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REPORTS



ENVIROTECH INC. (W-101

SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, NM 87401

Prepared For The New Mexico Oil Conservation Division

Commissioned by Mr. Maurice Sticker Environmental Affairs Coordinator Smith International Inc.

September 1993

Project: 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

PROJECT NO: 91410

SEPTEMBER 1993

ENVIROTECH INC. ENVIRONMENTAL SCIENTISTS & ENGINEERS 5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO

(505) 632-0615

SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to monitor groundwater quality at three spill remediation sites located on the subject property at 2198 East Bloomfield Highway. This property was the staging yard for Smith Energy Services. The site is currently unoccupied. This sampling report is prepared for the New Mexico Oil Conservation Division (NMOCD), continuing a monitoring program of select monitoring wells. This sampling plan follows a request by Mr. William C. Olson of the NMOCD in a letter dated November 17, 1992 to Mr. Maurice Sticker of Smith International Inc (attached). The long term monitoring requested is designed to verify cleanup of the sites described in the following previously prepared closure reports:

- Surface Impoundment Closure Report, Wash Bay Solids Disposal Area (April 1992)
- Acid UST and Sump Closure Report, Acid Storage Tank and Loading Area (May 1992)
- Acid UST & Sump Closure Supplemental Report, Smith International, Inc., 2198 East Bloomfield Highway, Farmington, New Mexico (July 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted by Smith International Inc. to the NMOCD.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS) Wash Bay Solids Disposal Area Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a trackhoe excavator. Approximately 13,000 cubic yards of soil were removed for treatment. Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of those areas under the NMOCD's jurisdiction, the waste acid underground storage tank and the wash bay solids disposal area sites at the Smith International property. This sampling program is designed to complete a long term monitoring evaluation of the reclamation operations.

The scope of services that Envirotech provides includes the following:

- A. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Future sampling requirements will be reviewed by the NMOCD.
- B. Groundwater samples from the monitor wells are to be analyzed for pH, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX). Samples are to be analyzed by Envirotech Labs using EPA method 8020 for BTEX.
- C. The results of the monitor well sampling will be submitted to the OCD within 60 days of the sampling event.

SAMPLING & ANALYSIS RESULTS

Monitor wells #4 and #5 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% HgCl₂. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX analysis using United States Environmental Protection Agency (USEPA) Method 8020. Sampling was done according to USEPA SW-846 protocol.

Field samples were collected simultaneously with laboratory samples for field testing of temperature, conductivity, and pH.

A summary of the results of the laboratory analyses for the samples collected September 21, 1993 are presented in Table 1. Laboratory results for previous samples collected are also included for comparison purposes. Table 2 contains field test results.

Table 1 Groundwater Monitoring Laboratory Results (μ g/l) Smith International Inc. 2198 East Bloomfield Highway Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-4 (9-21-93)	N/D	N/D	N/D	0.5
MW-4 (3-30-93)	N/D	N/D	N/D	N/D
MW-4 (8-13-92)	N/D	5.4	4.1	N/D
MW-5 (9-21-93)	N/D	N/D	N/D	N/D
MW-5 (3-30-93)	N/D	N/D	N/D	N/D
MW-5 (8-13-92)	N/D	5.1	3.7	3.2
Notes: 1) N/D = Not detected @ method detection limits.				

N/D = Not detected @ method detection limits. 1)

T-XYLENE = Total xylene including p,m, and o-xylene.2) 3) μ g/L. = Micrograms per liter equivalent to parts per

billion.

4) Test results by EPA Method 8020. Table 2 Groundwater Monitoring Field Test Results (3-30-93) Smith International Inc. 2198 East Bloomfield Highway Farmington, New Mexico

WELL #/DATE	OVM	pН	μ MHO/CM	TEMP (°C.)
MW-4 (9-21-93)	N/D	7.1	1100	19
MW-4 (3-30-93)	N/D	6.9	190	16
NM-5 (9-21-93)	N/D	7.3	600	19
MW-5 (3-30-93)	N/D	7.3	250	16
Notes: 1) OVA	I = 0 r ganic	Vanor Met	or reading	from well

Notes: 1) OVM = Organic Vapor Meter reading from well headspace prior to sampling.

2) μ MHO = Conductivity measurement

3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX analysis and field testing. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Oil Conservation Division and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted, ENVIROTECH INC.

Pobert E. O'nall

Robert E. O'Neill Environmental Engineer

Appendix: Site Plan Laboratory Results QA/QC Documentation Chain-of-Custody

Reviewed by:

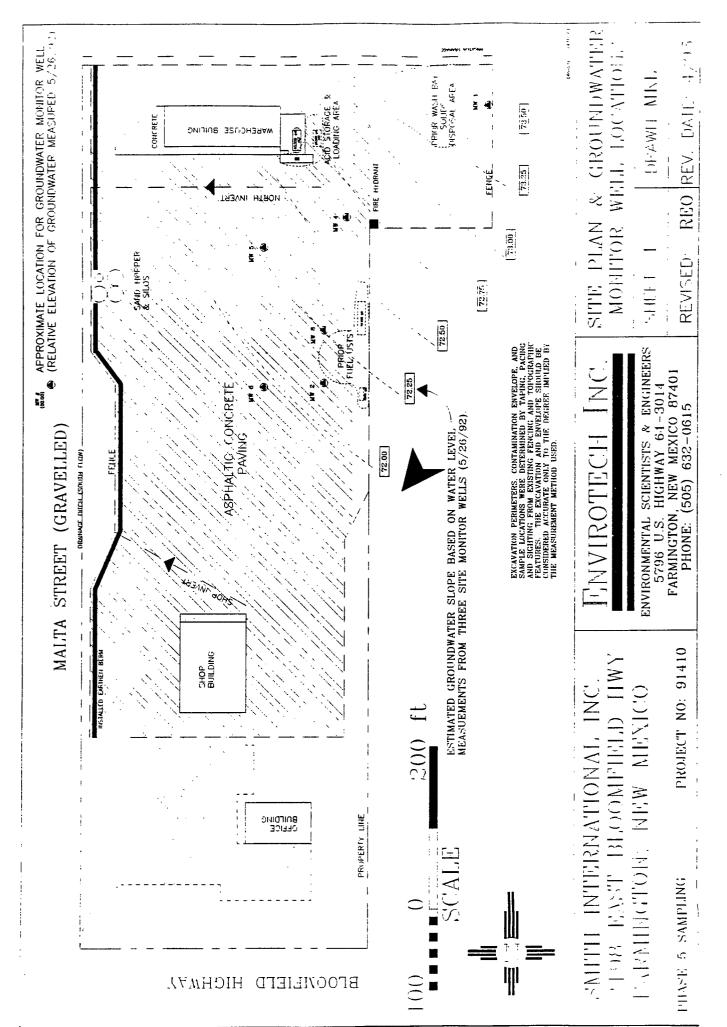
Jefly C. Blagg/FOR

Michael K. Lane, P.E.

Geological Engineer

REO/reo

91410SOC.RPT



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION



BRUCE KING GOVERNOR

November 17, 1992

POST OFFICE BOX 2088 STATE LAND OFFICE BUILDING SANTA FE, NEW MEXICO 87504 (505) 827-5800

91410

ANITA LOCKWOOD

CERTIFIED MAIL RETURN RECEIPT NO. P-667-242-310

Mr. Maurice Sticker Environmental Affairs Coordinator Smith International, Inc. 16740 Hardy St. Houston, Texas 72205-0068

RE: SITE REMEDIATION AND GROUND WATER ASSESSMENT SMITH INTERNATIONAL, INC. FARMINGTON, NEW MEXICO

Dear Mr. Sticker:

The New Mexico Oil Conservation Division (OCD) has completed a comprehensive review of the following documents submitted by Envirotech, Inc. on behalf of Smith International, Inc. regarding soil remediation activities and ground water quality investigations at the Smith International, Inc. Farmington, New Mexico service company facility:

- 1. April 1992 "SURFACE IMPOUNDMENT CLOSURE REPORT, WASH BAY SOLIDS DISPOSAL AREA".
- 2. May 1992 "ACID UST AND SUMP CLOSURE REPORT".
- 3. June 1992 "OFFSITE DRAINAGE CLOSURE REPORT".
- 4. July 1992 "ACID UST & SUMP CLOSURE SUPPLEMENTAL REPORT, SMITH INTERNATIONAL, INC., 2198 EAST BLOOMFIELD HIGHWAY, FARMINGTON, NEW MEXICO".
- 5. October 1992 "GROUNDWATER ASSESSMENT SUPPLEMENTAL, CLOSURE REPORT, SMITH INTERNATIONAL, INC., FARMINGTON, NEW MEXICO".

Mr. Maurice Sticker November 17, 1992 Page 2

The remedial activities for contaminated soils related to Smith International's waste disposal activities, as contained in the above reports, meet the OCD's requirements in effect at the time of closure of these disposal units. However, since the October 1992 report documented the presence of low level ground water contaminants in the monitor wells downgradient of both the waste acid underground storage tank and the wash bay solids disposal area the OCD requires the following long term monitoring:

Monitor wells Mwar and Mwas that be sampled in earch and September of 1995. Thereafter these monitor wells will be annually sampled during the month of Septembers Upon renewal of the facility's ground water discharge plan the sampling requirements will be reviewed.

