

1R - 454

# REPORTS

DATE:

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May 31, 2004

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



RECEIVED  
6/23/05  
NO OIL RELEASE  
HAS BEEN PERFORMED

Subject: **Remediation Closure Plan**  
BP Pipelines, NA - Denton Gathering System Release  
Section 11 – Township 15S – Range 37E  
Lea County, New Mexico

Dear Mr. Johnson:

On behalf of BP Pipelines (North America), Inc. (BP), Delta Environmental Consultants, Inc. (Delta) is pleased to present the following Remediation Closure Plan for BP's Denton Gathering System site, which is located south of New Mexico State Route 83, in Section 11, T15S, R37E in Lea County, New Mexico. This report summarizes our assessment activities to date and concludes with our closure plan.

**1.1 Background**

On March 7, 2003, a surface indication of crude oil was observed along a gathering line located on the Darr Angell Ranch (Denton field), approximately 12 miles east of Lovington, New Mexico. Figure 1 shows the site location on the USGS topographic map for the area. Field crews responded by performing the initial excavation at the leak location and repairing the pipeline. The source of the release was identified as a pipeline associated with the Denton Field gathering system. According to the C-141 'Release Notification and Corrective Action' form, an estimated 20 barrels of crude oil was released, 12 barrels of which were reportedly recovered.

The New Mexico Oil Conservation Division (NMOCD) has regulatory jurisdiction over this site. As stated in the NMOCD "Guidelines for Remediation of Spills, Leaks, and Releases" dated August 13, 1993, the agency "requires that corrective actions be taken for leaks, spills or releases of any material which has a reasonable probability to injure or be detrimental to public health, fresh waters, animal or plant life, or property or unreasonably interfere with the public welfare or use of the property". The cleanup levels are determined on a site-by-site basis and are typically based on ranking criteria that is outlined within the 'guidelines'. Procedures may deviate from the guidelines outlined in the above-referenced document if it can be shown that the proposed

A member of:



procedure will either remediate, remove, isolate or control contaminants in such a manner that fresh waters, public health and the environment will not be impacted.

Based on conversations with personnel from the Hobbs NMOCD office, the site-specific cleanup levels for affected soils were required to be 10 milligrams per kilogram (mg/Kg) benzene, 50 mg/Kg total benzene, toluene, ethylbenzene and xylenes (BTEX), and 100 mg/Kg total petroleum hydrocarbons (TPH), which are consistent with the recommended remediation action levels for sites, with unsaturated contaminated soils, with a ranking score of 10, which is based on a depth to groundwater that is less than 50 feet from the lowermost contaminants.

A chronology of critical events is presented below for your reference.

March 7, 2003 – A crude oil leak was discovered on the Denton Gathering system on property owned by Mr. Darr Angell. Initial excavation activities removed visibly affected soil and the line was repaired. NMOCD (LJ) FOUND WORK IN PROGRESS BY CJR CONTRACTORS OF DENVER CITY TX. OGD HAD NOT BEEN NOTICED. CJR HAD NOT KNOWN WHOSE LEAK HE WAS WORKING ON. STATE HAD TO REMOVE SOIL & MOVE ON

April 1, 2003 – The line was taken out of service with no plans to resume use of the line.

April 8, 2003 – Site meeting with NMOCD, BNC, Delta, and Mr. Darr Angell to discuss cleanup alternatives. NOT TRUE. NMOCD NEVER ATTENDED ANY SUCH MEETING -

April 14, 2003 – A workplan for on-site treatment of impacted soils was provided to Mr. Larry Johnson with the NMOCD by Delta. ? BNC WAS ONLY CONSULTED

April 28 through August 20, 2003 – Several episodes of over-excavation and confirmation sampling were conducted. Final samples indicate all crude oil affected soils above applicable cleanup standards have been removed, with the exception of historical impact on the east side of the remedial excavation adjacent to the EOTT pipeline. Excavation details, sample locations and analytical data are depicted on Figure 2. NO SO - LEAK DETECTION WAS NOT CONSIDERED AT THAT STAGE OF INVESTIGATION

September 30, 2003 – **Soil Assessment Report and Remedial Work Plan** (BNC) submitted to NMOCD for review.

February 25, 2004 – Delta submitted a **Workplan for Monitor Well Installation** for NMOCD review.

April 13, 2004 – Mr. Larry Johnson of NMOCD approves monitor well workplan.

