

**SUBSURFACE HYDROCARBON ASSESSMENT  
REPORT**

BP Service Station Number 3887  
164 4<sup>th</sup> Avenue  
Brooklyn, New York

NYSDEC Spill Number 97-13442

May 27, 2005

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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
<b>2.0</b>	<b>SITE CHARACTERIZATION .....</b>	<b>1</b>
2.1	SITE DESCRIPTION .....	1
2.2	SURROUNDING LAND USE .....	1
2.3	SENSITIVE RECEPTOR SURVEY .....	2
<b>3.0</b>	<b>REGIONAL GEOLOGY/HYDROGEOLOGY .....</b>	<b>2</b>
3.1	SITE HYDROGEOLOGY .....	2
<b>4.0</b>	<b>FIELD EXPLORATION METHODS .....</b>	<b>3</b>
4.1	GEOPROBE SOIL BORINGS .....	3
4.2	MONITORING WELL INSTALLATION .....	3
4.3	MONITORING WELL DEVELOPMENT .....	4
4.4	MONITORING WELL SURVEY .....	4
4.5	MONITORING WELL GAUGING AND SAMPLING .....	4
<b>5.0</b>	<b>INVESTIGATION ANALYTICAL RESULTS .....</b>	<b>4</b>
5.1	SOIL ANALYTICAL RESULTS .....	4
5.2	MONITORING WELL GAUGING RESULTS .....	5
5.3	GROUND WATER ANALYTICAL RESULTS .....	5
<b>6.0</b>	<b>CONCLUSIONS/FUTURE PLANS .....</b>	<b>5</b>
<b>7.0</b>	<b>REMARKS .....</b>	<b>6</b>
<b>8.0</b>	<b>REFERENCES .....</b>	<b>6</b>

### APPENDICES

<b>APPENDIX A</b>	<b>FIGURES</b>
<b>APPENDIX B</b>	<b>MONITORING WELL INSTALLATION LOGS</b>
<b>APPENDIX C</b>	<b>TABLES</b>
<b>APPENDIX D</b>	<b>LABORATORY ANALYTICAL REPORT – SOIL</b>
<b>APPENDIX E</b>	<b>LABORATORY ANALYTICAL REPORT – GROUND WATER</b>

### LIST OF FIGURES

<b>FIGURE 1</b>	<b>SITE LOCATION MAP</b>
<b>FIGURE 2</b>	<b>SITE PLAN</b>
<b>FIGURE 3</b>	<b>SURROUNDING LAND USE MAP</b>
<b>FIGURE 4</b>	<b>SOIL ANALYTICAL RESULTS MAP</b>
<b>FIGURE 5</b>	<b>GROUND WATER ELEVATION MAP</b>
<b>FIGURE 6</b>	<b>GROUND WATER ANALYTICAL RESULTS MAP</b>

### LIST OF TABLES

<b>TABLE 1</b>	<b>SOIL ANALYTICAL RESULTS</b>
<b>TABLE 2</b>	<b>LIQUID LEVEL MEASUREMENTS</b>
<b>TABLE 3</b>	<b>GROUND WATER ANALYTICAL RESULTS</b>

## 1.0 INTRODUCTION

This Subsurface Hydrocarbon Assessment Report (SHAR) presents the results of subsurface assessment activities conducted by Delta Environmental Consultants, Inc. (Delta) on behalf of Atlantic Richfield Company, a BP affiliated company (Atlantic Richfield), at BP Service Station Number 3887 between August 23, 2004 and September 14, 2004.

The objective of this assessment was to install two off-site monitoring wells to complete the downgradient delineation of sub-surface impacts to soil and ground water. The scope of work for this assessment included the following:

- advancement of off-site monitoring wells MW-11 and MW-12;
- collect soil samples during boring advancement for field screening and laboratory analysis;
- install off-site monitoring wells MW-11 and MW-12;
- develop monitoring wells MW-11 and MW-12;
- survey monitoring well MW-11 and MW-12 casing elevations;
- collect liquid level data from monitoring wells MW-11 and MW-12;
- collect ground water samples from monitoring wells MW-11 and MW-12 for laboratory analysis; and,
- prepare this Subsurface Hydrocarbon Assessment Report containing the observations and information obtained from the aforementioned activities.

## 2.0 SITE CHARACTERIZATION

### 2.1 Site Description

BP Service Station Number 3887 is located at 164 4<sup>th</sup> Avenue, Brooklyn, Kings County, New York (the "subject site"). The subject site is located on the southwestern corner of the intersection of 4<sup>th</sup> Avenue and Douglass Street. According to the United States Geological Survey (USGS) *Brooklyn, New York-New Jersey 7.5 Minute Series Topographic Map*, the subject site is situated on a generally level parcel at an elevation of approximately 30 feet (ft) above mean sea level. The location of the site is shown on the Site Location Map, Figure 1, Appendix A.

The subject site has an irregular shape and can be accessed from the east along 4<sup>th</sup> Avenue and from the north along Douglass Street. Above ground structures at the subject site consist of a single-story convenience store, a canopy, two vacuums, and six pump islands with six dispensers. Below ground structures consist of two 10,000-gallon double-wall fiberglass-reinforced plastic gasoline underground storage tanks (USTs), one 12,000-gallon double-wall fiberglass-reinforced plastic gasoline UST, four detention basins, two catch basins, and numerous electrical conduits and municipal water/sewer connection pipes. Site features are shown on the Site Plan, Figure 2, Appendix A.

### 2.2 Surrounding Land Use

To the north across Douglass Street are the "Marble Tile Terrazzo and Granite Corporation" and the "Big Apply Industry of New York" facilities. To the south across Degraw Street are industrial and commercial facilities, including "Gino's Auto Body Shop." Adjacent to the west are multi-level commercial and industrial facilities. Adjacent to the northwest is the "Emco, Inc." industrial warehouse facility. Across 4<sup>th</sup> Avenue, approximately 120 ft to the east, are multi-level residential apartments

improved with basements. Additionally, approximately 65 ft east of the subject site beneath 4<sup>th</sup> Avenue is the 4<sup>th</sup> Avenue subway tunnel. A Surrounding Land Use Map is provided as Figure 3, Appendix A.

### 2.3 Sensitive Receptor Survey

Delta conducted a sensitive receptor survey of the subject site and surrounding properties. Several utility vaults and subsurface improvements were identified both on site and off site, including those located beneath 4<sup>th</sup> Avenue, approximately 5 to 10 ft east of the subject site. Four detention basins were identified in the vicinity of the southern portion of the subject site. Additionally, there are two catch basins located on the subject site. These features are shown on the Site Plan, Figure 2, Appendix A. According to a review of an Environmental Data Resources, Inc. (EDR) Report, there are no Federal or State Public Water Supply Wells within a one-mile radius of the subject site. The nearest basement that is hydraulically downgradient of the subject site is located approximately 100 ft to the southeast, across Degraw Street. Approximately 65 ft to the east is the 4<sup>th</sup> Avenue Subway tunnel.

## 3.0 REGIONAL GEOLOGY/HYDROGEOLOGY

According to the Surficial Geologic Map of New York, Lower Hudson Sheet (Cadwell, 1989), this area of New York is underlain by Pleistocene-age glacial till, dominantly consisting of fine to coarse-grained sand with interstitial lenses of gravel and silt, which are remnants of glacial deposition. According to the United States Department of Agriculture Soil Survey Classification and Nomenclature System, this soil would likely be referred to as *Urban Land*, because the original composition and structure of the soil has been significantly altered by urbanization and development activities.

According to a review of the United States Department of the Interior Geological Survey's Water-Table Map of Kings and Queens Counties, Long Island, New York Map, dated March 1997, ground water is located at a depth of approximately 9 ft below ground surface (bgs) and flows to the southwest.

There are no predominant geological surface features such as bedrock outcroppings on the subject site. Site-specific stratigraphy was gathered during soil boring advancement activities. Based on soil collected via continuous macrocore sampling and split-spoon sampling activities during this and previous subsurface assessments, the subject site is underlain by brown medium to coarse-grained silty-sand with clay and peat lenses to a depth of 24 ft bgs, the depth of the deepest boring. Soil boring logs generated during the soil boring advancement and monitoring well installation activities are provided in Appendix C.

### 3.1 Site Hydrogeology

Ground water movement varies in relation to topography, lithology, elevations of recharge and discharge areas, and man-made influences. Ground water elevations were determined for this site by measuring each monitoring well's top of casing (TOC) relative to an arbitrary benchmark with an assigned elevation of 100.00 ft, measuring the water level in the monitoring wells relative to the TOC, and computing the reference elevation of the ground water at the time of the measurement. The depth to ground water was measured on September 14, 2004 to be between 15.24 and 15.58 ft bgs.

The direction of ground water flow within unconsolidated deposits is interpolated between monitoring wells by comparing the ground water elevations in the monitoring wells and taking into consideration the types of influencing factors mentioned above. Previous ground water monitoring activities at the site have shown ground water flow to the west-southwest.

#### **4.0 FIELD EXPLORATION METHODS**

Field explorations performed as part of the subsurface assessment activities included the following:

- install off-site monitoring wells MW-11 and MW-12;
- collect soil samples during soil boring advancement for field screening and laboratory analysis;
- develop monitoring wells MW-11 and MW-12;
- survey monitoring well MW-11 and MW-12 casing elevations;
- collect liquid level data from monitoring wells MW-11 and MW-12; and,
- collect ground water samples MW-11 and MW-12 from monitoring wells MW-11 and MW-12, respectively, for laboratory analysis.

#### **4.1 Geoprobe Soil Borings**

On August 23, 2004, Zebra Environmental Corporation (Zebra) of Lynbrook, New York, on behalf of Delta, installed monitoring wells MW-11 and MW-12 using a Geoprobe Model 6600 direct-push unit with hollow-stem auger drill capability. The wells were installed off site, south of the service station, within the sidewalk area on the south side of Degraw Street. The locations of the monitoring wells are shown on Figure 2, Site Plan, Appendix A.

On August 23, 2004, the boring locations were pre-cleared by Zebra with a hand auger to a depth of 5 ft bgs and 110% of the geoprobe casing diameter. Subsequent to pre-clearing activities, Zebra used a macrocore soil sampler, advanced by direct-push technique, to collect continuous soil samples from a depth of 5 to 22 ft bgs during the advancement of monitoring well borings MW-11 and MW-12. Soil samples from the macrocore were inspected for visual evidence of petroleum impact and were screened for total volatile organic compounds (VOCs) using a photoionization detector (PID). The soil samples were classified in general accordance with the Unified Soil Classification System. Boring logs/monitoring well construction summaries for MW-11 and MW-12 are included in Appendix B.

Soil samples for laboratory analysis were collected from monitoring wells MW-11 and MW-12 at the 15 to 16 ft bgs depth interval. This depth interval generally represents the ground water interface as determined by field observations. 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 (EPA) Method 8260. The analytical results for these soil samples are discussed in Section 5.1.

#### **4.2 Monitoring Well Installation**

On August 23, 2004, soil borings MW-11 and MW-12 were completed as one-inch-diameter ground water monitoring wells MW-11 and MW-12 to depths of 22 ft bgs. The depth to ground water in monitoring wells MW-11 and MW-12 at the time of installation was approximately 16 ft bgs.

Monitoring wells MW-11 and MW-12 were each constructed of 10 ft of one-inch-diameter, Schedule 40, 0.010-inch slot, polyvinyl chloride (PVC) well screen and 11.5 ft of one-inch-diameter, Schedule 40, solid, PVC riser pipe. A sand pack of Morie #2 well sand was installed from the completion depth of each well to 3 ft above the top of each well screen. A two-foot-thick Bentonite seal was installed above

each sand pack. The annular space of each well was backfilled with native material from the top of the Bentonite seal to approximately 1 ft bgs. A six-inch-diameter bolt-down, flush-mount protective casing was installed at ground surface using concrete to seal each well from approximately 1 ft bgs to grade level.