- Ground water samples from the monitor wells will be analyzed for ph. Benzene, Toluene, Ethylbenzene and Xylenes using EPA approved laboratory methods.
- 32

The results of the monitor well sampling will be submitted to OCD within 60 days of the sampling event.

Please be advised that OCD approval does not relieve you of liability should future sampling show ground water to be contaminated in excess of New Mexico Water Quality Control Commission ground water standards as a result of these closed disposal areas.

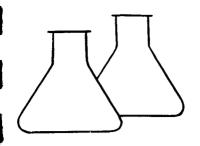
If you have any questions, please contact me at (505) 827-5885.

Sincerely,

C. Chan

William C. Olson Hydrogeologist Environmental Bureau

xc: Denny Foust, OCD Aztec Office Michael K. Lane, Envirotech, Inc.





Star Prairie Star Star Star

EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	alProject #:	91410
Sample ID:	MW # 4	Date Reported:	09-22-93
Laboratory Number:	6145	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl and Cool	Date Analyzed:	09-22-93
Condition:	Cool and Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)

Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	0.5	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	96 %
Bromofluorobenzene	98 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

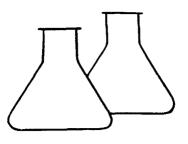
ND - Parameter not detected at the stated detection limit.

Comments:

2198 E. Bloomfield Highway

ejemen Analyst

Review





CONTRACTOR CONTRACTOR STATES

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	alProject #:	91410
Sample ID:	MW # 5	Date Reported:	09-22-93
Laboratory Number:	6146	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl and Cool	Date Analyzed:	09-22-93
Condition:	Cool and Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
~~~~~~		
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES: Parame

Parameter	Percent Recovery
	~~~~~~~~~~~~~
Trifluorotoluene	97 %
Bromofluorobenzene	99 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

Gener Analyst

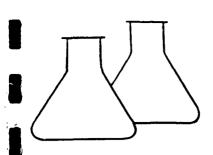
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Envirotech Laboratories

5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615

QUALITY ASSURANCE/QUALITY CONTROL

DOCUMENTATION





> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed: -	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.4
o-Xylene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromofluorobenzene	102 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

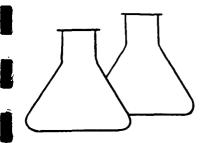
> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Gene Analyst

Review





** QUALITY ASSURANCE EPA METHOD 8020 MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client: NA Project #: NA Sample ID: Sample Spike Date Reported: 09-22-93 Laboratory Number: 6147-S-BTEX Date Sampled: 09-21-93 Sample Matrix: Water Date Received: 09-21-93 Analysis Requested: BTEX Date Analyzed: 09-22-93 Condition: NA

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20.0	18	0.2	88	39-150
Toluene	ND	20.0	18	0.3	90	46-148
Ethylbenzene	ND	20.0	19	0.2	95	32-160
p,m-Xylene	ND	20.0	20	0.4	100	46-148
o-Xylene	ND	20.0	21	0.3	102	46-148

Method:

Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

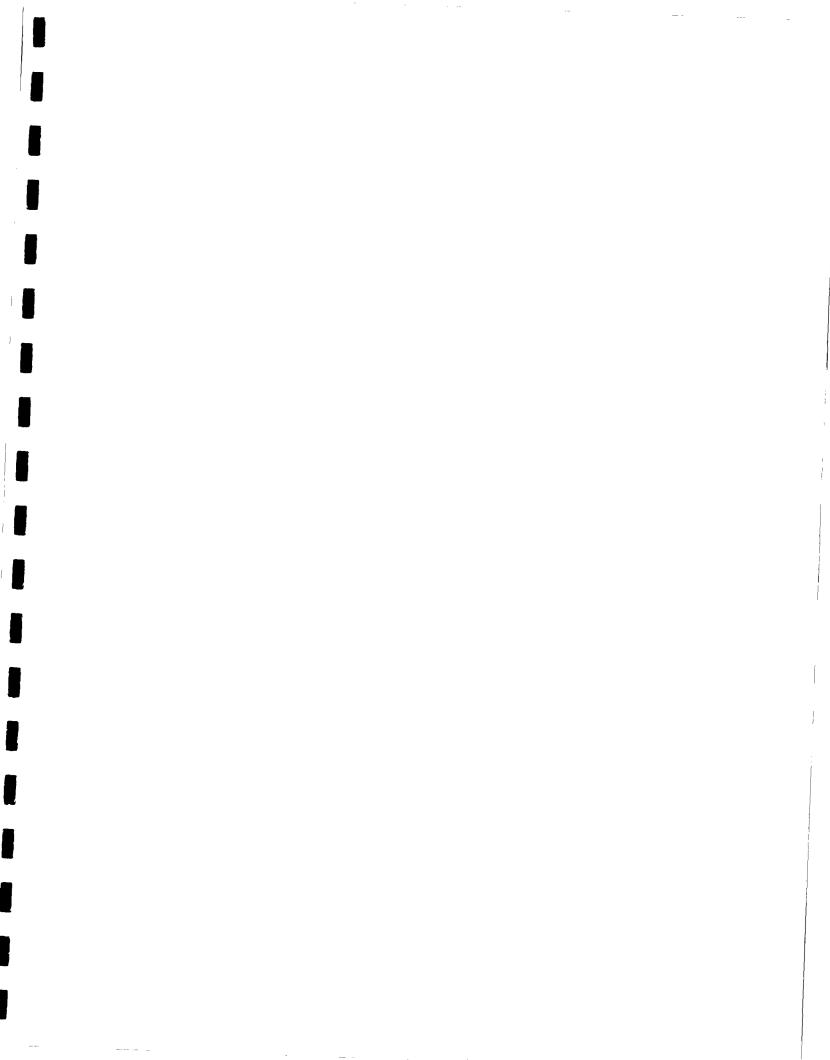
Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Gener Analyst

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PHASE 5 SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. FARMINGTON, NEW MEXICO

Prepared for The New Mexico Environmental Department

Commissioned by Mr. Maurice Sticker

September 1993

Project : 91410

GW-101

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

PHASE 5

SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

PROJECT NO: 91410

SEPTEMBER 1993

ENVIROTECH INC. ENVIRONMENTAL SCIENTISTS & ENGINEERS 5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO

(505) 632-0615

PHASE 5 SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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PHASE 5

SEPTEMBER 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to monitor groundwater quality at three spill remediation sites located on the subject property at 2198 East Bloomfield Highway. This property was the staging yard for Smith Energy Services. The site is currently unoccupied. This sampling report is prepared for the New Mexico Environment Department (NMED), continuing a two year monitoring program of select monitoring wells. The monitoring program, described in a March 9, 1993 Phase 5 Workplan, was verbally approved by the NMED on March 26, 1993. A Workplan addendum dated March 31, 1993 incorporating additional NMED requested laboratory analyses was formally approved by the NMED in a June 30, 1993 letter. This sampling parallels a New Mexico Oil Conservation Division (NMOCD) sampling plan requested in a letter to Smith International dated November 17, 1992. The long term monitoring is designed to verify cleanup of the site described in the following previously prepared closure reports:

- UST Closure Report, Diesel & Gasoline Fuel System (March 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted by Smith International Inc. to the NMED.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS) Wash Bay Solids Disposal Area Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a trackhoe excavator. Approximately 13,000 cubic yards of soil were removed for treatment. Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Monitor well locations are designated on the site plan located in the Appendix.

PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of the UST site at the Smith International property. This sampling program is designed to complete a 2-year evaluation of the reclamation operations as described in the Phase 5 Workplan.

The scope of services that Envirotech provides includes the following:

- A. Collect water samples from two down-gradient monitoring wells, MW-2 and MW-6, as shown on the attached site diagram. Sampling is scheduled to be done in March and September of 1993 and again in September of 1994. Sampling requirements beyond the initial sampling event will be reviewed by the NMED.
- B. Samples are to be analyzed by Envirotech Labs for Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), MTBE, EDB, EDC, and Naphthalene.
- C. Report on sampling results.

SAMPLING & ANALYSIS RESULTS

Monitor wells #2 and #6 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% HgCl₂. An additional one liter (1 L) sample was collected in a laboratory supplied glass container for the Naphthalene test. Field samples were collected simultaneously with laboratory samples for field testing of temperature, conductivity, and pH. The laboratory water samples were placed on ice and transported to Envirotech's laboratory for BTEX and MTBE analysis using United States Environmental Protection Agency (USEPA) Method 8020. EDB and EDC analyses were done using USEPA Method 8010, and Naphthalene analyses were done using USEPA Method 8100. Sampling was performed according to USEPA SW-846 protocol.

A summary of the results of the laboratory analyses for the samples collected September 21, 1993 are presented in Table 1. Laboratory results for previous samples collected are also included for comparison purposes. Table 2 contains field test results.

- . .