June 2-4, 2004 – Monitor wells installed.

June 10, 2004 – Monitor wells surveyed, bailed and sampled

August 30, 2004 – **Site Investigation Report** submitted to NMOCD.

November 18, 2004 – Revised **Site Investigation Report** submitted to NMOCD, to correct stated volume of excavated soils (7,500 cubic yards – actual amount 5,000 cubic yards) and typographical errors.

### Remedial Excavation

Excavation, remedial and soil sampling activities were provided by BNC, as directed by BP and overseen by the NMOCD. During the course of soil excavation activities:

- The excavation reached 22 feet below grade surface (bgs) - at the maximum depth;
- Excavation activities were terminated when the vertical and horizontal extent of BTEX and TPH affected soils were confirmed by analytical methods to exhibit concentrations below the site-specific cleanup targets of 10 mg/kg benzene, 50 mg/kg total BTEX, and 100 mg/kg TPH;
- Approximately 5,000 cubic yards of affected soil were removed;
- Figure 2 presents color coded sample locations for four separate confirmation sampling events that occurred subsequent to excavation/over-excavation activities, and the confirmation soil sample analytical results.
- The laboratory analytical results of the confirmation samples collected on August 20, 2003, indicate the horizontal and vertical extent of hydrocarbon impact in the on-site soils has been defined.
- Confirmation sample results indicate that soils affected with hydrocarbon concentrations above 10 mg/kg benzene, 50 mg/kg total BTEX and 100 mg/kg TPH have been removed from the release area and stockpiled on-site. The aforementioned meets the recommended remediation corrective action as described in the NMOCD "Guidelines for Remediation of Spills, Leaks, and Releases" dated August 13, 1993, specifically Section VI, A, 1. The remedial excavation roughly measures 95 feet by 140 feet and ranges in depth from 3 to 22 feet bgs.

NEVER EXCAVATION @ SCHEDULE TIME SO OCD COULD SPLIT OR OBSERVE

WAS THIS PLAN & NOTIFICATION? ✓ HORIZ

### Soil Stockpile Characterization

- Approximately 5,000 cubic yards of soil were removed during site excavation activities.
- Stockpiled soils are staged adjacent to the excavation in three areas.
- Laboratory analytical results of samples collected from the stockpiled soils in April and August 2003 indicate the TPH concentrations in the stockpiles ranged from 38.2 mg/kg to 411 mg/kg, and BTEX concentrations were below respective site-specific regulatory cleanup levels.
- Laboratory analytical results, from a re-sampling event that took place on October 1, 2004, indicate the TPH concentrations range from 207 mg/kg to 6,766 mg/kg and total BTEX concentrations range from <0.050 (6 samples) to 1.8 mg/kg. Stockpile sample analytical results are summarized in Table 4.
- The analytical results indicate that the residual hydrocarbon impact, in the stockpiled soils, represents heavy hydrocarbons with generally lower mobility and no remaining benzene, toluene or ethylbenzene.

### Vertical Soil and Ground Water Assessment

In response to an OCD request, Delta installed four groundwater monitor wells and one soil boring (SB-3), to evaluate potential groundwater impact due to the release. The soil boring/monitor wells were installed in accordance with the OCD approved **Workplan for Monitor Well Installation** dated May 28, 2004, and in locations approved by Mr. Larry Johnson during a site visit on February 13, 2004. Figure 3 depicts the soil boring/monitor well locations.

- MW-1 was installed within the limits of the excavation, in a down- to crossgradient location from the release point;
- Monitor wells 2 and 3 were installed in cross- to upgradient positions;
- MW-4 was installed in a downgradient position; and,
- Soil boring SB-3 was installed adjacent to MW-3 (auger refusal was encountered and the boring was abandoned).
- Soil borings were installed using a combination of hollow-stem auger and air rotary drilling methods.

Sediments encountered during drilling activities included:

- 0 to approximately 10 feet bgs - dark gray clayey silt.
- Approximately 10 to 30 feet bgs
  - At MW-2, SB-3 and MW-3 - light-gray to light-brown dense limestone/dolomite mudstone;
  - At MW-1 and MW-4 - a more friable light-gray to light-brown dense limestone/grainstone.
- Approximately 30 ft bgs to boring terminus (approximately 70 feet bgs) - red fine-grained sands and lightly lithified sandstone.