#### 4.3 Monitoring Well Development

Monitoring wells MW-11 and MW-12 were developed on August 24, 2004. The monitoring wells were developed by the over-purging method using a peristaltic 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 at the conclusion of purging activities.

#### 4.4 Monitoring Well Survey

Monitoring wells MW-11 and MW-12 were surveyed on August 24, 2004. The elevation of the top-of-casing for each monitoring well was surveyed to an accuracy of 0.01 ft. The monitoring well survey was referenced to a local, arbitrary benchmark with an assigned elevation of 100.00 ft.

#### 4.5 Monitoring Well Gauging and Sampling

On September 14, 2004, monitoring wells MW-11 and MW-12 were gauged for depth to ground water and monitored for the presence of light non-aqueous phase liquid (LNAPL) to an accuracy of 0.01 ft using an oil/water interface probe. Liquid level measurements for the September 14, 2004 sampling event are discussed in Section 5.2.

On September 14, 2004, ground water samples MW-11 and MW-12 were collected from monitoring wells MW-11 and MW-12, respectively. Prior to sampling, the volume of water contained within each monitoring well was calculated using the well diameter and water column height. Whenever possible, a volume of ground water equivalent to at least three well volumes was purged from each monitoring well using a disposable polyethylene bailer and/or a mechanical pump with dedicated polyethylene tubing. Dedicated polyethylene bailers were used to collect the ground water samples. The samples were poured from the bailers into dedicated laboratory-supplied glassware. The glassware was then placed into a cooler and maintained at a temperature of less than 4-degrees Celsius for transportation to the laboratory.

The ground water samples were forwarded with a trip blank and under chain-of-custody procedures to Accutest. The ground water samples were analyzed for NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The analytical results for these ground water samples are discussed in Section 5.3.

## 5.0 INVESTIGATION ANALYTICAL RESULTS

### 5.1 Soil Analytical Results

On August 23, 2004, Delta advanced off-site soil borings MW-11 and MW-12 to a depth of 24 ft bgs using a Geoprobe 6600 unit. Soil samples MW-11 (15-16 ft) and MW-12 (15-16 ft) were collected from monitoring wells MW-11 and MW-12, respectively, and forwarded to Accutest for analysis of NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The locations of the soil borings are shown on Figure 2, Site Plan, Appendix A. The laboratory analytical results are summarized in Table 1, Soil Analytical Results, Appendix C. Analytical results in **bold** exceed applicable NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Soil Cleanup Objectives to Protect

Ground Water Quality (NYSDEC Soil Cleanup Objectives). The Laboratory Analytical Results Report is provided in Appendix D.

As shown in Table 1, laboratory analysis did not identify any VOC concentrations in excess of applicable NYSDEC Soil Cleanup Objectives in either of the two soil samples. BTEX concentrations (benzene, toluene, ethylbenzene, and xylenes) were not detected in either soil sample. Methyl tertiary-butyl ether (MTBE) concentrations ranged from not detected in MW-12 to 1.8 micrograms per kilogram ( $\mu\text{g}/\text{Kg}$ ) in MW-11. Other target VOCs were not detected in the soil samples.

Figure 4, Soil Analytical Results, Appendix A, illustrates the distribution of VOCs present in the soil samples collected during the August 23, 2004 soil boring activities. Figure 4 indicates that a detectable MTBE concentration was identified at off-site monitoring well boring MW-11 and that BTEX concentrations were not detected in either of the borings.

### 5.2 Monitoring Well Gauging Results

On September 14, 2004, ground water monitoring wells MW-11 and MW-12 were gauged for depth to ground water and were monitored for the presence of LNAPL. The depth to ground water in monitoring wells MW-11 and MW-12 was measured to be 15.58 and 15.24 ft bgs, respectively. LNAPL was not detected in either of the gauged wells. The results of the gauging event are shown on Figure 5, Ground Water Elevation Map, Appendix A and summarized in Table 2, Liquid Level Measurements, Appendix C.

### 5.3 Ground Water Analytical Results

On September 14, 2004, ground water samples MW-11 and MW-12 were collected from off-site monitoring wells MW-11 and MW-12, respectively. The ground water samples were forwarded to Accutest for analysis of NYSDEC STARS Memo #1-listed VOCs in accordance with EPA Method 8260. The laboratory analytical results are summarized in Table 3, Ground Water Analytical Results, Appendix C. Analytical results in **bold** exceed applicable NYSDEC Ground Water Quality Standards (GWQS). The Laboratory Analytical Results Report is provided in Appendix E.

As shown in Table 3, laboratory analysis identified one VOC concentration (MTBE) in excess of the applicable NYSDEC GWQS in one of the two ground water samples (MW-11). BTEX concentrations were not detected in either ground water sample. MTBE concentrations ranged from 4 micrograms per liter ( $\mu\text{g}/\text{L}$ ) in MW-12 to 27.6  $\mu\text{g}/\text{L}$  in MW-11. Other target VOCs were not detected in the ground water samples.

Figure 6, Ground Water Analytical Results, Appendix A, illustrates the distribution of VOCs present in the ground water samples collected during the September 14, 2004 sampling event. Figure 6 indicates that the maximum MTBE and total VOC concentrations were identified at off-site monitoring well MW-11, a detectable MTBE concentration was identified at monitoring well MW-12, and BTEX concentrations were not detected in either of the two monitoring wells.

## 6.0 CONCLUSIONS/FUTURE PLANS

Laboratory analysis did not identify BTEX or other target VOCs in excess of applicable NYSDEC Soil Cleanup Objectives in either of the two soil samples collected during off-site monitoring well installation. Laboratory analysis identified an MTBE concentration in excess of the applicable NYSDEC

GWQS in one of the two ground water samples collected. Delta will sample the monitoring wells on a quarterly schedule.

## 7.0 REMARKS

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.

## 8.0 REFERENCES

United States Geologic Survey, *Brooklyn, New York*, 7.5 Minute Series Topographic Map, dated 1967 (photorevised 1979), scale 1:24,000.

Cadwell, Donald H., *et al.*, 1989, Surficial Geologic Map of New York, Lower Hudson Sheet: New York State Geologic Survey.

New York State Department of Environmental Conservation, Spill Technology and Remediation Series Memo #1 Petroleum-Contaminated Soil Guidance Policy, dated August 1992.

New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels, dated January 24, 1994, revised August 22, 2001.

New York State Department of Environmental Conservation, Division of Water Resources, Water Quality Regulations, Surface Water and Groundwater Classifications and Standards, New York State, Codes, Rules and Regulations Title 6, Chapter X, Parts 700-706, through March 1998.

United States Department of the Interior Geological Survey, Water-Table Configuration of Kings and Queens Counties, Long Island, New York Map, dated March 1997.



## **Appendix A**



MAP BASED ON USGS 7.5 MINUTES SERIES TOPOGRAPHIC MAP  
 BROOKLYN, NEW YORK QUADRANGLE  
 DATE: 1967 REVISED 1979

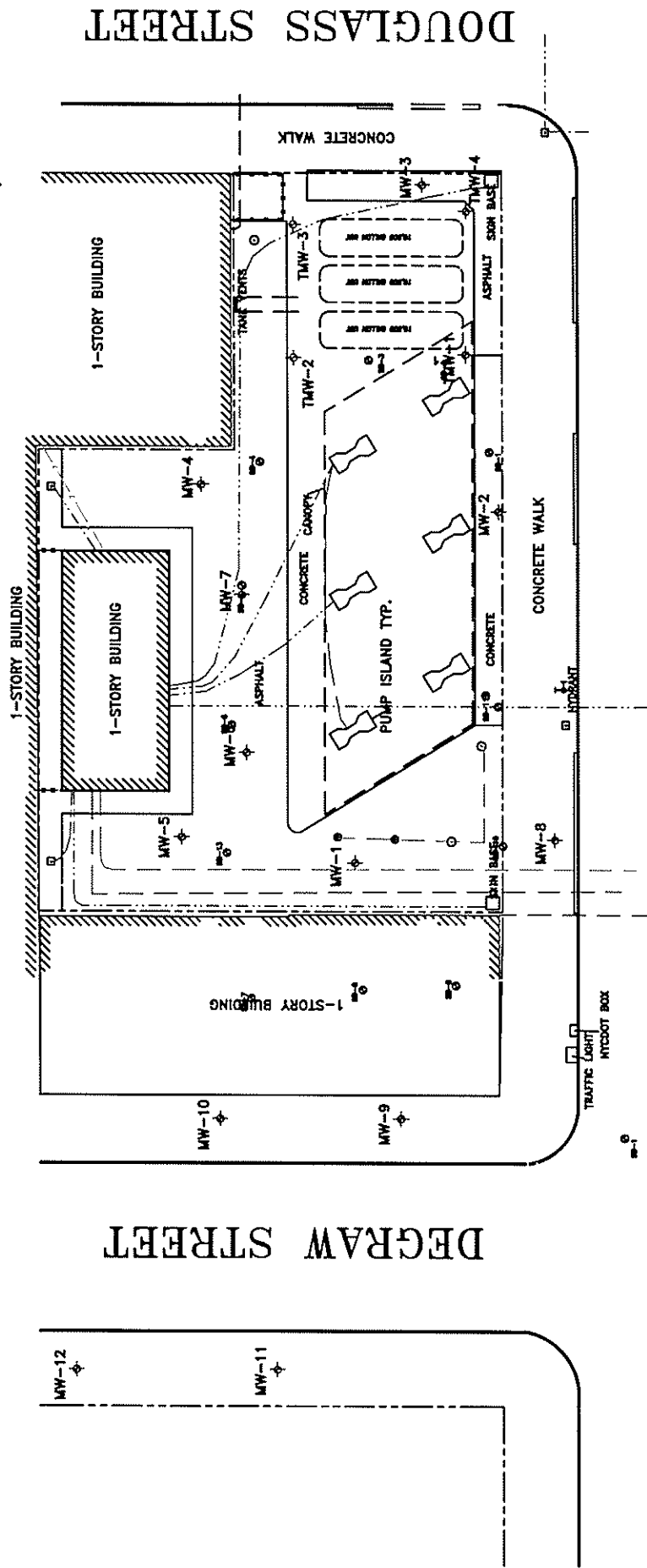
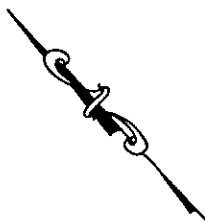
## FIGURE 1

### SITE LOCATION MAP

BP SERVICE STATION NUMBER 3887  
 164 4TH AVENUE  
 BROOKLYN, NEW YORK

PROJECT NO.: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: SCJ	DATE: 1/17/05
FILE NAME: SLOC	





