

# ENVIROTECH INC.

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

## SUBSURFACE INVESTIGATION WORKPLAN

**FOR:**

**BP AMERICA PRODUCTION COMPANY  
ATLANTIC B LS #7  
UNIT LETTER A, SECTION 34, TOWNSHIP 31N, RANGE 10W  
LATITUDE 36.860175 LONGITUDE -107.863775  
SAN JUAN COUNTY, NEW MEXICO  
API # 30-045-10190**

**PROJECT NO. 03143-0019**

**JUNE 2009**



June 24, 2009

Project No. 03143-0019

Mr. Brandon Powell  
New Mexico Oil Conservation Division  
1000 Rio Brazos Road  
Aztec, New Mexico 87401

Phone: (505) 320-0200

**RE: SUBSURFACE INVESTIGATION WORKPLAN FOR THE ATLANTIC B LS #7 WELL SITE,  
SAN JUAN COUNTY, NEW MEXICO**

Dear Mr. Powell,

Enclosed please find the *Subsurface Investigation Workplan* detailing proposed subsurface investigation activities at the Atlantic B LS #7 well site located in Section 34, Township 31N, Range 10W, San Juan County, New Mexico.

We appreciate the opportunity to be of service. If you have any questions or require additional information, please contact our office at (505) 632-0615.

Respectfully Submitted,  
**ENVIROTECH, INC.**

A handwritten signature in blue ink that reads 'Toni McKnight for'.

Toni McKnight, EIT  
Staff Geologist  
[tmcknight@envirotech-inc.com](mailto:tmcknight@envirotech-inc.com)

Enclosure: Subsurface Investigation Workplan  
Health and Safety Plan

Cc: Client File No. 03143

**SUBSURFACE INVESTIGATION  
WORKPLAN**

**SITE NAME:**

**BP AMERICA PRODUCTION COMPANY  
ATLANTIC B LS #7  
UNIT LETTER A, SECTION 34, TOWNSHIP 31N, RANGE 10W  
LATITUDE 36.860175 LONGITUDE -107.863775  
SAN JUAN COUNTY, NEW MEXICO  
API # 30-045-10190**

**SUBMITTED TO:**

**MR. BRANDON POWELL, NMOCD  
NEW MEXICO OIL CONSERVATION DIVISION  
1000 RIO BRAZOS ROAD  
AZTEC, NEW MEXICO 87410  
PHONE (505) 320-0200**

**SUBMITTED FOR:**

**MR. LARRY SCHLOTTERBACK  
BP AMERICA PRODUCTION COMPANY  
200 ENERGY COURT  
FARMINGTON, NEW MEXICO 87401  
(505) 326-9425**

**SUBMITTED BY:**

**ENVIROTECH, INC.  
5796 U.S. HIGHWAY 64  
FARMINGTON, NEW MEXICO 87401  
(505) 632-0615**

**PROJECT No. 03143-0064**

**JUNE 2009**

**SUBSURFACE INVESTIGATION  
WORKPLAN  
BP AMERICA PRODUCTION COMPANY  
ATLANTIC B LS #7  
API # 30-045-10190**

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## INTRODUCTION

Envirotech, Inc. has been retained by Mr. Larry Schlotterback, of BP America, to conduct a hydro-geological assessment at the Atlantic B LS #7 well site in San Juan County and to prepare a work plan for a subsurface investigation at the above referenced site. Subsurface investigation activities will begin on Tuesday, June 30, 2009. The site is located in the NE ¼ NE ¼ of Section 34, Township 31N, Range 10W, San Juan County, New Mexico; see **Figure 1, Vicinity Map**. On December 30, 2008, a meeting was conducted at the well site for concerns of residual soil contamination associated with previously closed production pits on the Atlantic B LS #7 well site. Attendees included Mr. Larry Schlotterback of BP America, Mr. Brandon Powell of the New Mexico Oil and Conservation Division (NMOCD), Envirotech, Inc. personnel, and the land owner.

On October 18, 2002, a pit located on the west side of the site was closed by Blagg Engineering, Inc; see **Figure 2, Site Map**. Blagg Engineering, Inc gave the site an NMOCD ranking score of 10 and NMOCD TPH closure standard of 1000 ppm. The well site was closed by Blagg Engineering, Inc. at 506 ppm TPH, 0.156 ppm benzene, and 6.57 ppm BTEX. The landowner's nearby water well, drilled in the fall of 1999, is < 200 feet from the Atlantic B LS #7 well site. The water well is approximately 156 feet west and 20 feet higher in elevation than the well site. This water well is not included in the iWATERS database. According to this data, the NMOCD site ranking would be 30 points and the closure standard would be decreased to 100 ppm. At the request of the landowner, Iina Ba Inc. conducted an investigation of the well site on October 3, 2008, taking samples from the pit located on the west side of the Atlantic B LS #7 well site. Samples were also taken from a pit on the Hart Canyon 34 #1 well site, owned and operated by Energen Resources, located west of the Atlantic B LS #7 well site. Samples were also taken from a pit located on the Atlantic B LS #18 well site located south-west of the Atlantic B LS #7 well site; see **Appendix A, Iina Ba Inc. Results**.

## HYDROGEOLOGIC SUMMARY

The Atlantic B LS #7 well site lies within the Blancot-Fruitland Association, which is a loamy material from 0-6 inches in depth and a sandy clay loam from 6-60 inches in depth. Its origins are from fan alluvium derived from sandstone and shale with a 0% to 8% slope; see **Appendix B, web soil survey (Natural Resources Conservation Service)**. Permeability of the soil is moderate to moderately rapid and water capacity is moderate to high. Runoff is slow to medium with water erosion slight to moderate. The Atlantic B LS #7 well site lies within the western edge of the San Juan Formation Aquifer which ranges from less than 200 feet in the west and south to nearly 2,700 feet in the basin center between Cuba and Gobernador (Frenzel, 1983).

The Atlantic B LS #7 well site is approximately 287 feet east of a second order ephemeral wash that flows into Hart Canyon toward the Animas River to the north-west. The depth to groundwater is approximately 120 feet from surface according to cathodic well protection documentation and nearby water wells. A cathodic well protection data sheet, accepted by OCD in May of 1991, states ground water was encountered at 120 feet; see **Appendix C, Cathodic**

**Protection Data Sheet.** The landowners well, approximately 156 feet west of the well site and 20 feet higher in elevation, was quoted by the landowner to be 120 feet to ground water. According to the landowner, an old capped-off watering well is located approximately 430 feet to the south-west of the well site where depth to groundwater is unknown. These wells are not in the iWATERS database. An additional water well located within 1000 feet of the well site, drilled in 2004, after the pit closure at Atlantic B LS #7, has depth to groundwater at 200 feet according to the iWATERS database; see *Appendix D, iWaters Point of Diversion Summary*. This well is approximately 393 feet to the north and 9 feet higher in elevation than the Atlantic B LS #7 well site.

### PURPOSE AND SCOPE OF SERVICES

The purpose of this work plan is to provide the methodology for subsurface investigation and remediation planning for NMOCD approval consisting of soil borings, on-site investigation activities, laboratory analysis, and reporting of on-site activities. Subsurface investigation activities will begin on Tuesday, June 30, 2009. The following scope of services has been designed to meet this objective.

- 1) Soil borings will be completed to determine the horizontal and vertical extents of contamination on-site. The anticipated depth of the borings, based on available information and pit depths, is 15 to 25 feet. Proposed soil borings will be located in the middle of each of the two pits located on west and south-east sides of the site and stepping out every five (5) feet north, south, east, and west until contamination extents are delineated. Proposed soil boring locations (PSB-1 through PSB-10) are shown on *Figure 2, Site Map*.
- 2) All soil boring samples will be screened in the field for organic vapors using a Photo-Ionization Detector (PID), and analyzed in the laboratory for BTEX using USEPA Method 8021 and TPH using USEPA Method 8015.
- 3) A report documenting the results of on-site activities will be prepared and submitted to the NMOCD for review and approval.

Envirotech, Inc. has reviewed available information regarding the site submitted to Mr. Brandon Powell, NMOCD Environmental Division. Based on the above information, this work plan has been prepared in conformance with the NMOCD, Guidelines for Remediation of Leaks, Spills, and Releases.

### WORKPLAN FOR SUBSURFACE INVESTIGATION

#### **Task 1: Project Management**

Sundry and diverse duties are associated with management, maintenance, and reporting. This includes project scheduling, conferencing with the NMOCD, BP America, and the landowner; work plan development, field and laboratory data review, management of operation and

maintenance, and review of all reports and specifications. Administrative and secretarial time is included for project file research and maintenance, as well as project administrative duties.

### **Task 2: Soil Borings**

- a. Soil borings will be completed to determine the horizontal and vertical extents of soil contamination on-site. One (1) soil boring will be placed in the center of each of the two pits located on the west and south-east sides of the site. One (1) boring will be located on each side to the north, south, east, and west of the center borings and step out every five (5) feet until the contamination extents are delineated. Soil borings will be advanced to a depth of approximately 15 feet using a power flighted auger. All drilling and sampling tools will be thoroughly decontaminated between samples. Field personnel will conduct field screening every three (3) feet to evaluate, describe, and record lithology, organic vapors, odor, and all observations pertinent to the geology of the site. Any contamination detected during screening activities will be noted and analyzed as appropriate. Proposed soil boring locations (PSB-1 through PSB-10) are shown on *Figure 2, Site Map*.
- b. Two (2) soil samples will be collected for laboratory analysis from each soil boring: one based on the highest headspace measurements and one from the total depth of the soil boring. Samples will be collected in 16 ounce or larger clean glass jars, sealed with clean aluminum foil, heated to approximately 60 degrees Fahrenheit to 80 degrees Fahrenheit for 5 to 10 minutes, and analyzed for organic vapors (OVs) in accordance with NMOCD guidelines. All samples will be preserved in a chilled, insulated cooler until delivered under chain of custody to the analyzing laboratory. Samples will be screened and analyzed in accordance with USEPA Method SW-846. Soil samples will be delivered under chain of custody to ESC Lab Sciences, 12065 Lebanon Rd, Mt. Juliet, Tennessee, for analysis of BTEX using USEPA Method 8021 and for analysis of TPH using USEPA Method 8015.
- c. If ground water is encountered during the characterization of the impacted soils, a sample will be obtained to assess potential impact on ground water quality in accordance with USEPA Method SW-846. Monitor wells may be required to further delineate and evaluate any residual contamination at the site.

### **Task 3: Groundwater Monitoring and Analysis**

If ground water is encountered, water samples will be taken and submitted to the laboratory for analysis for BTEX. Water levels will be measured prior to bailing each well. A minimum of three well volumes will be removed from each well prior to sampling, using a new disposable bailer. Conductivity, pH, and temperature will be measured and recorded. Samples will be collected in 40 ml VOA vials with Teflon closures, preserved with HgCL<sub>2</sub>, capped headspace free, labeled and stored on ice in an ice chest. Samples will be delivered under chain of custody to ESC Lab

Sciences, 12065 Lebanon Rd, Mt. Juliet, Tennessee, for analysis of BTEX using USEPA Method 8021 and for analysis of TPH using USEPA Method 8015.

#### **Task 4: Report Preparation**

A report will be prepared and submitted to the NMOCD upon completion of drilling and sampling activities. The report will address the methods and procedures, analytical results, and other information related to on-site activities. One copy of the report will be submitted to the NMOCD and one copy will be submitted to BP America Production Company. Administrative and secretarial time is included for report preparation assistance.

#### **CLOSURE AND LIMITATIONS**

The scope of Envirotech's services will be limited to project management, sampling, laboratory analysis, and reporting at the Atlantic B LS #7 well site located in the NE ¼ NE ¼ of Section 34, Township 31N, Range 10W, San Juan County, New Mexico. All work will be performed in accordance with accepted practices in geotechnical, environmental and petroleum engineering, and hydrogeology.

Envirotech, Inc. will not perform work beyond the Scope of Services outlined herein without first obtaining approval from the Responsible Party and the NMOCD Environmental Division.

The site will be assessed for potential risks, the need for remedial action, and if necessary, the level of cleanup required at the site, based on the Guidelines for Remediation of Leaks, Spills, and Releases.

The contractor is hired by and works directly for the owner/operator. The owner/operator is responsible to pay for all costs which result from the investigation or cleanup activities.

Respectfully Submitted,  
ENVIROTECH, INC.