Following completion of the two-inch diameter PVC monitor wells, with 15' of well screen and blank riser pipe to the surface, they were developed using a combination of submersible pump and hand bailing.

Groundwater was encountered at depths between 59 and 61 ft bgs.

#### **Soil Sampling Results**

- Soil samples collected in MW-1, MW-2 and MW-4 were collected from above the soil/groundwater interface with the highest OVM reading. If no OVM readings were observed, the sample collected at the soil/groundwater interface was submitted for laboratory analysis.
- Soil samples were not collected during the installation of MW-3 because of the necessity to use air rotary drilling methods. However, soil cuttings were monitored continuously by for field evidence of hydrocarbon impact. None were observed.
- Samples were analyzed for BTEX using EPA Method 8021B.
- Laboratory results indicate BTEX constituents are below the limits of laboratory quantitation for all soil samples analyzed. Laboratory analytical results are presented in Table 1.
- Field evidence and analytical results indicate that there is over 40 feet of unaffected soils between the deepest impact from the release (22 feet bgs) and groundwater (~60 feet bgs), which confirm that the release of hydrocarbons was confined to the excavated area.

FIELD  
NOTES

### **Groundwater Sampling Results**

- June 10, 2004 – MW-1, MW-2, MW-3 and MW-4 gauged, surveyed and sampled. Samples were analyzed for BTEX constituents using EPA Method 8021B.
- Groundwater flow direction is to the east and southeast. Groundwater elevation data is presented in Table 2 and depicted on Figure 3.
- Laboratory results indicate:
  - MW-2, MW-3 and MW-4 - BTEX constituents are below the limits of laboratory quantitation.
  - MW-1 - Concentrations of benzene, toluene, ethylbenzene and o-xylenes are below limits of laboratory quantitation; however, a m,p-xylenes concentration of 0.00191 mg/L was identified. This concentration is below the standard of 0.620 mg/L for total xylenes that is established in the New Mexico Water Quality Control Commission Regulations (NMWQCC - 20.6.2 NMAC, Subpart III, Section 3103).
- Laboratory analytical results indicate that no concentrations of petroleum hydrocarbons above NMWQCC standard levels are present in the groundwater underlying the site. The laboratory analytical results for the groundwater samples are presented in Table 3.

### **Closure Workplan**

Based on the above, conversations with NMOCD personnel, and a request from the property owner that no soils be removed, nor imported to this site, on behalf of Atlantic Richfield (A BP Affiliated Company), Delta requests NMOCD approval of the following site closure workplan, which is in accordance with Section VI, A, 2, b, i, of the NMOCD "Guidelines for Remediation of Spills, Leaks, and Releases" dated August 13, 1993.

Site activities will be conducted in accordance with Occupational Safety and Health Administration (OSHA) excavation standards (29 CFR 1926) and other applicable federal, state, or local requirements. All work will be conducted under a site-specific Health and Safety Plan (HASP) that addresses the physical, process and chemical hazards that may be encountered and outline the emergency procedures for the project team.

The site closure objectives are based on current and anticipated future land use and are consistent with current land use.

The site activities will consist of the following:

1. Monitor wells MW-1, MW-2, MW-3 and MW-4 will be plugged and abandoned by removing the casing, if possible, and filling the borehole to the surface with bentonite grout in accordance with applicable federal, state, or local requirements.
2. To provide an impermeable lower barrier, an approximate 6-inch layer of clay (red bed) will be used to line the bottom of the excavation.
3. The excavation will then be backfilled to approximately 3.0 feet bgs with the stockpiled soils; the least impacted soils will be utilized in the lower lifts. Clean overburden to be kept in reserve for use as topsoil. Backfill placed in the

- excavation shall be compacted by construction equipment in lifts not to exceed one foot.
4. The excavation will be "crowned" to allow for subsequent settling of the backfilled soil.
  5. A layer of clean sand will be placed across the excavation to ensure a smooth, relatively level surface; then, a geosynthetic clay liner (GCL; e.g., CETCO's Bentomat CL) will be placed onto the sand layer to serve as an upper liner and prevent ponding of rainfall in the excavation. As noted in the **Soil Assessment Report and Remedial Work Plan** that was submitted to the NMOCD on September 30, 2003, a reinforced GCL consists of two carrier geotextiles needle punched together to encapsulate a layer of Volclay sodium bentonite. GCLs are commonly utilized by landfills as liners, and have been previously approved by the NMOCD as a control measure at other crude oil release sites for similar closure purposes.
  6. Once the GCL has been installed, a layer of sand will be placed on top providing a buffer between the GCL and the remaining backfill/overburden.
  7. Final grading of the excavated area will approximately match existing contours.
  8. The project will be conducted in September of 2005, depending on weather conditions and will be completed within two weeks from initiation. Once completed, the Site Closure Report will be submitted to the NMOCD within 60 days.