4TH AVENUE

MONITORING WELL LOCATION

MW-1

- WATER LINE
- TELEPHONE LINE
- ELECTRICAL LINE
- GAS LINE
- SEWER LINE



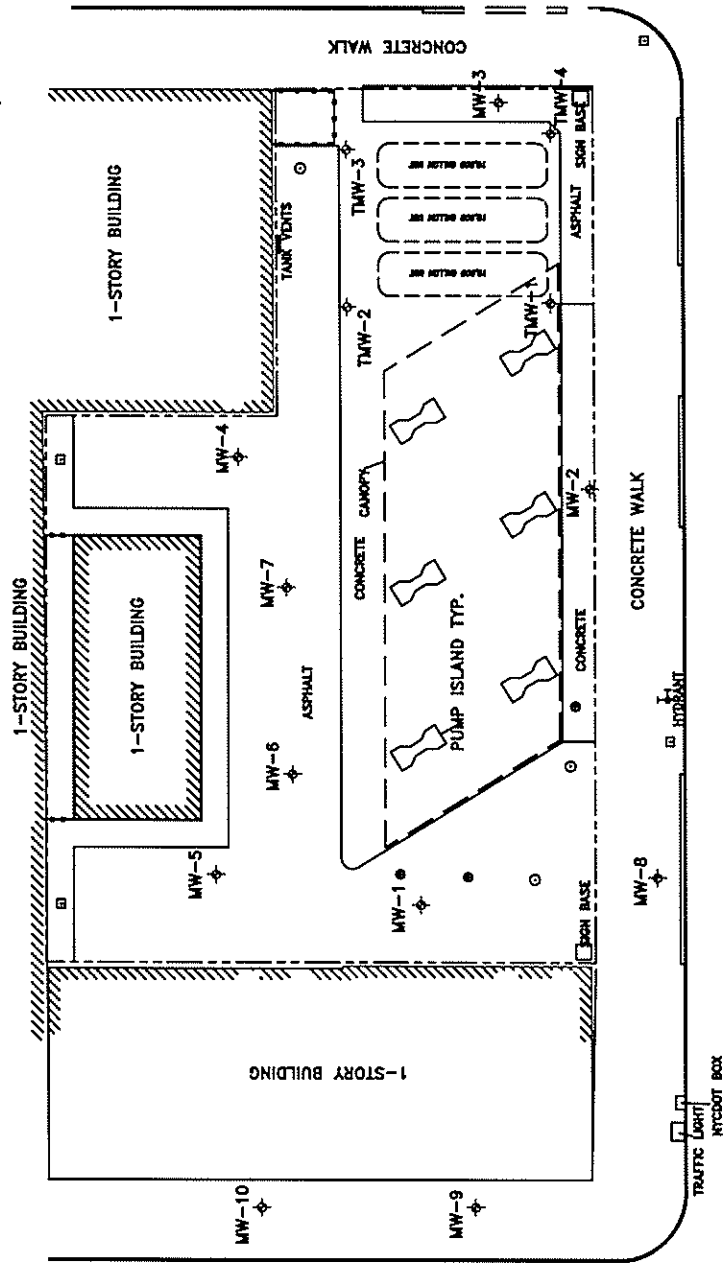
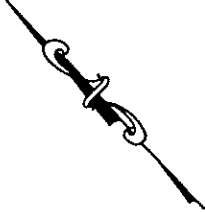
FIGURE 2  
SITE PLAN

BP SERVICE STATION NUMBER 3887  
164 4TH AVENUE  
BROOKLYN, NEW YORK

PROJECT NO.: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: SCJ	DATE: 0/13/04
FILE NAME: SITE PLAN	







MW-12  
(15-16 FT)  
B: <1.4  
T: <1.4  
E: <1.4  
X: <2.8  
M: <1.4

MW-11  
(15-16 FT)  
B: <1.5  
T: <1.5  
E: <1.5  
X: <3.1  
M: 1.8

# 4TH AVENUE

**LEGEND:**  
 MW-1 ● MONITORING WELL LOCATION

- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: XYLENES
- M: METHYL TERTIARY-BUTYL ETHER (MTBE)
- VOCs: TOTAL VOLATILE ORGANIC COMPOUNDS



RESULTS IN RED EXCEED NYSDEC SOIL CLEANUP CRITERIA  
 RESULTS IN MICROGRAMS PER KILOGRAM ( $\mu\text{g}/\text{kg}$ )

**FIGURE 4**  
**SOIL ANALYTICAL RESULTS**  
 AUGUST 23, 2004  
 BP SERVICE STATION NUMBER 3887  
 164 4TH AVENUE  
 BROOKLYN, NEW YORK

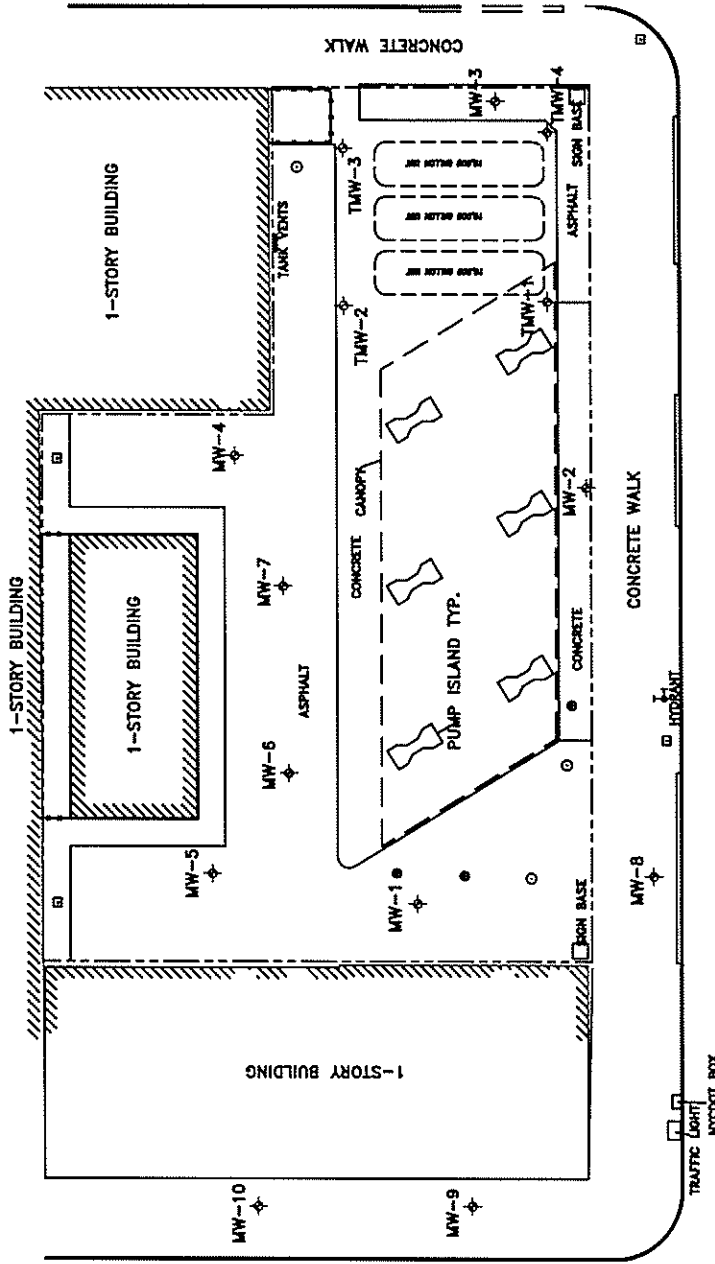
PROJECT NO:	02JF-RP50	DRAWN BY:	SCJ
PREPARED BY:	SCJ	DATE:	0/13/04
FILE NAME:	SITE PLAN		



DOUGLASS STREET

DEGRAW STREET

4TH AVENUE



LEGEND:  
 MW-1 ●

○ ● MONITORING WELL LOCATION



**FIGURE 5**  
**GROUND WATER ELEVATION MAP**  
**SEPTEMBER 14, 2004**

BP SERVICE STATION NUMBER 3887  
 164 4TH AVENUE  
 BROOKLYN, NEW YORK

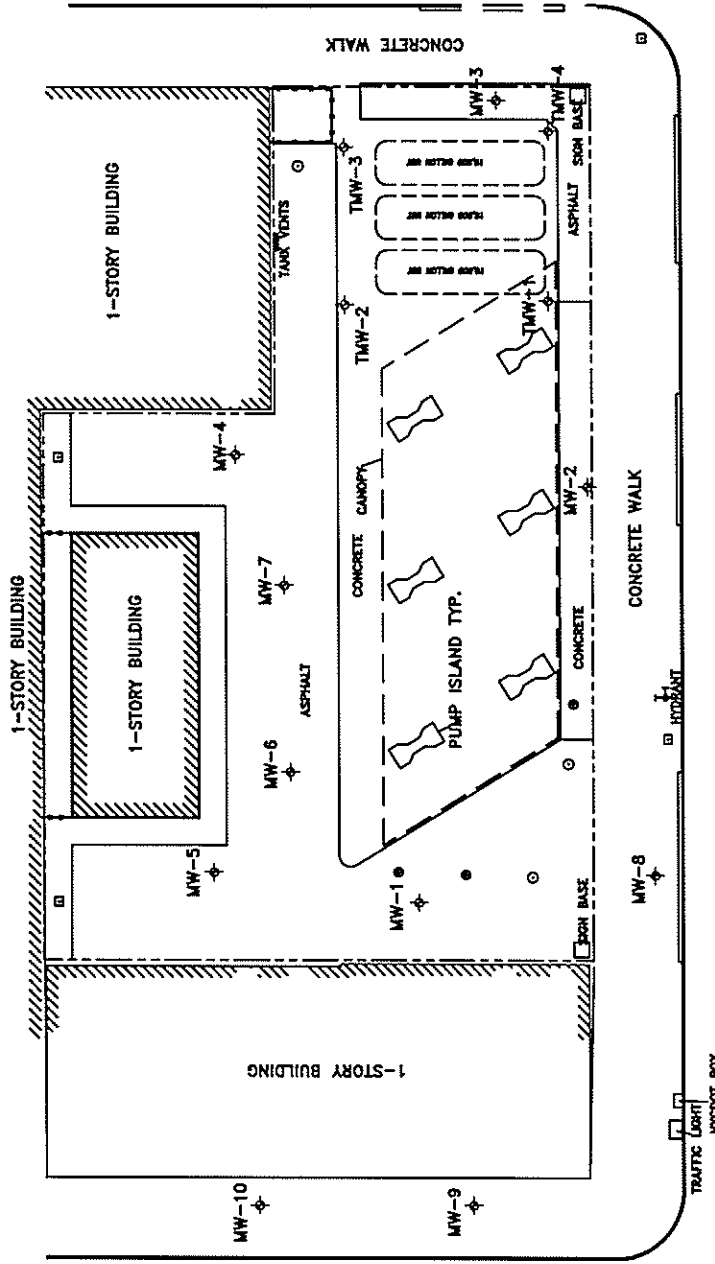
PROJECT NO.:	G02JF-RP50	DRAWN BY:	SCJ
PREPARED BY:	SCJ	DATE:	0/13/04
FILE NAME:	GWARM		



DOUGLASS STREET

DEGRAW STREET

4TH AVENUE



MW-12  
(15-16 FT)  
B: <1.0  
T: <1.0  
E: <1.0  
X: <1.0  
M: 4.0  
VOCs: 4.0

MW-11  
(15-16 FT)  
B: <1.0  
T: <1.0  
E: <1.0  
X: <2.0  
M: 27.6  
VOCs: 27.6

LEGEND:

- MW-1 ● MONITORING WELL LOCATION
- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: XYLENES
- M: METHYL TERTIARY-BUTYL ETHER (MTBE)
- VOCs: TOTAL VOLATILE ORGANIC COMPOUNDS
- RESULTS IN RED EXCEED NYSDEC GWQS
- RESULTS IN MICROGRAMS PER LITER (µg/L)



**FIGURE 6**  
GROUND WATER ANALYTICAL RESULTS  
SEPTEMBER 14, 2004

BP SERVICE STATION NUMBER 3887  
164 4TH AVENUE  
BROOKLYN, NEW YORK

PROJECT NO: G02JF-RP50	DRAWN BY: SCJ
PREPARED BY: SCJ	DATE: 0/13/04
FILE NAME: GWAR4	



## **Appendix B**





**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: BP S/S 3887  
 SITE LOCATION: Brooklyn, NY  
 JOB NO.: G02HPRP5  
 LOGGED BY: Andre Obligado  
 PROJECT MANAGER: Aaron Lapine  
 DATES DRILLED: August 23, 2004