<u>Table 1</u>	
Groundwater Monitoring	
Laboratory Results $(\mu g/1)$	
Smith International Inc.	
2198 East Bloomfield Highway	
Farmington, New Mexico	
-	

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-2 (9-21-93)	N/D	N/D	N/D	N/D
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-2 (5-26-92)	N/D	N/D	N/D	N/D
MW-6 (9-21-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (8-13-92)	N/D	7.9	N/D	2.7
WELL #/DATE	MTBE	EDB	EDC	NAPHTHA.
MW-2 (9-21-93)	N/D	N/D	N/D	N/D
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (9-21-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D

Notes:

1) N/D = not detected @ method detection limits.

2) T-XYLENE = Total xylene including p,m and o-xylene.

- 3) $\mu g/l = Micrograms/liter$, equivalent to parts per billion.
- 4) MTBE = Methyl-tertiary-butyl-ether
- 5) EDB = Ethylene dibromide
- 6) EDC = 1,2-dichloroethane
- 7) Naptha. = Naphthalene
- 8) Test Results by EPA Methods 8020 (BTEX), 8010 (EDB, EDC, MTBE), and 8100 (NAPHTHALENE).

<u>Table 2</u> Groundwater Monitoring Field Test Results Smith International Inc. 2198 East Bloomfield Highway Farmington, New Mexico

WELL #/DATE	OVM	рН	μ MHO/CM	TEMP (°C.)
MW-2 (9-21-93)	N/D	7.2	600	19
MW-2 (3-30-93)	N/D	7.0	190	16
MW-6 (9-21-93)	N/D	7.2	600	19
MW-6 (3-30-93)	N/D	7.0	190	17

Notes: 1) OVM = Organic Vapor Meter reading (PPM) from well headspace prior to sampling.

- 2) μ MHO = Conductivity measurement
- 3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX, MTBE, EDC, EDB, and Naphthalene analysis. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Environmental Department and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted, ENVIROTECH INC.

Pobert E. O'Neill

Robert E. O'Neill Environmental Engineer

Appendix: Site Plan Laboratory Results QA/QC Documentation Chain-of-Custody

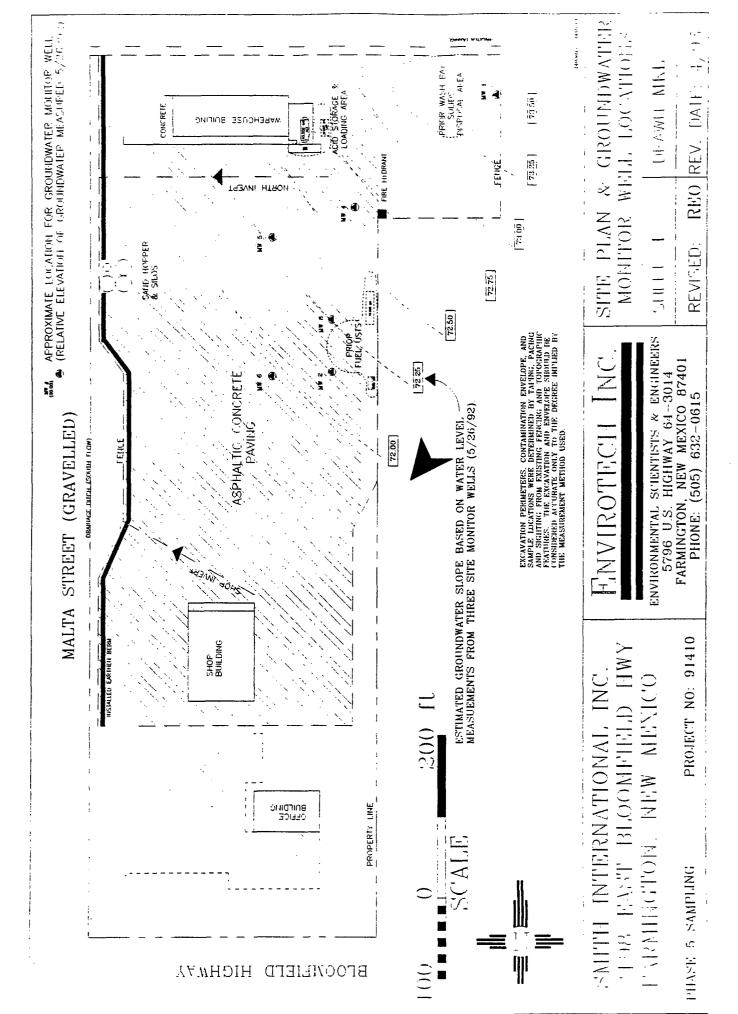
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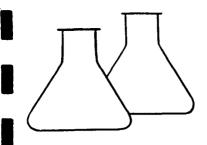
Reviewed by:

fly C. Blag FOR

Michael K. Lane, P.E. Geological Engineer

91410SED.RPT







> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client: Smith I	nternational	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-22-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl & Cool	Date Analyzed:	09-22-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-Trimethylbenzene	ND	0.3
1,2,4-Trimethylbenzene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	94 %
Bromfluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

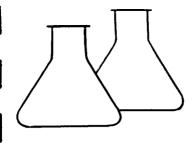
> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

L. Ciencer

Analyst





> EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

Client: Smith	International	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-21-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-21-93
Condition:	Cool and Intact	Analysis Requested:	DCE-DBE

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.1
1,2-Dichloroethane	ND	0.1
1,2-Dibromoethane	ND	0.1

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Bromofluorobenzene	101 %
Bromochloromethane	103 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

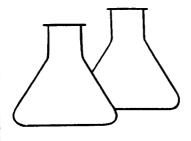
ND - Parameter not detected at the stated detection limit.

Comments:

2198 E. Bloomfield Highway

S. Gjenner

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EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client: Smith In	nternational	Project #:	91410
Sample ID:	MW # 2	Date Reported:	09-23-93
Laboratory Number:	6147	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-23-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.20
Acenaphthylene	ND	0.50
Acenaphthene	ND	1.02
Fluorene	ND	0.43
Phenanthrene	ND	0.87
Anthracene	ND	0.47
Fluoranthene	ND	0.20
Pyrene	ND	1.17
Benzo(a)anthracene	ND	1.05
Chrysene	ND	1.38
Benzo(b) & Benzo(k)		
fluoranthene	ND	0.45
Benzo(a)pyrene	ND	0.20
Indeno(1,2,3-cd)		
pyrene	ND	0.20
& Dibenzo(a,h)anthracene		
Benzo(g,h,i)perylene	ND	0.20
SURROGATE RECOVERY	Parameter	Percent Recovery

1-fluoronapthalene 107 %

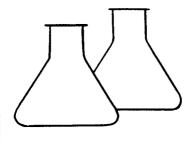
Methods:

Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 E. Bloomfield Highway

L. Gjennen Analyst





> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client: Smith Ir	iternational	Project #:	91410
Sample ID:	MW # 6	Date Reported:	09-22-93
Laboratory Number:	6148	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	HgCl & Cool	Date Analyzed:	09-22-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-Trimethylbenzene	ND	0.3
1,2,4-Trimethylbenzene	ND	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	99 %
Bromfluorobenzene	100 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

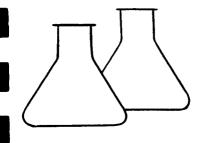
> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

2198 E. Bloomfield Highway

Gence Analyst





> EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

Client: Smith In	nternational	Project #:	91410
Sample ID:	MW # 6	Date Reported:	09-21-93
Laboratory Number:	6148	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Preservative:	Cool	Date Analyzed:	09-21-93
Condition:	Cool and Intact	Analysis Requested:	DCE-DBE

Concentration	Det. Limit (NG(I)
	(ug/L)
ND	0.1
ND ND	0.1 0.1
	(ug/L) ND ND

SURROGATE RECOVERIES:	Parameter	Percent Recovery
	Bromofluorobenzene	101 %
	Bromochloromethane	104 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

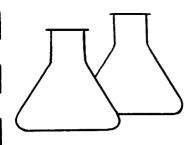
> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

2198 E. Bloomfield Highway

L. ajence ULL Analyst





EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Laboratory Number: 61 Sample Matrix: Wa Preservative: Co	rnational V # 6 148 ater ool ool & Intact	Project #: Date Reported: Date Sampled: Date Received: Date Analyzed: Analysis Requested:	91410 09-23-93 09-21-93 09-21-93 09-23-93 8100
Parameter	Concent (ug/		Det. Limit (ug/L)
Naphthalene	NE	 }	0.20
Acenaphthylene	NE		0.50
Acenaphthene	NE		1.02
Fluorene	NC)	0.43
Phenanthrene	NE)	0.87
Anthracene	NE)	0.47
Fluoranthene	NE		0.20
Pyrene	NE		1.17
Benzo(a)anthracene	NE		1.05
Chrysene	NC		1.38
Benzo(b) & Benzo(k)			
fluoranthene	ND		0.45
Benzo(a)pyrene	NE		0.20
Indeno(1,2,3-cd)			
pyrene	ND		0.20
& Dibenzo(a,h)anthrace			
Benzo(g,h,i)perylene	ND		0.20
SURROGATE RECOVERY	Paramet	er Percent Re	covery

-----1-fluoronapthalene 100 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986.