We appreciate your cooperation with this project, and request a meeting with you on June 9, 2005, at 9:00 am to discuss and finalize this closure plan. Prior to our meeting, if you have any questions please do not hesitate to give me a call at 972-416-7171 or email me at [MHenn@DeltaEnv.com](mailto:MHenn@DeltaEnv.com). You can also contact Mike Whelan with Atlantic Richfield at (281) 366-7485 / [Whelamr@bp.com](mailto:Whelamr@bp.com).

Upon your approval of this workplan Delta will submit a copy of this workplan to the property owner, Mr. Darr Angell for his concurrence. We will obtain his approval in writing and provide that to you, prior to initiating any field work.

Respectfully,

**DELTA ENVIRONMENTAL CONSULTANTS, INC.**

  
Michael Henn  
Project Manager

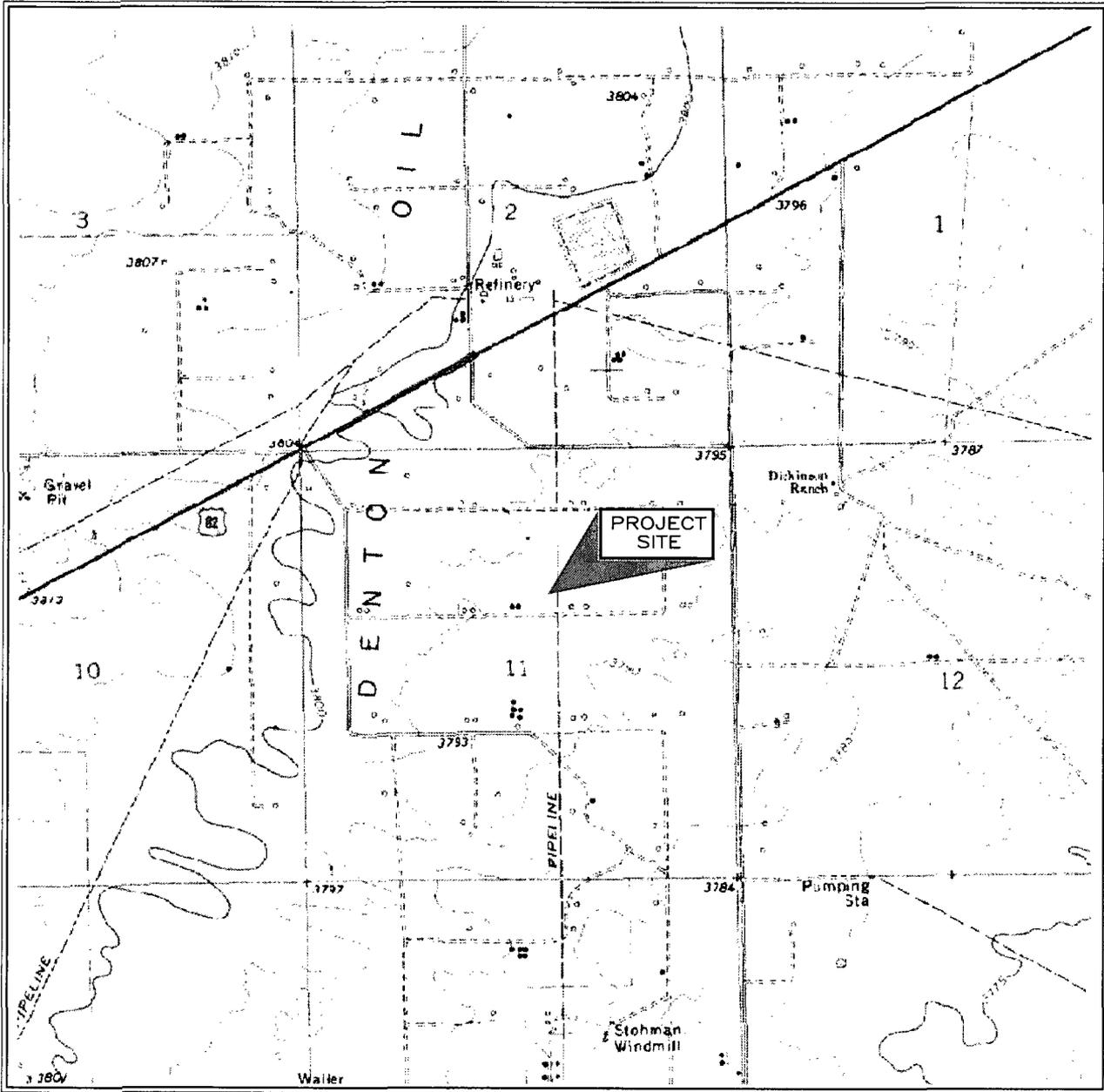
Attachments:  
Figures 1 - 3  
Tables 1 - 4

