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March 31, 2004

Mr. Charles Wein  
BP Products North America Inc.  
41 Regan Road  
Ridgefield, Connecticut 06877

**Re: NYSDEC Spill Number 97-13442**  
**BP Service Station Number 3887**  
**164 4<sup>th</sup> Avenue**  
**Brooklyn, New York**

Dear Mr. Wein:

Delta Environmental Consultants, Inc. (Delta) has prepared this letter on behalf of BP Products North America Inc. (BP) to serve as a Subsurface Hydrocarbon Assessment Report (SHAR) Addendum for BP Service Station number 3887, located on 164 4<sup>th</sup> Avenue, Brooklyn, Kings County, New York (the subject site). A Site Location Map is provided as Figure 1, Appendix A.

#### **SITE HISTORY**

A SHAR was issued for the subject site on October 3, 2001, documenting the installation of five permanent, two-inch diameter, monitoring wells (MW-1 through MW-5). On November 14, 2002, two additional monitoring wells were installed (MW-6 and MW-7).

Specifically, this SHAR Addendum documents the installation of three permanent, off-site monitoring wells on November 18 and 19, 2003. The locations of the monitoring wells are indicated on the Site Plan, Figure 2, Appendix A.

#### **FIELD INVESTIGATION METHODS**

Zebra Environmental, Corp. (Zebra) of Lynbrook, New York, on behalf of Delta, installed monitoring wells MW-8, MW-9, and MW-10 using a Geoprobe Model 6600 direct-push unit with hollow stem auger capability. Monitoring well MW-8 was installed southeast of the pump island, in the sidewalk along 4<sup>th</sup> Avenue. Monitoring wells MW-9 and MW-10 were installed down gradient of the station, in the sidewalk on the northern side of Degraw Street, as shown on the Site Plan.

Soil boring locations were pre-cleared to a depth of five feet (ft) below ground surface (bgs) using a truck-mounted air knife. A macro-core soil sampler, advanced by direct-push technique, was used to collect continuous soil samples from a depth of five to 24 feet (ft) below ground surface (bgs) during the

installation of MW-8, MW-9, and MW-10. Soil samples from the macro-core were inspected for visual evidence of petroleum impact and were screened for total volatile organic compounds (VOCs) using a photo-ionization detector (PID). The soil samples were classified in general accordance with the Unified Soil Classification System. Boring logs/monitoring well installation summaries for MW-8, MW-9, and MW-10 are provided in Appendix B.

Soil samples for laboratory analysis were collected from monitoring well boring MW-8 at the 12 to 14 ft bgs depth interval, monitoring well boring MW-9 at the 17 to 19 ft bgs depth interval, and monitoring well boring MW-10 at the 16 to 18 ft bgs depth interval. This depth interval generally represented the ground water interface as determined based upon field observations. No PID readings were detected at shallower depths within each boring. The soil samples were forwarded, under chain-of-custody procedures, to Accutest Laboratories (Accutest) of Dayton, New Jersey. Accutest is a New York State Department of Health-certified laboratory (Certification Number 10983). The soil samples were analyzed for New York State Department of Environmental Conservation (NYSDEC) Spill Technology And Remediation Series (STARS) Memo #1-listed VOCs in accordance with United States Environmental Protection Agency (USEPA) Method 8260.

Subsequent to sampling, 4.25-inch inside diameter augers were advanced to a depth of 23 to 24 ft bgs to facilitate the installation of monitoring wells at the boring locations. Monitoring well MW-8 was constructed of 15 ft of two-inch-diameter, Schedule 40, 0.020-inch slot, polyvinyl chloride (PVC) well screen and 8.5 ft of two-inch-diameter, Schedule 40, PVC riser pipe. Monitoring well MW-9 was constructed of 10 ft of two-inch-diameter, Schedule 40, 0.020-inch slot, PVC well screen and 13.5 ft of two-inch-diameter, Schedule 40, PVC riser pipe. Monitoring well MW-10 was constructed of 10 ft of two-inch-diameter, Schedule 40, 0.020-inch slot, PVC well screen and 12.5 ft of two-inch-diameter, Schedule 40, PVC riser pipe. A sand pack of Morie #2 well sand was installed from the completion depth of each well to two feet above the top of each well screen. A two-foot-thick Bentonite seal was installed immediately above each sand pack. The annular space, of each well, was back filled with native material from the top of the Bentonite seal to approximately one ft bgs. An eight-inch-diameter, bolt-down, flush-mount, protective casing was installed at ground surface using concrete to seal each well from approximately one ft bgs to grade level.

Ground water at the site is located between 16 and 20 ft bgs. The completion depth and approximate static ground water depth for each well documented in this SHAR Addendum is as follows:

<b>MONITORING WELL ID</b>	<b>COMPLETION DEPTH</b>	<b>APPROXIMATE STATIC GROUND WATER DEPTH</b>
MW-8	24.0 ft	16.5 ft
MW-9	24.0 ft	16.8 ft
MW-10	23.5 ft	16.5 ft

The three monitoring wells (MW-8, MW-9, and MW-10) were developed on November 19, 2003. The monitoring wells were developed by the over-purging method using a two-inch-diameter submersible pump. At a minimum, five casing volumes of water were purged from each monitoring well. The ground

water purged from each monitoring well was observed to be clear or have low turbidity at the conclusion of purging activities.

## **INVESTIGATION ANALYTICAL RESULTS**

As shown in Soil Analytical Results, Table 1, Appendix C, laboratory analysis did not identify exceedences of NYSDEC Soil Clean-up Objectives for VOCs in soil for any of the three soil samples analyzed. The analytical results are plotted on Soil Analytical Results, Figure 3, Appendix A. The laboratory analytical report is provided in Appendix D.