ND - Parameter not detected at the stated detection limit.

2198 E. Bloomfield Highway Comments:

L. Clemen Analyst

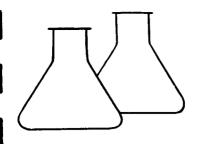
Review

Envirotech Laboratories

5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615

QUALITY ASSURANCE/QUALITY CONTROL

DOCUMENTATION





5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Concentration (ug/L)	Det. Limit (ug/L)
ND	0.2
ND	0.3
ND	0.2
ND	0.4
ND	0.3
	(ug/L) ND ND ND ND ND

SURROGATE	RECOVERIES:	Parameter	Percent Recovery
		Trifluorotoluene	98 %

Trifluorotoluene									98	%	
Bromofluorobenzene							102 %				
 _	-	_	_				-	-		_	

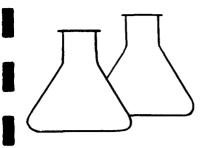
Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Gener Analyst





5796 US Highway 64-3014 • Farmington, New Mexico 87401 Phone: (505) 632-0615 • Fax: (505) 632-1865

> EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-22-93
Laboratory Number:	0922AM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-22-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-butyl Ether	ND	0.2
Benzene	ND	0.2
Toluene	ND	0.3
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.2
o-Xylene	ND	0.3
1,3,5-trimethylbenzene	ND	0.3
1,2,4-trimethylbenzene	ND	0.3

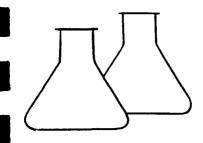
SURROGATE RECOVERIES:	Parameter	Percent Recovery		
		Trifluorotoluene	98 %	
		Bromfluorobenzene	102 %	

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

in F. Cejanan Analyst





the application of the state of the state of the

EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-21-93
Laboratory Number:	0921vol.blk	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-21-93
Condition:	NA	Analysis Requested:	8010

