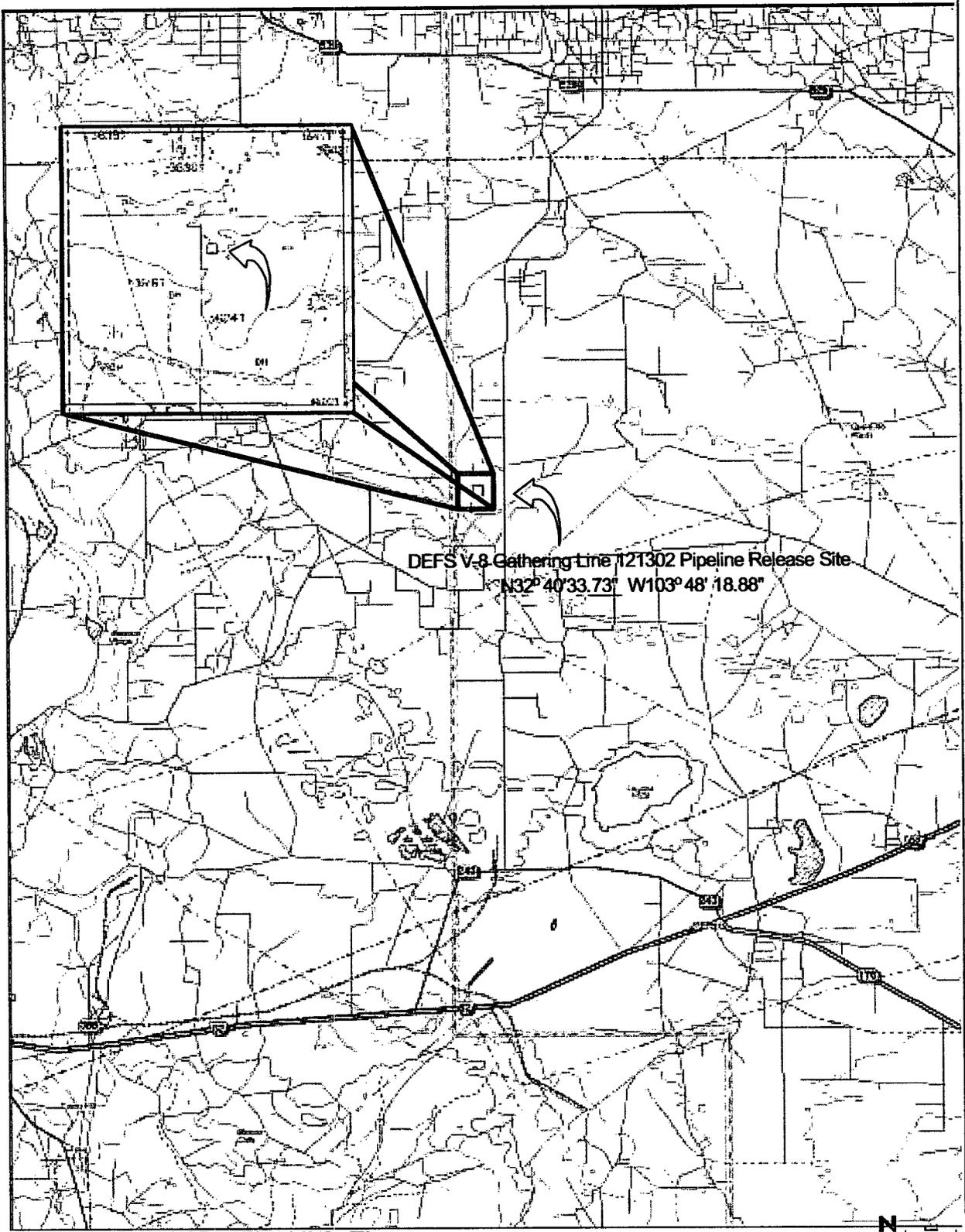


Incident Date and NMOCD Notified?

12/12/02; 12:15 PM 12/12/02; 3:25 PM

SITE: V-8 Gathering Line		Assigned Site Reference #: V-8 Line 121302	
Company: Duke Energy Field Services			
Street Address: 11525 W. Carlsbad Hwy, Hobbs, NM 88240			
Mailing Address: 11525 West Carlsbad Hwy			
City, State, Zip:			
Representative: Paul Mulkey			
Representative Telephone: 505-397-5716			
Telephone:			
Fluid volume released (bbls): 60		Recovered (bbls): 40	
>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: V-8 Line 121302			
Source of contamination: Natural Gas Pipeline (Poly)			
Land Owner, i.e., BLM, ST, Fee, Other: BLM Carlsbad, NM District Office			
LSP Dimensions: 40'x50' + 37,100 ft ² Overspray (see Plate 3 - Site Diagram)			
LSP Area: 2400 -ft ²			
Location of Reference Point (RP):			
Location distance and direction from RP:			
Latitude: N32:40:33.73			
Longitude: W103:48:18.88			
Elevation above mean sea level: 3630 -ft amsl			
Feet from South Section Line: 3054			
Feet from West Section Line: 2760			
Location - Unit or 1/4 1/4: UL- G SW 1/4 of NE 1/4			
Location - Section: 7			
Location - Township: 19S			
Location - Range: 32E			
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): 10			
Depth (ft) to ground water (DG - DC = DtGW): 55			
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	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