## **CONCLUSIONS**

Laboratory analysis did not identify VOCs in excess of the applicable NYSDEC Soil Clean-up Objectives in soil samples collected during monitoring well installation. Delta will sample the monitoring wells on a quarterly schedule and will continue to delineate hydrocarbon impacts.

## **LIMITATIONS**

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

If you should have any questions regarding this matter, please do not hesitate to contact us.

Sincerely,  
**Delta Environmental Consultants, Inc.**



Paul Meyer  
Project Scientist

C. Wein  
NYSDEC Spill Number 97-13442  
SHAR Addendum November 2003  
BP Service Station Number 3887  
March 31, 2004  
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Encl: Appendix A - Figure 1, Site Location Map  
Figure 2, Site Plan  
Figure 3, Soil Analytical Results  
Appendix B - Soil Boring/Monitoring Well Construction Summaries  
Appendix C - Table 1, Soil Analytical Results  
Appendix D - Laboratory Analytical Report


Cc: K. Foley – NYSDEC  
A. Lapine – Delta

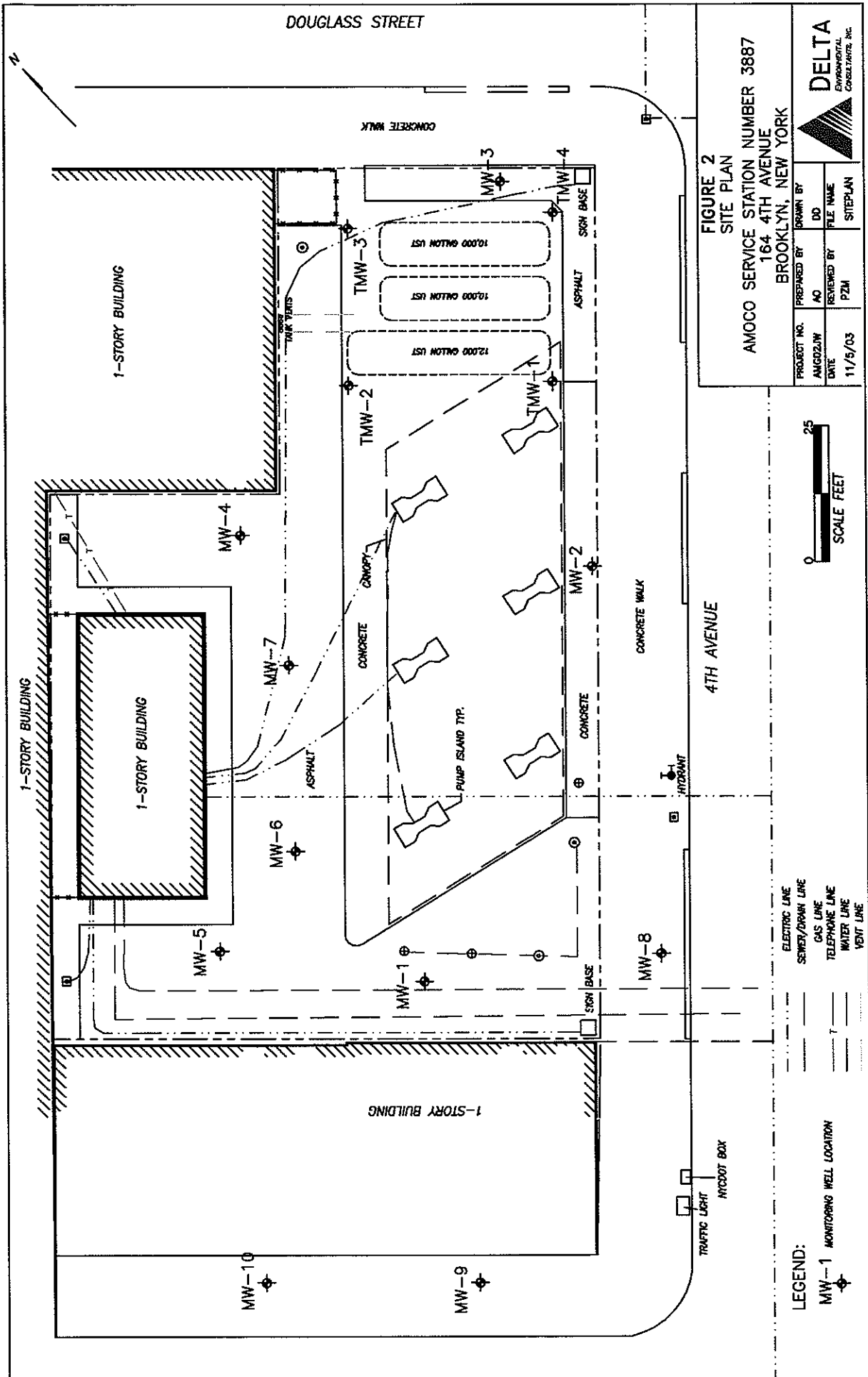
## **Appendix A**



MAP BASED ON USGS 7.5 MINUTES SERIES TOPOGRAPHIC MAP  
 BROOKLYN, NEW YORK QUADRANGLE  
 DATE 1960 EDITED 1971

**FIGURE 1**  
 SITE LOCATION MAP  
 BP SERVICE STATION NUMBER 3887  
 164 4TH AVENUE  
 BROOKLYN, NY

PROJECT NO. AMGO-2JF	PREPARED BY AO	DRAWN BY AO	
DATE 5/21/03	REVIEWED BY PZM	FILE NAME SLOC	



**FIGURE 2**  
**SITE PLAN**  
 AMOCO SERVICE STATION NUMBER 3887  
 164 4TH AVENUE  
 BROOKLYN, NEW YORK

PROJECT NO.	AMG021W	DATE	11/5/03
PREPARED BY	AO	REVIEWED BY	PZM
DRAWN BY	DD	FILE NAME	SITEPLAN



- LEGEND:**
- MW-1 MONITORING WELL LOCATION
  - ELECTRIC LINE
  - SEWER/DRAIN LINE
  - GAS LINE
  - TELEPHONE LINE
  - WATER LINE
  - VENT LINE

4TH AVENUE

DOUGLASS STREET



1-STORY BUILDING

1-STORY BUILDING

1-STORY BUILDING

1-STORY BUILDING

12,000 GALLON UST

12,000 GALLON UST

12,000 GALLON UST

PUMP ISLAND TYP.