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
~~~~~~		~~_
1,1-Dichloroethane	ND	0.1
1,2-Dichloroethane	ND	0.1
1,2-Dibromoethane	ND	0.1

SURROGATE RECOVERIES:	Parameter	Percent Recovery
	Bromofluorobenzene	99 %
	Bromochloromethane	95 %

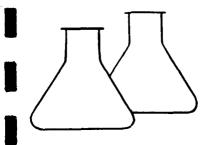
Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst L. Gjenner





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EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	09-23-93
Laboratory Number:	0923pah.blk	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	09-23-93
Condition:	NA	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	1.0
Fluorene	ND	0.4
Phenanthrene	ND	0.9
Anthracene	ND	0.5
Fluoranthene	ND	0.2
Pyrene	ND	1.2
Benzo(a)anthracene	ND	1.1
Chrysene	ND	1.4
Benzo(b) & Benzo(k)		
fluoranthene	ND	0.5
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd)		
pyrene	ND	0.2
& Dibenzo(a,h)anthracene		
Benzo(g,h,i)perylene	ND	0.2
SURROGATE RECOVERY:	Parameter	Percent Recovery

Methods:

Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

1-fluoronapthalene

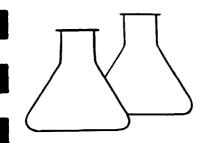
ND - Parameter not detected at the stated detection limit.

Comments:

J. Gjenne Analyst

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** QUALITY ASSURANCE EPA METHOD 8020 MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	09-22-93
Laboratory Number:	6147-S-BTEX	Date Sampled:	09-21-93
Sample Matrix:	Water	Date Received:	09-21-93
Analysis Requested:	BTEX	Date Analyzed:	09-22-93
Condition:	NA		

Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	% Rec. Accept. Range
18	0.2	88	39-150
18	0.3	90	46-148
19	0.2	95	32-160
20	0.4	100	46-148
21	0.3	102	46-148
	Result (ug/L)  18 18 19 20	Result Limit (ug/L) (ug/L) 	(ug/L) (ug/L) 18 0.2 88 18 0.3 90 19 0.2 95 20 0.4 100

Method:

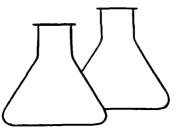
Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

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** QUALITY ASSURANCE EPA METHOD 8020 MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client: NA Project #: NA Sample ID: Sample Spike Date Reported: 09-22-93 Laboratory Number: 6147-S-MTBE. Date Sampled: 09-21-93 Sample Matrix: Water Date Received: 09-21-93 Analysis Requested: BTEX Date Analyzed: 09-22-93 Condition: NA

Parameter	Sample Result (ug/Kg)	Spike Added (ug/Kg)	Spiked Sample Result (ug/Kg)	Det. Limit (ug/Kg	Percent Recovery )	SW-846 % Rec. Accept. Range
Methyl-t-Butyl Ether	ND	20	20.0	0.2	100	
Benzene	ND	20	17.7	0.2	88	39-150
Toluene	ND	20	18.3	0.3	91	46-148
Ethylbenzene	ND	20	18.9	0.2	94	32-160
p,m-Xylene	ND	20	20.3	0.2	101	46-148
o-Xylene	ND	20	20.6	0.3	102	46-148
1,3,5-TMBenzene	ND	20	19.8	0.3	98	
1,2,4-MTBenzene	ND	20	20.6	0.3	102	

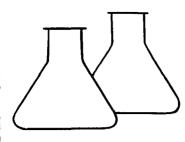
Method:

Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

L. Cejemen Analyst





** QUALITY ASSURANCE EPA METHOD 8010 MATRIX SPIKE - HALOGENATED VOLATILE ORGANICS

Client: NA Project #: NA Sample ID: Sample Spike Date Reported: 09-21-93 Date Sampled: 09-17-93 Laboratory Number: 6129-S-EDB. Date Received: 09-17-93 Sample Matrix: Water 8010 Analysis Requested: Date Analyzed: 09-21-93 Condition: NA 

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range	
1,1-Dichloroethane	ND	10.0	10.0	0.1	100	39-150	
1,2-Dichloroethane	ND	10.0	10.5	0.1	105	46-148	
1,2-Dibromoethane	ND	10.0	10.4	0.1	104	32-160	

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

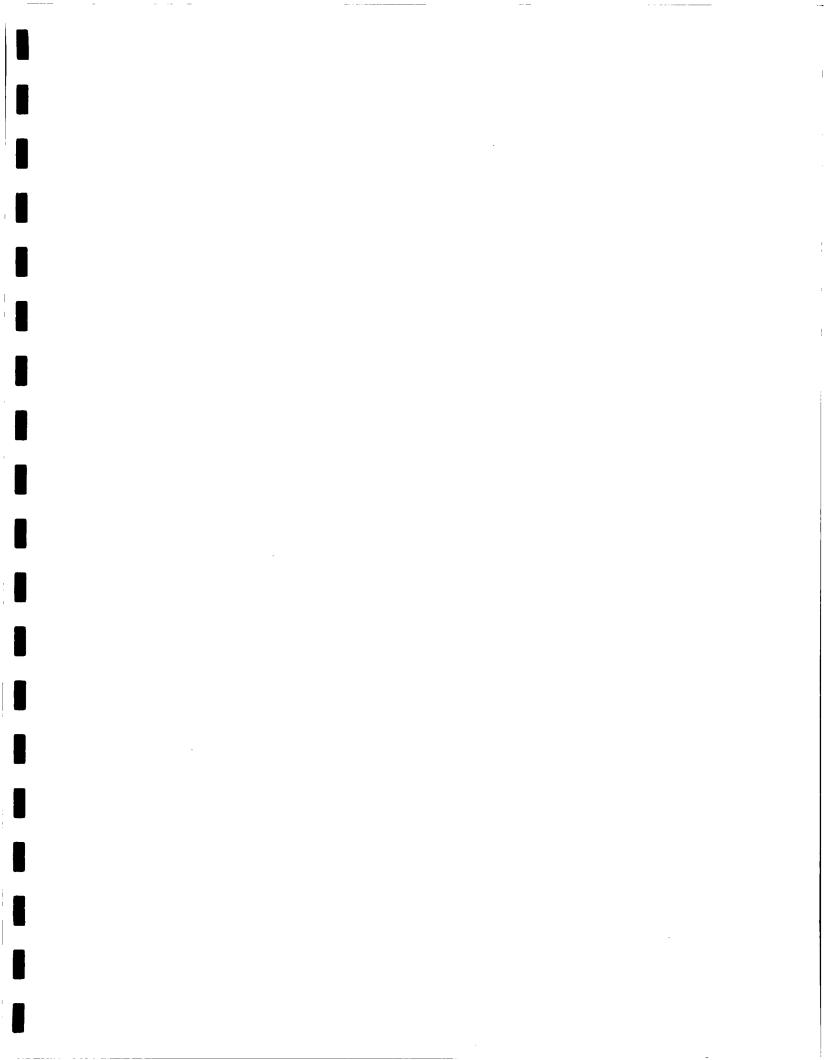
> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

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				CHAIN OF CUSTODY RECORD	STODY F	RECOL	۵				• )	5055
Client/Project Name 91410 SW117H INTERNATICNAL	914 TICHAC	01,	Project Location 2198 E. BLo	Project Location 2198 E. BLOOMFIELD HWY			-	ANAL	ANALYSIS/PARAMETERS	TERS		
Sampler: (Signature) $\mathcal{R},\ \mathcal{F},\ \mathcal{O}$	Onell		Chain of Custody Tape No.	No.	of Defa		202	38	anart		Remarks	
Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. Contai	318	5081	ШШ	THEAT			
MW #4	9-21-93	110	6145	yautro	7	7						
SF ME	9-21-93	1155	6146	WATER	2	7						
1m 6 # 2	9-21-93	1350	チャーの	w Ater	ы	7	7	7	7			
MW # 6	9-21-93	12.55	6148	MATER	3	7	7	7	2			
y: (Signatu					Received by: (Signature)	(Signature		-			Date	Time
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				ENVIROTECH INC. 5796 U.S. Highway 64-3014 Farmington, New Mexico 87401	ENVIROTECH INC. 5796 U.S. Highway 64-3014 trmington, New Mexico 874	7401 7401						
				(enc)	GTQ0-250 (GDG)							and from source from 578 at





## RECEIVED

PHASE 5

APR 1 5 1993

OIL CONSERVATION DIV. SANTA FE

# MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY NEW MEXICO

PREPARED FOR THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

## COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

**MARCH 1993** 

## PROJECT NO: 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

#### PHASE 5

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

#### PREPARED FOR THE NEW MEXICO ENVIRONMENTAL DEPARTMENT

#### COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

PROJECT NO: 91410

MARCH 1993

ENVIROTECH INC. ENVIRONMENTAL SCIENTISTS & ENGINEERS 5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO

(505) 632-0615

#### PHASE 5

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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PURPOSE & SCOPE OF SERVICES	.2
SAMPLING & ANALYSIS RESULTS	. 2

#### SECTION 2

CONCLUS	IONS.	• • • • • • • • • • • • • • • • • • • •	
CLOSURE	AND	LIMITATIONS	

#### APPENDIX

SITE PLAN LABORATORY ANALYSES QA/QC DOCUMENTATION CHAIN-OF-CUSTODY

÷ -

#### PHASE 5

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

#### INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to obtain closure at three spill remediation sites located on the subject property. This property is currently the staging yard for Smith Energy Services. This sampling report is prepared for the New Mexico Environmental Department (NMED), initiating a two year monitoring program of select monitoring wells. The monitoring program, described in a Phase 5 Workplan, was verbally approved by the NMED on March 26, 1993. This sampling parallels a New Mexico Oil Conservation Division (NMOCD) sampling plan requested in a letter dated November 17, 1992. The long term monitoring would verify cleanup of the site described in the following previously prepared closure reports:

- UST Closure Report, Diesel & Gasoline Fuel System (March 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted to the NMED.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS) Wash Bay Solids Disposal Area Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a track excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Monitor well locations are designated on the site plan located in the Appendix.

#### PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of the UST site at the Smith International property. This sampling program is designed to complete a 2-year evaluation of the reclamation operations as described in a Phase 5 Workplan submitted to the NMED on March 18, 1993.

The scope of services that Envirotech provides includes the following:

- A. Collect water samples from two down-gradient monitoring wells, MW-2 and MW-6, as shown on the attached site diagram. Sampling is scheduled to be done in March and September of 1993 and again in September of 1994. Sampling requirements beyond the initial sampling event will be reviewed by the NMED.
- B. Samples are to be analyzed by Envirotech Labs for Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), MTBE, EDB, EDC, and Naphthalene.
- C. Report on sampling results.

#### SAMPLING & ANALYSIS RESULTS

Monitor wells #2 and #6 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and preserved with 5% HgCl₂. An additional one liter (1 L) sample was collected in a laboratory supplied glass container for the Naphthalene test. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX and MTBE analysis using United States Environmental Protection Agency (USEPA) Method 8020. EDB and EDC analyses were done using USEPA Method 8010, and Naphthalene analyses were done using USEPA Method 8100. Sampling was performed according to USEPA SW-846 protocol. A summary of the results of the laboratory analyses for the samples taken March 30, 1993 are presented in Table 1. Previous test results for samples taken May 26 and August 13, 1992 are also included for comparison. Table 2 contains field test results.