cc: Mike Whelan – AR – Houston (w/o reports)  
Jim Lucari – BP Legal (w/o reports)

PRAIRIEVIEW QUADRANGLE  
TEXAS

LAT=32° 2' 3.8"N  
LONG=103° 10' 10"W

PHOTOREVISED 1970



SCALE 1:24000



(Miles)



(Feet)

CONTOUR INTERVAL 5 FEET



NORTH

1014 SLR 10/16/03

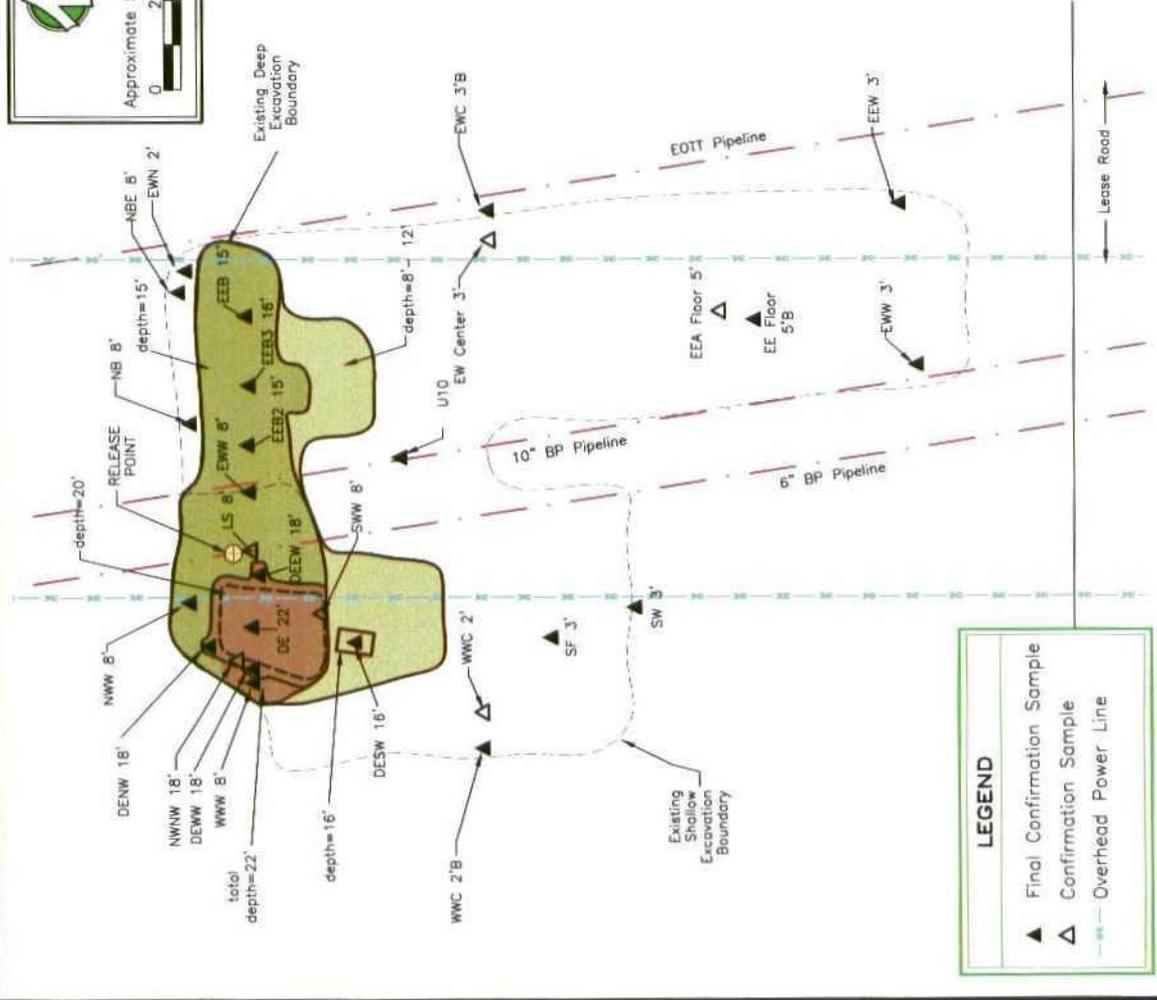
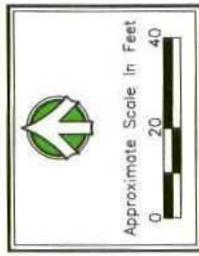