MW-4

MW-6

MW-5

MW-1

MW-10

MW-9

CONCRETE WALK

MW-3

MW-4

TMW-2

TMW-1

MW-2

CONCRETE WALK

CONCRETE

CONCRETE

HYDRANT

MW-8

TRAFFIC LIGHT  
NYC DOT BOX

CONCRETE

CONCRETE

CONCRETE

CONCRETE

CONCRETE

CONCRETE





## **Appendix B**



**PROJECT INFORMATION**

PROJECT: **BP S/S 3887**  
 SITE LOCATION: **Brooklyn, NY**  
 JOB NO.: **AMG02HP**  
 LOGGED BY: **Andre Obligado**  
 PROJECT MANAGER: **Aaron Lapine**  
 DATES DRILLED: **November 18, 2003**

**DRILLING INFORMATION**

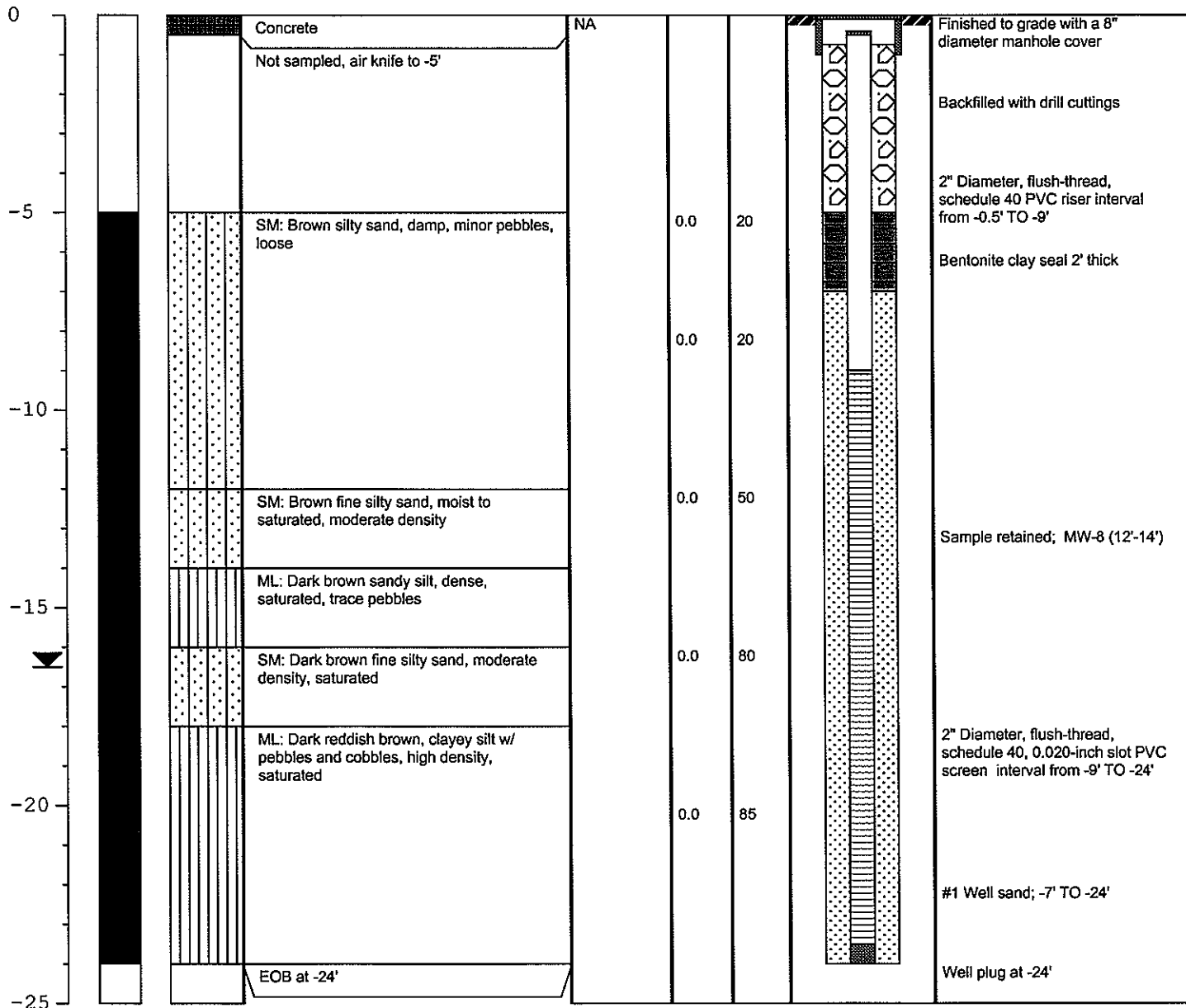
DRILLING CO.: **Zebra Environmental Corp**  
 DRILLER: **Bob Buraua**  
 RIG TYPE: **Geoprobe Model 6600**  
 METHOD OF DRILLING: **Direct push/4.25-inch ID HSA**  
 SAMPLING METHODS: **3-inch x 4-foot macrocore**  
 HAMMER WT./DROP **NA**

**NOTES:**

- ≡ Initial water level measurement
- ✕ Static water level measurement

SAMPLE ID: MW-8 (12'-14')