# Table 1Groundwater MonitoringLaboratory Results (μg/l)Smith International Inc.2198 East Bloomfield HighwayFarmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	•••• •••••••••••••••••••••••••••••••••	N/D
MW-2 (5-26-92)	N/D	N/D	N/D	N/D
MW-6 (8-13-92)	N/D	7.9	N/D	2.7
WELL #/DATE	MTBE	EDB	EDC	NAPHTHA.
MW-2 (3-30-93)	N/D	N/D	N/D	N/D
MW-6 (3-30-93)	N/D	N/D	N/D	N/D

Notes: 1) N/D = not detected

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2) T-XYLENE = Total xylene including p,m and o-xylene.

3)  $\mu g/l = Micrograms/liter equiv. to parts per billion.$ 

4) MTBE = Methyl tertiary butyl ether

5) EDB = Ethylene dibromide

6) EDC = 1, 2-dichloroethane

7) Naptha. = Naphthalene

8) Test Results by EPA Methods 8020, 8010, and 8100.

Table 2 Groundwater Monitoring Field Test Results (3-30-93) Smith International Inc. 2198 East Bloomfield Highway Farmington, New Mexico

WELL #	OVM	рн	$\mu$ MHO	TEMP (°C.)
MW-2	N/D	7.0	190	16
MW-6	N/D	7.0	190	17
Notes: 1)	OVM = Organ	ic Vapor Mete	r (PPM)	

2)  $\mu$ MHO = Conductivity measurement

3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

#### CONCLUSIONS

Sample results would indicate that residual contaminants detected in previous sampling events have naturally dissipated and/or degraded. Site remediation appears to have eliminated a source for groundwater contamination.

#### CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX, MTBE, EDC, EDB, and Naphthalene analysis. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Environmental Department and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted, ENVIROTECH INC.

Pobert E O'Nell

Robert E. O'Neill Environmental Engineer

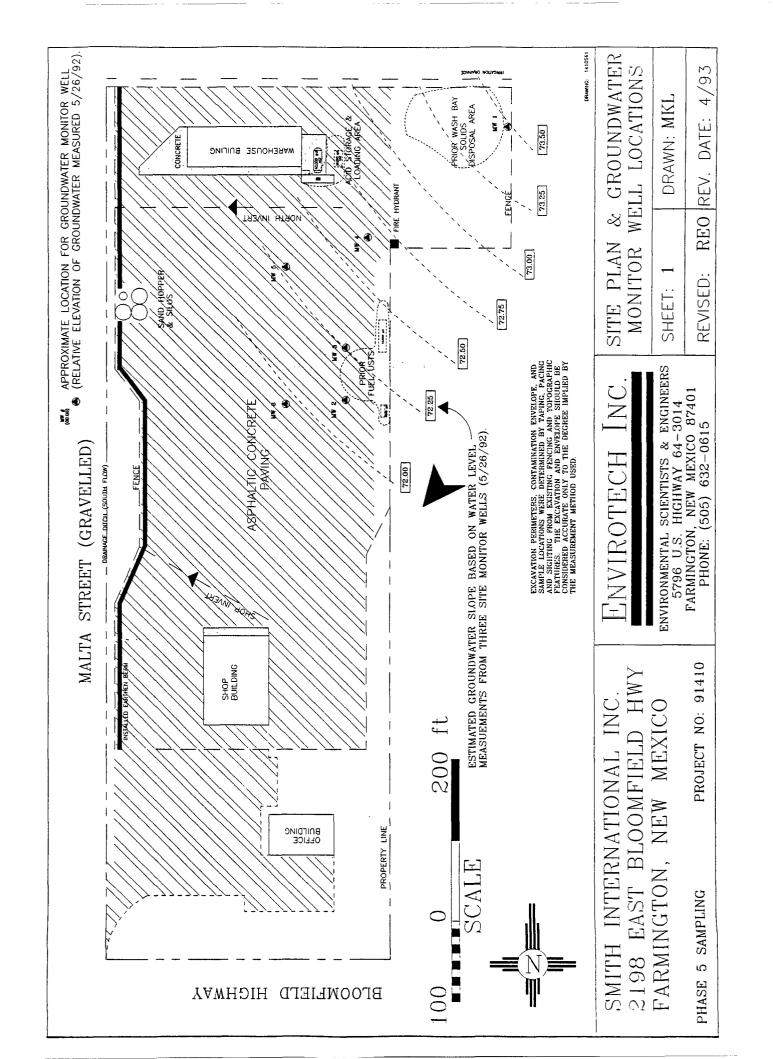
Appendix: Site Plan Laboratory Results QA/QC Documentation Chain-of-Custody

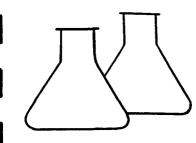
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Reviewed by:

Michael K. Lane, P.E. Geological Engineer

91410MED.RPT







EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	alProject #:	91410
Sample ID:	MW # 2	Date Reported:	04-01-93
Laboratory Number:	4880	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

Percent Recovery
95 %
ne 111 %

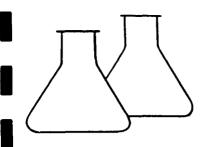
Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

al Chaharlag Analyst Review





#### EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

nternational	Project #:	91410
MW # 2	Date Reported:	04-01-93
4880	Date Sampled:	03-30-93
Water	Date Received:	03-30-93
Cool	Date Analyzed:	04-01-93
Cool & Intact	Analysis Requested:	EDC-EDB
	MW # 2 4880 Water Cool	MW # 2Date Reported:4880Date Sampled:WaterDate Received:CoolDate Analyzed:

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE	<b>RECOVERIES:</b>	Parameter	Percent Recovery
	dan saw	Bromofluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

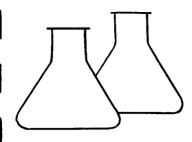
> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

L. Ceremen Analyst

Review



5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

> EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client: Smith I	international, Inc.	Project #:	91410
Sample ID:	MW # 2	Date Reported:	04-01-93
Laboratory Number:	4880	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k)		
fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd)		
pyrene 🔔	ND	0.2
& Dibenzo(a,h)anthracene		
Benzo(g,h,i)perylene	ND	0.2

SURROGATE RECOVERY Parameter Percent Recovery 1-fluoronapthalene 93.9 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

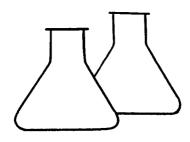
Comments: 2198 East Bloomfield Hwy.

L. afener

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EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	alProject #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Number:	4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L) 
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE	<b>RECOVERIES:</b>	Parameter	Percent Recovery
		Trifluorotoluene	104 %
	den	Bromofluorobenzene	106 %

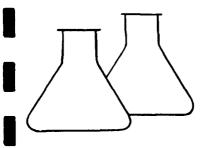
Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

<u>Cu Chahalag</u> Analyst





#### EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

Client: Smith I	nternational	Project #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Number:	4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	EDC-EDB

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
	**********	
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE	<b>RECOVERIES:</b>	Parameter	Percent Recover	У
			~~	-
		Bromofluorobenzene	96	૪

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

L. ajenne

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Analyst



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5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

> EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client: Sm	ith International, Inc.	. Project #:	91410
Sample ID:	MW # 6	Date Reported:	04-01-93
Laboratory Num	ber: 4881	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	Cool	Date Analyzed:	04-01-93
Condition:	Cool & Intact	Analysis Requested:	8100

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k)		
fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd)		
pyrene +- & Dibenzo(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2

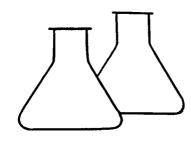
SURROGATE RECOVERY	Parameter	Percent Recovery
	1-fluoronapthalen	e 93.7 %

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

L. ajenno Analyst





EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L) 
Methyl-t-Butyl Ether	ND	0.2
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

<b>RECOVERIES:</b>	Parameter	Percent Recovery
	نے بنا جا جہ جہ جہ حد ناہ	
	Trifluorotoluene	103 %
	Bromofluorobenzene	109 %
	RECOVERIES:	Trifluorotoluene

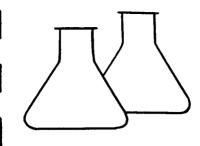
Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Chaharlang . Analyst

Review





EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

SURROGATE RECOVERIES:	Parameter	Percent Recovery
	<b></b>	
	Trifluorotoluene	103 %
	Bromofluorobenzene	109 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

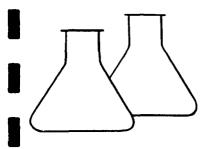
ND - Parameter not detected at the stated detection limit.

Comments:

Chaharlay Analyst

Review

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#### EPA METHOD 8010 HALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0401DCE.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	8010

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
	*******	
1,1-Dichloroethane	ND	0.7
1,2-Dichloroethane	ND	0.3
1,2-Dibromoethane	ND	2.0

SURROGATE	<b>RECOVERIES:</b>	Parameter	Percent Recovery
	an en	Bromofluorobenzene	102 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8010, Halogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

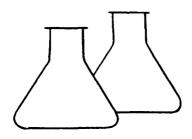
ND - Parameter not detected at the stated detection limit.

Comments:

J. ajenen

Review

Analyst





#### EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0401PAH.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	8100

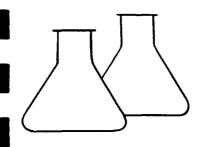
Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Naphthalene	ND	0.2
Acenaphthylene	ND	0.2
Acenaphthene	ND	0.2
Fluorene	ND	0.2
Phenanthrene	ND	0.2
Anthracene	ND	0.2
Fluoranthene	ND	0.2
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b) & Benzo(k)		
fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Indeno(1,2,3-cd)		
pyrene +-	ND	0.2
& Dibenzo(a,h)anthracene		
Benzo(g,h,i)perylene	ND	0.2
SURROGATE RECOVERY:	Parameter	Percent Recovery

URROGATE	RECOVERY:	Parameter	Percent	Reco	very
		1-fluoronapthalene	•	95.8	00

Methods: Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

un R. Giemen Analyst





#### EPA METHOD 8100 POLYNUCLEAR AROMATIC HYDROCARBONS

Client: Sample ID: Laboratory Number: Sample Matrix:	NA Method Blank Ø331PAH.MB Water	Project #: Date Reported: Date Sampled: Date Received:	NA 04-01-93 NA NA