SITE LOCATION MAP

BP PIPELINES (NORTH AMERICA)  
DENTON GATHERING                      LOVINGTON, NEW MEXICO

JOB No.  
1014-2

FIGURE  
1



**LEGEND**

- ▲ Final Confirmation Sample
- △ Confirmation Sample
- Overhead Power Line

SAMPLE ID	DATE	TOTAL BTEX (mg/Kg)	TPH (GRO/DRO) (mg/Kg)
<b>Excavation Confirmation Samples</b>			
EEA Floor 5'	4/8/2003	0.0119	462
EE Floor 5' B	4/30/2003	0.151	61.7
EW Center 3'	4/8/2003	1.855	4,902
EW 3' B	4/30/2003	BDL	BDL
EWN 2'	4/8/2003	BDL	BDL
NWW 8'	4/8/2003	BDL	BDL
WWC 2'	4/8/2003	0.3574	1,558.6
WWC 2' B	4/30/2003	0.0150	BDL
EEW 3'	4/30/2003	BDL	4.20
EWW 3'	4/30/2003	BDL	BDL
EWW 8'	4/30/2003	BDL	3.04
LS 8'	4/30/2003	2.1310	2,460.0
DEEW 18'	8/20/2003	<0.0100	BDL
SF 3'	4/30/2003	BDL	BDL
SW 3'	4/30/2003	BDL	BDL
SWW 8'	4/30/2003	1.6172	1,886.7
DESW 16'	8/20/2003	<0.0100	BDL
U 10	4/30/2003	BDL	BDL
WWW 8'	4/30/2003	0.0137	BDL
NW 18'	7/15/2003	62.433	5,120
DENW 18'	8/20/2003	<0.0100	BDL
DE 22'	8/20/2003	0.0394	8.08
DEWW 18'	8/20/2003	<0.0100	BDL
EEB2 15'	8/20/2003	<0.0100	BDL
EEB3 16'	8/20/2003	<0.0100	BDL
EEB 15'	8/20/2003	<0.0100	BDL
NB 8'	8/20/2003	<0.0100	BDL
NBE 8'	8/20/2003	<0.0200	505 <sup>1</sup>

**Notes:**  
 BTEX analysis by EPA Method 8021.  
 TPH analysis by EPA Method 8015 Modified.  
 BDL - Below Detection Limits (See Lab Results)  
<sup>1</sup> Sample located adjacent to EOTT PL.



JOB No.  
1762

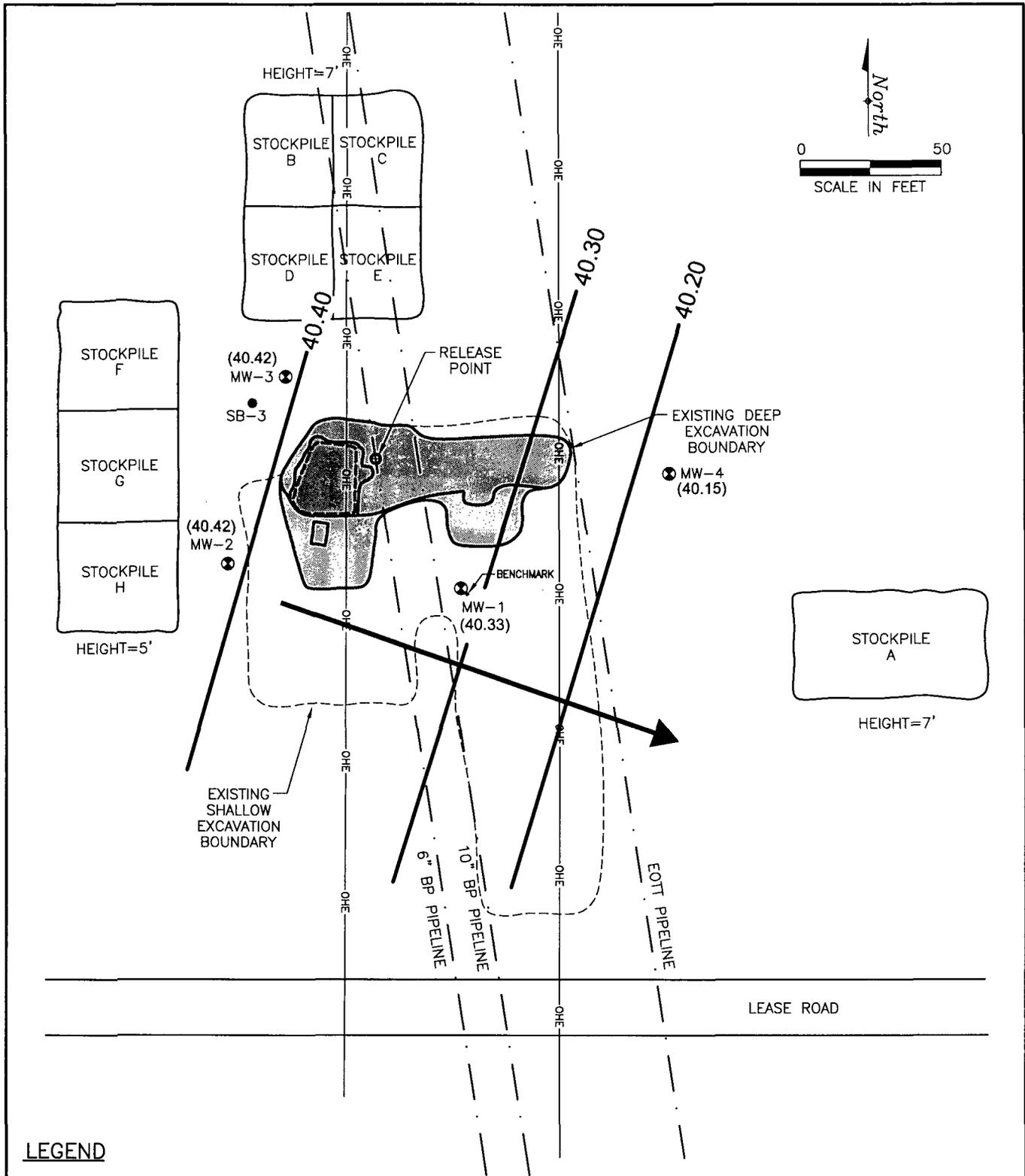
FIGURE  
2

**SAMPLE LOCATIONS AND OVEREXCAVATION DETAILS**

BP PIPELINES (NORTH AMERICA)

DENTON GATHERING

LOVINGTON, NEW MEXICO



**LEGEND**

- ⊙ MONITOR WELL LOCATIONS
  - SOIL BORING LOCATION
  - OHE— OVERHEAD POWER LINE
  - (40.33) GROUNDWATER ELEVATION (FT.)
  - 40.20 GROUNDWATER CONTOUR LINE
  - ➔ GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION MEASUREMENTS COLLECTED ON 6/10/04

**FIGURE 3**  
**GROUNDWATER ELEVATION AND**  
**FLOW DIRECTION MAP**  
**BP PIPELINES (NORTH AMERICA)**  
**DENTON GATHERING**  
**LOVINGTON, NEW MEXICO**