DEPTH	SAMPLE INTERVAL	SOIL TYPE	SOIL DESCRIPTION	BLOW COUNT	PID ppm	% REC	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
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**PROJECT INFORMATION**

PROJECT: BP S/S 3887  
 SITE LOCATION: Brooklyn, NY  
 JOB NO.: AMG02HP  
 LOGGED BY: Andre Obligado  
 PROJECT MANAGER: Aaron Lapine  
 DATES DRILLED: November 19, 2003

**DRILLING INFORMATION**

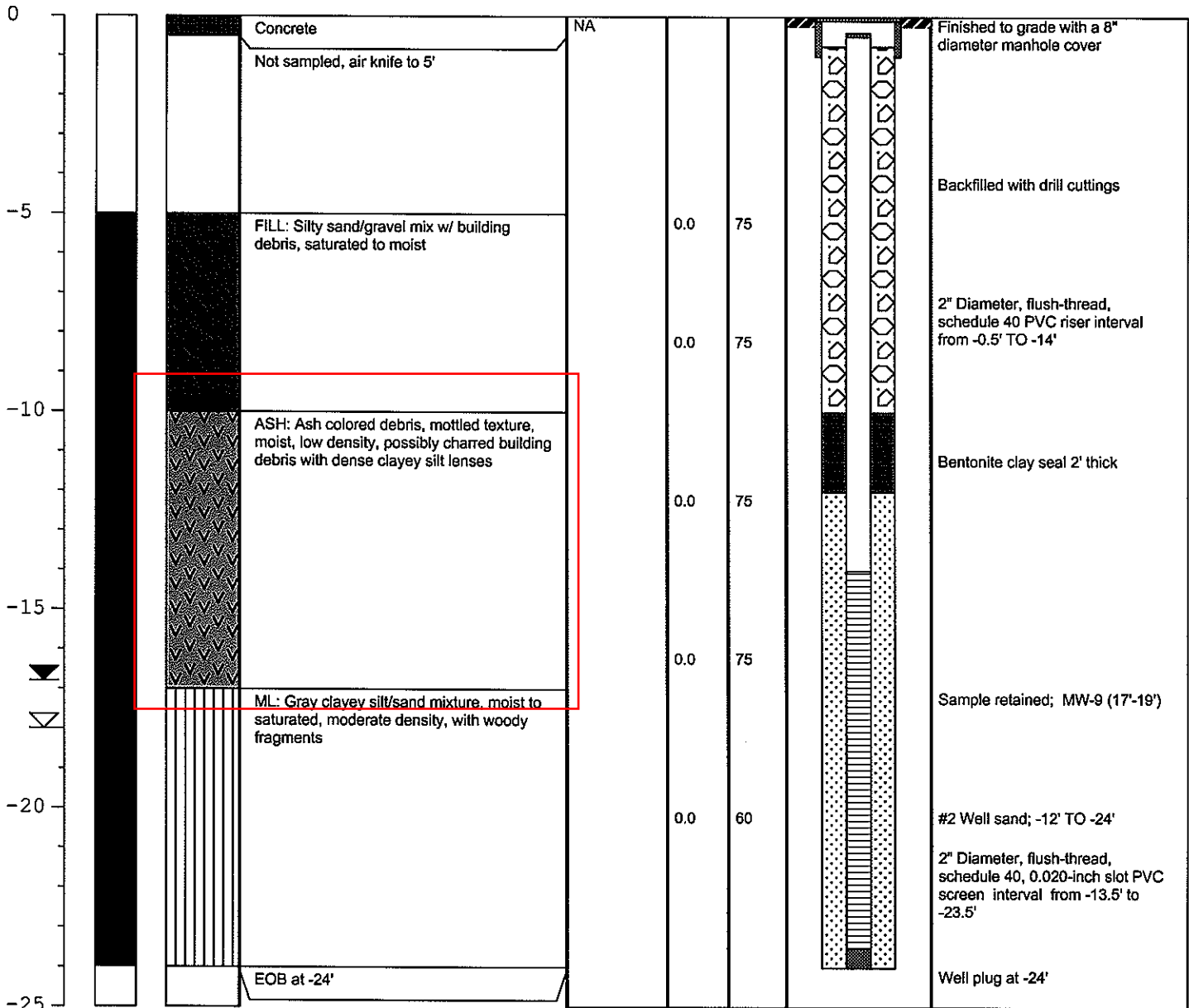
DRILLING CO.: Zebra Environmental Corp  
 DRILLER: Bob Buraua  
 RIG TYPE: Geoprobe Model 6600  
 METHOD OF DRILLING: Direct push/ 4.25-inch ID HSA  
 SAMPLING METHODS: 3-inch x 4-foot macrocore  
 HAMMER WT./DROP NA

**NOTES:**

- ≡ Initial water level measurement
- ▽ Static water level measurement

SAMPLE ID: MW-9 (17'-19')

DEPTH	SAMPLE INTERVAL	SOIL TYPE	SOIL DESCRIPTION	BLOW COUNT	PID ppm	% REC	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
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**PROJECT INFORMATION**

**PROJECT:** BP S/S 3887  
**SITE LOCATION:** Brooklyn, NY  
**JOB NO.:** AMG02HP  
**LOGGED BY:** Andre Obligado  
**PROJECT MANAGER:** Aaron Lapine  
**DATES DRILLED:** November 19, 2003