  
Toni McKnight, EIT  
Staff Geologist  
[tmcknight@envirotech-inc.com](mailto:tmcknight@envirotech-inc.com)

Reviewed by:

  
Kyle P. Kerr, CHMM  
Senior Environmental Scientist/Manager  
[kpkerr@envirotech-inc.com](mailto:kpkerr@envirotech-inc.com)



**FIGURES**

**Figure 1, Vicinity Map**  
**Figure 2, Site Map**



Source: Aztec, New Mexico 7.5 Minute U.S.G.S. Topographic Quadrangle Map  
 Scale: 1:24,000 1" = 2,000'

BP America Production Company  
 Atlantic B LS #7  
 Sec. 34, Twn 31N, Rng. 10W  
 San Juan County, NM

**ENVIROTECH INC.**

ENVIRONMENTAL SCIENTISTS & ENGINEERS  
 5796 U.S. HIGHWAY 64  
 FARMINGTON, NEW MEXICO 87401  
 PHONE (505) 632-0615

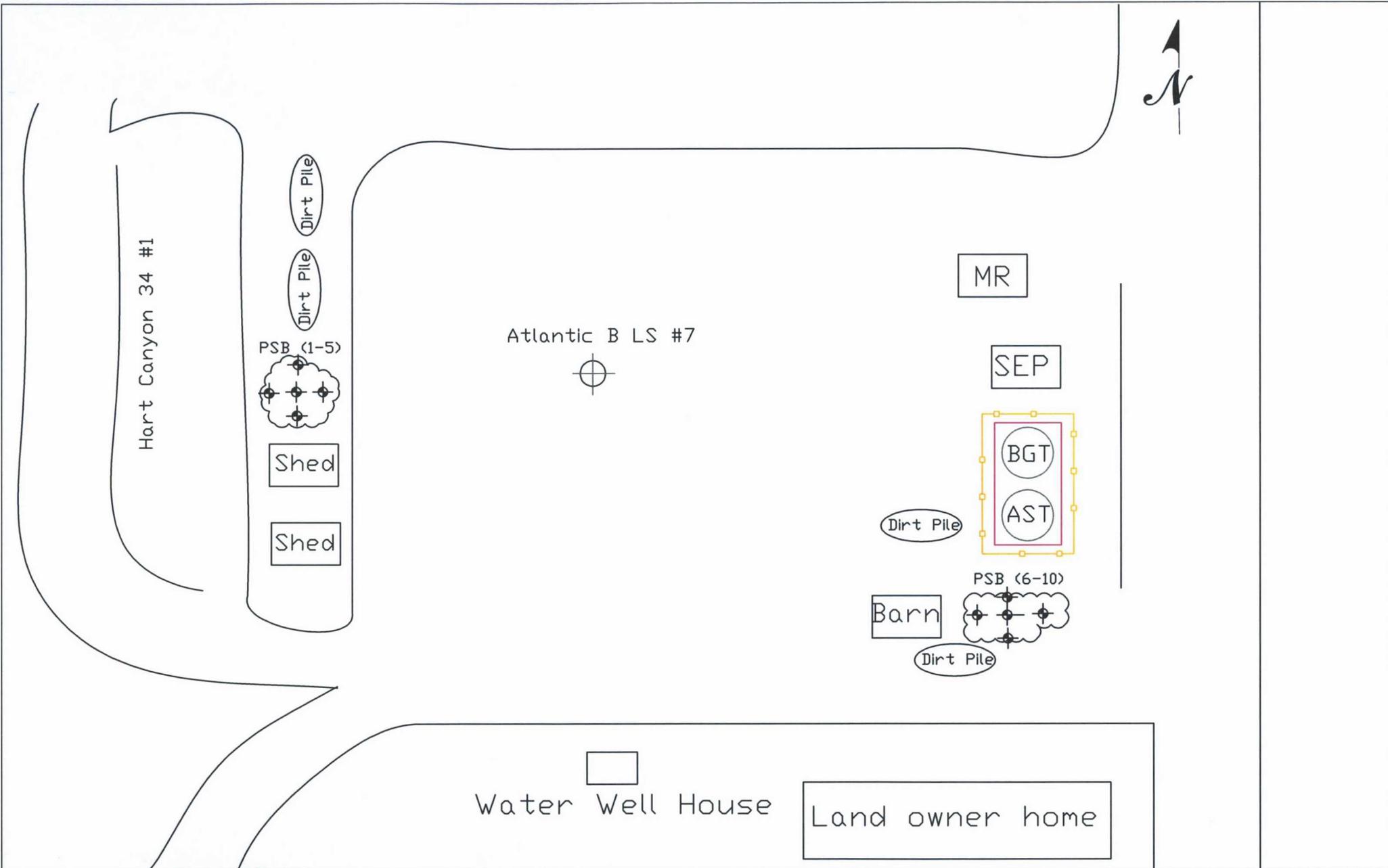
Vicinity Map

Figure 1

PROJECT No 03143-0019 Date Drawn: 6/24/09

DRAWN BY:  
 Rachel Nielsen

PROJECT MANAGER:  
 Kyle P. Kerr



LEGEND	
	PROPOSED BORING LOCATION
	WELL HEAD
	APPROXIMATE LOCATION OF OLD PITS
	Dirt Piles

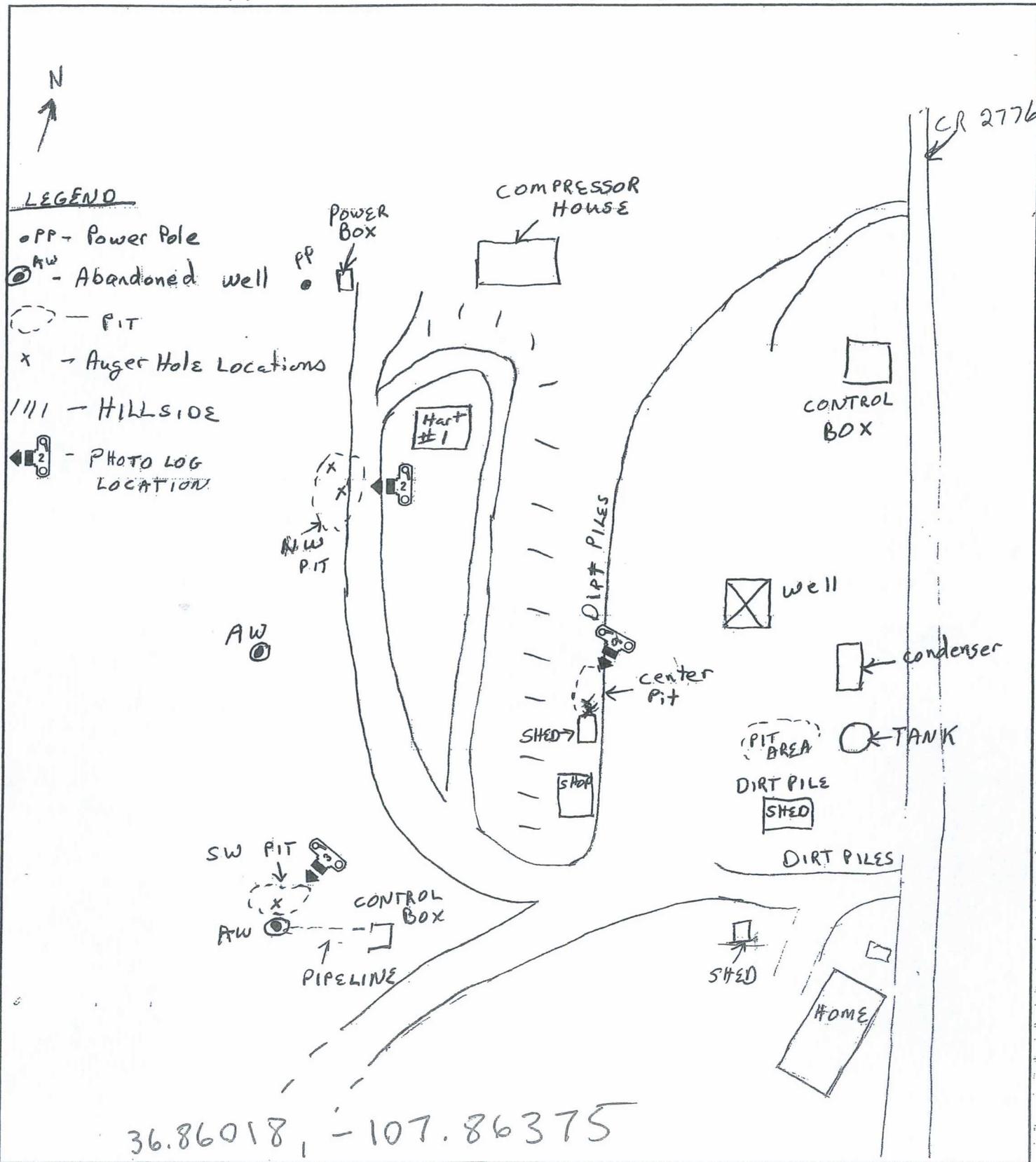
ATLANTIC B LS #7 SECTION 34, TOWNSHIP 31N, RANGE 10W SAN JUAN COUNTY, NEW MEXICO	
REVISIONS	PROJECT NO. 03143-0019
BY _____ DATE _____	
BY _____ DATE _____	

**ENVIROTECH INC.**  
 ENVIRONMENTAL SCIENTISTS & ENGINEERS  
 5796 U.S. HIGHWAY 64  
 FARMINGTON, NEW MEXICO 87401  
 (505) 632-0615

SITE MAP			
DATE	1/09/2009	DRAWN	TLM
SCALE	NTS	APPROVED	KPK
			FIGURE 2

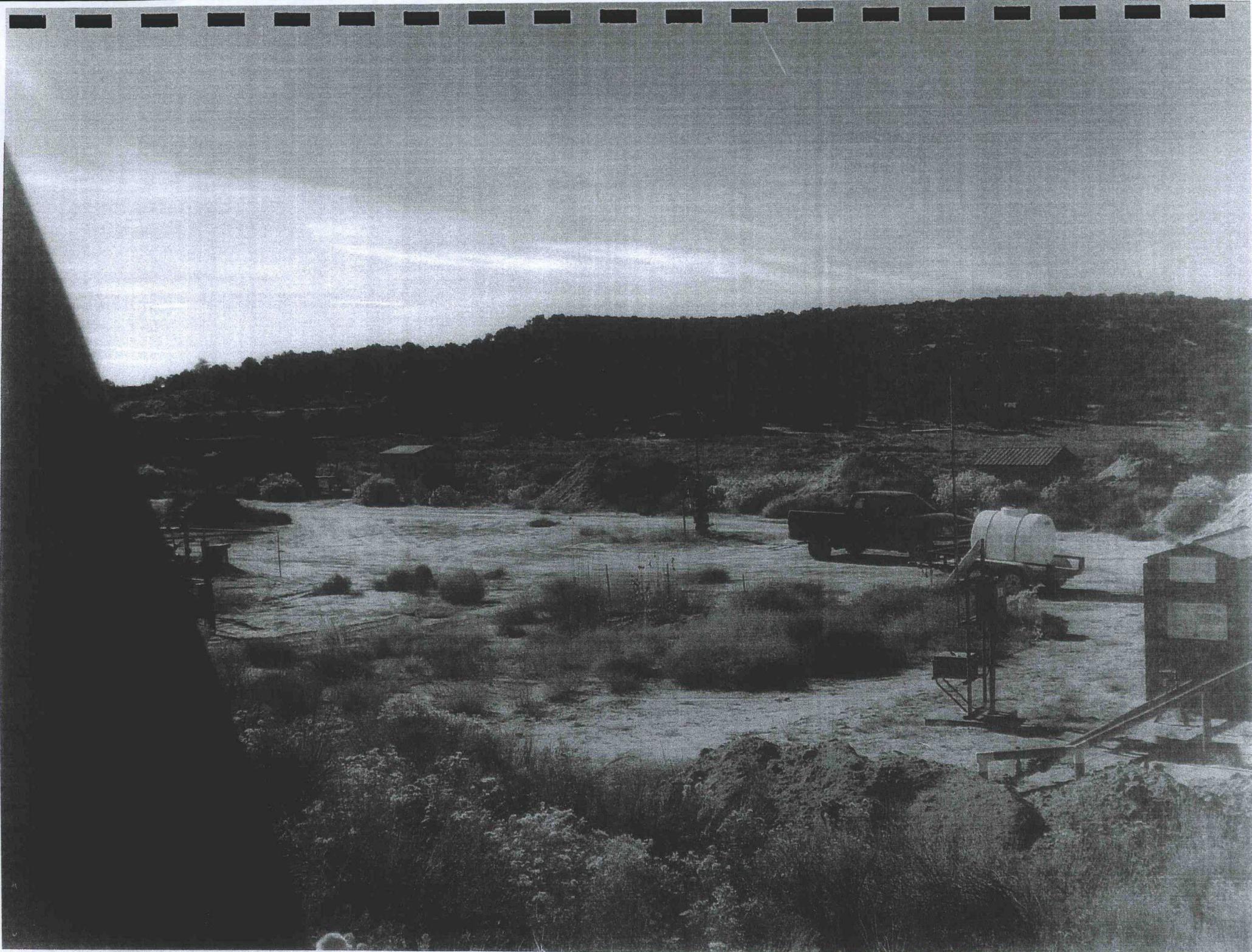
**APPENDIX A**

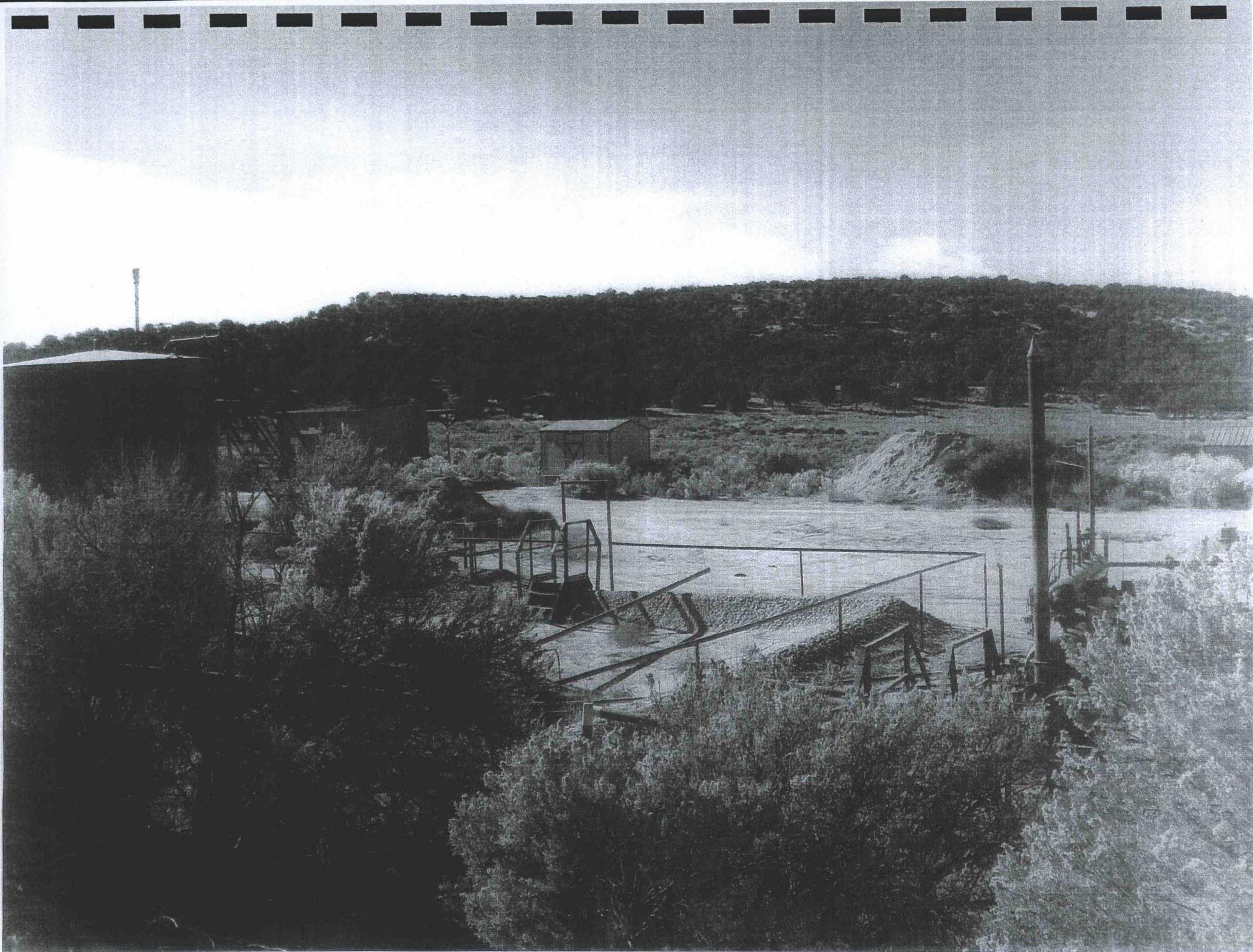
**Iina Ba Inc. Survey**

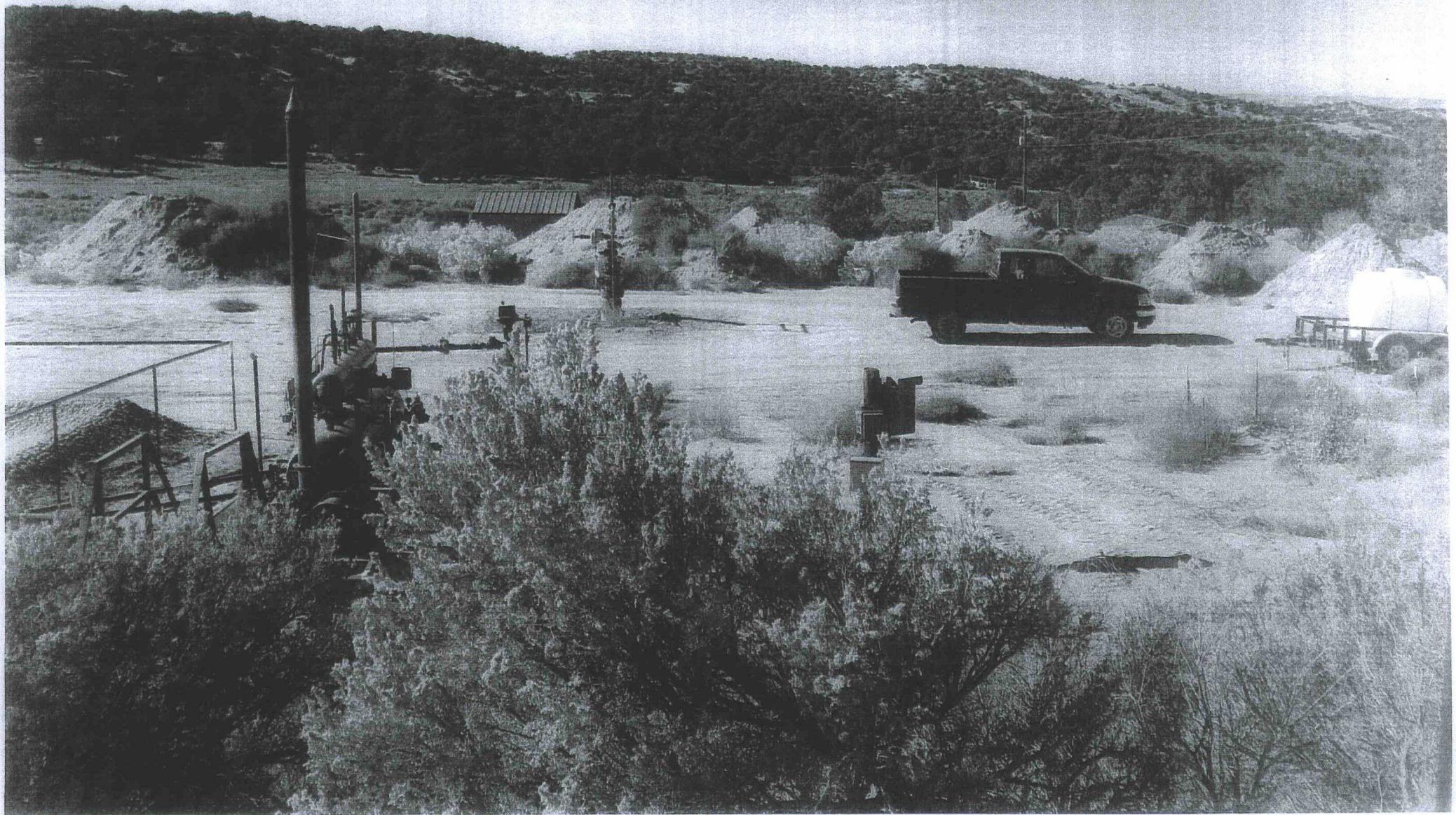


36.86018, -107.86375

01433 01439 23







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

Form C-144  
June 1, 2004

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

For drilling and production facilities, submit to appropriate NMOCD District Office.  
For downstream facilities, submit to Santa Fe office

Pit or Below-Grade Tank Registration or Closure

Is pit or below-grade tank covered by a "general plan"? Yes  No

Type of action: Registration of a pit or below-grade tank  Closure of a pit or below-grade tank

Operator: BP America Production Company Telephone: (505)326-9200 e-mail address: \_\_\_\_\_

Address: 200 Energy Ct. Farmington, NM 87401

Facility or well name: Atlantic B LS#7 API #: 300KS 10190 U/L or Qtr/Qtr A Sec 34N T 31 R 10W

County: San Juan Latitude \_\_\_\_\_ Longitude \_\_\_\_\_ NAD: 1927  1983

Surface Owner: Federal  State  Private  Indian

Pit

Type: Drilling  Production  Disposal

Workover  Emergency

Lined  Unlined

Liner type: Synthetic  Thickness \_\_\_\_\_ mil Clay

Pit Volume \_\_\_\_\_ bbl

Below-grade tank

Volume: \_\_\_\_\_ bbl Type of fluid: \_\_\_\_\_

Construction material: \_\_\_\_\_

Double-walled, with leak detection? Yes  If not, explain why not. \_\_\_\_\_

Depth to ground water (vertical distance from bottom of pit to seasonal high water elevation of ground water.)

Less than 50 feet	(20 points)
50 feet or more, but less than 100 feet	(10 points)
100 feet or more	( 0 points)

Wellhead protection area: (Less than 200 feet from a private domestic water source, or less than 1000 feet from all other water sources.)

Yes	(20 points)
No	( 0 points)

Distance to surface water: (horizontal distance to all wetlands, playas, irrigation canals, ditches, and perennial and ephemeral watercourses.)

Less than 200 feet	(20 points)
200 feet or more, but less than 1000 feet	(10 points)
1000 feet or more	( 0 points)

Ranking Score (Total Points)

This is a pit closure: (1) Attach a diagram of the facility showing the pit's relationship to other equipment and tanks. (2) Indicate disposal location: (check the onsite box if you are burying in place) onsite  offsite  If offsite, name of facility \_\_\_\_\_ (3) Attach a general description of remedial action taken including remediation start date and end date. (4) Groundwater encountered: No  Yes  If yes, show depth below ground surface \_\_\_\_\_ ft. and attach sample results.

Attach soil sample results and a diagram of sample locations and excavations.

Additional Comments:

See Attached Documentation

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

Date: 11/01/2005

Printed Name/Title Jeffrey C. Blagg, Agent Signature Jeffrey C. Blagg

Your certification and NMOCD approval of this application/closure does not relieve the operator of liability should the contents of the pit or tank contaminate ground water or otherwise endanger public health or the environment. Nor does it relieve the operator of its responsibility for compliance with any other federal, state, or local laws and/or regulations.

Approval: DEPUTY OIL & GAS INSPECTOR, DIST. #8

Printed Name/Title \_\_\_\_\_ Signature Brenda Pelt

Date: DEC 19 2005

VUL

CLIENT: <u>BP</u>	<b>BLAGG ENGINEERING, INC.</b> P.O. BOX 87, BLOOMFIELD, NM 87413 (505) 632-1199	LOCATION NO: <u>B1080</u> COCR NO: <u>10273</u>
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**FIELD REPORT: PIT CLOSURE VERIFICATION** PAGE No: 1 of 1

LOCATION: NAME: <u>ATLANTIC &amp; LS</u> WELL#: <u>7</u> TYPE: <u>DEHY/SEP.</u> QUAD/UNIT: <u>A</u> SEC: <u>34</u> TWP: <u>31N</u> RNG: <u>10W</u> PM: <u>NM</u> CNTY: <u>ST</u> ST: <u>NM</u> QTR/FOOTAGE: <u>790'N/790'E</u> NE/SE CONTRACTOR: <u>FLINT (CORWELL)</u>	DATE STARTED: <u>10/18/02</u> DATE FINISHED: _____ ENVIRONMENTAL SPECIALIST: <u>NV</u>
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EXCAVATION APPROX. 15 FT. x 17 FT. x 10 FT. DEEP. CUBIC YARDAGE: 60

DISPOSAL FACILITY: CRONCH MESA FACILITY REMEDIATION METHOD: LANDFARM

LAND USE: RANGE - BLM <sup>SURFACE</sup> USE - RELEASE: 5F080917 FORMATION: MV

FIELD NOTES & REMARKS: PIT LOCATED APPROXIMATELY 99 FT. S35W FROM WELLHEAD.

DEPTH TO GROUNDWATER: >100' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER: <1000'

NMOCB RANKING SCORE: 10 NMOCB TPH CLOSURE STD: 1000 PPM

SOIL AND EXCAVATION DESCRIPTION: ELEV. 6400

OVM CALIB. READ. = <u>54.2</u> ppm
OVM CALIB. GAS = <u>100</u> ppm RF = <u>0.52</u>
TIME: <u>9:47</u> @/PM DATE: <u>10/18/02</u>

SOIL TYPE: (SAND) SILTY SAND / SILT / SILTY CLAY / CLAY / GRAVEL / OTHER \_\_\_\_\_

SOIL COLOR: LT. MED. TO MED. GRAY

COHESION (ALL OTHERS): (NON COHESIVE) / SLIGHTLY COHESIVE / COHESIVE / HIGHLY COHESIVE

CONSISTENCY (NON COHESIVE SOILS): (LOOSE) / (FIRM) / DENSE / VERY DENSE

PLASTICITY (CLAYS): NON PLASTIC / SLIGHTLY PLASTIC / COHESIVE / MEDIUM PLASTIC / HIGHLY PLASTIC

DENSITY (COHESIVE CLAYS & SILTS): SOFT / FIRM / STIFF / VERY STIFF / HARD (CLOSED)

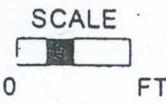
MOISTURE: DRY / (SLIGHTLY MOIST) / (MOIST) / WET / SATURATED / SUPER SATURATED

DISCOLORATION/STAINING OBSERVED: YES / NO EXPLANATION: EXCAVATION (3-12 FT. BELOW GRADE w/ EXCAVATION)

HC ODOR DETECTED: YES / NO EXPLANATION: EXCAVATION & OVM SAMPLE

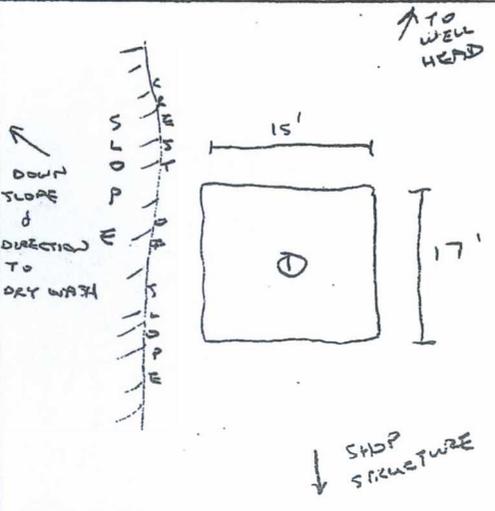
SAMPLE TYPE: (GRAB) COMPOSITE - # OF PTS. \_\_\_\_\_

ADDITIONAL COMMENTS: WATER WELL UP GRADIENT (SSE DIRECTION) APPROX. 130 FT. LANDOWNER (KATIE DALSTROM (SP.)) INDICATED SUBMERSIBLE PUMP SET APPROX. 175 FT. BELOW GROUND.  
BEDROCK ENCOUNTERED  
BEDROCK OUTCROPS OBSERVED NNE & SSE OF WELL PAD, SEE ATTACHED BOREHOLE LOG SHEET



FIELD 418.1 CALCULATIONS							
SAMP. TIME	SAMP. ID	LAB NO.	WEIGHT (g)	mL FREON	DILUTION	READING	CALC. (ppm)

PIT PERIMETER



OVM READING

SAMPLE ID	FIELD HEADSPACE (ppm)
1 @ 12'	334
2 @	
3 @	
4 @	
5 @	

PIT PROFILE

NOT APPLICABLE

SAMPLE ID	ANALYSIS	TIME
① 212	TPH (80158)	0932
"	BTEX (80218)	"
<u>(BOTH PASSED)</u>		

P.D. = PIT DEPRESSION; B.G. = BELOW GRADE; B = BELOW T.H. = TEST HOLE; - = APPROX.; T.B. = TANK BOTTOM

TRAVEL NOTES: CALLOUT: 10/18/02 - MORN. ONSITE: 10/19/02 - MORN.

# BLAGG ENGINEERING, Inc.

P.O. BOX 87  
BLOOMFIELD, NM 87413  
(505) 632-1199

## BORE / TEST HOLE REPORT

BORING #.....	BH - 1
MW #.....	-
PAGE #.....	1
DATE STARTED	10/23/02
DATE FINISHED	-
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT:	<b>BP AMERICA PRODUCTION COMPANY</b>
LOCATION NAME:	<b>ATLANTIC B LS #7 UNIT A, SEC. 34, T31N, R10W</b>
CONTRACTOR:	<b>BLAGG ENGINEERING, INC.</b>
EQUIPMENT USED:	<b>EARTHPROBE 200</b>
BORING LOCATION:	<b>99 FEET, S35W FROM WELL HEAD.</b>

DEPTH (FT.)	INTERVAL	LITHOLOGY INTERVAL	OVM READINGS (ppm)	FIELD CLASSIFICATION AND REMARKS
				GROUND SURFACE
2				<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">                     Upon completion of boring &amp; sampling, inserted 2 inch PVC piping for passive venting - casing from 3 ft. above grade to 5.5 ft. below grade, 0.010 slotted screen between 5.5 to 35.5 feet below grade, sand packed annular to 1 ft. below grade, then bentonite powdered to surface. Wind generated turbine placed on top of casing.                 </div> BACKFILL MATERIAL - PALE ORANGE SAND TO SILTY SAND ( 0 - 10 FT. BELOW GRADE).
4				
6				
8				
10				
12			334	
14				
16				
18				
20				
22				SAMPLE 1 @ 12 FT. - CONDUCTED DURING SOIL REMOVAL ON 10/18/02; TIME COLLECTED 0932, TPH = <b>1,140</b> ppm; Benzene = <b>156</b> ppb; Total BTEX = <b>6,570</b> ppb (see Pit Closure Field Report for additional information).  MEDIUM TO DARK GRAY SAND, NON COHESIVE, MOIST, STRONG HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS ( 10 - 23 FT. BELOW GRADE).
24				
26				
28			1,605	
30				
32				
34				
36				
38				
40				
42				BH1 @ 28 FT. - CONDUCTED DURING DRILLING ON 10/23/02; TIME COLLECTED 0943, TPH = <b>506</b> ppm; Benzene = <b>21.7</b> ppb; Total BTEX = <b>5,870</b> ppb.  DARK GRAY TO BLACK SAND, NON COHESIVE, SLIGHTLY MOIST TO MOIST, HC ODOR DETECTED WITHIN CUTTINGS ( 23 - 35 FT. BELOW GRADE).  DARK GRAY TO BLACK SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, DENSE, HC ODOR PHYSICALLY DETECTED WITHIN CUTTINGS ( 35 - 37 FT. BELOW GRADE). POSSIBLY BEDROCK OR CLAYSTONE - DARK GREENISH GRAY, DENSE TO HARD, BECOMING MORE COMPETENT @ 37 TO 38 FT. BELOW GRADE.
44				
46				
48				
50				
52				
54				
56				
58				
60				

NOTES:

- SAND TO SILTY SAND.
- BEDROCK OR VERY HARD CLAY.
- OVM - organic vapor meter or PID (photoionization detector).
- ppm - parts per million.
- ppb - parts per billion.
- TPH - total petroleum hydrocarbons (US Epa modified method 8015B).
- BTEX - benzene, toluene, ethylbenzene, & total xylenes.

**OVM CALIBRATION:**

54.2 ppm; RF = 0.52  
(RF = response factor).  
100 ppm calibration gas  
- isobutylene.  
Date - 10/23/02.  
Time - 0943.

# ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

## EPA METHOD 8015 Modified Nonhalogenated Volatile Organics Total Petroleum Hydrocarbons

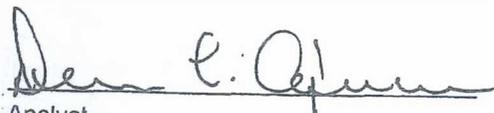
Client:	Blagg / BP	Project #:	94034-010
Sample ID:	1 @ 12'	Date Reported:	10-22-02
Laboratory Number:	24067	Date Sampled:	10-18-02
Chain of Custody No.:	10273	Date Received:	10-18-02
Sample Matrix:	Soil	Date Extracted:	10-18-02
Preservative:	Cool	Date Analyzed:	10-22-02
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	1,010	0.2
Diesel Range (C10 - C28)	134	0.1
Total Petroleum Hydrocarbons	1,140	0.2

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Atlantic B LS #7 Dehydrator / Separator Pit Grab Sample.

  
Analyst

  
Review

# ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

## EPA METHOD 8021 AROMATIC VOLATILE ORGANICS

Client:	Blagg / BP	Project #:	94034-010
Sample ID:	1 @ 12'	Date Reported:	10-22-02
Laboratory Number:	24067	Date Sampled:	10-18-02
Chain of Custody:	10273	Date Received:	10-18-02
Sample Matrix:	Soil	Date Analyzed:	10-22-02
Preservative:	Cool	Date Extracted:	10-18-02
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	156	1.8
Toluene	774	1.7
Ethylbenzene	849	1.5
p,m-Xylene	3,210	2.2
o-Xylene	1,580	1.0
<b>Total BTEX</b>	<b>6,570</b>	

ND - Parameter not detected at the stated detection limit.

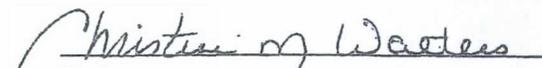
Surrogate Recoveries:	Parameter	Percent Recovery
	Fluorobenzene	94 %
	1,4-difluorobenzene	94 %
	Bromochlorobenzene	94 %

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Atlantic B LS #7 Dehydrator / Separator Pit Grab Sample.

  
Analyst

  
Review

# ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

## EPA METHOD 8015 Modified Nonhalogenated Volatile Organics Total Petroleum Hydrocarbons

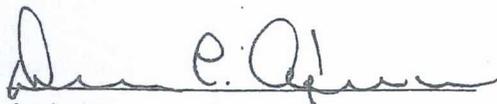
Client:	Blagg / BP	Project #:	94034-010
Sample ID:	BH 1 @ 29'	Date Reported:	10-24-02
Laboratory Number:	24084	Date Sampled:	10-23-02
Chain of Custody No.:	10276	Date Received:	10-23-02
Sample Matrix:	Soil	Date Extracted:	10-24-02
Preservative:	Cool	Date Analyzed:	10-24-02
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	355	0.2
Diesel Range (C10 - C28)	151	0.1
Total Petroleum Hydrocarbons	506	0.2

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Atlantic B LS #7 Dehydrator/Separator Pit Grab Sample.

  
Analyst

  
Review

# ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

## EPA METHOD 8021 AROMATIC VOLATILE ORGANICS

Client:	Blagg / BP	Project #:	94034-010
Sample ID:	BH 1 @ 29'	Date Reported:	10-24-02
Laboratory Number:	24084	Date Sampled:	10-23-02
Chain of Custody:	10276	Date Received:	10-23-02
Sample Matrix:	Soil	Date Analyzed:	10-24-02
Preservative:	Cool	Date Extracted:	10-24-02
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	21.7	1.8
Toluene	618	1.7
Ethylbenzene	640	1.5
p,m-Xylene	3,160	2.2
o-Xylene	1,430	1.0
<b>Total BTEX</b>	<b>5,870</b>	

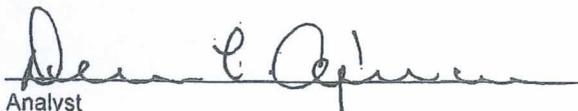
ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Fluorobenzene	99 %
	1,4-difluorobenzene	99 %
	Bromochlorobenzene	99 %

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Atlantic B LS #7 Dehydrator/Separator Pit Grab Sample.

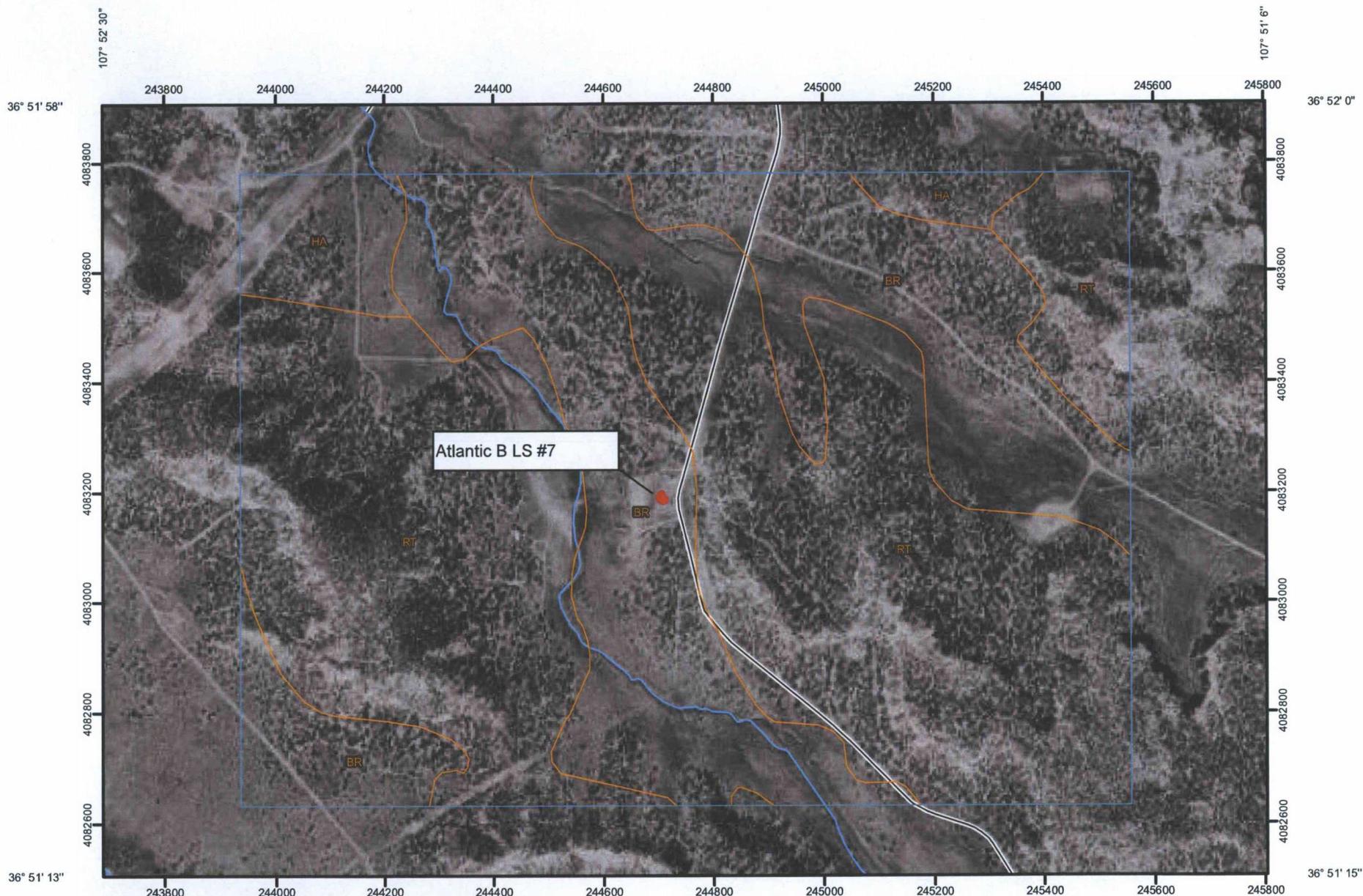
  
Analyst

  
Review

**APPENDIX B**

**Web Soil Survey**

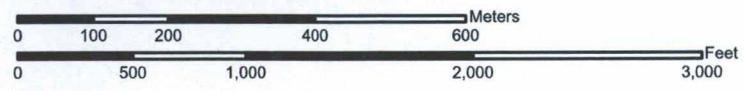
Soil Map—San Juan County, New Mexico, Eastern Part



107° 52' 29"



Map Scale: 1:10,000 if printed on A size (8.5" x 11") sheet.



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

 Soil Map Units

**Special Point Features**

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other

**Special Line Features**

-  Gully
-  Short Steep Slope
-  Other

**Political Features**

 Cities

**Water Features**

-  Oceans
-  Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### MAP INFORMATION

Map Scale: 1:10,000 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:63,360.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 13N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Juan County, New Mexico, Eastern Part  
 Survey Area Data: Version 8, Dec 9, 2008

Date(s) aerial images were photographed: 10/9/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

San Juan County, New Mexico, Eastern Part (NM618)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BR	Blancot-Fruitland association, gently sloping	161.4	35.1%
HA	Haplargids-Blackston-Torriorthents complex, very steep	23.2	5.0%
RT	Rock outcrop-Travessilla-Weska complex, extremely steep	275.1	59.8%
<b>Totals for Area of Interest</b>		<b>459.6</b>	<b>100.0%</b>



## San Juan County, New Mexico, Eastern Part

### BR—Blancot-Fruitland association, gently sloping

#### Map Unit Setting

*Elevation:* 4,800 to 6,400 feet  
*Mean annual precipitation:* 6 to 10 inches  
*Mean annual air temperature:* 51 to 55 degrees F  
*Frost-free period:* 140 to 160 days

#### Map Unit Composition

*Blancot and similar soils:* 45 percent  
*Fruitland and similar soils:* 25 percent

#### Description of Blancot

##### Setting

*Landform:* Fan remnants  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Fan alluvium derived from sandstone and shale

##### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Gypsum, maximum content:* 1 percent  
*Maximum salinity:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 2.0  
*Available water capacity:* High (about 10.1 inches)

##### Interpretive groups

*Land capability (nonirrigated):* 6c  
*Ecological site:* Loamy (R035XB001NM)

##### Typical profile

*0 to 6 inches:* Loam  
*6 to 60 inches:* Sandy clay loam

#### Description of Fruitland

##### Setting

*Landform:* Fan remnants  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Fan alluvium derived from sandstone and shale

**Properties and qualities**

*Slope:* 0 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* High (2.00  
to 6.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 2 percent

*Gypsum, maximum content:* 1 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/  
cm)

*Available water capacity:* Moderate (about 7.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3e

*Land capability (nonirrigated):* 7e

*Ecological site:* Sandy (R035XB002NM)

**Typical profile**

*0 to 8 inches:* Sandy loam

*8 to 60 inches:* Sandy loam

**Data Source Information**

Soil Survey Area: San Juan County, New Mexico, Eastern Part

Survey Area Data: Version 8, Dec 9, 2008

**APPENDIX C**

**Cathodic Protection Data Sheet**

7-30-045-10190  
18-30-045-22780

DATA SHEET FOR DEEP GROUND BED CATHODIC PROTECTION WELLS  
NORTHWESTERN NEW MEXICO  
(Submit 3 copies to OCD Aztec Office)

Operator TENNECO Location: Unit NE Sec 34 Twp 31 Rng 10

Name of Well/Wells or Pipeline Serviced ATLANTIC B #7, #18

cps 336w

Elevation 6298' Completion Date 5/16/72 Total Depth 300' Land Type\* N/A

Casing, Sizes, Types & Depths N/A

If Casing is cemented, show amounts & types used N/A

If Cement or Bentonite Plugs have been placed, show depths & amounts used

N/A

Depths & thickness of water zones with description of water when possible:

Fresh, Clear, Salty, Sulphur, Etc. 120'

RECEIVED

MAY 31 1991

Depths gas encountered: N/A

OIL CON DIST

Type & amount of coke breeze used: 5900 lbs.

Depths anodes placed: 260', 250', 225', 215', 205', 175', 155', 140', 130', 120'

Depths vent pipes placed: N/A

Vent pipe perforations: 260'

Remarks: gb #2 not a MERIDIAN well.

If any of the above data is unavailable, please indicate so. Copies of all logs, including Drillers Log, Water Analyses & Well Bore Schematics should be submitted when available. Unplugged abandoned wells are to be included.

\*Land Type may be shown: F-Federal; I-Indian; S-State; P-Fee.  
If Federal or Indian, add Lease Number.

7- 30-045-10190  
18- 30-045-22780

DATA SHEET FOR DEEP GROUND BED CATHODIC PROTECTION WELLS  
NORTHWESTERN NEW MEXICO  
(Submit 3 copies to OCD Aztec Office)

Operator TENNECO Location: Unit NE Sec. 34 Twp 31 Rng 10

Name of Well/Wells or Pipeline Served ATLANTIC B #7, #18

cps 336w

Elevation 6298' Completion Date 6/4/63 Total Depth 140' Land Type\* N/A

Casing, Sizes, Types & Depths N/A

If Casing is cemented, show amounts & types used N/A

If Cement or Bentonite Plugs have been placed, show depths & amounts used  
N/A

Depths & thickness of water zones with description of water when possible:  
Fresh, Clear, Salty, Sulphur, Etc. N/A

Depths gas encountered: N/A

Type & amount of coke breeze used: 1200 lbs.

Depths anodes placed: 106', 100', 90', 84', 78', 72', 18'

Depths vent pipes placed: N/A

Vent pipe perforations: N/A

Remarks: qb #1 not a MERIDIAN well.

**RECEIVED**  
MAY 31 1991  
OIL CON. DIST.

If any of the above data is unavailable, please indicate so. Copies of all logs, including Drillers Log, Water Analyses & Well Bore Schematics should be submitted when available. Unplugged abandoned wells are to be included.

\*Land Type may be shown: F-Federal; I-Indian; S-State; P-Fee.  
If Federal or Indian, add Lease Number.

**APPENDIX D**

**Groundwater Statement  
Water Well Map  
iWaters Point of Diversion Summary**

### Atlantic B LS #7 Groundwater Statement

The attached iWATERS database search and topographic map shows a water well approximately 298 feet east of the Atlantic B LS #7 well site with a depth to groundwater of 200 feet. This water well is labeled on the topographic map with a red flag. As illustrated on the attached topographical map, the water well is at an elevation approximately 31 feet higher than the Atlantic B LS #7 well site, which is represented by a blue point on the topographic map. The attached cathodic well data sheet from a cathodic well drilled at the Atlantic B LS #7 well site shows that ground water was encountered at 120 feet. This cathodic data sheet was received by the OCD in May of 1991. The soil type at the Atlantic B LS #7 well site is the Blancot-Fruitland. The soil is loam from 0 inches to 6 inches in depth and sandy clay loam from 6 inches to 60 inches in depth which comes from fan alluvium derived from sandstone and shale with a 0% to 8% slope per the attached soils map from the United States Department of Agriculture. Permeability of the soil is moderate to moderately rapid and water capacity is moderate to high. Runoff is slow to medium with water erosion slight to moderate. The nearest wash is 287 feet west of the Atlantic B LS #7 well site with flow to the north-west at an elevation of approximately 6,267 feet towards the Animas River. This wash is a second order tributary to Hart Canyon which flows into the Animas River. Atlantic B LS #7 well site lies in the San Jose Formation aquifer which has an overall dip of 5 degrees to the south-east (Frenzel, 1983). Locally the San Jose Aquifer flows to the north-west dipping towards the Animas River Valley; see map for surface flow and hydrology direction. The San Jose Formation ranges from less than 200 feet in the west and south to nearly 2,700 feet in the basin center between Cuba and Gobernador (Frenzel, 1983). All above information was confirmed, excluding the aquifer dip, by a visual inspection during a site assessment performed by Envirotech personnel.

The **San Jose Formation (Tsj)** is the youngest Tertiary unit in the San Juan Basin and was named by Simpson (1948, p. 277-283). It is of early Eocene age and as early as 1875 was correlated with the Wasatch Formation in Wyoming. The San Jose is the surface formation in the eastern two-thirds of the San Juan Basin. Although largely exposed in New Mexico, the San Jose also straddles the New Mexico/Colorado State boundaries. It outcrops in its west, south and northeast boundaries in a broad, and in some places irregular, southeasterly trending band in the Blanco Canyon to Largo Canyon area. On the east side, it rises structurally and outcrops in a narrow band along the west face of the Nacimiento Uplift forming the eastern boundary of the San Juan Basin. There are several smaller, isolated remnants of the San Jose Formation west of the central exposure. The San Jose has eroded deeply in some areas and because of differential resistance to erosion of its various sandstone and shale units, produces a large thickness variance and in some places formation of very rugged topographic expression (Baltz, 1967, p. 45). In some places it erodes to horseshoe-shaped badlands and massive cliffs. The San Jose overlays the nonresistant slope-forming Nacimiento Formation (Tn). Thickness of the San Jose ranges from less than 200' at the outcrop on the west and south sides to almost 2700 feet in the the Basin center (Stone, etal, p. 25). The thickness is 1300' or less on the southern part of the Tapicitos Plateau where the San Jose structurally rises and its upper beds are eroded. In the Largo Plains area (Largo Canyon) which marks the western exposure of the preserved San Jose, more than half of the Formation was removed by erosion (Baltz, p. 46). The San Jose Formation contact is that of an angular

unconformity surface with the underlying Paleocene-age Nacimiento Formation near the Nacimiento Uplift, but is slightly disconformable to conformable in the Basin center (Stone, etal, p. 25).

The San Jose Formation is comprised of four identifiable rock facies (in ascending order) called the Cuba Mesa, the Regina, the Llaves and the Tapicitos Members. These four members are only present in the far eastern part of the basin (Brimhall, 1973, p. 198). Within the preserved area, only the Cuba Mesa and Regina are widespread throughout the basin. The oldest Member of the San Jose is the Cuba Mesa (150-800 feet thick), which is largely a massive cliff-forming buff and yellow, rusty-weathering cross-bedded arkosic coarse-grained sandstone with lenticular reddish, green and gray shale beds (Baltz, p. 46). The Cuba Mesa is overlain in the southern two-thirds of the area by drab-colored variegated shale and interbedded soft to hard sandstones known as the Regina Member (100 to 1700 feet thick) and overlain in the northern one-third by a thick sequence of sandstone called the Llaves (50 to 1300 feet thick) which in turn intertongues and grades southward into the Regina. In the northeastern part of the area, the upper Llaves Member grades southward and westward into the red silty mudstones, siltstones and interbedded poorly consolidated sandstones of the Tapicitos Member (120-500 feet thick) (Stone, etal, p. 25).

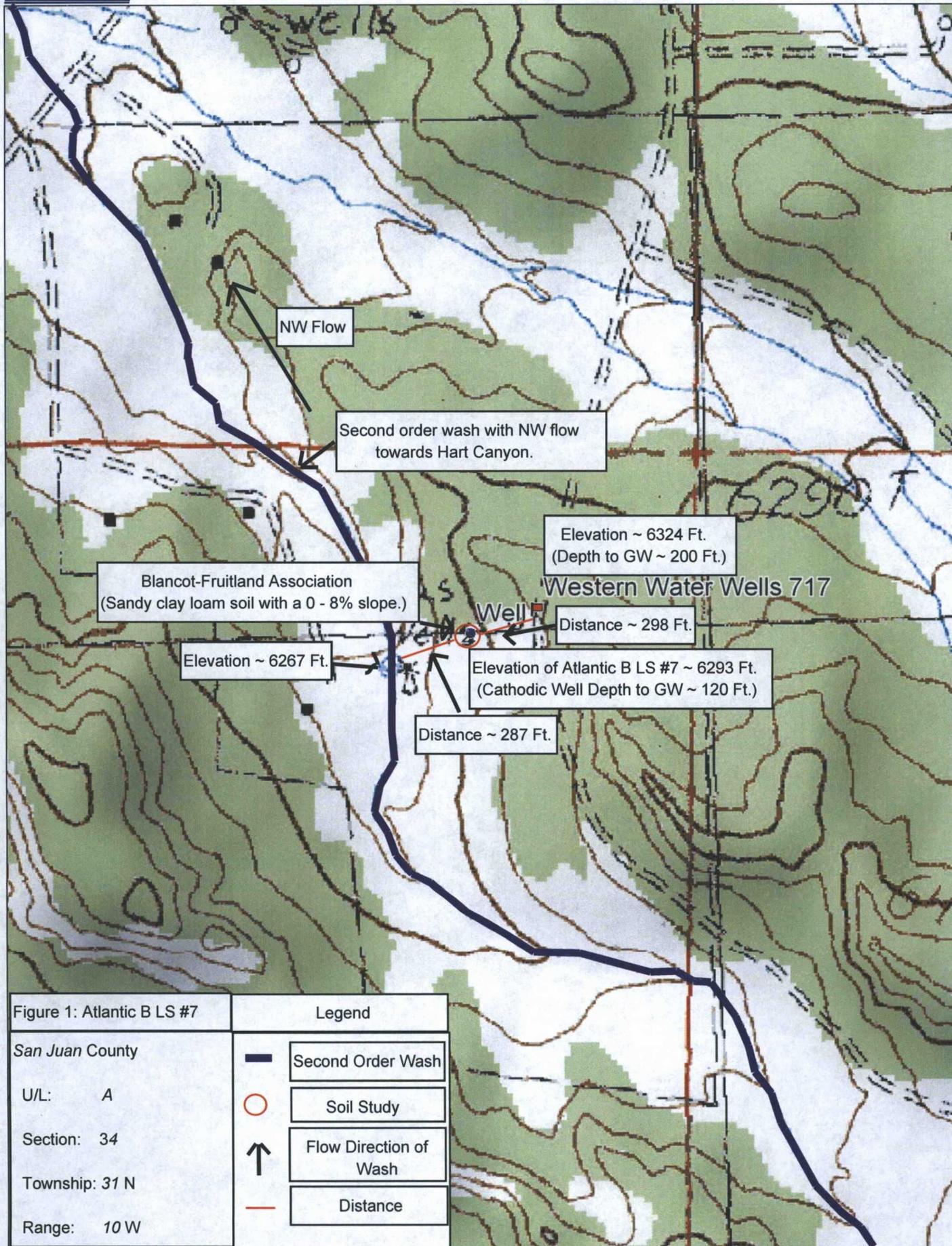


Figure 1: Atlantic B LS #7

San Juan County

U/L: A

Section: 34

Township: 31 N

Range: 10 W

Legend	
	Second Order Wash
	Soil Study
	Flow Direction of Wash
	Distance

*New Mexico Office of the State Engineer*  
**Point of Diversion Summary**

---

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are biggest to smallest)

POD Number                                  Tws   Rng   Sec   q   q   q   Zone   X   Y  
SJ 03387                                    31N   10W   34   2   2   1

Driller Licence: 717 WESTERN WATER WELLS                                  Source: Shallow  
Driller Name: HOOD, TERRY    Drill Finish Date: 02/08/2004  
Drill Start Date: 02/07/2004    PCW Received Date:  
Log File Date: 02/13/2004    Pipe Discharge Size:  
Pump Type:    Estimated Yield: 8  
Casing Size: 4.5    Depth Water: 200  
Depth Well: 250

Water Bearing Stratifications:	Top	Bottom	Description
	200	250	Sandstone/Gravel/Conglomer
Casing Perforations:	Top	Bottom	
	190	250	

---

*New Mexico Office of the State Engineer*  
**Point of Diversion Summary**

Back

(quarters are 1=NW 2=NE 3=SW 4=SE)  
 (quarters are biggest to smallest)

<b>POD Number</b>	<b>Tws</b>	<b>Rng</b>	<b>Sec</b>	<b>q</b>	<b>q</b>	<b>q</b>	<b>Zone</b>	<b>X</b>	<b>Y</b>
SJ 01480	31N	10W	34	2	1				

<b>Driller Licence:</b> 725 MCDONALD'S WATER WELL DRLG	<b>Source:</b> Shallow
<b>Driller Name:</b> D.K.MCDONALD	<b>Drill Finish Date:</b> 10/23/1981
<b>Drill Start Date:</b> 10/01/1981	<b>PCW Received Date:</b>
<b>Log File Date:</b> 11/05/1981	<b>Pipe Discharge Size:</b>
<b>Pump Type:</b>	<b>Estimated Yield:</b> 15
<b>Casing Size:</b>	<b>Depth Water:</b> 125
<b>Depth Well:</b> 245	

<b>Water Bearing Stratifications:</b>	<b>Top</b>	<b>Bottom</b>	<b>Description</b>
	125	145	Sandstone/Gravel/Conglomerate
<b>Casing Perforations:</b>	<b>Top</b>	<b>Bottom</b>	
	125	150	

New Mexico Office of the State Engineer  
Point of Diversion Summary

Back

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are biggest to smallest)

POD Number                      Tws   Rng   Sec   q   q   q   Zone        X        Y  
SJ 00981                        31N   10W   34   2   1

Driller Licence: 777   MATTICS, JOHN ALLEN

Driller Name:

Source: Shallow

Drill Start Date: 06/06/1979

Drill Finish Date: 06/10/1979

Log File Date: 06/19/1979

PCW Received Date:

Pump Type:

Pipe Discharge Size:

Casing Size: 6.63

Estimated Yield: 10

Depth Well: 164

Depth Water: 118

Water Bearing Stratifications:	Top	Bottom	Description
	142	160	Shale/Mudstone/Siltstone
Casing Perforations:	Top	Bottom	
	135	160	

*New Mexico Office of the State Engineer*  
**Point of Diversion Summary**

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are biggest to smallest)

<b>POD Number</b>	<b>Tws</b>	<b>Rng</b>	<b>Sec</b>	<b>q</b>	<b>q</b>	<b>q</b>	<b>Zone</b>	<b>X</b>	<b>Y</b>
SJ 03624	31N	10W	34	2	1	2			

**Driller Licence:** 717 WESTERN WATER WELLS

**Driller Name:** HOOD, TERRY

**Source:** Shallow

**Drill Start Date:** 01/28/2006

**Drill Finish Date:** 01/29/2006

**Log File Date:** 02/08/2006

**PCW Received Date:**

**Pump Type:**

**Pipe Discharge Size:**

**Casing Size:** 4.5

**Estimated Yield:** 7

**Depth Well:** 165

**Depth Water:** 65

**APPENDIX E**

**Health & Safety Plan**

**Envirotech, Inc.**  
**Health and Safety**  
**Plan**

**Power Flighted Auger Services**

Envirotech, Inc.  
5796 US Hwy 64  
Farmington, NM  
Phone (505) 632-0615

**2009**

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## 1.0 PURPOSE AND POLICY

The purpose of the Health and Safety Plan (HSP) is to establish employee protection standards and mandatory safety practices for all personnel employed at/or working in conjunction with Envirotech, Inc.

This HSP has been prepared to enable personnel and collaborators to conduct field operations in support of drilling operations. The plan also provides for contingencies that may arise during field operations. All company personnel shall abide by this plan. Any supplemental plans used by subcontractors, cooperative agreement personnel, visiting professionals, and other research or regulatory personnel will conform to this plan as a minimum.

## 2.0 PROGRAM TEAM ORGANIZATION

The Field Scientist is ultimately responsible for the overall conduct of the projects, including the enforcement of the HSP. He/She will be responsible for the schedule and budget.

The Site Safety Officer (SSO) will be responsible for insuring that field team members have the necessary hazardous waste site training and will coordinate the staff medical monitoring program.

For each field operation, the SSO is responsible for ensuring that on-site activities are performed in conformance with the HSP/SSHSP. The site SSO has the authority to stop on-site work if actions or conditions are deemed unsafe or not in compliance with the HSP/SSHSP.

All field team members and other contractors are responsible for reading and conforming to the HSP/SSHSP. All Envirotech personnel and contractors personnel will sign the statement found in **Appendix A** stating they have read the plan, are familiar with its contents, and have received training in accordance with OSHA regulation 29CFR 1910.120(e). No employee will perform a project activity that he/she believes may endanger his/her health and safety or the health and safety of others.

## 3.0 TRAINING REQUIREMENTS/MEDICAL MONITORING

All field team members with potential exposure to site hazards will have the 40-hour Occupational Safety and Health Administration (OSHA) training as specified in 29CFR1910.120E or an equivalent approved training certification such as Petroleum Education Council (PEC) 40-hour Core Compliance, a current 8-hour annual refresher course, and site-specific training before starting field work. All field team members will participate in an appropriate and current medical monitoring program. Listed below are additional health and safety training and medical monitoring requirements.

Additional safety training requirements: 24 hours of on-the-job supervised training, powered equipment training, and daily safety briefings. "Morning Tailgate Safety Meetings" will be required of all personnel.

Additional medical monitoring requirements: an annual physical examination provided through Reliance Medical in Farmington, New Mexico, is required of all staff members who have potential exposure to hazardous materials. All employees with less than 30 days of potential exposure per annum do not need an annual (OSHA required) physical exam.

## 4.0 Personal Protective Equipment (PPE)

Note that PPE is required when exposed to the general hazards listed below.

### PPE Specifications

Hazard	PPE
General entry to active industrial facility or construction site, or when required by client/facility.	Approved footwear with toes and sole protection in accordance with ANSI Z41.1; safety glasses; and hardhat.
Skin absorption of harmful substances; sever cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.	Leather work gloves; nitrile gloves if potential for contact with chemicals.
Working around heavy equipment or other noisy machinery, or if you must raise your voice to be heard while communicating with persons near you.	Ear plugs must be worn = 85 dba or higher. Ear muffs and plugs must be worn = 115 dba or higher.
Danger of foot injuries due to falling, or rolling objects, objects piercing the sole, or when the feet are exposed to electrical hazards.	Approved footwear with toes and sole protection in accordance with ANSI Z41.1.
Potential for head injury from impact, falling or flying objects.	Approved hardhats shall meet the minimum requirements set forth by ANSI Z89.1.1997 (Type 1 or 2 – Class E Hardhats).
Flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.	Safety glasses with side shields, safety goggles, face shield, or welding glasses. Face shield may be used only in conjunction with the use of other protective eyewear.

### Reasons for Upgrading or Downgrading Level of Protection

Upgrade	Downgrade
<ul style="list-style-type: none"> <li>• Request from individual performing tasks</li> <li>• Change in work tasks that will increase potential for injury</li> <li>• Known or suspected presence of dermal hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Situation is less hazardous than originally thought</li> <li>• Change in site conditions that decrease the hazard</li> <li>• Work task change that reduces the potential for injury</li> </ul>

The following personal protective ensemble is required by all team members during power augering and decontamination operations:

- Heavy cloth work gloves over nitrile or latex gloves (when required)
- Hard hat
- Steel-toed work boots or shoes
- Safety glasses or goggles
- Hearing protection
- Long –sleeved shirt (when required)
- Flame resistant clothing (when required)

Flame resistant clothing is required when location management, PPE hazard assessments or historical data/experience dictate the need. Flame retardant clothing shall meet Federal Test Standard CS-191A (<2.0 seconds after flame and no more than 6.0 inches char length). Only manufacturer's approved modifications shall be made to garments.

#### 4.1 Equipment and Supplies

Each field team shall have the following items readily available:

- Separate list of emergency contacts/local telephone book
- First Aid Kit
- Paper towels
- Duct tape
- Water
- Plastic garbage bags
- Portable radio or other communication device
- Fire extinguisher

#### 5.0 SAFETY AND HEALTH POLICIES

##### 5.1 General Hazards and Housekeeping

- Site work will be performed during daylight hours whenever possible. Work conducted during hours of darkness will require enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all work areas.
- Common paths of travel will be established and kept free from the accumulation of materials.
- Specific areas will be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies will be stored in an orderly manner.
- As work progresses, scrap and unessential materials will be neatly stored or removed from the work area.
- Containers will be provided for collecting trash and other debris and will be removed at regular intervals.
- All spills will be quickly cleaned up. Oil and grease will be cleaned from walking and working surfaces.

##### 5.2 Hazardous Materials Information Systems

The SSO is to perform the following:

- Complete an inventory of chemicals brought on site using Attachment B.
- Confirm that an inventory of chemicals brought on site by subcontractors and contractors is available.
- Request or confirm locations of Materials Safety Data Sheets (MSDS) from the client, contractors, and subcontractors for chemicals to which Envirotech employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each chemical.
- Label Envirotech chemical containers with the identity of the chemical and with hazard warnings and store properly.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

### 5.3 Shipping and Transportation of Chemical Products

All Envirotech employees who ship or transport hazardous chemicals, according to DOT standards, by road must receive training in shipping and transporting dangerous goods in accordance with applicable regulations. All hazardous materials that are shipped or are transported by road by Envirotech employees must be properly identified, labeled, packaged, and documented by trained staff.

### 5.4 Lifting

Proper lifting techniques must be used when lifting any object.

- Plan storage and staging to minimize lifting or carrying distances.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift – especially for heavy or awkward loads.
- Make sure the path or travel area is clear prior to the lift.

### 5.5 Forklifts

Powered industrial trucks or “forklifts” are essential for material handling. Unsafe use of these trucks has caused serious injury. Only authorized and trained employees are permitted to operate a forklift. Required practices for safe operation are as follows:

- Inspect the truck before the start of each shift
- Never carry more than the rated capacity
- Be aware of center of gravity changes when moving or carrying loads
- Always look in the direction of travel
- Never allow passengers
- Never lift a person on the forks unless provided with a platform designed for that purpose
- Always park with the forks on the floor
- Pedestrians always have the right of way
- Always chock the wheels before loading or unloading a trailer
- To prevent a possible explosion, know and follow the safe method of filling gas tanks or LP cylinders, changing LP cylinders, and changing or charging batteries
- Obey state and local traffic laws at all times
- If your forklift is equipped with seat belts, they must be worn at all times
- Never reach between the masts or place any part of your body under a load
- Always back down and go forward on a ramp or incline
- Never smoke in the battery charging area.

### 5.6 Heat Stress

- Heat rash is caused by continuous exposure to heat and humid air and is aggravated by chafing clothes. This condition decreases ones ability to tolerate heat.
- Heat cramps are caused by profuse perspiration with inadequate fluid intake and chemical replacement, especially salts. Signs of heat cramps include:
  - muscle spasms
  - pain in the extremities
  - pain in the abdomen.
- Heat exhaustion is caused by the increased stress placed on various organs to meet increased demands to cool the body. Signs of heat exhaustion include:
  - pale, cool, moist skin
  - profuse sweating
  - shortness of breath
  - dizziness
  - increased pulse rate (120-200 beats per minute)

--lassitude.

- Heat stroke is the most severe form of heat stress. Signs of heat stroke include:
  - red, hot and dry skin
  - no perspiration
  - nausea
  - dizziness
  - confusion
  - strong, rapid pulse
  - possible unconsciousness.

The body must be cooled immediately to prevent severe injury and/or death. Professional medical assistance must be obtained immediately.

Monitoring of personnel will begin when the ambient temperature is above 90° F. Monitoring frequency will increase as the ambient temperature increases, or as slow recovery rates are observed (see Table 5.1). A person with current first-aid certification who is trained to recognize heat stress symptoms will perform heat-stress monitoring. For monitoring the body's recuperative capabilities in response to excess heat, one or more of the techniques listed below will be used. Other methods for determining heat-stress monitoring, such as the wet-bulb globe temperature index from American Conference of Governmental Industrial Hygienist (ACGIH), (1992) Threshold Limit Value (TLV) Booklet may be used.

To monitor the worker, measure his/her heart rate. To do this, count and document the radial pulse during a 30-second period as early as possible during the rest period. Procedures for dealing with the heart rate measurement are as follows:

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, the next work cycle will be shortened by one third and the rest period will remain the same.
- If the heart rate still exceeds 100 beats per minute at the next rest period, the subsequent work cycle will be reduced by one-third.

Measure the person's oral temperature to determine whether his/her body is at a safe temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).

- If oral temperature exceeds 99.6°F, the next work cycle will be reduced by one-third without changing the rest period.
- If oral temperature still exceeds 99.6°F at the beginning of the next rest period, the subsequent work cycle will be reduced by one-third.

## 5.7 Cold Exposure

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling (hypothermia), possibly causing death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Local injury resulting from cold is included in the generic term "frostbite" for which there are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incident frostbite is characterized by suddenly blanching or whitening of skin.
- Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia, or lowering of the core body temperature, is caused by exposure to freezing or rapidly dropping temperatures. Symptoms are usually exhibited in five stages:

- Shivering and loss of coordination
- Apathy, listlessness, sleepiness and (sometimes) rapid cooling of the body to less than 95° F.
- Unconsciousness, glassy stare, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death.

Cold exposure symptoms, including hypothermia and frostbite, should be monitored when workers are exposed to low temperature for extended periods of time.

## 5.8 Slips, Trips and Falls

The sites could contain a number of slip, trip, and fall hazards for site workers, such as:

- Holes, pits, or ditches
- Slippery surfaces
- Steep grades
- Uneven grades
- Snow and ice
- Sharp objects

Site personnel will be instructed to look for potential safety hazards and immediately inform the SSO or the Site Manager about any new hazards. If the hazard cannot be immediately removed, actions must be taken to warn site workers about the hazard.

## 5.9 Noise-Induced Hearing Loss

Work on-site involves the use of the drill rig and other heavy equipment such as a geoprobe, jack hammer, compressor, and generator. The unprotected exposure of site workers to this noise during field activities can result in noise-induced hearing loss. The SSO will monitor the noise exposure for the initial trip and determine whether noise protection is warranted for each of the team members. The SSO will ensure that either ear muffs or disposable foam earplugs are made available to all personnel and are used by the personnel in the immediate vicinity of the field operation as required.

## 5.10 Fire Prevention

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 80 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - be maintained in a fully charged and operable condition,
  - be visually inspected annually by a competent worker, who shall record the date of the inspection on a tag attached to it,
  - undergo a maintenance check each year,
  - have an ABC rating,
  - be protected from physical damage and from freezing.
- The area in front of the extinguisher must be kept clear.
- Post "Exit" signs over exiting doors and post "Fire Extinguisher" signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers and must be stored in an approved storage cabinet.

Fires are classified in the following manner:

Class A – Combustible Solids

- Class A should be used to put out trash fires

Class B – Combustible Liquids

- Class B extinguishers contain carbon dioxide which is used on oil or grease fires

Class C – Electrical

- Class C extinguishers contain a dry, non-toxic chemical needed to put out electrical fires
- Never attempt to use water on an electrical fire

ABC type fire extinguishers may be used on all three types of fires.

#### 5.11 Electrical

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Remove defective electrical equipment from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - equipped with third-wire grounding.
  - covered, elevated, or protected from damage when passing through work areas.
  - protected from pinching if routed through doorways.
- Electrical power tools and equipment must be effectively grounded or double insulated.
- Operate and maintain electrical power tools and equipment according to manufacturers' instruction.
- Maintain safe clearance distances between overhead power lines and any electrical conducting materials unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact.
- Temporary lights shall not be suspended by the electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

#### 5.12 Compressed Gas Cylinders

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or being exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

#### 5.13 Power Flighted Auger

- Electrical power cord must be inspected for any nicks or abrasions to prevent electrocution.
- Ensure that power supply for flighted auger is away from any water sources.
- Maintain careful footing around power auger to prevent slips/trips/falls.
- Keep hands and any loose clothing away from all moving parts while auger is in motion.
- Use strong grip on handles of auger to prevent auger from spinning and striking personnel.
- Keep cord away from moving auger to prevent electrocution and destruction of cord.
- Watch for pinch points on when using sampling device.

## 6.0 HAZARD CONTROLS

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. Envirotech Employees and contractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. Envirotech employees, clients, and subcontractors who do not understand any of these provisions shall contact the SSO for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment E. The objective of the self-assessment process is to identify gaps in project safety performance and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the SSO. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records and be promptly submitted to the SSO.

### 6.1 Power Auger Specific Hazards

- Stay clear of the rotating augers and other rotating components.
- Do not wear loose-fitting clothing or jewelry items such as rings or watches that could get caught in moving parts. Long hair should be restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Watch for pinch points on and around equipment.

### 6.2 Subsurface Hazards/Utility Locate

Before augering activities are initiated, efforts must be made to determine whether underground installations, (e.g., sewers, telephone, water, fuel and electric lines) will be encountered and, if so, where such underground installations are located. This typically accomplished through the One-Call system. Utility companies or the facility engineer will be contacted by the field team leader prior to commencing any type of subsurface work.

#### Procedures for Locating Buried Utilities

#### **Local Utility Mark-Out Service: ONE CALL 1-800-321-ALERT (Albuquerque: 260-1990)**

- Where available, obtain utility diagrams for the facility
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from One Call service.
- When uncertain about utility locations, excavating or drilling of the upper depth interval should be performed manually.
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the assigned One-Call Authorization Number and expiration date is required to be noted on the SSHSP/Tailgate Safety Meeting Form.

### 6.3 Heavy Equipment Hazards

The scope of work for this department involves working outdoors around vehicles and heavy equipment. Any project involving heavy equipment, unimproved work-sites, and outside work can present numerous physical

hazards to the work force. Training, adherence to work rules, and careful housekeeping can prevent many problems or accidents due to physical hazards. The general rules and preventive measures for this work follow.

## **7.0 SITE CONTROL MEASURES**

The following Site control measures will be followed in order to minimize potential contamination of workers, protect the public from potential Site hazards, and to control access to the Sites. Site organization is discussed in this section.

### **7.1 Safe Work Practices**

To ensure a strong safety awareness program during field operations, personnel shall have adequate training and this health and safety plan must be communicated to all employees. Sample standing orders for personnel entering the work zone are as follows:

- Wear appropriate PPE
- Avoid walking through puddles or stained solids
- Discovery of unusual or unexpected conditions will result in immediate evaluation and reassessment of site conditions and health and safety work practices
- Conduct daily/weekly safety meetings as necessary
- Take precautions to reduce injuries from heavy equipment and other tools.

### **7.2 Site Controls**

Preventative measures may include:

Nonsparking tools, no welding, approved electrical equipment, and grounding and bonding of static electricity sources

The following guidelines will be followed while working on-site:

- Heavy Equipment – Only qualified operators will be allowed to operate heavy equipment. Subcontractors will be required to use the safe work guidelines included in the OSHA General Industry (29 CFR 1910) and Construction Industry (29 CFR 1926) Standards.
- Electrical Equipment – All electrical equipment will be properly grounded and class approved for the location.
- Machine Guarding – All machinery on-site will be properly guarded to prevent contact with rotating shafts, blades, or gears.

Flammable Materials – When work involves flammable materials, adequate ventilating and control of all ignition sources will be maintained.

## **8.0 Biological Hazards and Controls**

### **8.1 Snakes**

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a snake bites a person, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. DO NOT apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

### **8.2 Poison Ivy, Poison Oak, and Poison Sumac**

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective

clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

### 8.3 Bees and Other Stinging Insects

Bees and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit (e.g., EpiPen) if you have had allergic reactions in the past and inform the SSO and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

### 8.4 Bloodborne Pathogens

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

## 9.0 AIR MONITORING

Air monitoring at drill sites will be performed as needed on a site by site basis. Air monitoring will be used to identify and quantify airborne levels of hazardous substances. Periodic monitoring is required during on-site activities where airborne contamination may be encountered (i.e., drilling, sampling, etc.). The SSO will periodically monitor air quality and review calibration and record keeping procedures.

During on-site operations that disturb site soils, a photoionization detector (OVM, HNU, Photovac TIP, or MicroTIP) should be used to measure ambient air concentrations in the worker-breathing zone. Any detectable concentration above background concentrations in the breathing zone will necessitate screening for benzene with a Drager tube or on-site GC. The SSO will determine whether it is safe to continue activities or assign an upgrade in the level of protection.

## 10.0 RESPIRATORY PROTECTION

Envirotech has established a written Respiratory Protection Policy and Program that meets all requirements set forth by OSHA 29CFR1926.103, 29CFR1910.134, and 29CFR1910.120. Respiratory protection will be provided to all employees based on hazard exposure to reduce employee exposure to toxic substances and allow employees to work safely in hazardous work environments. Any employee identified as needing respiratory protection for job responsibilities must have the following:

- physician's approval to wear respirator
- training and instruction period for the type of respirator
- quantitative or qualitative fit-tested annually
- clean-shaven in the seal area of the respirator to ensure a proper fit and seal

Only MSHA/NIOSH-certified respirators will be selected and used. Respirators shall be cleaned, inspected, repaired (if necessary), disinfected, and dried after each use and stored in a sealed plastic bag in a cool, dry place away from dust and contaminants.

## 11.0 HYDROGEN SULFIDE GAS (H<sub>2</sub>S)

Hydrogen Sulfide or sour gas is flammable, colorless gas that is highly toxic at extremely low concentrations. It is heavier than air, and may accumulate in low-lying areas. It smells like "rotten eggs" at low concentrations and causes you to quickly lose your sense of smell. Many areas where the gas is found have been identified but pockets of the gas can occur anywhere.

Proper notification to Envirotech prior to the start of the project will ensure that employees will have the proper monitoring devices. Active monitoring for H<sub>2</sub>S, preventive planning, and training programs for workers are the best ways to prevent injury and death.

## EXPOSURE EFFECTS OF HYDROGEN SULFIDE GAS (H<sub>2</sub>S)

<u>(PPM)</u>	<u>Physical Effect</u>
0.003-0.02	Odor threshold
Above 10	Prolonged exposure may be toxic
Below 100	Quickly deadens the sense of smell
Above 100	Considered Immediately Dangerous to Life or Health (IDLH) by NIOSH
Above 500	Attacks respiratory center in brain causing loss of consciousness within 15 minutes
Above 1000	Immediate unconsciousness and death if not revived promptly

Portable monitors must be used to alert personnel who may encounter H<sub>2</sub>S levels beyond permissible exposure levels. Fixed monitors must be used in areas where H<sub>2</sub>S is present in high concentrations above 100 PPM.

Detection equipment must be worn when working in an area where there is a possibility of encountering H<sub>2</sub>S, especially in enclosed or below grade areas. Do not enter without proper training and authorization.

In atmospheres immediately dangerous to life or health (IDLH level of 100 PPM or greater) a standby person(s), with suitable self-contained breathing apparatus must be available for purposes of rescue. Never attempt to rescue a H<sub>2</sub>S victim without proper respiratory protection in the form of a Self-Contained-Breathing-Apparatus (SCBA) or an approved air line unit equipped with an escape pack.

Iron sulfide deposits are generally found in H<sub>2</sub>S areas i.e. tanks, vessels, and piping. Iron sulfide may spontaneously combust when exposed to air and should always be kept wet to prevent ignition.

## 12.0 SILICA

Silica dust may be encountered during drilling and monitor well plugging operations. Respiratory protection must be worn when operations include silica sand.

## 13.0 EQUIPMENT DECONTAMINATION PROCEDURES

### 13.1 Personnel Decontamination

If personnel are in Level D-modified protection, a portable decontamination station will be set up at the site. The decontamination station will include provisions for collecting disposable PPE (e.g., garbage bags); washing boots, gloves, vinyl rainsuits (if used), and field instruments and tools; and washing hands, face, and other exposed body parts. On-site personnel will shower upon return to their hotel or homes at the end of the workday. Refuse from decontamination will be bagged and left on-site for proper disposal.

Decontamination equipment will include:

- Pressure washer
- Plastic buckets and pails
- Scrub brushes and long handle brushes
- Detergent
- Containers of water
- Paper towels
- Plastic garbage bags
- Distilled water

### 13.2 Equipment Decontamination

Decontamination of all equipment will be conducted at a location on-site. High pressure, hot water or steam cleaning of all equipment will be necessary prior to the start of the operation, between borehole locations, and before leaving the project site. All sampling equipment will be decontaminated prior to use, between samples and between sampling locations.

## 14.0 EMERGENCY RESPONSE

All drill site activities present a degree of risk to on-site personnel. During routine operations, risk is minimized by establishing good work practices, staying alert, and using proper personal protective equipment (PPE). Unpredictable events: such as physical injury, chemical exposure, or fire may occur, and must be anticipated. Employees are encouraged to participate in first aid and cardiopulmonary resuscitation (CPR) courses in order to more effectively handle physical and medical emergencies that may arise in the field. The sections below establish procedures and guidelines for emergencies.

### 14.1 Pre-Emergency Planning

Employees must read this site HSP, and must familiarize themselves with the information in this chapter. Prior to project initiation, the SSO will conduct a meeting with the field team members to review the provisions of this HSP and to review the emergency response plan. Employees will be required to have a copy of the emergency contacts and telephone numbers immediately accessible on-site and know the route to the nearest emergency medical services

### 14.2 Personnel Roles and Communication Procedures during an Emergency

When an emergency occurs, decisive action is required. Hastily made choices may have far reaching, long-term consequences. Delays of minutes can create life-threatening situations. Personnel must be ready to respond to emergencies immediately. All personnel should know their own responsibilities during an emergency, know who is in charge during an emergency and know the extent of that person's authority. This section outlines personnel roles, lines of authority, and communication procedures to be followed during emergencies.

In the event of an emergency situation at a site, the SSO will assume total control and will be responsible for on-site decision making. The designated alternate for the SSO will be the Team Leader (TL). These individuals have the authority to resolve all disputes about health and safety requirements and precautions. They will also be responsible for coordinating all activities until emergency response teams (ambulance, fire department, etc.) arrive on-site. In addition, the Field Scientist will be contacted as soon as possible.

All on-site personnel must know the location of the nearest telephone and the location of the emergency telephone number list next to all telephones.

### 14.3 Procedures for Emergency Medical Treatment/First Aid

In the event of personal injury:

- Field team members trained in first aid can administer treatment to an injured worker. The victim should be transported to the nearest hospital or medical center if necessary; an ambulance should be called to transport the victim as required.
- The site SSO is responsible for the completion of an Accident Report Form.

### 14.4 Chemical Exposure

In the event of chemical exposure (i.e. skin contact, inhalation, ingestion) the following procedures will be implemented:

- Another team member will assist or remove the individual from the immediate area of contamination to an upwind location if it is safe to do so.
- Precautions will be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the clothing will be removed if it is safe to do so.
- If the chemical has contacted the skin, the skin will be washed with generous amounts of water, preferably under a shower.
- In case of eye contact, emergency eyewash should be used. Eyes should be washed for at least 15 minutes.
- If necessary, the victim will be transported to the nearest hospital or medical center. An ambulance will be called to transport the victim, if necessary. Local emergency personnel can be contacted at the numbers in Appendix A.

### 14.5 Severe Weather

In the event that your location is threatened by severe or violent weather, all employees are required to take shelter until the threat is over.

### 14.6 Fire or Explosion

In the event of fire or explosion, personnel will evacuate the area immediately and go to designated assembly area and administer necessary first aid to injured employees. Personnel will proceed to a safe area and telephone the emergency support services. Upon contacting the emergency support services, the caller should state his/her name, nature of the hazard (fire, high combustible vapor levels), the location of the incident, and whether there were any physical injuries requiring an ambulance. Do not hang up until emergency support services have all of the additional information they may require. The Site Manager will be contacted as soon as possible by radio or telephone.

### 14.7 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down operations and evacuate the immediate area
- Notify appropriate response personnel.
- Account for personnel at the designated assembly areas(s).
- Assess the need for site evacuation and evacuate the site as warranted.

Note that small fires or spills posing minimal safety or health hazards may be controlled, instead of implementing a work-area evacuation,

## 14.8 Evacuation Procedures

The Field Scientist is responsible for ensuring that Envirotech employees are familiar with the following procedures:

- Evacuation routes and assembly areas will be reviewed before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The Field Scientist will account for all Envirotech personnel at the assembly area.
- The Field Scientist will inform the HSM of the incident as soon as possible after it occurs and follow appropriate reporting procedures.

## 14.9 Emergency Medical Treatment/Emergency Contacts

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to the Field Scientist. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the General Superintendent or Field Superintendent. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Attachment C (e.g., 911) and the General Superintendent or Field Superintendent as soon as possible.
- The Field Scientist will assist Envirotech employees during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Make certain that the injured person is accompanied to the emergency room.

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list as provided in Appendix A. For emergency situations, telephone or radio contact should be made with the site point of contact or site emergency personnel who will then contact the appropriate response teams.

## 14.10 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the SSO or Field Scientist.
- Complete an Incident Report Form (IRF) within 24 hours of incident. Contact the Envirotech Human Resources Administrative Assistant for help with the form completion.
- For subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the SSO or Field Scientist.
- Notify and submit reports to client as required in contract.

## 15.0 DRUG & ALCOHOL POLICY

Envirotech, Inc. follows the DOT Pipeline Drug & Alcohol Policies.

## 16.0 FIREARMS POLICY

The use, possession and distribution of illegal drugs, deadly weapons or unauthorized explosives while on Company premises, in Company vehicles, or rental/personal vehicles while on Company business is prohibited.

## 17.0 APPROVALS

This HSP has been written for use by Envirotech drilling department and their subcontractors only. Envirotech claims no responsibility for its use by others.

Written by: Vicki A. Young, H&S Administrator                      Date: July 1, 2005

Approved by: Morris D. Young, President                      Date: July 1, 2005

## 16.0 ATTACHMENTS

Attachment A: Employee Acknowledgement of Understanding

Attachment B: Emergency Contacts/Hospital Directions

## ENVIROTECH, INC.

### EMPLOYEE ACKNOWLEDGEMENT OF UNDERSTANDING

I, \_\_\_\_\_, an employee of Envirotech, Inc. acknowledge that I have received, read, understand, and will abide by the contents of the Environmental, inc. Health and Safety Plan.

I further understand that this information has been prepared and provided to me as a reference for the minimum standards, policies, and procedures of site activities to keep both myself and others safe and healthy.

_____	_____	_____
Print Name	Signature of Recipient	Date
_____	_____	_____
Print Name	Signature of Field Scientist	Date
_____	_____	_____
Print Name	Signature of Safety Manager	Date

## APPENDIX A - EMERGENCY CONTACTS / HOSPITAL DIRECTIONS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact should be made from the list below.

<u>HOSPITALS (CALL 911 in emergencies)</u>	<u>Phone</u>
Reliance Medical (Envirotech Preferred Provider)	505-566-1915
San Juan Regional Medical Center (Farmington)	505-325-5011
Southwest Memorial (Cortez)	970-565-6666
Northern Navajo Medical Center (Shiprock)	800-549-5644
Mercy Medical Center (Durango)	970-247-4311
Rehoboth McKinley Christian Hospital (Gallup)	505-863-7000
<u>STATE PATROL</u>	<u>Phone</u>
New Mexico (Farmington)	505-325-7547
Colorado	970-247-4722
Arizona	928-524-6177
Utah	435-259-5441
<u>OTHER AGENCIES</u>	<u>Phone</u>
Jicarilla Apache Police (Dulce, NM)	505-759-3222
Navajo Police (Shiprock, NM)	505-368-1350
Southern Ute Police (Ignacio, CO)	970-563-4401
Ute Mountain Ute Police (Towaoc, CO)	970-565-3706
U.S. Forest Service	505-842-3292
Bureau of Land Management (BLM)	505-599-8900
Bureau of Indian Affairs	202-208-3710
NM Oil Conservation Division (Aztec)	505-334-6178
NMED Petroleum Storage Tank Inspection	505-984-1741
NMED Ground Water Quality Inspection	505-827-2918
<u>PIPELINE COMPANY EMERGENCY</u>	<u>Phone</u>
BP, New Mexico	505-326-9200
BP, Colorado	970-2476800
Burlington Resources	505-632-1815
Chevron/Texaco	505-327-2719
CO Public Service Co.	800-698-7811
EPFS	800-334-8047
Exxon/Mobil	888-532-5427
PhillipsConoco	505-599-5081
PNM	800-282-1732
Red Cedar	970-382-0828
Red Willow	970-563-0145
Williams	800-635-7400

## **APPENDIX A - EMERGENCY CONTACTS / HOSPITAL DIRECTIONS**

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact should be made from the list below. For emergency situations, telephone contact should be made with the site point of contact or site emergency personnel who will then contact the appropriate response teams.

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<u>Contingency Contacts</u>	<u>Phone</u>
Nearest telephone at the work site – Love's Country Store	(928) 288-3726
Fire Department	(928) 288-3311
Medical Emergency	911
Security/Police	911
Site Contact – Michael Key	(928) 288 - 3726

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### **Hospital Route Directions**

From Atlantic B LS #7 well site;

TL to CR 2770, go approximately 5.0 miles,

TL on HWY 550 to Aztec, NM ~ 4.0 miles,

TL on HWY 550 in Aztec, NM to Bloomfield, NM ~ 6.0 miles,

TR on HWY 64 to Farmington, NM ~ 12.0 miles,

TL on Schwartz and stay right to West Maple St. at San Juan Regional Hospital.

## APPENDIX B - SITE SPECIFIC TRAINING RECORD

On this date \_\_\_\_\_, 2009 the following individuals were provided site specific training in accordance with OSHA regulations contained in 29 CFR 1910.120 (e). These individuals have also read and are familiar with the contents of the site specific health and safety plan.

Name (print)

Signature

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

\_\_\_\_\_