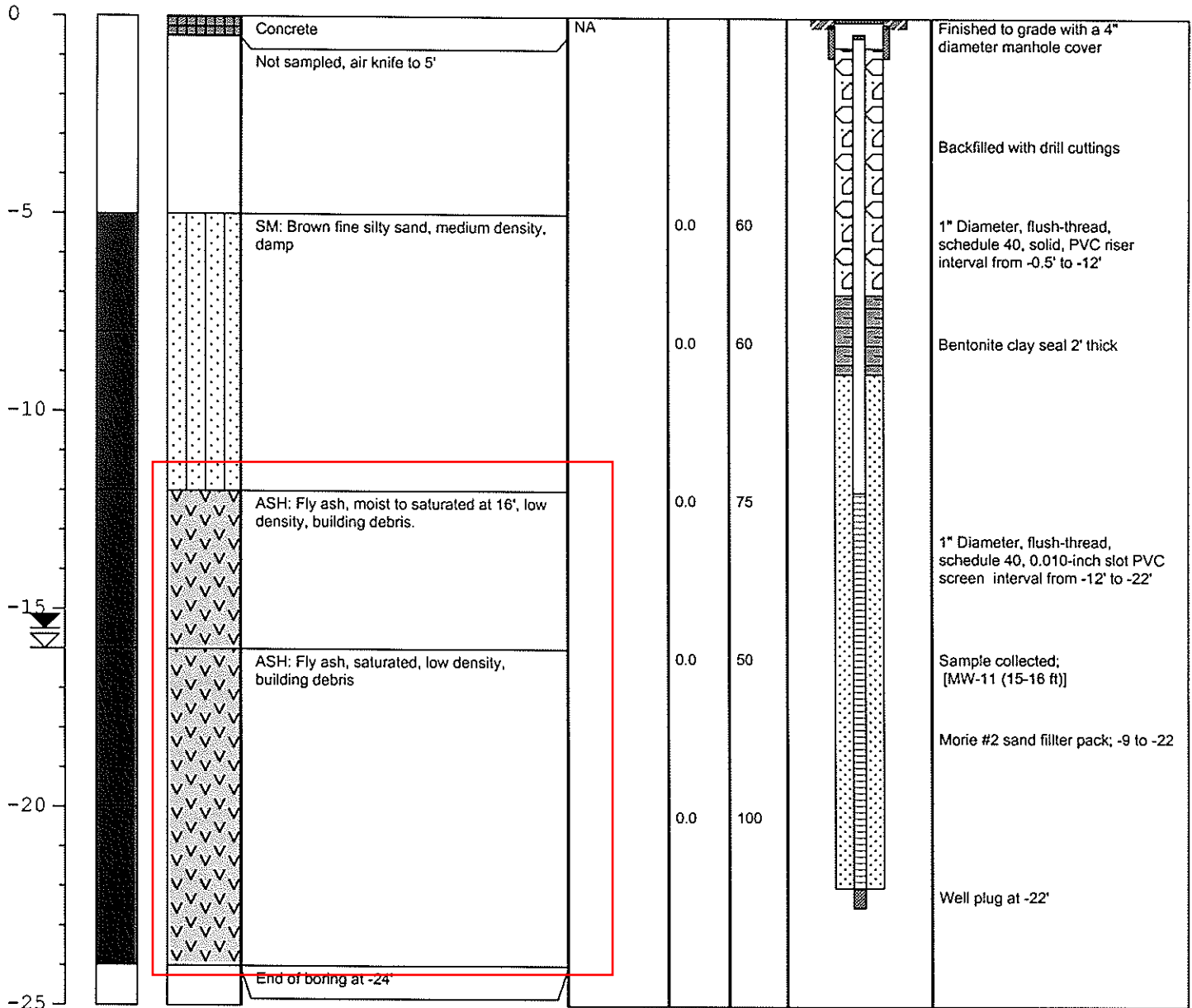
DRILLING CO.: Zebra Environmental Corp  
 DRILLER: Evan  
 RIG TYPE: Geoprobe Model 6600  
 METHOD OF DRILLING: Direct push  
 SAMPLING METHODS: 3-inch x 4-foot macrocore  
 HAMMER WT./DROP NA

NOTES:

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

SAMPLE ID: MW-11 (15'-16')

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

**DRILLING INFORMATION**

PROJECT: BP S/S 3887  
 SITE LOCATION: Brooklyn, NY  
 JOB NO.: G02HPR5  
 LOGGED BY: Andre Obligado  
 PROJECT MANAGER: Aaron Lapine  
 DATES DRILLED: August 23, 2004

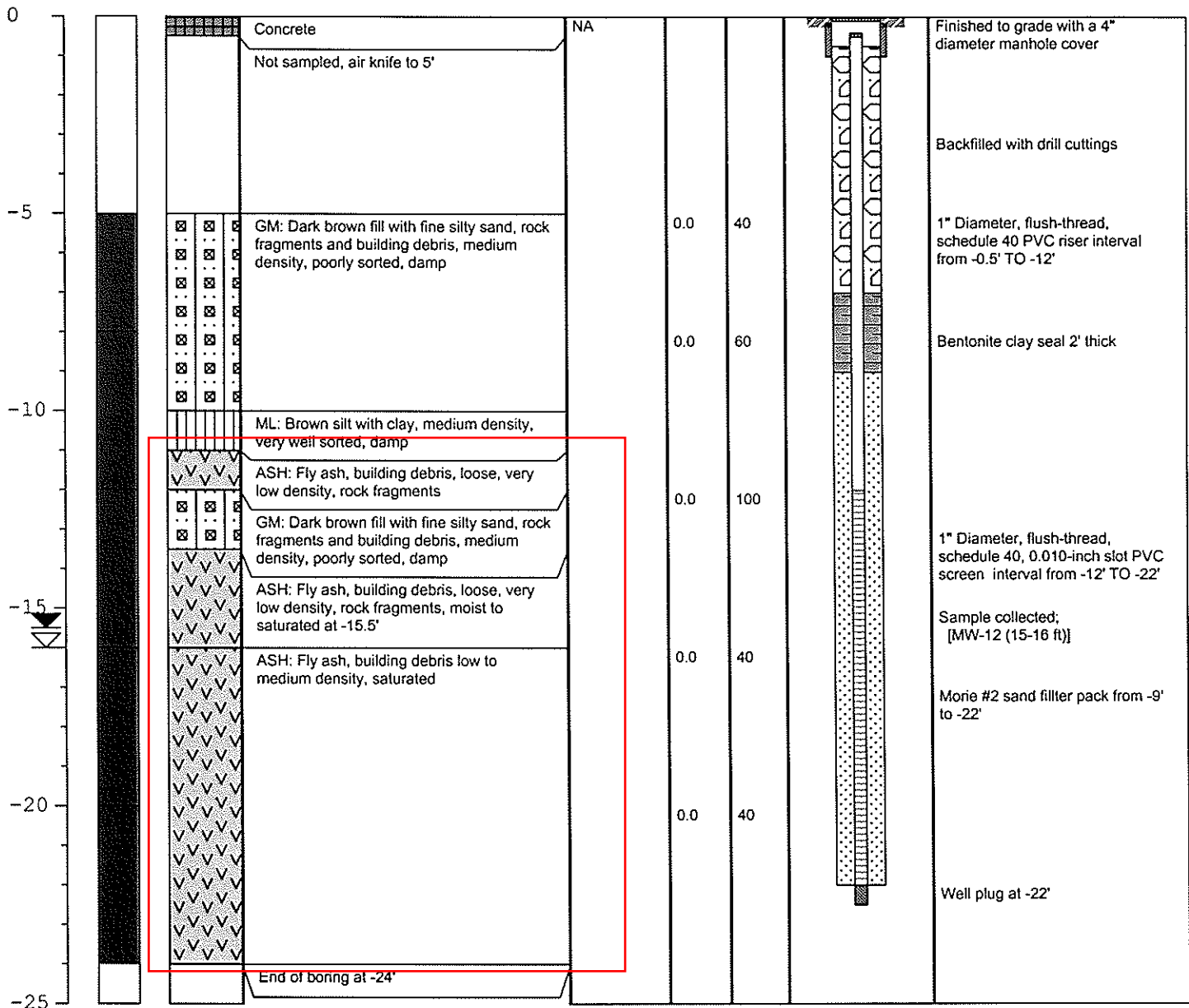
DRILLING CO.: Zebra Environmental Corp  
 DRILLER: Evan  
 RIG TYPE: Geoprobe Model 6600  
 METHOD OF DRILLING: Direct push/4.25-inch ID HSA  
 SAMPLING METHODS: 3-inch x 4-foot macrocore  
 HAMMER WT./DROP NA

NOTES:

- ⊖ Initial water level measurement
- ▼ Static water level measurement

SAMPLE ID: MW-12 (15'-16')

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**  
**August 23, 2004**

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-11 (15-16 ft)	MW-12 (15-16 ft)
Benzene	60	<1.5	<1.4
Ethylbenzene	5,500	<1.5	<1.4
Toluene	1,500	<1.5	<1.4
Xylenes (total)	1,200	<3.1	<2.8
Methyl Tertiary Butyl Ether	120	1.8	<1.4
n-Butylbenzene	12,000	<7.7	<7.1
sec-Butylbenzene	11,000	<7.7	<7.1
tert-Butylbenzene	11,000	<7.7	<7.1
Isopropylbenzene	2,300	<7.7	<7.1
p-Isopropyltoluene	11,000	<7.7	<7.1
Naphthalene	13,000	<7.7	<7.1
n-Propylbenzene	3,700	<7.7	<7.1
1,2,4-Trimethylbenzene	13,000	<7.7	<7.1
1,3,5-Trimethylbenzene	3,300	<7.7	<7.1
Total BTEX	NGV	ND	ND
Total VOCs	NGV	1.8	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

**Table 2**  
**Liquid Level Measurements**  
**September 14, 2004**

BP Service Station Number 3887  
Brooklyn, New York

Well Number	Top of Casing Elevation	Depth to Ground Water	Depth to LNAPL	LNAPL Thickness	Ground Water Elevation
MW-11	94.02	15.58	NP	NP	78.44
MW-12	93.53	15.24	NP	NP	78.29

Notes:

All measurements are in feet

LNAPL - Light non-aqueous phase liquid

NP - LNAPL not present

Top of casing elevation based upon arbitrary on-site benchmark

Ground water elevation corrected for LNAPL, as applicable

**Table 3**  
**Ground Water Analytical Results**  
**September 14, 2004**

BP Service Station Number 3887  
 Brooklyn, New York

Analytical Parameter	NYSDEC GWQS	Sample Location and Concentration (µg/L)	
		MW-11	MW-12
Benzene	1	<1.0	<1.0
Toluene	5	<1.0	<1.0
Ethylbenzene	5	<1.0	<1.0
Xylenes	5	<1.0	<1.0
Methyl Tertiary Butyl Ether	10	<b>27.6</b>	4.0
n-Butylbenzene	5	<5.0	<5.0
sec-Butylbenzene	5	<5.0	<5.0
tert-Butylbenzene	5	<5.0	<5.0
Isopropylbenzene	5	<2.0	<2.0
p-Isopropyltoluene	5	<5.0	<5.0
Naphthalene	10	<5.0	<5.0
n-Propylbenzene	5	<5.0	<5.0
1,2,4-Trimethylbenzene	5	<5.0	<5.0
1,3,5-Trimethylbenzene	5	<5.0	<5.0
Total BTEX	NGV	ND	ND
Total VOCs	NGV	27.6	4.0

NOTES:

NYSDEC GWQS - New York State Department of Environmental Conservation Ground Water Quality Standards

All concentrations reported in micrograms per liter (µg/L)

< - Not detected at or above indicated laboratory reporting limit

NGV - No guidance value available for this parameter

ND - Not detected

Results in **bold** exceed the applicable NYSDEC GWQS

## **Appendix D**



New Jersey

RECEIVED SEP 10 2004

09/08/04

Technical Report for

BP Amoco Corporation

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

G02JFRP

Accutest Job Number: N75945

Sampling Date: 08/23/04

Report to:

Delta Environmental Consultants  
84 Business Park Drive  
Armonk, NY 10501

ATTN: Aaron Lapine

Total number of pages in report: 14



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.

A handwritten signature in black ink, appearing to read 'Vincent J. Pugliese'.

Vincent J. Pugliese  
President

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

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# Table of Contents

Sections:



-1-

<b>Section 1: Sample Summary</b> .....	3
<b>Section 2: Sample Results</b> .....	4
2.1: N75945-1: MW-11(15-16') .....	4
2.2: N75945-2: MW-12(15-16') .....	5
<b>Section 3: Misc. Forms</b> .....	6
3.1: Chain of Custody .....	7
<b>Section 4: GC/MS Volatiles - QC Data Summaries</b> .....	8
4.1: Method Blank Summary .....	9
4.2: Blank Spike Summary .....	10
4.3: Matrix Spike/Matrix Spike Duplicate Summary .....	11
4.4: Instrument Performance Checks (BFB) .....	12
4.5: Surrogate Recovery Summaries .....	14

### Sample Summary

BP Amoco Corporation

Job No: N75945

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY  
Project No: G02JFRP

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
N75945-1	08/23/04	10:00	AO	08/24/04	SO Soil	MW-11(15-16')
N75945-2	08/23/04	12:00	AO	08/24/04	SO Soil	MW-12(15-16')

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

### Report of Analysis

Client Sample ID:	MW-11(15-16')	Date Sampled:	08/23/04
Lab Sample ID:	N75945-1	Date Received:	08/24/04
Matrix:	SO - Soil	Percent Solids:	66.3
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	G72931.D	1	09/05/04	SJM	n/a	n/a	VG3807
Run #2							

Run #	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	1.5	0.36	ug/kg	
104-51-8	n-Butylbenzene	ND	7.7	1.4	ug/kg	
135-98-8	sec-Butylbenzene	ND	7.7	0.42	ug/kg	
98-06-6	tert-Butylbenzene	ND	7.7	0.68	ug/kg	
100-41-4	Ethylbenzene	ND	1.5	0.87	ug/kg	
98-82-8	Isopropylbenzene	ND	7.7	1.6	ug/kg	
99-87-6	p-Isopropyltoluene	ND	7.7	0.47	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	1.8	1.5	0.50	ug/kg	
91-20-3	Naphthalene	ND	7.7	3.8	ug/kg	
103-65-1	n-Propylbenzene	ND	7.7	0.22	ug/kg	
108-88-3	Toluene	ND	1.5	0.35	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	7.7	1.2	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	7.7	1.5	ug/kg	
	m,p-Xylene	ND	3.1	1.2	ug/kg	
95-47-6	o-Xylene	ND	1.5	0.65	ug/kg	
1330-20-7	Xylene (total)	ND	3.1	0.65	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	79%		67-119%
17060-07-0	1,2-Dichloroethane-D4	72%		58-128%
2037-26-5	Toluene-D8	91%		75-121%
460-00-4	4-Bromofluorobenzene	88%		67-132%

(a) I.S. recovery confirmed by ms/msd.

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

Client Sample ID:	MW-12(15-16')	Date Sampled:	08/23/04
Lab Sample ID:	N75945-2	Date Received:	08/24/04
Matrix:	SO - Soil	Percent Solids:	70.5
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G72934.D	1	09/05/04	SJM	n/a	n/a	VG3807
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	1.4	0.34	ug/kg	
104-51-8	n-Butylbenzene	ND	7.1	1.2	ug/kg	
135-98-8	sec-Butylbenzene	ND	7.1	0.39	ug/kg	
98-06-6	tert-Butylbenzene	ND	7.1	0.63	ug/kg	
100-41-4	Ethylbenzene	ND	1.4	0.80	ug/kg	
98-82-8	Isopropylbenzene	ND	7.1	1.5	ug/kg	
99-87-6	p-Isopropyltoluene	ND	7.1	0.43	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.4	0.47	ug/kg	
91-20-3	Naphthalene	ND	7.1	3.5	ug/kg	
103-65-1	n-Propylbenzene	ND	7.1	0.20	ug/kg	
108-88-3	Toluene	ND	1.4	0.32	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	7.1	1.1	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	7.1	1.4	ug/kg	
	m,p-Xylene	ND	2.8	1.1	ug/kg	
95-47-6	o-Xylene	ND	1.4	0.60	ug/kg	
1330-20-7	Xylene (total)	ND	2.8	0.60	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	80%		67-119%
17060-07-0	1,2-Dichloroethane-D4	75%		58-128%
2037-26-5	Toluene-D8	96%		75-121%
460-00-4	4-Bromofluorobenzene	91%		67-132%

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

## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



# Chain of Custody Record

109213

N75945 Page 1 of 1

Project Name SS 5887  
 BP BU/GEM CO Portfolio: RETAIL  
 BP Laboratory Contract Number:  
 Requested Due Date (mm/dd/yy) STANDARD

On-site Time: 8:00 Temp: 75°  
 Off-site Time: 2:00 Temp: 80°  
 Sky Conditions: Sunny  
 Meteorological Events:  
 Wind Speed: \_\_\_\_\_ Direction: \_\_\_\_\_

Send To:	BP/GEM Facility No.: <u>SS 5887</u>	Consultant/Contractor: <u>Delta Environmental</u>
Lab Name: <u>Accutest</u>	BP/GEM Facility Address: <u>164 4th Ave, Brooklyn</u>	Address: <u>84 Business Park Drive Suite 102</u>
Lab Address: <u>2235 Highway 130</u>	Site ID No.:	<u>Armonk, NY 10504</u>
<u>Dayton, NJ</u>	Site Lat/Long:	e-mail EDD: <u>pmeyer@deltaenv.com</u>
Lab PM: <u>Diana Kemer</u>	California Global ID #:	Consultant/Contractor Project No.: <u>CO2JRP</u>
Tele/Fax:	BP/GEM PM Contact:	Consultant/Contractor Tele/Fax: <u>914 265 8206</u>
Report Type & QC Level:	Address:	Consultant/Contractor PM: <u>Paul Meyer</u>
BP/GEM Account No.:	Tele/Fax:	Invoice to: <u>Consultant or BP or Atlantic Richfield Co (Circle one)</u>
Lab Bottle Order No.:		BP/GEM Work Release No.:

Item No.	Sample Description	Time	Date	Matrix			Laboratory No.	No. of containers	Preservatives				Requested Analysis				Sample Point Lat/Long and Comments
				Solid	Liquid	Air			Unpreserved	H2SO4	HNO3	HCl	DTX 8021	DTX 8022	DTX 8023	DTX 8024	
1	MW-11 (15-16')	10:00	8/23/04	X			-1	1	X								1782
2	MW-12 (15-16')	12:00	8/23/04	X			-2	1	X								1455A
3																	445C
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler's Name: <u>Andre Obiedo</u>	Relinquished By / Affiliation: <u>Andre Obiedo / Delta</u>	Date: <u>8/23/04</u>	Time: <u>10:00 AM</u>	Accepted By / Affiliation: <u>Paul Meyer</u>	Date: <u>8/23/04</u>	Time: <u>1:00 PM</u>
Sampler's Company: <u>Delta Environmental</u>						
Shipment Date: <u>8/23/04</u>						
Shipment Method: <u>FedEx</u>						
Shipment Tracking No.:						
Special Instructions:						

Custody Seals In Place Yes  No  Cooler Temperature on Receipt 5.6 °F/C Trip Blank Yes  No

LABORATORY BP COC Rev. 2 4/18/03



## GC/MS Volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Surrogate Recovery Summaries

# Method Blank Summary

Job Number: N75945  
 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
VG3807-MB1	G72928.D	1	09/05/04	SJM	n/a	n/a	VG3807

4.1  
4

The QC reported here applies to the following samples: Method: SW846 8260B

N75945-1, N75945-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.24	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.88	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.27	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.44	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	0.57	ug/kg	
98-82-8	Isopropylbenzene	ND	5.0	1.0	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.31	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.33	ug/kg	
91-20-3	Naphthalene	ND	5.0	2.5	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.14	ug/kg	
108-88-3	Toluene	ND	1.0	0.23	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.77	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.98	ug/kg	
	m,p-Xylene	ND	2.0	0.78	ug/kg	
95-47-6	o-Xylene	ND	1.0	0.42	ug/kg	
1330-20-7	Xylene (total)	ND	2.0	0.42	ug/kg	

CAS No.	Surrogate Recoveries	Limits	
1868-53-7	Dibromofluoromethane	83%	67-119%
17060-07-0	1,2-Dichloroethane-D4	77%	58-128%
2037-26-5	Toluene-D8	90%	75-121%
460-00-4	4-Bromofluorobenzene	99%	67-132%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
124-38-9	Carbon dioxide	2.81	130	ug/kg	JN
	Total TIC, Volatile		130	ug/kg	J



# Blank Spike Summary

Job Number: N75945  
 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
VG3807-BS	G72929.D	1	09/05/04	SJM	n/a	n/a	VG3807

4.2  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N75945-1, N75945-2

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	47.4	95	80-116
104-51-8	n-Butylbenzene	50	42.1	84	72-122
135-98-8	sec-Butylbenzene	50	43.5	87	76-122
98-06-6	tert-Butylbenzene	50	36.9	74	74-123
100-41-4	Ethylbenzene	50	42.2	84	81-118
98-82-8	Isopropylbenzene	50	41.7	83	78-125
99-87-6	p-Isopropyltoluene	50	41.5	83	74-120
1634-04-4	Methyl Tert Butyl Ether	50	47.2	94	78-122
91-20-3	Naphthalene	50	48.2	96	62-131
103-65-1	n-Propylbenzene	50	41.7	83	76-124
108-88-3	Toluene	50	46.1	92	82-118
95-63-6	1,2,4-Trimethylbenzene	50	38.5	77	77-118
108-67-8	1,3,5-Trimethylbenzene	50	39.7	79	77-119
	m,p-Xylene	100	87.4	87	82-118
95-47-6	o-Xylene	50	49.6	99	83-121
1330-20-7	Xylene (total)	150	137	91	83-119

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	88%	67-119%
17060-07-0	1,2-Dichloroethane-D4	85%	58-128%
2037-26-5	Toluene-D8	95%	75-121%
460-00-4	4-Bromofluorobenzene	91%	67-132%

# Matrix Spike/Matrix Spike Duplicate Summary

Job Number: N75945  
 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
N75945-1MS	G72932.D	1	09/05/04	SJM	n/a	n/a	VG3807
N75945-1MSD	G72933.D	1	09/05/04	SJM	n/a	n/a	VG3807
N75945-1 <sup>a</sup>	G72931.D	1	09/05/04	SJM	n/a	n/a	VG3807

4.3  
4

The QC reported here applies to the following samples: Method: SW846 8260B

N75945-1, N75945-2

CAS No.	Compound	N75945-1 ug/kg	Spike Q	ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	77	51.0	66	50.9	66	0	52-132/19	
104-51-8	n-Butylbenzene	ND	77	23.8	31	24.1	31	1	29-158/34	
135-98-8	sec-Butylbenzene	ND	77	30.5	40	31.8	41	4	32-153/33	
98-06-6	tert-Butylbenzene	ND	77	30.5	40	30.1	39	1	31-151/30	
100-41-4	Ethylbenzene	ND	77	37.5	49	38.4	50	2	39-144/23	
98-82-8	Isopropylbenzene	ND	77	37.9	49	38.4	50	1	37-149/27	
99-87-6	p-Isopropyltoluene	ND	77	31.3	41	30.7	40	2	32-154/35	
1634-04-4	Methyl Tert Butyl Ether	1.8	77	53.1	67	57.0	72	7	56-133/17	
91-20-3	Naphthalene	ND	77	19.5	25* <sup>b</sup>	17.2	22* <sup>b</sup>	13	27-155/37	
103-65-1	n-Propylbenzene	ND	77	33.3	43	32.9	43	1	32-149/29	
108-88-3	Toluene	ND	77	47.4	62	47.8	62	1	46-140/20	
95-63-6	1,2,4-Trimethylbenzene	ND	77	31.7	41	30.6	40	4	30-154/33	
108-67-8	1,3,5-Trimethylbenzene	ND	77	33.0	43	32.9	43	0	30-153/32	
	m,p-Xylene	ND	154	77.5	50	77.4	50	0	38-146/26	
95-47-6	o-Xylene	ND	77	45.8	60	44.7	58	2	43-146/22	
1330-20-7	Xylene (total)	ND	231	123	53	122	53	1	40-145/24	

CAS No.	Surrogate Recoveries	MS	MSD	N75945-1	Limits
1868-53-7	Dibromofluoromethane	81%	81%	79%	67-119%
17060-07-0	1,2-Dichloroethane-D4	75%	78%	72%	58-128%
2037-26-5	Toluene-D8	90%	91%	91%	75-121%
460-00-4	4-Bromofluorobenzene	81%	83%	88%	67-132%

(a) I.S. recovery confirmed by ms/msd.  
 (b) Outside control limits due to matrix interference.

# Instrument Performance Check (BFB)

Job Number: N75945  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VG3742-BFB1	Injection Date:	07/19/04
Lab File ID:	G71533.D	Injection Time:	10:06
Instrument ID:	GCMMSG		

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	9599	23.2	Pass
75	30.0 - 60.0% of mass 95	21016	50.9	Pass
95	Base peak, 100% relative abundance	41328	100.0	Pass
96	5.0 - 9.0% of mass 95	2885	7.0	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	30565	74.0	Pass
175	5.0 - 9.0% of mass 174	2610	6.3 (8.5) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	30133	72.9 (98.6) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	2270	5.5 (7.5) <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
VG3742-IC3742	G71534.D	07/19/04	10:58	00:52	Initial cal 1
VG3742-IC3742	G71535.D	07/19/04	11:38	01:32	Initial cal 5
VG3742-IC3742	G71536.D	07/19/04	12:14	02:08	Initial cal 10
VG3742-ICC3742	G71537.D	07/19/04	12:51	02:45	Initial cal 50
VG3742-IC3742	G71538.D	07/19/04	13:28	03:22	Initial cal 100
VG3742-IC3742	G71539.D	07/19/04	14:10	04:04	Initial cal 200
VG3742-IC3742	G71540.D	07/19/04	14:50	04:44	Initial cal 400

# Instrument Performance Check (BFB)

Job Number: N75945  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VG3807-BFB	Injection Date:	09/05/04
Lab File ID:	G72925.D	Injection Time:	16:06
Instrument ID:	GCMSC		

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	5733	23.2	Pass
75	30.0 - 60.0% of mass 95	12458	50.3	Pass
95	Base peak, 100% relative abundance	24749	100.0	Pass
96	5.0 - 9.0% of mass 95	2060	8.3	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	18453	74.6	Pass
175	5.0 - 9.0% of mass 174	1650	6.7 (8.9) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	17804	71.9 (96.5) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	1100	4.4 (6.2) <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
VG3807-CC3742	G72926.D	09/05/04	16:52	00:46	Continuing cal 100
VG3807-MB1	G72928.D	09/05/04	19:40	03:34	Method Blank
VG3807-BS	G72929.D	09/05/04	20:15	04:09	Blank Spike
ZZZZZ	G72930.D	09/05/04	21:02	04:56	(unrelated sample)
N75945-1	G72931.D	09/05/04	21:37	05:31	MW-11(15-16')
N75945-1MS	G72932.D	09/05/04	22:13	06:07	Matrix Spike
N75945-1MSD	G72933.D	09/05/04	22:48	06:42	Matrix Spike Duplicate
N75945-2	G72934.D	09/05/04	23:23	07:17	MW-12(15-16')
ZZZZZ	G72935.D	09/05/04	23:58	07:52	(unrelated sample)

# Volatile Surrogate Recovery Summary

Job Number: N75945  
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
N75945-1	G72931.D	79.0	72.0	91.0	88.0
N75945-2	G72934.D	80.0	75.0	96.0	91.0
N75945-1MS	G72932.D	81.0	75.0	90.0	81.0
N75945-1MSD	G72933.D	81.0	78.0	91.0	83.0
VG3807-BS	G72929.D	88.0	85.0	95.0	91.0
VG3807-MB1	G72928.D	83.0	77.0	90.0	99.0

Surrogate Compounds	Recovery Limits
S1 = Dibromofluoromethane	67-119%
S2 = 1,2-Dichloroethane-D4	58-128%
S3 = Toluene-D8	75-121%
S4 = 4-Bromofluorobenzene	67-132%

4.5  
4

## **Appendix E**



09/28/04

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Technical Report for

BP Amoco Corporation

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

G02J-FRP-2

Accutest Job Number: N77850

Sampling Date: 09/14/04

Report to:

Delta Environmental Consultants  
84 Business Park Drive  
Armonk, NY 10501

ATTN: Aaron Lapine

Total number of pages in report: 23



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

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# Table of Contents

Sections:



-1-

<b>Section 1: Sample Summary .....</b>	<b>3</b>
<b>Section 2: Sample Results .....</b>	<b>4</b>
2.1: N77850-1: MW-11 .....	4
2.2: N77850-2: MW-12 .....	5
2.3: N77850-3: TRIP BLANK .....	6
<b>Section 3: Misc. Forms .....</b>	<b>7</b>
3.1: Chain of Custody .....	8
<b>Section 4: GC/MS Volatiles - QC Data Summaries .....</b>	<b>9</b>
4.1: Method Blank Summary .....	10
4.2: Blank Spike Summary .....	13
4.3: Matrix Spike/Matrix Spike Duplicate Summary .....	16
4.4: Instrument Performance Checks (BFB) .....	19
4.5: Surrogate Recovery Summaries .....	23





### Sample Summary

BP Amoco Corporation

Job No: N77850

DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY  
Project No: G02J-FRP-2

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
N77850-1	09/14/04	14:18 BH	09/15/04	AQ Ground Water	MW-11
N77850-2	09/14/04	14:40 BH	09/15/04	AQ Ground Water	MW-12
N77850-3	09/14/04	14:40 BH	09/15/04	AQ Trip Blank Water	TRIP BLANK

# Report of Analysis

Client Sample ID:	MW-11	Date Sampled:	09/14/04
Lab Sample ID:	N77850-1	Date Received:	09/15/04
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A87277.D	1	09/21/04	ZLM	n/a	n/a	VA2699
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	27.6	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		79-119%
17060-07-0	1,2-Dichloroethane-D4	97%		68-129%
2037-26-5	Toluene-D8	97%		83-118%
460-00-4	4-Bromofluorobenzene	100%		82-120%

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

Client Sample ID:	MW-12	Date Sampled:	09/14/04
Lab Sample ID:	N77850-2	Date Received:	09/15/04
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A87420.D	1	09/25/04	ZLM	n/a	n/a	VA2704
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

## VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	4.0	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		79-119%
17060-07-0	1,2-Dichloroethane-D4	117%		68-129%
2037-26-5	Toluene-D8	95%		83-118%
460-00-4	4-Bromofluorobenzene	104%		82-120%

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

Client Sample ID:	TRIP BLANK	Date Sampled:	09/14/04
Lab Sample ID:	N77850-3	Date Received:	09/15/04
Matrix:	AQ - Trip Blank Water	Percent Solids:	n/a
Method:	SW846 8260B		
Project:	DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A87257.D	1	09/21/04	ZLM	n/a	n/a	VA2698
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

## VOA STARS List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		79-119%
17060-07-0	1,2-Dichloroethane-D4	106%		68-129%
2037-26-5	Toluene-D8	97%		83-118%
460-00-4	4-Bromofluorobenzene	101%		82-120%

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



## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



Chain of Custody Record

Project Name SS # 3887 Brooklyn, NY
BP BU/GEM CO Portfolio: retail
BP Laboratory Contract Number:
Requested Due Date (mm/dd/yy) standard

131877 N77850

On-site Time: Temp:
Off-site Time: Temp:
Sky Conditions:
Meteorological Events:
Wind Speed: Direction:

Send To: Diane Kemer
Lab Name: Accutest
Lab Address: 2835 Rt. 130 Dayton, NY 05510
Lab PM: D.K.
Tele/Fax: 732-329-0806
Report Type & QC Level:
BP/GEM Account No.: 6025-FRP-2
Lab Bottle Order No:

Table with columns: Item No., Sample Description, Time, Date, Matrix (Soil/Solid, Water/Liquid, Air), Laboratory No., No. of containers, Preservatives (Unpreserved, H2SO4, HNO3, HCl), Requested Analysis (BTEX, BTEX/TPH, EPA 8260, EPA 8270), Sample Point Lat/Long and Comments.

Sampler's Name: Brian Howe
Sampler's Company: Analytic Assoc.
Shipment Date: 9/14/04
Shipment Method: Fed-ex
Shipment Tracking No:

Custody Seals In Place Yes No
Cooler Temperature on Receipt 6 F/C
Trip Blank Yes No

1B

LABORATORY

BP COC Rev. 2 4/18/03

N77850: Chain of Custody
Page 1 of 1

## GC/MS Volatiles

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Surrogate Recovery Summaries

# Method Blank Summary

Job Number: N77850  
 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
VA2698-MB1	A87248.D	I	09/21/04	ZLM	n/a	n/a	VA2698

4.1  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-3

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	79-119%
17060-07-0	1,2-Dichloroethane-D4	91%	68-129%
2037-26-5	Toluene-D8	95%	83-118%
460-00-4	4-Bromofluorobenzene	98%	82-120%



# Method Blank Summary

Job Number: N77850  
 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
VA2699-MBI	A87270.D	1	09/21/04	ZLM	n/a	n/a	VA2699

4.1  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Limits	
1868-53-7	Dibromofluoromethane	99%	79-119%
17060-07-0	1,2-Dichloroethane-D4	93%	68-129%
2037-26-5	Toluene-D8	95%	83-118%
460-00-4	4-Bromofluorobenzene	100%	82-120%

# Method Blank Summary

Job Number: N77850  
 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
VA2704-MB1	A87415.D	1	09/25/04	ZLM	n/a	n/a	VA2704

4.1  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.31	ug/l	
104-51-8	n-Butylbenzene	ND	5.0	0.24	ug/l	
135-98-8	sec-Butylbenzene	ND	5.0	0.098	ug/l	
98-06-6	tert-Butylbenzene	ND	5.0	0.33	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.27	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.33	ug/l	
99-87-6	p-Isopropyltoluene	ND	5.0	0.12	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.28	ug/l	
91-20-3	Naphthalene	ND	5.0	0.52	ug/l	
103-65-1	n-Propylbenzene	ND	5.0	0.23	ug/l	
108-88-3	Toluene	ND	1.0	0.14	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	0.51	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	0.24	ug/l	
	m,p-Xylene	ND	1.0	0.36	ug/l	
95-47-6	o-Xylene	ND	1.0	0.17	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Limits	
1868-53-7	Dibromofluoromethane	105%	79-119%
17060-07-0	1,2-Dichloroethane-D4	112%	68-129%
2037-26-5	Toluene-D8	95%	83-118%
460-00-4	4-Bromofluorobenzene	105%	82-120%

# Blank Spike Summary

Job Number: N77850  
 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
VA2698-BS	A87249.D	1	09/21/04	ZLM	n/a	n/a	VA2698

4.2  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	50.1	100	77-119
104-51-8	n-Butylbenzene	50	46.5	93	77-122
135-98-8	sec-Butylbenzene	50	51.0	102	79-122
98-06-6	tert-Butylbenzene	50	45.6	91	79-121
100-41-4	Ethylbenzene	50	50.3	101	79-120
98-82-8	Isopropylbenzene	50	47.4	95	77-125
99-87-6	p-Isopropyltoluene	50	45.6	91	76-119
1634-04-4	Methyl Tert Butyl Ether	50	53.1	106	75-123
91-20-3	Naphthalene	50	49.7	99	63-127
103-65-1	n-Propylbenzene	50	48.8	98	81-121
108-88-3	Toluene	50	51.1	102	81-120
95-63-6	1,2,4-Trimethylbenzene	50	50.5	101	78-118
108-67-8	1,3,5-Trimethylbenzene	50	51.0	102	79-118
	m,p-Xylene	100	101	101	80-120
95-47-6	o-Xylene	50	45.9	92	80-120
1330-20-7	Xylene (total)	150	147	98	81-119

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	98%	79-119%
17060-07-0	1,2-Dichloroethane-D4	90%	68-129%
2037-26-5	Toluene-D8	99%	83-118%
460-00-4	4-Bromofluorobenzene	97%	82-120%

# Blank Spike Summary

Job Number: N77850  
 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
VA2699-BS	A87271.D	1	09/21/04	ZLM	n/a	n/a	VA2699

4.2  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	51.2	102	77-119
104-51-8	n-Butylbenzene	50	48.4	97	77-122
135-98-8	sec-Butylbenzene	50	51.6	103	79-122
98-06-6	tert-Butylbenzene	50	46.5	93	79-121
100-41-4	Ethylbenzene	50	50.8	102	79-120
98-82-8	Isopropylbenzene	50	48.5	97	77-125
99-87-6	p-Isopropyltoluene	50	46.2	92	76-119
1634-04-4	Methyl Tert Butyl Ether	50	56.7	113	75-123
91-20-3	Naphthalene	50	49.4	99	63-127
103-65-1	n-Propylbenzene	50	50.8	102	81-121
108-88-3	Toluene	50	51.8	104	81-120
95-63-6	1,2,4-Trimethylbenzene	50	50.8	102	78-118
108-67-8	1,3,5-Trimethylbenzene	50	51.7	103	79-118
	m,p-Xylene	100	100	100	80-120
95-47-6	o-Xylene	50	45.7	91	80-120
1330-20-7	Xylene (total)	150	146	97	81-119

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	100%	79-119%
17060-07-0	1,2-Dichloroethane-D4	94%	68-129%
2037-26-5	Toluene-D8	99%	83-118%
460-00-4	4-Bromofluorobenzene	101%	82-120%

# Blank Spike Summary

Job Number: N77850  
 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
VA2704-BS	A87416.D	1	09/25/04	ZLM	n/a	n/a	VA2704

4.2  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-2

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	48.8	98	77-119
104-51-8	n-Butylbenzene	50	51.6	103	77-122
135-98-8	sec-Butylbenzene	50	55.9	112	79-122
98-06-6	tert-Butylbenzene	50	49.5	99	79-121
100-41-4	Ethylbenzene	50	53.6	107	79-120
98-82-8	Isopropylbenzene	50	51.3	103	77-125
99-87-6	p-Isopropyltoluene	50	49.2	98	76-119
1634-04-4	Methyl Tert Butyl Ether	50	54.9	110	75-123
91-20-3	Naphthalene	50	51.9	104	63-127
103-65-1	n-Propylbenzene	50	54.6	109	81-121
108-88-3	Toluene	50	50.1	100	81-120
95-63-6	1,2,4-Trimethylbenzene	50	56.3	113	78-118
108-67-8	1,3,5-Trimethylbenzene	50	56.1	112	79-118
	m,p-Xylene	100	104	104	80-120
95-47-6	o-Xylene	50	47.1	94	80-120
1330-20-7	Xylene (total)	150	151	101	81-119

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	101%	79-119%
17060-07-0	1,2-Dichloroethane-D4	107%	68-129%
2037-26-5	Toluene-D8	101%	83-118%
460-00-4	4-Bromofluorobenzene	103%	82-120%

# Matrix Spike/Matrix Spike Duplicate Summary

Job Number: N77850  
 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
N77884-3MS	A87265.D	1	09/21/04	ZLM	n/a	n/a	VA2698
N77884-3MSD	A87266.D	1	09/21/04	ZLM	n/a	n/a	VA2698
N77884-3	A87259.D	1	09/21/04	ZLM	n/a	n/a	VA2698

4.3  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-3

CAS No.	Compound	N77884-3 ug/l	Spike Q ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	50	51.0	102	50.3	101	1	51-138/10
104-51-8	n-Butylbenzene	ND	50	49.8	100	48.7	97	2	68-142/13
135-98-8	sec-Butylbenzene	ND	50	55.5	111	54.4	109	2	74-128/10
98-06-6	tert-Butylbenzene	ND	50	49.2	98	48.2	96	2	73-128/12
100-41-4	Ethylbenzene	ND	50	51.7	103	50.5	101	2	51-142/11
98-82-8	Isopropylbenzene	ND	50	50.4	101	48.9	98	3	65-131/10
99-87-6	p-Isopropyltoluene	ND	50	49.7	99	48.5	97	2	77-126/10
1634-04-4	Methyl Tert Butyl Ether	7.6	50	62.6	110	61.3	107	2	38-150/10
91-20-3	Naphthalene	ND	50	51.4	103	51.8	104	1	54-144/15
103-65-1	n-Propylbenzene	ND	50	52.3	105	50.9	102	3	65-135/12
108-88-3	Toluene	ND	50	52.8	106	52.3	105	1	49-147/10
95-63-6	1,2,4-Trimethylbenzene	ND	50	53.1	106	51.8	104	2	46-146/10
108-67-8	1,3,5-Trimethylbenzene	ND	50	53.0	106	51.8	104	2	60-139/13
	m,p-Xylene	ND	100	106	106	104	104	2	37-150/10
95-47-6	o-Xylene	ND	50	49.0	98	48.2	96	2	53-142/10
1330-20-7	Xylene (total)	ND	150	155	103	152	101	2	44-146/11

CAS No.	Surrogate Recoveries	MS	MSD	N77884-3	Limits
1868-53-7	Dibromofluoromethane	97%	94%	112%	79-119%
17060-07-0	1,2-Dichloroethane-D4	85%	82%	110%	68-129%
2037-26-5	Toluene-D8	98%	98%	97%	83-118%
460-00-4	4-Bromofluorobenzene	97%	96%	100%	82-120%

# Matrix Spike/Matrix Spike Duplicate Summary

Job Number: N77850  
 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
N78004-2MS	A87278.D	5	09/21/04	ZLM	n/a	n/a	VA2699
N78004-2MSD	A87279.D	5	09/21/04	ZLM	n/a	n/a	VA2699
N78004-2	A87274.D	5	09/21/04	ZLM	n/a	n/a	VA2699

4.3  
4

The QC reported here applies to the following samples: Method: SW846 8260B

N77850-1

CAS No.	Compound	N78004-2 ug/l	Spike Q ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	137	250	331	78	357	88	8	51-138/10
104-51-8	n-Butylbenzene	89.3	250	286	79	315	90	10	68-142/13
135-98-8	sec-Butylbenzene	75.0	250	300	90	339	106	12* a	74-128/10
98-06-6	tert-Butylbenzene	ND	250	222	89	250	100	12	73-128/12
100-41-4	Ethylbenzene	326	250	464	55	487	64	5	51-142/11
98-82-8	Isopropylbenzene	94.5	250	292	79	322	91	10	65-131/10
99-87-6	p-Isopropyltoluene	15.7	J 250	226	84	256	96	12* a	77-126/10
1634-04-4	Methyl Tert Butyl Ether	5.9	250	274	107	300	118	9	38-150/10
91-20-3	Naphthalene	18.1	J 250	268	100	302	114	12	54-144/15
103-65-1	n-Propylbenzene	323	250	458	54* a	492	68	7	65-135/12
108-88-3	Toluene	4.9	J 250	244	96	270	106	10	49-147/10
95-63-6	1,2,4-Trimethylbenzene	683	250	754	28* b	785	41* b	4	46-146/10
108-67-8	1,3,5-Trimethylbenzene	198	250	380	73	416	87	9	60-139/13
	m,p-Xylene	708	500	975	53	1020	62	5	37-150/10
95-47-6	o-Xylene	117	250	303	74	327	84	8	53-142/10
1330-20-7	Xylene (total)	824	750	1280	61	1350	70	5	44-146/11

CAS No.	Surrogate Recoveries	MS	MSD	N78004-2	Limits
1868-53-7	Dibromofluoromethane	100%	98%	101%	79-119%
17060-07-0	1,2-Dichloroethane-D4	97%	91%	99%	68-129%
2037-26-5	Toluene-D8	100%	99%	99%	83-118%
460-00-4	4-Bromofluorobenzene	99%	101%	99%	82-120%

- (a) Outside control limits due to matrix interference.
- (b) Outside control limits due to high level in sample relative to spike amount.

# Matrix Spike/Matrix Spike Duplicate Summary

Job Number: N77850  
 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
N78208-3MS	A87431.D	5	09/25/04	ZLM	n/a	n/a	VA2704
N78208-3MSD	A87432.D	5	09/25/04	ZLM	n/a	n/a	VA2704
N78208-3	A87430.D	5	09/25/04	ZLM	n/a	n/a	VA2704

4.3  
4

The QC reported here applies to the following samples:

Method: SW846 8260B

N77850-2

CAS No.	Compound	N78208-3 ug/l	Spike Q ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	231	250	403	69	393	65	3	51-138/10
104-51-8	n-Butylbenzene	45.4	250	275	92	272	91	1	68-142/13
135-98-8	sec-Butylbenzene	28.0	250	310	113	310	113	0	74-128/10
98-06-6	tert-Butylbenzene	ND	250	255	102	257	103	1	73-128/12
100-41-4	Ethylbenzene	5420	E 250	3820	-640* a	3630	-716* a	5	51-142/11
98-82-8	Isopropylbenzene	239	250	434	78	436	79	0	65-131/10
99-87-6	p-Isopropyltoluene	35.5	250	275	96	272	95	1	77-126/10
1634-04-4	Methyl Tert Butyl Ether	1800	E 250	1750	-20* a	1660	-56* a	5	38-150/10
91-20-3	Naphthalene	580	250	840	104	828	99	1	54-144/15
103-65-1	n-Propylbenzene	504	250	637	53* a	631	51* a	1	65-135/12
108-88-3	Toluene	1920	E 250	1610	-124* a	1570	-140* a	3	49-147/10
95-63-6	1,2,4-Trimethylbenzene	2790	E 250	2370	-168* b	2320	-188* b	2	46-146/10
108-67-8	1,3,5-Trimethylbenzene	608	250	742	54* b	737	52* b	1	60-139/13
	m,p-Xylene	9020	E 500	6390	-526* a	6010	-602* a	6	37-150/10
95-47-6	o-Xylene	2210	E 250	1830	-152* a	1760	-180* a	4	53-142/10
1330-20-7	Xylene (total)	11200	E 750	8210	-399* a	7770	-457* a	6	44-146/11

CAS No.	Surrogate Recoveries	MS	MSD	N78208-3	Limits
1868-53-7	Dibromofluoromethane	96%	92%	101%	79-119%
17060-07-0	1,2-Dichloroethane-D4	93%	87%	105%	68-129%
2037-26-5	Toluene-D8	97%	98%	97%	83-118%
460-00-4	4-Bromofluorobenzene	99%	99%	97%	82-120%

- (a) Outside control limits due to high level in sample relative to spike amount.
- (b) Outside control limits due to matrix interference.



# Instrument Performance Check (BFB)

Job Number: N77850  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VA2682-BFB	Injection Date:	09/10/04
Lab File ID:	A86843.D	Injection Time:	12:38
Instrument ID:	GCMSA		

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	3364	21.6	Pass
75	30.0 - 60.0% of mass 95	8325	53.5	Pass
95	Base peak, 100% relative abundance	15564	100.0	Pass
96	5.0 - 9.0% of mass 95	995	6.4	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	15243	97.9	Pass
175	5.0 - 9.0% of mass 174	1134	7.3 (7.4) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	14898	95.7 (97.7) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	1016	6.5 (6.8) <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
VA2682-IC2682	A86846.D	09/10/04	14:15	01:37	Initial cal 5
VA2682-IC2682	A86847.D	09/10/04	14:44	02:06	Initial cal 20
VA2682-ICC2682	A86848.D	09/10/04	15:14	02:36	Initial cal 50
VA2682-IC2682	A86849.D	09/10/04	15:43	03:05	Initial cal 200
VA2682-IC2682	A86850.D	09/10/04	16:06	03:28	Initial cal 100
VA2682-IC2682	A86853.D	09/10/04	17:35	04:57	Initial cal 2
VA2682-IC2682	A86854.D	09/10/04	18:19	05:41	Initial cal 1
VA2682-MB1	A86855.D	09/10/04	18:49	06:11	Method Blank
VA2682-BS	A86856.D	09/10/04	19:19	06:41	Blank Spike
ZZZZZZ	A86858.D	09/10/04	20:13	07:35	(unrelated sample)
ZZZZZZ	A86859.D	09/10/04	20:43	08:05	(unrelated sample)
ZZZZZZ	A86860.D	09/10/04	21:12	08:34	(unrelated sample)
ZZZZZZ	A86861.D	09/10/04	21:42	09:04	(unrelated sample)
ZZZZZZ	A86862.D	09/10/04	22:11	09:33	(unrelated sample)
ZZZZZZ	A86863.D	09/10/04	22:41	10:03	(unrelated sample)
ZZZZZZ	A86864.D	09/10/04	23:25	10:47	(unrelated sample)
ZZZZZZ	A86865.D	09/10/04	23:55	11:17	(unrelated sample)

# Instrument Performance Check (BFB)

Job Number: N77850  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VA2698-BFB	Injection Date:	09/20/04
Lab File ID:	A87245.D	Injection Time:	23:01
Instrument ID:	GCMSA		

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	15712	18.1	Pass
75	30.0 - 60.0% of mass 95	41656	47.9	Pass
95	Base peak, 100% relative abundance	86875	100.0	Pass
96	5.0 - 9.0% of mass 95	5721	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	89563	103.1	Pass
175	5.0 - 9.0% of mass 174	6197	7.1 (6.9) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	86651	99.7 (96.7) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	5771	6.6 (6.7) <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
VA2698-CC2682	A87246.D	09/20/04	23:30	00:29	Continuing cal 50
VA2698-MBI	A87248.D	09/21/04	01:29	02:28	Method Blank
VA2698-BS	A87249.D	09/21/04	01:58	02:57	Blank Spike
ZZZZZZ	A87250.D	09/21/04	02:28	03:27	(unrelated sample)
ZZZZZZ	A87251.D	09/21/04	02:57	03:56	(unrelated sample)
ZZZZZZ	A87252.D	09/21/04	03:42	04:41	(unrelated sample)
ZZZZZZ	A87253.D	09/21/04	04:11	05:10	(unrelated sample)
ZZZZZZ	A87254.D	09/21/04	04:41	05:40	(unrelated sample)
ZZZZZZ	A87255.D	09/21/04	05:10	06:09	(unrelated sample)
ZZZZZZ	A87256.D	09/21/04	05:40	06:39	(unrelated sample)
N77850-3	A87257.D	09/21/04	06:10	07:09	TRIP BLANK
ZZZZZZ	A87258.D	09/21/04	06:39	07:38	(unrelated sample)
N77884-3	A87259.D	09/21/04	07:09	08:08	(used for QC only; not part of job N77850)
ZZZZZZ	A87260.D	09/21/04	07:38	08:37	(unrelated sample)
ZZZZZZ	A87261.D	09/21/04	08:08	09:07	(unrelated sample)
ZZZZZZ	A87264.D	09/21/04	09:40	10:39	(unrelated sample)
N77884-3MS	A87265.D	09/21/04	10:09	11:08	Matrix Spike
N77884-3MSD	A87266.D	09/21/04	10:39	11:38	Matrix Spike Duplicate

# Instrument Performance Check (BFB)

Job Number: N77850  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample:	VA2699-BFB	Injection Date:	09/21/04
Lab File ID:	A87267.D	Injection Time:	11:41
Instrument ID:	GCMSA		

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	3539	17.4	Pass
75	30.0 - 60.0% of mass 95	9698	47.7	Pass
95	Base peak, 100% relative abundance	20320	100.0	Pass
96	5.0 - 9.0% of mass 95	1448	7.1	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	20568	101.2	Pass
175	5.0 - 9.0% of mass 174	1540	7.6 (7.5) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	19627	96.6 (95.4) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	1367	6.7 (7.0) <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
VA2699-CC2682	A87268.D	09/21/04	14:00	02:19	Continuing cal 20
VA2699-MB1	A87270.D	09/21/04	15:24	03:43	Method Blank
VA2699-BS	A87271.D	09/21/04	16:01	04:20	Blank Spike
ZZZZZZ	A87273.D	09/21/04	17:32	05:51	(unrelated sample)
N78004-2	A87274.D	09/21/04	18:03	06:22	(used for QC only; not part of job N77850)
ZZZZZZ	A87275.D	09/21/04	18:32	06:51	(unrelated sample)
N77850-1	A87277.D	09/21/04	19:31	07:50	MW-11
N78004-2MS	A87278.D	09/21/04	20:01	08:20	Matrix Spike
N78004-2MSD	A87279.D	09/21/04	20:31	08:50	Matrix Spike Duplicate
ZZZZZZ	A87280.D	09/21/04	21:00	09:19	(unrelated sample)
ZZZZZZ	A87281.D	09/21/04	21:30	09:49	(unrelated sample)
ZZZZZZ	A87282.D	09/21/04	21:59	10:18	(unrelated sample)
ZZZZZZ	A87283.D	09/21/04	22:29	10:48	(unrelated sample)
ZZZZZZ	A87284.D	09/21/04	23:13	11:32	(unrelated sample)

# Instrument Performance Check (BFB)

Job Number: N77850  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Sample: VA2704-BFB	Injection Date: 09/24/04
Lab File ID: A87412.D	Injection Time: 22:58
Instrument ID: GCMSA	

4.4  
4

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	15.0 - 40.0% of mass 95	10590	22.6	Pass
75	30.0 - 60.0% of mass 95	26291	56.0	Pass
95	Base peak, 100% relative abundance	46960	100.0	Pass
96	5.0 - 9.0% of mass 95	3275	7.0	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	45320	96.5	Pass
175	5.0 - 9.0% of mass 174	3086	6.6 (6.8) <sup>a</sup>	Pass
176	95.0 - 101.0% of mass 174	44397	94.5 (98.0) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	2874	6.1 (6.5) <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
VA2704-CC2682	A87413.D	09/24/04	23:28	00:30	Continuing cal 50
VA2704-MB1	A87415.D	09/25/04	01:26	02:28	Method Blank
VA2704-BS	A87416.D	09/25/04	01:55	02:57	Blank Spike
ZZZZZZ	A87418.D	09/25/04	02:55	03:57	(unrelated sample)
ZZZZZZ	A87419.D	09/25/04	03:24	04:26	(unrelated sample)
N77850-2	A87420.D	09/25/04	04:09	05:11	MW-12
ZZZZZZ	A87421.D	09/25/04	04:38	05:40	(unrelated sample)
ZZZZZZ	A87422.D	09/25/04	05:08	06:10	(unrelated sample)
ZZZZZZ	A87423.D	09/25/04	05:37	06:39	(unrelated sample)
ZZZZZZ	A87424.D	09/25/04	06:07	07:09	(unrelated sample)
ZZZZZZ	A87425.D	09/25/04	06:36	07:38	(unrelated sample)
ZZZZZZ	A87426.D	09/25/04	07:06	08:08	(unrelated sample)
ZZZZZZ	A87427.D	09/25/04	07:35	08:37	(unrelated sample)
ZZZZZZ	A87428.D	09/25/04	08:05	09:07	(unrelated sample)
ZZZZZZ	A87429.D	09/25/04	08:35	09:37	(unrelated sample)
N78208-3	A87430.D	09/25/04	09:04	10:06	(used for QC only; not part of job N77850)
N78208-3MS	A87431.D	09/25/04	09:34	10:36	Matrix Spike
N78208-3MSD	A87432.D	09/25/04	10:03	11:05	Matrix Spike Duplicate

# Volatile Surrogate Recovery Summary

Job Number: N77850  
 Account: BPAMSS BP Amoco Corporation  
 Project: DELTANYA: S/S 3887, 164 4th Avenue, Brooklyn, NY

Method: SW846 8260B	Matrix: AQ
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Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
N77850-1	A87277.D	101.0	97.0	97.0	100.0
N77850-2	A87420.D	109.0	117.0	95.0	104.0
N77850-3	A87257.D	110.0	106.0	97.0	101.0
N77884-3MS	A87265.D	97.0	85.0	98.0	97.0
N77884-3MSD	A87266.D	94.0	82.0	98.0	96.0
N78004-2MS	A87278.D	100.0	97.0	100.0	99.0
N78004-2MSD	A87279.D	98.0	91.0	99.0	101.0
N78208-3MS	A87431.D	96.0	93.0	97.0	99.0
N78208-3MSD	A87432.D	92.0	87.0	98.0	99.0
VA2698-BS	A87249.D	98.0	90.0	99.0	97.0
VA2698-MB1	A87248.D	101.0	91.0	95.0	98.0
VA2699-BS	A87271.D	100.0	94.0	99.0	101.0
VA2699-MB1	A87270.D	99.0	93.0	95.0	100.0
VA2704-BS	A87416.D	101.0	107.0	101.0	103.0
VA2704-MB1	A87415.D	105.0	112.0	95.0	105.0

Surrogate Compounds	Recovery Limits
S1 = Dibromofluoromethane	79-119%
S2 = 1,2-Dichloroethane-D4	68-129%
S3 = Toluene-D8	83-118%
S4 = 4-Bromofluorobenzene	82-120%

4.5  
4