**DRILLING INFORMATION**

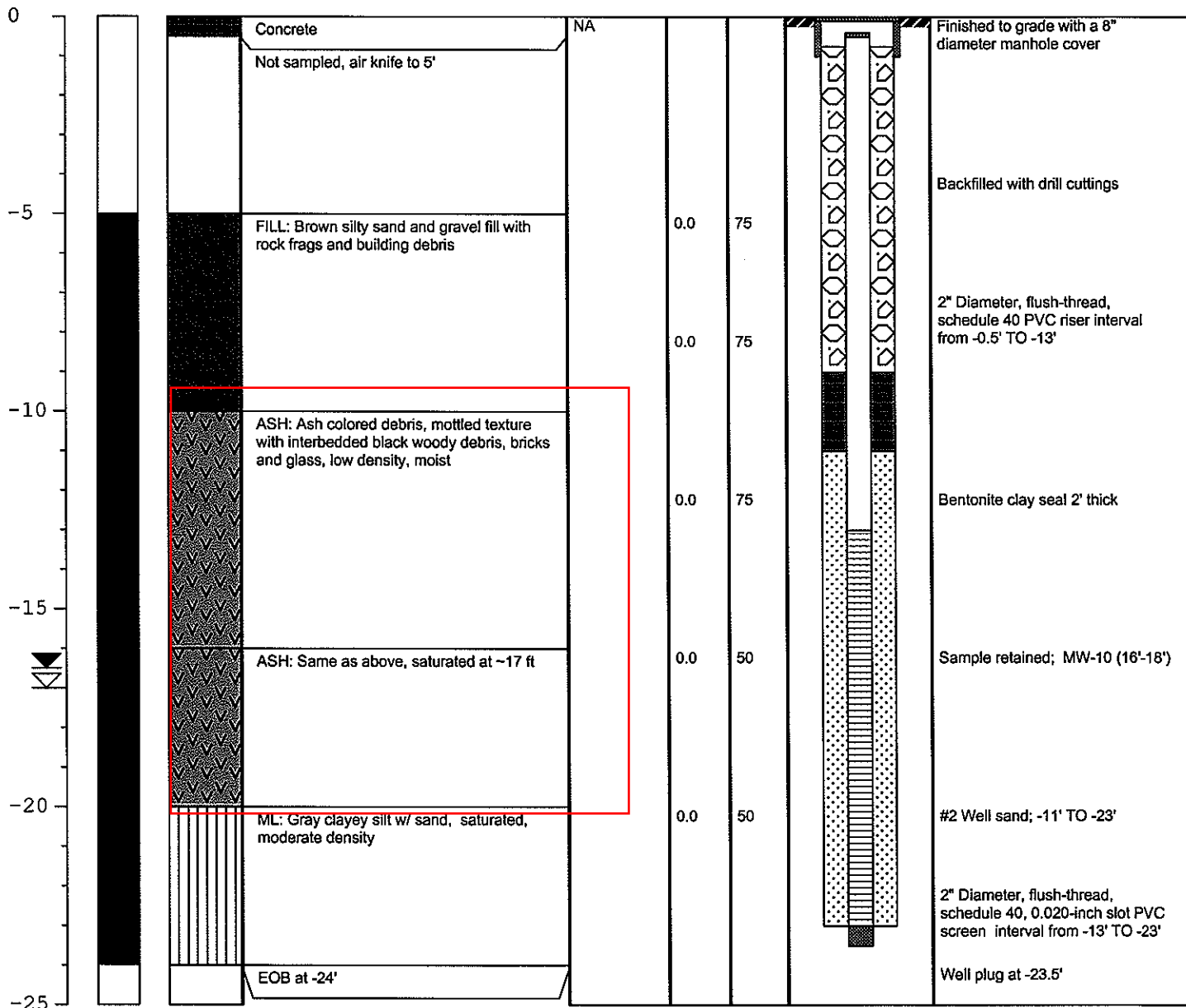
**DRILLING CO.:** Zebra Environmental Corp  
**DRILLER:** Bob Buraua  
**RIG TYPE:** Geoprobe Model 6600  
**METHOD OF DRILLING:** Direct push/4.25-inch ID HSA  
**SAMPLING METHODS:** 3-inch x 4-foot macrocore  
**HAMMER WT./DROP** NA

**NOTES:**

- ☒ Initial water level measurement
- ☒ Static water level measurement

**SAMPLE ID:** MW-10 (16'-18')

DEPTH	SAMPLE INTERVAL	SOIL TYPE	SOIL DESCRIPTION	BLOW COUNT	PID ppm	% REC	WELL CONSTRUCTION	WELL CONSTRUCTION NOTES
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## **Appendix C**

**Table 1**  
**Soil Analytical Results**  
**November 18 and 19, 2003**

BP Service Station Number 3887  
 Brooklyn, New York

Analytical Parameter	NYSDEC Soil Clean-up Objectives ( $\mu\text{g}/\text{Kg}$ )	Soil Sample Location and Concentration ( $\mu\text{g}/\text{Kg}$ )		
		MW-8 (12'-14')	MW-9 (17'-19')	MW-10 (16'-18')
Benzene	60	<1.2	<1.2	<1.2
Ethylbenzene	5,500	<1.2	<1.2	<1.2
Toluene	1,500	<1.2	<1.2	<1.2
Xylenes (total)	1,200	<2.3	<2.3	<2.4
Methyl Tertiary Butyl Ether	120	<1.2	<1.2	<1.2
n-Butylbenzene	12,000	<5.9	<5.8	<6.0
sec-Butylbenzene	11,000	<5.9	<5.8	<6.0
tert-Butylbenzene	11,000	<5.9	<5.8	<6.0
Isopropylbenzene	2,300	<5.9	<5.8	<6.0
p-Isopropyltoluene	11,000	<5.9	<5.8	<6.0
Naphthalene	13,000	<5.9	<5.8	<6.0
n-Propylbenzene	3,700	<5.9	<5.8	<6.0
1,2,4-Trimethylbenzene	13,000	<5.9	<5.8	<6.0
1,3,5-Trimethylbenzene	3,300	<5.9	<5.8	<6.0
Total BTEX	NGV	ND	ND	ND
Total VOCs	NGV	ND	ND	ND

NOTES:

NYSDEC - New York State Department of Environmental Conservation

NYSDEC Soil Clean-up Objectives are based on NYSDEC Technical and Administrative Guidance Memorandum

No. 4046 Soil Clean-up Objectives to protect ground water

All VOC concentrations reported in micrograms per kilogram ( $\mu\text{g}/\text{Kg}$ )

NGV - No guidance value

## **Appendix D**

RECEIVED DEC 08 2003

Technical Report for

BP Amoco Corporation

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

AMG02HP

Accutest Job Number: N53653

Report to:


Delta Environmental Consultants  
84 Business Park Drive  
Armonk, NY 10501

ATTN: Aaron Lapine

Total number of pages in report: 16



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

  
Vincent J. Pugliese  
President

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, MA, MD, NC, PA, RI, SC, VA

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.



### Sample Summary

BP Amoco Corporation

Job No: N53653

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY  
Project No: AMG02HP

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
N53653-1	11/18/03	12:20 AO	11/20/03	SO	Soil	MW-8
N53653-2	11/19/03	08:20 AO	11/20/03	SO	Soil	MW-9
N53653-3	11/19/03	11:45 AO	11/20/03	SO	Soil	MW-10

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**TITLE/COVER PAGE**

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- B. Matrix Spike/Matrix Spike Duplicate Summary (Form 3)
- C. Blank Spike Summary
- D. Method Blank Summary (Form 4)
- E. Tune Results Summary (Form 5)

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Com. B 12/4/2003

## Report of Analysis

<b>Client Sample ID:</b> MW-8	
<b>Lab Sample ID:</b> N53653-1	<b>Date Sampled:</b> 11/18/03
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 11/20/03
<b>Method:</b> SW846 8260B	<b>Percent Solids:</b> 88.3
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V26787.D	1	12/01/03	DFT	n/a	n/a	VV986
Run #2							

Run #1	Initial Weight
Run #1	4.9 g
Run #2	

## VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.2	0.24	ug/kg	
104-51-8	n-Butylbenzene	ND	5.8	0.28	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.8	0.27	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.8	0.27	ug/kg	
100-41-4	Ethylbenzene	ND	1.2	0.16	ug/kg	
98-82-8	Isopropylbenzene	ND	5.8	0.28	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.8	0.28	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.2	0.26	ug/kg	
91-20-3	Naphthalene	ND	5.8	0.48	ug/kg	
103-65-1	n-Propylbenzene	ND	5.8	1.4	ug/kg	
108-88-3	Toluene	ND	1.2	0.79	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.8	0.31	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.8	0.33	ug/kg	
	m,p-Xylene	ND	2.3	0.54	ug/kg	
95-47-6	o-Xylene	ND	1.2	0.52	ug/kg	
1330-20-7	Xylene (total)	ND	2.3	0.52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		71-117%
17060-07-0	1,2-Dichloroethane-D4	118%		62-124%
2037-26-5	Toluene-D8	103%		78-115%
460-00-4	4-Bromofluorobenzene	98%		73-127%

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> MW-8	<b>Date Sampled:</b> 11/18/03
<b>Lab Sample ID:</b> N53653-1	<b>Date Received:</b> 11/20/03
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> 88.3
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY	

## General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	88.3		%	1	12/02/03	TC	ASTM 4643-00

## Report of Analysis

<b>Client Sample ID:</b> MW-9	
<b>Lab Sample ID:</b> N53653-2	<b>Date Sampled:</b> 11/19/03
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 11/20/03
<b>Method:</b> SW846 8260B	<b>Percent Solids:</b> 83.1
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V26788.D	1	12/01/03	DFT	n/a	n/a	VV986
Run #2							

Run #	Initial Weight
Run #1	5.0 g
Run #2	

## VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.2	0.25	ug/kg	
104-51-8	n-Butylbenzene	ND	6.0	0.29	ug/kg	
135-98-8	sec-Butylbenzene	ND	6.0	0.28	ug/kg	
98-06-6	tert-Butylbenzene	ND	6.0	0.28	ug/kg	
100-41-4	Ethylbenzene	ND	1.2	0.16	ug/kg	
98-82-8	Isopropylbenzene	ND	6.0	0.29	ug/kg	
99-87-6	p-Isopropyltoluene	ND	6.0	0.29	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.2	0.27	ug/kg	
91-20-3	Naphthalene	ND	6.0	0.50	ug/kg	
103-65-1	n-Propylbenzene	ND	6.0	1.5	ug/kg	
108-88-3	Toluene	ND	1.2	0.82	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	6.0	0.33	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	6.0	0.34	ug/kg	
	m,p-Xylene	ND	2.4	0.56	ug/kg	
95-47-6	o-Xylene	ND	1.2	0.54	ug/kg	
1330-20-7	Xylene (total)	ND	2.4	0.54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		71-117%
17060-07-0	1,2-Dichloroethane-D4	122%		62-124%
2037-26-5	Toluene-D8	104%		78-115%
460-00-4	4-Bromofluorobenzene	98%		73-127%

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> MW-9		<b>Date Sampled:</b> 11/19/03
<b>Lab Sample ID:</b> N53653-2		<b>Date Received:</b> 11/20/03
<b>Matrix:</b> SO - Soil		<b>Percent Solids:</b> 83.1
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	83.1		%	1	12/02/03	TC	ASTM 4643-00

## Report of Analysis

<b>Client Sample ID:</b> MW-10	<b>Date Sampled:</b> 11/19/03
<b>Lab Sample ID:</b> N53653-3	<b>Date Received:</b> 11/20/03
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> 83.5
<b>Method:</b> SW846 8260B	
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V26789.D	1	12/01/03	DFT	n/a	n/a	VV986
Run #2							

Run #	Initial Weight
Run #1	5.1 g
Run #2	

## VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.2	0.24	ug/kg	
104-51-8	n-Butylbenzene	ND	5.9	0.28	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.9	0.27	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.9	0.27	ug/kg	
100-41-4	Ethylbenzene	ND	1.2	0.16	ug/kg	
98-82-8	Isopropylbenzene	ND	5.9	0.28	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.9	0.29	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.2	0.27	ug/kg	
91-20-3	Naphthalene	ND	5.9	0.49	ug/kg	
103-65-1	n-Propylbenzene	ND	5.9	1.5	ug/kg	
108-88-3	Toluene	ND	1.2	0.80	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.9	0.32	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.9	0.33	ug/kg	
	m,p-Xylene	ND	2.3	0.54	ug/kg	
95-47-6	o-Xylene	ND	1.2	0.52	ug/kg	
1330-20-7	Xylene (total)	ND	2.3	0.52	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		71-117%
17060-07-0	1,2-Dichloroethane-D4	120%		62-124%
2037-26-5	Toluene-D8	104%		78-115%
460-00-4	4-Bromofluorobenzene	99%		73-127%

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> MW-10	<b>Date Sampled:</b> 11/19/03
<b>Lab Sample ID:</b> N53653-3	<b>Date Received:</b> 11/20/03
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> 83.5
<b>Project:</b> DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY	

**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	83.5		%	1	12/02/03	TC	ASTM 4643-00





### Internal Sample Tracking Chronicle

BP Amoco Corporation

Job No: N53653

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY  
 Project No: AMG02HP

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
N53653-1 Collected: 18-NOV-03 12:20 By: AO Received: 20-NOV-03 By: MP MW-8						
N53653-1	SW846 8260B	01-DEC-03 20:22	DFT			V8260STAR
N53653-1	ASTM 4643-00	02-DEC-03	TC			%SOL
N53653-2 Collected: 19-NOV-03 08:20 By: AO Received: 20-NOV-03 By: MP MW-9						
N53653-2	SW846 8260B	01-DEC-03 20:50	DFT			V8260STAR
N53653-2	ASTM 4643-00	02-DEC-03	TC			%SOL
N53653-3 Collected: 19-NOV-03 11:45 By: AO Received: 20-NOV-03 By: MP MW-10						
N53653-3	SW846 8260B	01-DEC-03 21:19	DFT			V8260STAR
N53653-3	ASTM 4643-00	02-DEC-03	TC			%SOL

**GC/MS**

**SUPPORT DATA SUMMARY**

# Volatile Surrogate Recovery Summary

Job Number: N53653  
Account: BPAMSS BP Amoco Corporation  
Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Method: SW846 8260B Matrix: SO

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
N53653-1	V26787.D	107.0	118.0	103.0	98.0
N53653-2	V26788.D	106.0	122.0	104.0	98.0
N53653-3	V26789.D	109.0	120.0	104.0	99.0
N53652-1MS	V26779.D	103.0	103.0	101.0	99.0
N53652-1MSD	V26780.D	104.0	104.0	103.0	99.0
VV986-BS	V26777.D	103.0	107.0	103.0	101.0
VV986-MB1	V26776.D	101.0	105.0	101.0	101.0

Surrogate Compounds	Recovery Limits
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S1 = Dibromofluoromethane	71-117%
S2 = 1,2-Dichloroethane-D4	62-124%
S3 = Toluene-D8	78-115%
S4 = 4-Bromofluorobenzene	73-127%

# Matrix Spike/Matrix Spike Duplicate Summary

Job Number: N53653

Account: BPAMSS BP Amoco Corporation

Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
N53652-1MS	V26779.D	1	12/01/03	DFT	n/a	n/a	VV986
N53652-1MSD	V26780.D	1	12/01/03	DFT	n/a	n/a	VV986
N53652-1	V26778.D	1	12/01/03	DFT	n/a	n/a	VV986

The QC reported here applies to the following samples:

Method: SW846 8260B

N53653-1, N53653-2, N53653-3

CAS No.	Compound	N53652-1 ug/kg	Spike Q	ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	51	37.6	74	37.2	73	1	51-135/17	
104-51-8	n-Butylbenzene	ND	51	33.1	65	32.8	64	1	44-149/25	
135-98-8	sec-Butylbenzene	ND	51	33.8	66	33.2	65	2	43-148/24	
98-06-6	tert-Butylbenzene	ND	51	35.0	69	34.1	67	3	43-145/24	
100-41-4	Ethylbenzene	ND	51	37.2	73	36.5	72	2	55-138/22	
98-82-8	Isopropylbenzene	ND	51	35.3	69	34.8	68	1	50-142/21	
99-87-6	p-Isopropyltoluene	ND	51	34.1	67	34.0	67	0	49-145/24	
1634-04-4	Methyl Tert Butyl Ether	ND	51	40.6	80	40.6	80	0	57-133/19	
91-20-3	Naphthalene	ND	51	35.4	69	36.2	71	2	42-142/28	
103-65-1	n-Propylbenzene	ND	51	34.8	68	34.4	67	1	46-144/22	
108-88-3	Toluene	ND	51	37.2	73	37.1	73	0	51-138/18	
95-63-6	1,2,4-Trimethylbenzene	ND	51	34.8	68	34.2	67	2	44-147/24	
108-67-8	1,3,5-Trimethylbenzene	ND	51	35.1	69	34.9	68	1	50-144/23	
	m,p-Xylene	ND	102	73.7	72	71.6	70	3	50-143/23	
95-47-6	o-Xylene	ND	51	38.1	75	37.4	73	2	53-143/22	
1330-20-7	Xylene (total)	ND	153	112	73	109	71	3	51-143/22	

CAS No.	Surrogate Recoveries	MS	MSD	N53652-1	Limits
1868-53-7	Dibromofluoromethane	103%	104%	102%	71-117%
17060-07-0	1,2-Dichloroethane-D4	103%	104%	107%	62-124%
2037-26-5	Toluene-D8	101%	103%	99%	78-115%
460-00-4	4-Bromofluorobenzene	99%	99%	98%	73-127%

# Blank Spike Summary

Job Number: N53653  
Account: BPAMSS BP Amoco Corporation  
Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV986-BS	V26777.D	1	12/01/03	DFT	n/a	n/a	VV986

The QC reported here applies to the following samples:

Method: SW846 8260B

N53653-1, N53653-2, N53653-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	47.4	95	76-120
104-51-8	n-Butylbenzene	50	49.1	98	70-125
135-98-8	sec-Butylbenzene	50	48.2	96	75-122
98-06-6	tert-Butylbenzene	50	48.1	96	69-125
100-41-4	Ethylbenzene	50	48.4	97	81-120
98-82-8	Isopropylbenzene	50	48.2	96	75-123
99-87-6	p-Isopropyltoluene	50	48.2	96	75-122
1634-04-4	Methyl Tert Butyl Ether	50	48.0	96	74-123
91-20-3	Naphthalene	50	44.2	88	63-129
103-65-1	n-Propylbenzene	50	48.4	97	74-123
108-88-3	Toluene	50	47.8	96	81-119
95-63-6	1,2,4-Trimethylbenzene	50	47.0	94	76-122
108-67-8	1,3,5-Trimethylbenzene	50	47.6	95	75-123
	m,p-Xylene	100	94.9	95	82-122
95-47-6	o-Xylene	50	47.7	95	84-123
1330-20-7	Xylene (total)	150	143	95	83-121

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	103%	71-117%
17060-07-0	1,2-Dichloroethane-D4	107%	62-124%
2037-26-5	Toluene-D8	103%	78-115%
460-00-4	4-Bromofluorobenzene	101%	73-127%

# Method Blank Summary

Job Number: N53653  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV986-MB1	V26776.D	1	12/01/03	DFT	n/a	n/a	VV986

The QC reported here applies to the following samples:

Method: SW846 8260B

N53653-1, N53653-2, N53653-3

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.21	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.23	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.23	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	0.14	ug/kg	
98-82-8	Isopropylbenzene	ND	5.0	0.24	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.25	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.23	ug/kg	
91-20-3	Naphthalene	ND	5.0	0.41	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	1.2	ug/kg	
108-88-3	Toluene	ND	1.0	0.68	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.27	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.29	ug/kg	
	m,p-Xylene	ND	2.0	0.46	ug/kg	
95-47-6	o-Xylene	ND	1.0	0.45	ug/kg	
1330-20-7	Xylene (total)	ND	2.0	0.45	ug/kg	

CAS No.	Surrogate Recoveries	Limits
1868-53-7	Dibromofluoromethane	101% 71-117%
17060-07-0	1,2-Dichloroethane-D4	105% 62-124%
2037-26-5	Toluene-D8	101% 78-115%
460-00-4	4-Bromofluorobenzene	101% 73-127%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/kg	

# Instrument Performance Check (BFB)

Job Number: N53653  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VV986-BFB	Injection Date:	12/01/03
Lab File ID:	V26767.D	Injection Time:	10:25
Instrument ID:	GCMSV		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	3083	15.5	Pass
75	30.0 - 60.0% of mass 95	8676	43.5	Pass
95	Base peak, 100% relative abundance	19922	100.0	Pass
96	5.0 - 9.0% of mass 95	1307	6.6	Pass
173	Less than 2.0% of mass 174	0	0.0 (0.0) <sup>a</sup>	Pass
174	50.0 - 150.0% of mass 95	16447	82.6	Pass
175	5.0 - 9.0% of mass 174	1198	6.0 (7.3) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	16082	80.7 (97.8) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	1054	5.3 (6.6) <sup>b</sup>	Pass

(a) Value is % of mass 174

(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
VV986-ICC986	V26768.D	12/01/03	10:59	00:34	Initial cal 50
VV986-IC986	V26769.D	12/01/03	11:27	01:02	Initial cal 20
VV986-IC986	V26770.D	12/01/03	11:56	01:31	Initial cal 10
VV986-IC986	V26771.D	12/01/03	12:25	02:00	Initial cal 5
VV986-IC986	V26772.D	12/01/03	13:00	02:35	Initial cal 1
VV986-IC986	V26773.D	12/01/03	13:32	03:07	Initial cal 100
VV986-IC986	V26774.D	12/01/03	14:00	03:35	Initial cal 200
VV986-MB1	V26776.D	12/01/03	14:58	04:33	Method Blank
VV986-BS	V26777.D	12/01/03	15:28	05:03	Blank Spike
N53652-1	V26778.D	12/01/03	16:05	05:40	(used for QC only; not part of job N53653)
N53652-1MS	V26779.D	12/01/03	16:34	06:09	Matrix Spike
N53652-1MSD	V26780.D	12/01/03	17:02	06:37	Matrix Spike Duplicate
ZZZZZZ	V26781.D	12/01/03	17:31	07:06	(unrelated sample)
ZZZZZZ	V26782.D	12/01/03	17:59	07:34	(unrelated sample)
ZZZZZZ	V26783.D	12/01/03	18:28	08:03	(unrelated sample)
ZZZZZZ	V26784.D	12/01/03	18:56	08:31	(unrelated sample)
ZZZZZZ	V26785.D	12/01/03	19:24	08:59	(unrelated sample)
ZZZZZZ	V26786.D	12/01/03	19:54	09:29	(unrelated sample)
N53653-1	V26787.D	12/01/03	20:22	09:57	MW-8
N53653-2	V26788.D	12/01/03	20:50	10:25	MW-9
N53653-3	V26789.D	12/01/03	21:19	10:54	MW-10
ZZZZZZ	V26791.D	12/01/03	22:17	11:52	(unrelated sample)