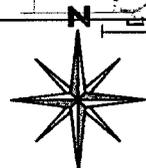
¹ 100 ppm field VOC headspace measurement may be substituted for lab analysis

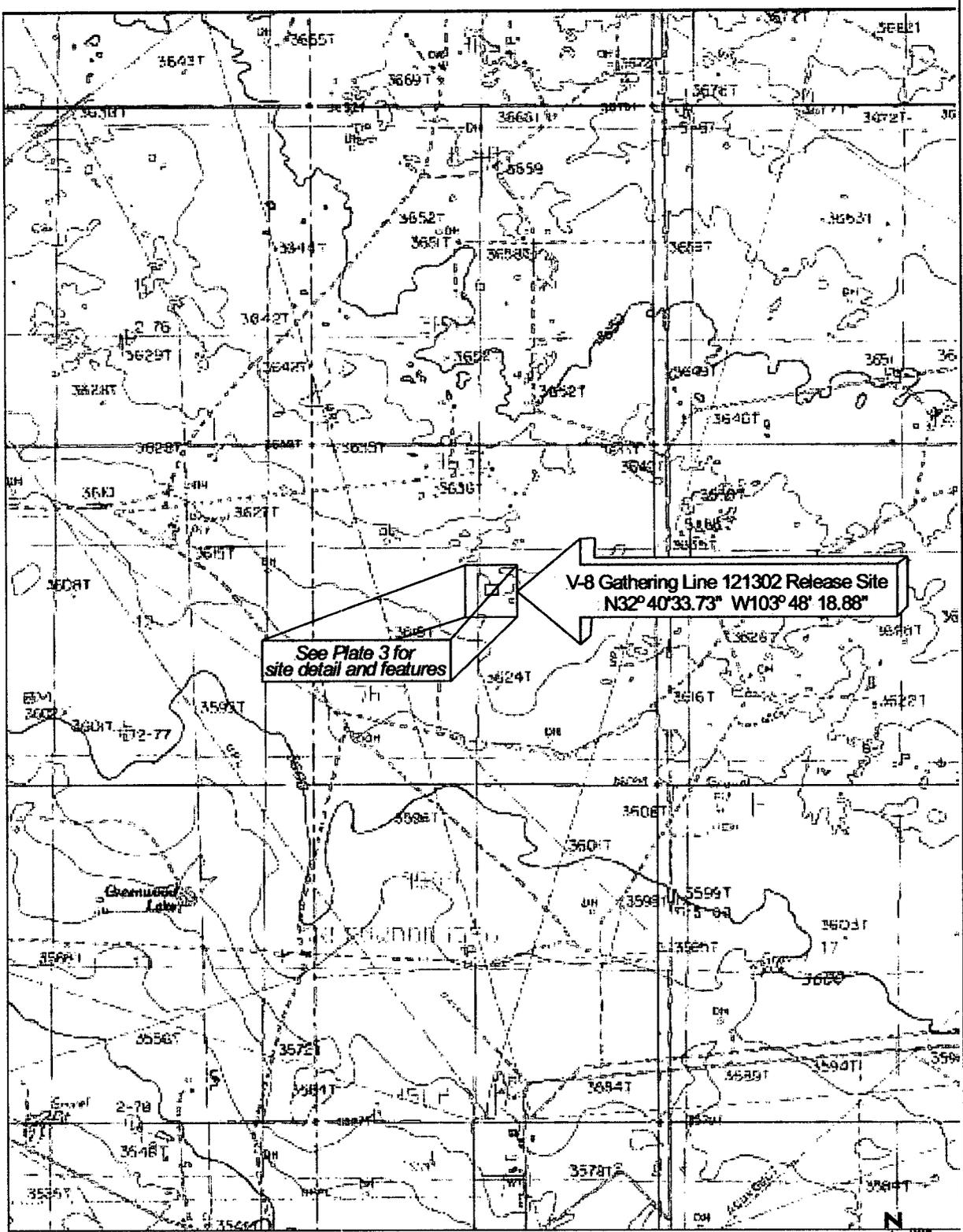


DEFS V-8 Gathering Line 121302 Pipeline Release Site
 N32° 40' 33.73" W103° 48' 18.88"