PROJECT NO. F003-003	PREPARED BY BS	DRAWN BY DD
DATE 11/10/04	REVIEWED BY	FILE NAME F003-003



**Table 1**  
**Stockpile Analytical Data**  
**BP Pipelines, NA**  
**Denton Gathering Leak Site**  
**Lea County, NM**

Sample #	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total xylenes (mg/kg)	Total BTEX (mg/kg)	TPH GRO (mg/kg)	TPH-DRO (mg/kg)
Soil Target Levels (mg/kg)		10	---	---	---	50	100	100
A	04/30/03	<0.0100	<0.0100	0.114	0.757	0.871	38.2	<50.0
B	04/30/03	<0.0100	<0.0100	1.52	9.14	10.66	260	151
C	04/30/03	<0.0100	<0.0100	1.06	6.15	7.21	204	124
D	04/30/03	<0.0100	<0.0100	1.16	5.71	6.87	194	75
E	04/30/03	<0.0100	<0.0100	0.871	3.65	4.521	221	<50.0
F	08/20/03	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<2.00	28
G	08/20/03	<0.0200	<0.0200	<0.0200	0.0326	0.0326	<2.00	122
H	08/20/03	<0.0100	<0.0100	0.0116	0.235	0.2466	33.3	103
A	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	9.44	1080
B	10/01/04	<0.025	<0.025	<0.025	1.8	1.8	156	6610
C	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	6.16	1670
D	10/01/04	<0.025	<0.025	<0.025	0.688	0.688	68.1	4510
E	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	115	2220
F	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	<2.50	369
G	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	<2.50	207
H	10/01/04	<0.025	<0.025	<0.025	<0.050	<0.050	<2.50	596

WHAT SAMPLE PROCEDURE USED? SURFACE, 6", 1', 2', 3'  
OR WHAT? DEPTH IS NO INDICATED - WHERE PUT  
SHOWING SAMPLE LOCATIONS, WAS OGD NOTIFIED OF  
SAMPLE EVENT OR SUBMITTED A SAMPLE PLAN FOR  
APPROVAL?

**TABLE 2**  
**Soil Analytical Data**  
**BP Pipelines NA, Inc.**  
**Denton Gathering Site**  
**Lea County, New Mexico**

Soil Boring / Monitor Well	Date Sampled	Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	m,p-xylenes (mg/kg)	o-xylenes (mg/kg)
Soil Target Levels (mg/kg)			10	---	---	---	---
MW-1	6/2/04	54-55	<0.025	<0.025	<0.025	<0.025	<0.025
MW-1	6/2/04	59-60	<0.025	<0.025	<0.025	<0.025	<0.025
MW-2	6/4/04	60-61	<0.025	<0.025	<0.025	<0.025	<0.025
MW-4	6/2/04	59-60	<0.025	<0.025	<0.025	<0.025	<0.025

Notes:

mg/kg = milligrams per kilogram

Samples analyzed by EPA Method 8021B

\*Detection limit for all BTEX constituents and samples was 0.025 mg/kg

**Table 3**  
**Ground Water Elevation Data**  
**BP Pipelines NA, Inc.**  
**Denton Gathering Site**  
**Lea County, New Mexico**

Monitor Well	Date Gauged	Top of Casing	Depth to Product	Depth to Water	Product Thickness	Elevation of Water
MW-1	6/10/04	96.28	NP	55.95	0	40.33
MW-2	6/10/04	100.10	NP	59.68	0	40.42
MW-3	6/10/04	100.15	NP	59.73	0	40.42
MW-4	6/10/04	99.82	NP	59.67	0	40.15

Notes:

Monitor wells were surveyed based on a relative Benchmark of 100.00 feet on June 10, 2004.

NP = free product not present

**TABLE 4**  
**Ground Water Analytical Data**  
**BP Pipelines NA, Inc.**  
**Denton Gathering Site**  
**Lea County, New Mexico**

Monitor Well	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	m,p-xylenes (mg/L)	o-xylenes (mg/L)
NM WQCC Standard (mg/L)		0.01	0.75	0.75	0.62 (total xylenes)	
MW-1	6/10/04	<0.001	<0.001	<0.001	0.00191	<0.001
MW-2	6/10/04	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	6/10/04	<0.001	<0.001	<0.001	<0.001	<0.001
MW-4	6/10/04	<0.001	<0.001	<0.001	<0.001	<0.001
Trip Blank	---	<0.001	<0.001	<0.001	<0.001	<0.001

Notes:

NM WQCC = New Mexico Water Quality Control Commission  
mg/L = milligrams per Liter  
Samples analyzed by EPA Method 8021B  
Detection limit for all samples and constituents was 0.001 mg/L