Preservative: Condition:	Cool Cool & Intact	Date Analyzed: Analysis Requested:	04-01-93 8100
			Det.
	Concent	cration	Limit
Parameter	(ug/	'L)	(ug/L)
Naphthalene	 NE	)	0.2
Acenaphthylene	NI		0.2
Acenaphthene	NI		0.2
Fluorene	NI		0.2
Phenanthrene	NI		0.2
Anthracene	NI		0.2
Fluoranthene	NE	)	0.2
Pyrene	NI	)	0.2
Benzo(a)anthracene	NI	)	0.2
Chrysene	NI	)	0.2
Benzo(b) & Benzo(k)			
fluoranthene	NE	)	0.2
Benzo(a)pyrene	NI	)	0.2
Indeno(1,2,3-cd)			

Indeno(1,2,3-cd) pyrene & Dibenzo(a,h)anthracene Benzo(g,h,i)perylene

SURROGATE RECOVERY

ParameterPercent Recovery1-fluoronapthalene94.5 %

0.2

0.2

Methods:

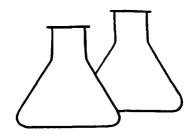
Method 8100, Polynuclear Aromatic Hydrocarbons, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND

ND

ND - Parameter not detected at the stated detection limit.

L. Gener Analyst





S. C. Sugar Chick

****** QUALITY ASSURANCE EPA METHOD 8020 MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA			NA
Sample ID:	Sample Spike		Date Reported:	04-01-93
Laboratory Number:	4879		Date Sampled:	03-30-93
Sample Matrix:	Water		Date Received:	03-30-93
Analysis Requested:	BTEX		Date Analyzed:	03-31-93
Condition:	NA		-	
		Contrad		011-046

Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
ND	20	17.3	0.3	86	39-150
ND	20	17.7	1.5	87	46-148
ND	20	18.5	0.3	92	32-160
ND	20	18.4	0.5	91	46-148
ND	20	18.4	0.3	91	46-148
	Result (ug/L) ND ND ND ND ND	ResultAdded(ug/L)(ug/L)ND20ND20ND20ND20ND20	Sample ResultSpike AddedSample Result(ug/L)(ug/L)(ug/L)ND2017.3ND2017.7ND2018.5ND2018.4	Sample Spike Result Added Sample Result Limit (ug/L) (ug/L) Det. Limit Limit (ug/L)   ND 20 17.3 0.3   ND 20 17.7 1.5   ND 20 18.5 0.3   ND 20 18.4 0.5	Sample Result Added Sample Result Limit Det. Percent Recovery   (ug/L) (ug/L) (ug/L) Limit Recovery   ND 20 17.3 0.3 86   ND 20 17.7 1.5 87   ND 20 18.5 0.3 92   ND 20 18.4 0.5 91

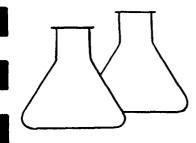
Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Cu Chaharlag Analyst

Review





** QUALITY ASSURANCE EPA METHOD 8010 MATRIX SPIKE - HALOGENATED VOLATILE ORGANICS

Client: NA Project #: NA Sample ID: Sample Spike Date Reported: 04-01-93 Laboratory Number: 4881VOL. Date Sampled: 03-30-93 Sample Matrix: Water Date Received: 03-30-93 Analysis Requested: 8010 Date Analyzed: 04-01-93 Condition: NA

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
1,1-Dichloroethane	ND	10.0	10.5	0.7	105	39-150
1,2-Dichloroethane	ND	10.0	9.0	0.3	89	46-148
1,2-Dibromoethane	ND	10.0	9.2	2.0	91	32-160

Method:

Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

P. Ceremen Analyst

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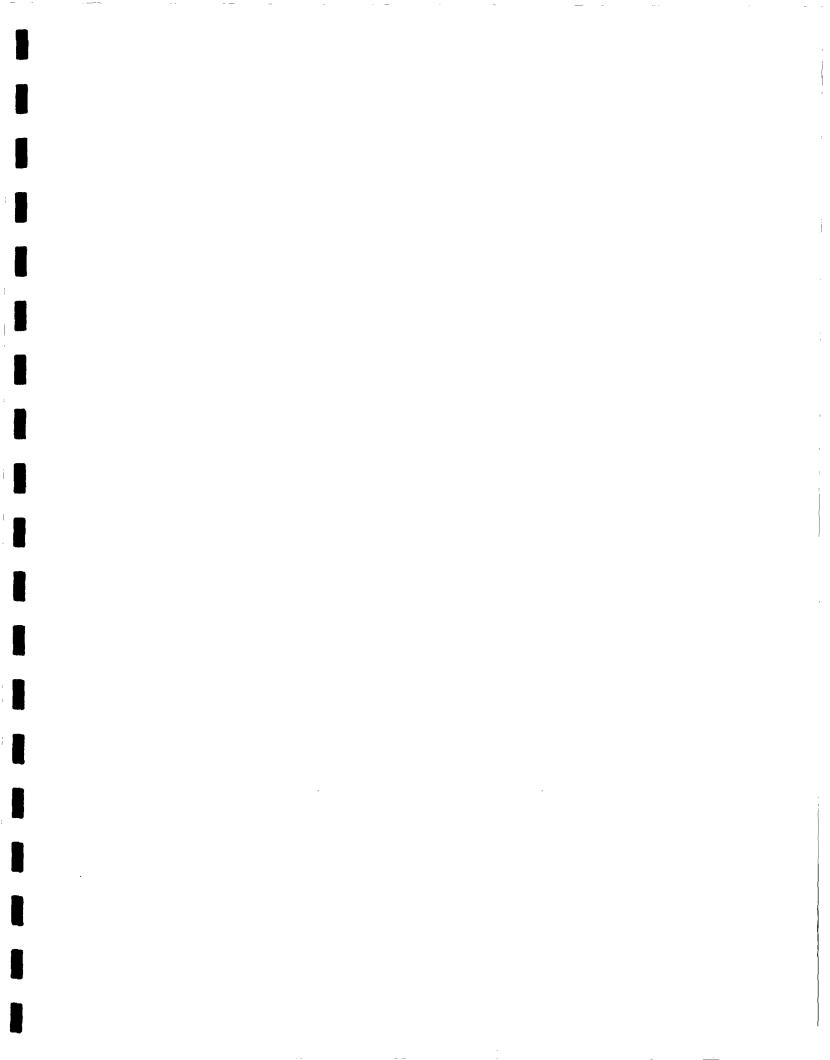
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APR 1 5 1993

OIL CONSERVATION DIV. SANTA FE

# MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY NEW MEXICO

PREPARED FOR THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

**MARCH 1993** 

## PROJECT NO: 91410

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

#### PREPARED FOR THE NEW MEXICO OIL CONSERVATION DIVISION

COMMISSIONED BY MR. MAURICE STICKER ENVIRONMENTAL AFFAIRS COORDINATOR SMITH INTERNATIONAL INC.

**PROJECT NO: 91410** 

MARCH 1993

ENVIROTECH INC. ENVIRONMENTAL SCIENTISTS & ENGINEERS 5796 U.S. HIGHWAY 64-3014 FARMINGTON, NEW MEXICO

(505) 632-0615

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY SE/4, SW/4, SECTION 14, TOWNSHIP 29N, RANGE 13W FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

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SITE PLAN NMOCD LETTER LABORATORY ANALYSES QA/QC DOCUMENTATION CHAIN-OF-CUSTODY

#### MARCH 1993 SAMPLING SMITH INTERNATIONAL INC. 2198 EAST BLOOMFIELD HIGHWAY FARMINGTON, SAN JUAN COUNTY, NEW MEXICO

#### INTRODUCTION

Envirotech Inc. has been retained by Smith International, Inc., to obtain closure at three spill remediation sites located on the subject property. This property was the staging yard for Smith Energy Services. This sampling report is prepared for the New Mexico Oil Conservation Division (NMOCD), initiating a monitoring program of select monitoring wells. This sampling plan follows a request by Mr. William C. Olson of the NMOCD in a letter dated November 17, 1992 to Mr. Maurice Sticker of Smith International Inc (attached). The long term monitoring requested would verify cleanup of the sites described in the following previously prepared closure reports:

- Surface Impoundment Closure Report, Wash Bay Solids Disposal Area (April 1992)
- Acid UST and Sump Closure Report, Acid Storage Tank and Loading Area (May 1992)
- Acid UST & Sump Closure Supplemental Report, Smith International, Inc., 2198 East Bloomfield Highway, Farmington, New Mexico (July 1992)
- Groundwater Assessment Supplemental Closure Report (October 1992)

All of the closure reports have been submitted to the NMOCD.

From December 1991 to June 1992, Envirotech Inc. conducted an extensive abatement program for site closures. Three sites of principal concern were involved at the subject property. These sites consisted of the:

Fuel Underground Storage Tank System (USTS) Wash Bay Solids Disposal Area Acid Tank Storage and Loading Area

Lead State of New Mexico regulatory agencies were contacted and involved with the closure operations. At all three sites, the reclamation action consisted of excavation and removal of the hydrocarbon contaminated soils for treatment. The excavations were extended to depths on the order of 28 feet (approximate depth of groundwater) with a track excavator. Approximately 13,000 cubic yards of soil were removed for treatment.

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Based on the site assessment conducted during the closures and abatement operations, the hydrocarbon contamination of soil appeared to be limited to the immediate area around each site. All soils exceeding the current regulatory levels for hydrocarbon contamination were excavated and removed for remediation in all areas practically feasible. Prior to backfilling, approval to close was given by Mr. Denny Foust, Oil and Gas Inspector, NMOCD, and/or the NMED for all areas of concern.

As part of the pre-abatement assessment, three groundwater monitor wells were installed on the property. Water samples analyzed from these wells indicated that the groundwater quality had not been significantly impacted. Considering the extent of the soil contamination, the NMOCD and NMED requested the installation of three additional groundwater monitoring wells and sampling to verify the groundwater quality. The analyses from the additional wells also indicated the residual hydrocarbon contamination to be well below the current regulatory limits. Well locations are designated on the site plan located in the Appendix.

#### PURPOSE & SCOPE OF SERVICES

The purpose of this monitoring plan is to complete the closure of those areas under the NMOCD's jurisdiction, the waste acid underground storage tank and the wash bay solids disposal area sites at the Smith International property. This sampling program is designed to complete a long term monitoring evaluation of the reclamation operations.

The scope of services that Envirotech provides includes the following:

- A. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Future sampling requirements will be reviewed by the NMOCD.
- B. Groundwater samples from the monitor wells are to be analyzed for pH, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX). Samples are to be analyzed by Envirotech Labs using EPA method 8020 for BTEX.
- C. The results of the monitor well sampling will be submitted to the OCD within 60 days of the sampling event.

#### SAMPLING & ANALYSIS RESULTS

Monitor wells #4 and #5 were purged by bailing until a minimum of three (3) well volumes had been removed. After purging, water samples were collected in laboratory supplied 40 ml VOA vials and

preserved with 5% HgCl₂. The water samples were placed on ice and transported to Envirotech's laboratory for BTEX analysis using United States Environmental Protection Agency (USEPA) Method 8020. Sampling was done according to USEPA SW-846 protocol.

A summary of the results of the laboratory analyses for the samples taken March 30, 1993 are presented in Table 1. Previous laboratory results for samples taken August 13, 1992 are also included for comparison. Table 2 contains field test results.

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#### Groundwater Monitoring Laboratory Results ( $\mu g/l$ ) Smith International Inc. 2198 East Bloomfield Highway Farmington, New Mexico

WELL #/DATE	BENZENE	TOLUENE	ETHYLBENZENE	T-XYLENE
MW-4 (3-30-93)	N/D	N/D	N/D	N/D
MW-5 (3-30-93)	N/D	N/D	N/D	N/D
MW-4 (8-13-92)	N/D	5.4	4.1	N/D
MW-5 (8-13-92)	N/D	5.1	3.7	3.2

Notes: 1) N/D = Not detected.

2)

T-XYLENE = Total xylene including p,m-xylene and o-xylene.

3)  $\mu$ g/L. = Micrograms per liter equivalent to parts per billion.

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4) Test results by EPA Method 8020.

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Groundwater	M	on	itor	ing

Field Test Results (3-30-93)

Smith International Inc.

2198 East Bloomfield Highway

Farmington, New Mexico

WELL #	OVM	рН	$\mu$ MHO	TEMP (°C.)
MW-4	N/D	6.9	190	16
MW-5	N/D	7.3	250	16

Notes: 1)

OVM = Organic Vapor Meter

2)  $\mu$ MHO = Conductivity measurement

3) N/D = Not detected

All laboratory sample results including QA/QC documentation are included in the Appendix.

#### CONCLUSIONS

Sample results would indicate that residual contaminants detected in previous sampling events have naturally dissipated and/or degraded. Site remediation appears to have eliminated a source for groundwater contamination.

#### CLOSURE AND LIMITATIONS

The scope of Envirotech's services was limited to sampling of the designated monitor wells for BTEX analysis and field testing. All work has been performed in accordance with generally accepted professional practices in geotechnical/environmental engineering and hydrogeology.

This report has been prepared for the exclusive use of the New Mexico Oil Conservation Division and Mr. Maurice Sticker of Smith International as it pertains to the subject site located at Farmington, New Mexico.

I hereby certify that the work described in this report was performed under my direct supervision, and that I am personally familiar with the nature of the work, the results of the monitoring, and the contents of this report.

Respectfully submitted, ENVIROTECH INC.

Pobert E O'Nell

Robert E. O'Neill Environmental Engineer

Appendix: Site Plan Laboratory Results QA/QC Documentation Chain-of-Custody

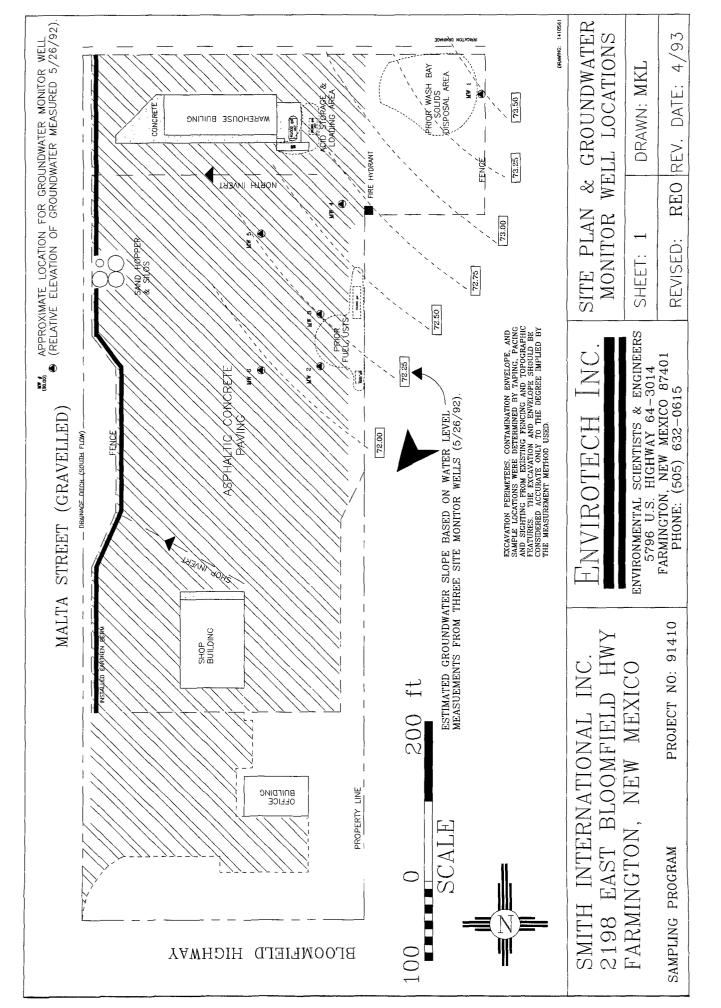
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Reviewed by:

Michael K. Lane, P.E. Geological Engineer

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STATE OF NEW MEXICO



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

POST OFFICE BOX 2088

STATE LAND OFFICE BUILDING

SANTA FE NEW MEXICO 87504

(505) 827-5800

BRUCE KING GOVERNOR

November 17, 1992

ANITA LOCKWOOD CABINET SECRETARY

> CERTIFIED MAIL RETURN RECEIPT NO. P-667-242-310

Mr. Maurice Sticker Environmental Affairs Coordinator Smith International, Inc. 16740 Hardy St. Houston, Texas 72205-0068

RE: SITE REMEDIATION AND GROUND WATER ASSESSMENT SMITH INTERNATIONAL, INC. FARMINGTON, NEW MEXICO

Dear Mr. Sticker:

The New Mexico Oil Conservation Division (OCD) has completed a comprehensive review of the following documents submitted by Envirotech, Inc. on behalf of Smith International, Inc. regarding soil remediation activities and ground water quality investigations at the Smith International, Inc. Farmington, New Mexico service company facility:

- 1. April 1992 "SURFACE IMPOUNDMENT CLOSURE REPORT, WASH BAY SOLIDS DISPOSAL AREA".
- 2. May 1992 "ACID UST AND SUMP CLOSURE REPORT".
- 3. June 1992 "OFFSITE DRAINAGE CLOSURE REPORT".
- 4. July 1992 "ACID UST & SUMP CLOSURE SUPPLEMENTAL REPORT, SMITH INTERNATIONAL, INC., 2198 EAST BLOOMFIELD HIGHWAY, FARMINGTON, NEW MEXICO".
- 5. October 1992 "GROUNDWATER ASSESSMENT SUPPLEMENTAL, CLOSURE REPORT, SMITH INTERNATIONAL, INC., FARMINGTON, NEW MEXICO".

Mr. Maurice Sticker November 17, 1992 Page 2

The remedial activities for contaminated soils related to Smith International's waste disposal activities, as contained in the above reports, meet the OCD's requirements in effect at the time of closure of these disposal units. However, since the October 1992 report documented the presence of low level ground water contaminants in the monitor wells downgradient of both the waste acid underground storage tank and the wash bay solids disposal area the OCD requires the following long term monitoring:

- 1. Monitor wells MW-4 and MW-5 will be sampled in March and September of 1993. Thereafter, these monitor wells will be annually sampled during the month of September. Upon renewal of the facility's ground water discharge plan the sampling requirements will be reviewed.
- 2. Ground water samples from the monitor wells will be analyzed for pH, Benzene, Toluene, Ethylbenzene and Xylenes using EPA approved laboratory methods.
- 3. The results of the monitor well sampling will be submitted to OCD within 60 days of the sampling event.

Please be advised that OCD approval does not relieve you of liability should future sampling show ground water to be contaminated in excess of New Mexico Water Quality Control Commission ground water standards as a result of these closed disposal areas.

If you have any questions, please contact me at (505) 827-5885.

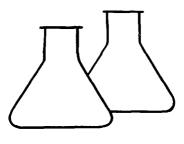
Sincerely,

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C. Que

William C. Olson Hydrogeologist Environmental Bureau

xc: Denny Foust, OCD Aztec Office Michael K. Lane, Envirotech, Inc.



5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	91410	
Sample ID:	MW # 4	Date Reported:	04-01-93
Laboratory Number:	4878	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

S: Parameter	Percent Recovery
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Trifluorotoluene	92 %
Bromofluorobenzene	98 %
	Trifluorotoluene

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

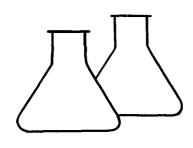
> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

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EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	Smith Internationa	91410	
Sample ID:	MW # 5	Date Reported:	04-01-93
Laboratory Number:	4879	Date Sampled:	03-30-93
Sample Matrix:	Water	Date Received:	03-30-93
Preservative:	HgCl & Cool	Date Analyzed:	03-31-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

Method:

Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

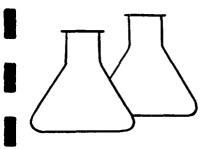
Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: 2198 East Bloomfield Hwy.

hahalang Analyst

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5796 US Highway 64-3014 • Farmington, New Mexico 87401 PHONE: (505) 632-0615 • Fax: (505) 632-1865

EPA METHOD 8020 AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	04-01-93
Laboratory Number:	0331BPM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	04-01-93
Condition:	NA	Analysis Requested:	BTEX
	,		

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.3
Toluene	ND	1.5
Ethylbenzene	ND	0.3
p,m-Xylene	ND	0.5
o-Xylene	ND	0.3

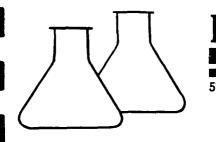
SURROGATE RECOVERIES:	Parameter	Percent Recovery
	Trifluorotoluene	103 %
	Bromofluorobenzene	109 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

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5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401 PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020 MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client: Project #: NA NA Sample ID: Sample Spike Date Reported: 04-01-93 Laboratory Number: Date Sampled: 03-30-93 4879 Date Received: 03-30-93 Sample Matrix: Water Analysis Requested: BTEX Date Analyzed: 03-31-93 Condition: NA

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20	17.3	0.3	86	39-150
Toluene	ND	20	17.7	1.5	87	46-148
Ethylbenzene	ND	20	18.5	0.3	92	32-160
p,m-Xylene	ND	20	18.4	0.5	91	46-148
o-Xylene	ND	20	18.4	0.3	91	46-148

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

> Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

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