Plate 1: Release Site Location

Duke Energy Field Services - V-8 Gathering Line 121302
 Lea County, NM; UL-G Section 07 T19S R32E

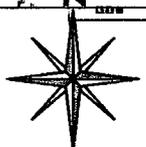




See Plate 3 for site detail and features

V-8 Gathering Line 121302 Release Site
 N32°40'33.73" W103°48' 18.88"

Plate 2: Site Topography and Release Location
 Duke Energy Field Services - V-8 Gathering Line 121302
 Lea County, NM; UL-G Section 07 T19S R32E



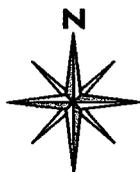
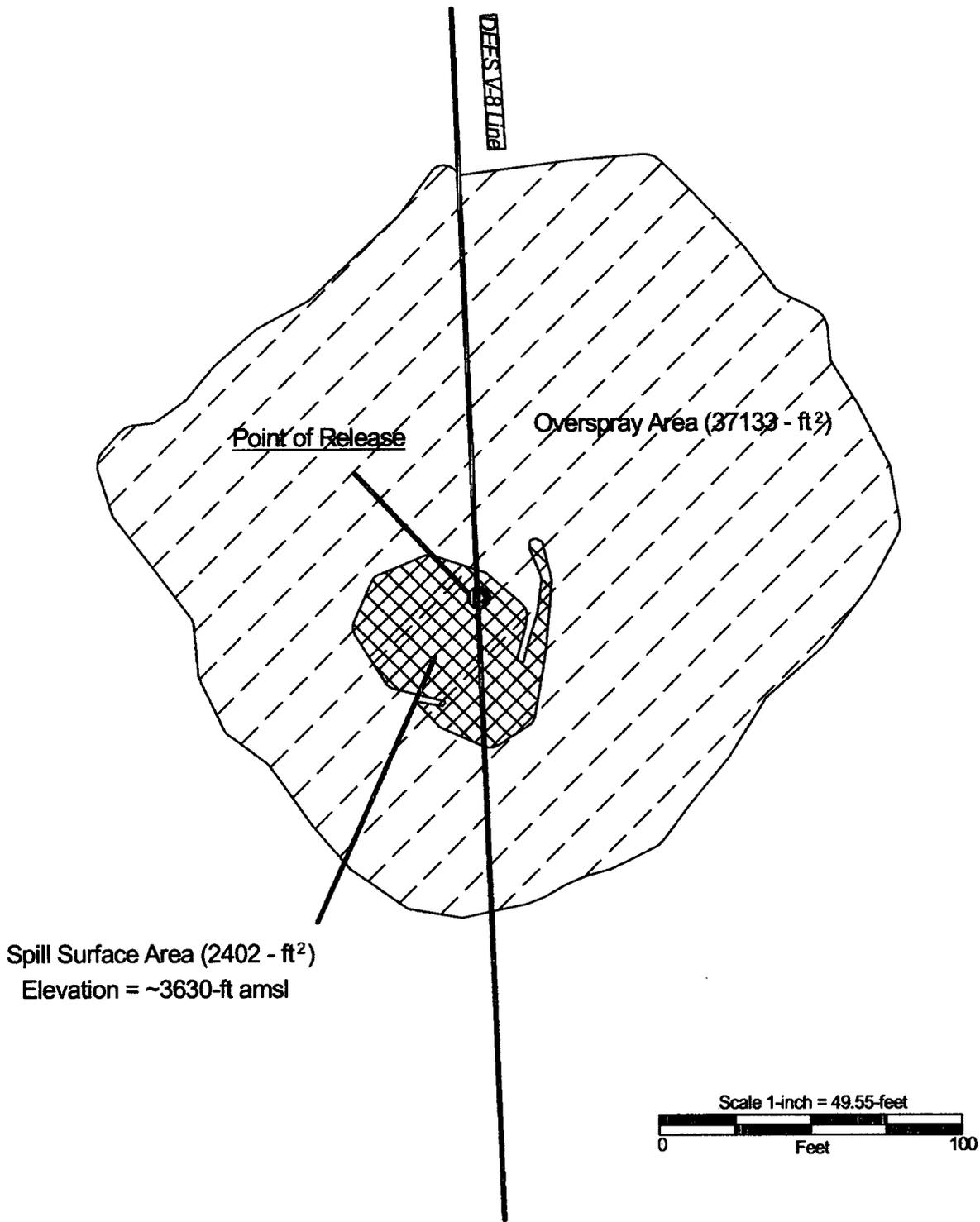


Plate 3: Release Site GPS Demarcation
Duke Energy Field Services - V-8 Line 121302
Lea County, NM; UL-G Section 07 T19S R32E

Drawn By: JCG Date: Dec-02 Revised:



