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FINAL
REPORT ON SYSTEM PERFORMANCE OF THE VACUUM ENHANCED LNAPL AND GROUND-WATER RECOVERY AND TREATMENT SYSTEM JANUARY 1999 TO DECEMBER 1999 SITE 10; NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

Contract No. N62472-92-D-1296
CTO No. 0074

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Prepared by

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June 2000

FINAL
Project No. 29600.74.7200

29600.74.7200

Final
Report on System Performance of the Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System
January 1999 to December 1999
Site 10; Navy Fuel Farm
Naval Air Station Joint Reserve Base
Willow Grove, Horsham Township, Pennsylvania

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Carl S. Reitenbach — 21 June 2000

Carl Reitenbach, P.E.
CTO Manager

Date

Robert S. Pace — 21 June 2000

Robert Pace
Program Manager

Date

June 2000

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project Number: 296.0074
Contract Task Order No. 0074
Activity 7200

Description of Report/Deliverable:

Final Report on System Performance of the Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System, January 1999 to December 1999, Site 10; Navy Fuel Farm, Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania

EA CTO Manager: Carl Reitenbach

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

David S. Santoro
Senior Technical Review

20 June 2000

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1. INTRODUCTION

1.1 OBJECTIVE

Under contract number N62472-9219-1296, CTO No. 0074, a Vacuum Enhanced Light Non-Aqueous Phase Liquid (LNAPL) and Ground-Water Recovery and Treatment System has been installed at the Navy Fuel Farm, Naval Air Station Joint Reserve Base (NASJRB) Willow Grove. Figure 1-1 is a site location map and Figure 1-2 is a site map of the Navy Fuel Farm.

The objective of the report is to evaluate the remediation systems effectiveness at achieving the Remedial Action Objective for the site. The Remedial Action Objective is the removal of recoverable LNAPL from the subsurface. The comparison of the gauging data and ground-water analytical data collected during the last year of operation with historical site data is used to evaluate system effectiveness. Records of LNAPL recovery will be used to assess the continuing effectiveness of the remediation system. Historical data from the site has been collected from the following documents:

> EA Engineering, Science, and Technology, Inc. 1991 *Interim Report On Investigations At The Navy Fuel Farm, NAS Willow Grove, November 1990 - July 1991*. Contract Number N62472-86-C-1037. November.
>
> EA Engineering, Science, and Technology, Inc. 1993 *Interim Report On Investigations, Navy Fuel Farm, Willow Grove NAS*. Contract Number N62472-91-D-1449. September.
>
> EA Engineering, Science, and Technology, Inc. 1996 *Final Pilot Study Report, Product Recovery Pilot System, Navy Fuel Farm Facility, Naval Air Station Willow Grove, Horsham Township, Pennsylvania*. Contract Number N62472-92-D-1296. Contract Task Order Number 0009. November.
>
> EA Engineering, Science, and Technology, Inc. 1991 *Interim Report On Investigations At The Navy Fuel Farm, NAS Willow Grove, November 1990 - July 1991*. Contract Number N62472-86-C-1037. November.

EA Engineering, Science, and Technology, Inc. 1997 *Sampling And Analysis Plan For Remedial Action At The Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania*. Contract Number N62472-92-D-1296. Contract Task Order Number 0074. 20 August.

EA Engineering, Science, and Technology, Inc. 1997 *Remedial Action Engineering Work Plan For Installation Of Remedial Action System At Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania*. Contract Number N62472-92-D-1296. Contract Task Order Number 0074. 3 July.

EA Engineering, Science, and Technology, Inc. 1998 *Sampling and Analysis Report For Remedial Action At The Navy Fuel Farm, Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania*. Contract Number N62472-92-D-1296. Contract Task Order Number 0074. 11 June.

EA Engineering, Science, and Technology, Inc. 1999 *Final Report on System Performance of the Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System At The Navy Fuel Farm, Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania*. Contract Number N62472-92-D-1296. Contract Task Order Number 0074. 14 June.

1.2 SCOPE OF WORK

This report presents the system monitoring and ground-water gauging results collected during the second year operation of the Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System at the Navy Fuel Farm, NASJRB Willow Grove (January 1999 and December 1999). Recommendations for improving the remediation system are to be included along with predicted yearly operation and maintenance costs for the existing remediation system.

1.3 ORGANIZATION OF THE REPORT

This Report on System Performance is comprised of the text, tables and figures in Chapters 1 through 5, and Appendices A through D. The five chapters in this report include:

Chapter 1: Introduction - Objective, scope and organization of this report.

Chapter 2: Ground-Water Gauging Data - Compares ground-water gauging data and LNAPL occurrence from before and after system operation.

Chapter 3: System Operations - Evaluates system operation for the second year and recommends changes to remedial system. Anticipated annual operation costs are also evaluated.

Chapter 4: Conclusions and Recommendations - Summarizes the conclusion drawn about system effectiveness, system improvements, and annual operation costs.

1.4 SITE HISTORY

From 1950 to 1991, two partially buried 210,000-gal JP-4/JP-5 aviation fuel tanks (Tank Nos. 115 and 116) were located at the Navy Fuel Farm. A 500-gal underground waste oil tank and an underground diesel fuel tank were also located at the southwestern corner of the site.

In 1986, a release occurred when Tank No. 115 was overfilled and fuel flowed from the vent pipe onto the ground. The event was attributed to faulty gauges that registered less fuel than was actually present. During this same year, a utility trench was excavated along the western boundary of the site, but work discontinued when LNAPL was observed floating on the water within the trench. The area where the LNAPL was discovered is immediately adjacent to a former drywell. The drywell accepted water that was periodically siphoned from the bottom of the fuel tanks.

In March 1989, JP-5 jet fuel was detected emanating from two patches of dead grass to the west of Tank No. 115. As a result, it was decided to empty and remove these tanks. Removal occurred in 1991. During this time the waste oil and diesel fuel USTs were also removed. Inspection of the waste oil tank during removal revealed the tank was not intact as holes up to 1 in. in diameter were reported.

Following the completion of removal activities, a new AST system was installed to the east of the former tank field location. The new tank system at the Navy Fuel Farm consists of

aboveground steel tanks set in a concrete berm. The Navy currently stores potassium acetate in the new 40,000-gal AST. One of the 210,000 gal ASTs is connected to the boiler house, Building 6, with an underground pipeline and holds #2 fuel oil. The second 210,000 gal AST remains empty.

The Navy performed a pilot study (March 1994 to October 1996) of remedial alternatives to address the recovery of LNAPL petroleum products at the Navy Fuel Farm (EA 1996). Based on results of the pilot study, the Navy proceeded with the expansion of the Vacuum-Enhanced LNAPL and Ground Water Recovery and Treatment System to include recovery from three wells (NFFW-2R, NFFW-14, and NFFW-16). The expansion was completed in January 1998 and operation of the remedial action commenced. The system has been operated for two years and this Report on System Performance assesses system operation for the second year from January 1999 to December 1999.

1.5 PREVIOUS INVESTIGATIONS

Several investigations have been conducted at the Navy Fuel Farm. The Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System has been installed as a result of the following reports and regulations:

- Draft Appendix B, Soil Vapor Contaminant Assessment at NAS Willow Grove (EA December, 1988b).
- Interim Report, Electromagnetic Survey, Soil Vapor Contaminant Assessment, and Revised Field Sampling Plan for Site Inspection Studies at NAS Willow Grove (EA March, 1989a).
- Final Report, Environmental Test Boring Investigation at the Navy Fuel Farm, NAS Willow Grove, Horsham Township, Pennsylvania (EA June, 1989a)
- Final Report, Site Inspection Studies at NAS Willow Grove, Horsham Township, Pennsylvania. Volumes I and II (EA May, 1990)
- Final Interim Report on Investigations at the Navy Fuel Farm, NAS Willow Grove, November 1990 - July 1991 (EA November, 1991).

- Commonwealth of Pennsylvania Department of Environmental Resources, Ground Water Quality Protection Strategy (PADER February, 1992).

- Title 25 - Pennsylvania Code Chapter 245 Subchapter D, Storage Tanks; Corrective Action. August. Commonwealth of Pennsylvania, Environmental Quality Board (EQB 1993).

- Final Report of Interim Site Investigations, Navy Fuel Farm - Willow Grove NAS (EA September, 1993b).

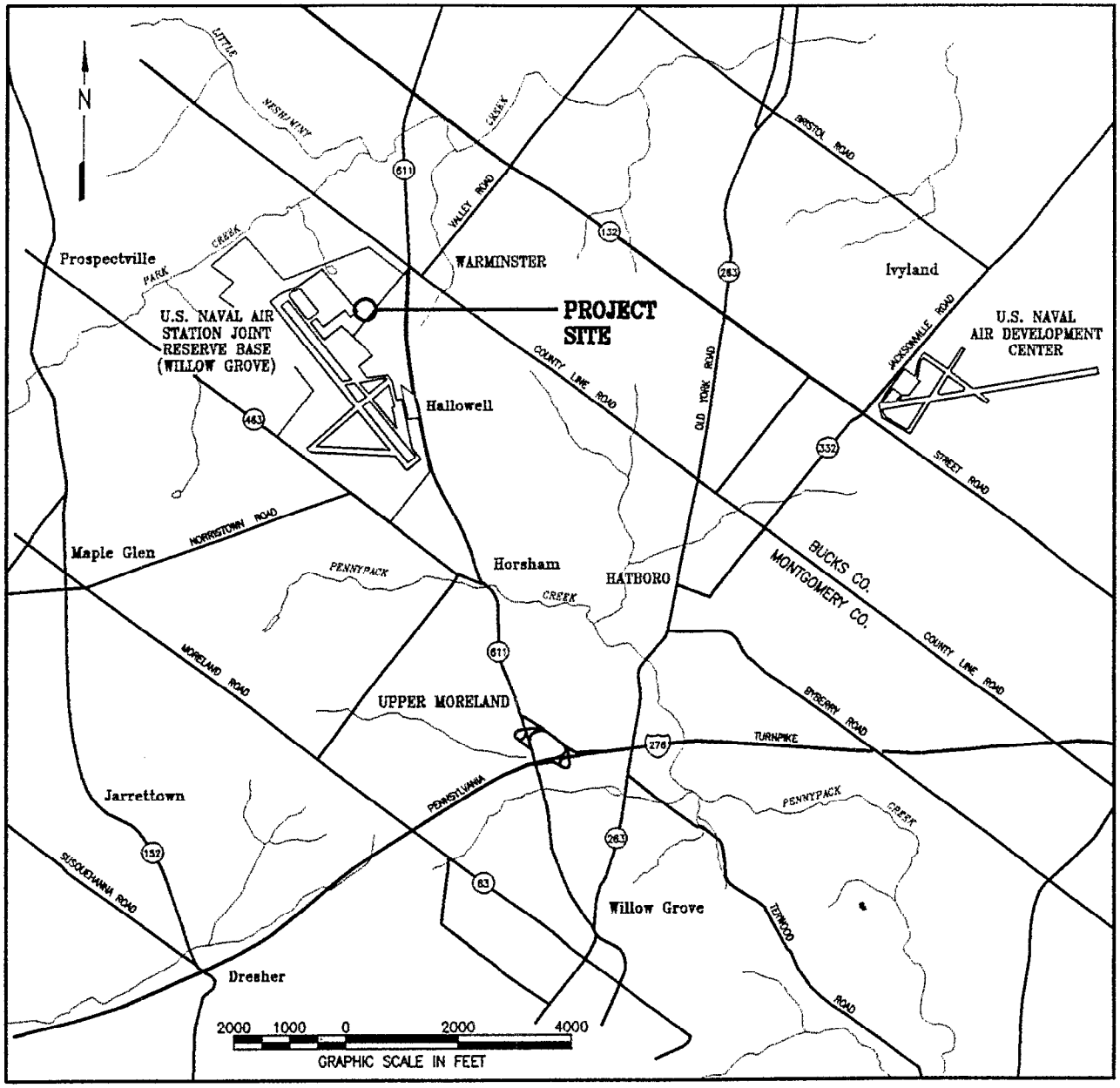
- Final Pilot Study Report, Product Recovery Pilot System at the Navy Fuel Farm, Naval Air Station Willow Grove, Horsham Township Pennsylvania (EA, November 1996).

- Remedial Action Engineering Work Plan for Installation of Remedial Action System at Naval Air Station Joint Reserve Base, Willow Grove, Horsham Township, Pennsylvania (EA, 3 July 1997).

- Sampling and Analysis Plan for Remedial Action at the Navy Fuel Farm, Naval Air Station Joint Reserve Base Willow Grove, Horsham Township, Pennsylvania (EA, 20 August 1997).

- Sampling and Analysis Report for Remedial Action at the Navy Fuel Farm, Naval Air Station Joint Reserve Base Willow Grove, Horsham Township, Pennsylvania (EA, 11 June 1998).

- Operation and Maintenance Manual for the Vacuum Enhanced LNAPL and Ground-Water Recovery System at Navy Fuel Farm, Naval Air Station Joint Reserve Base Willow Grove, Horsham Township, Pennsylvania (EA, October 1998).



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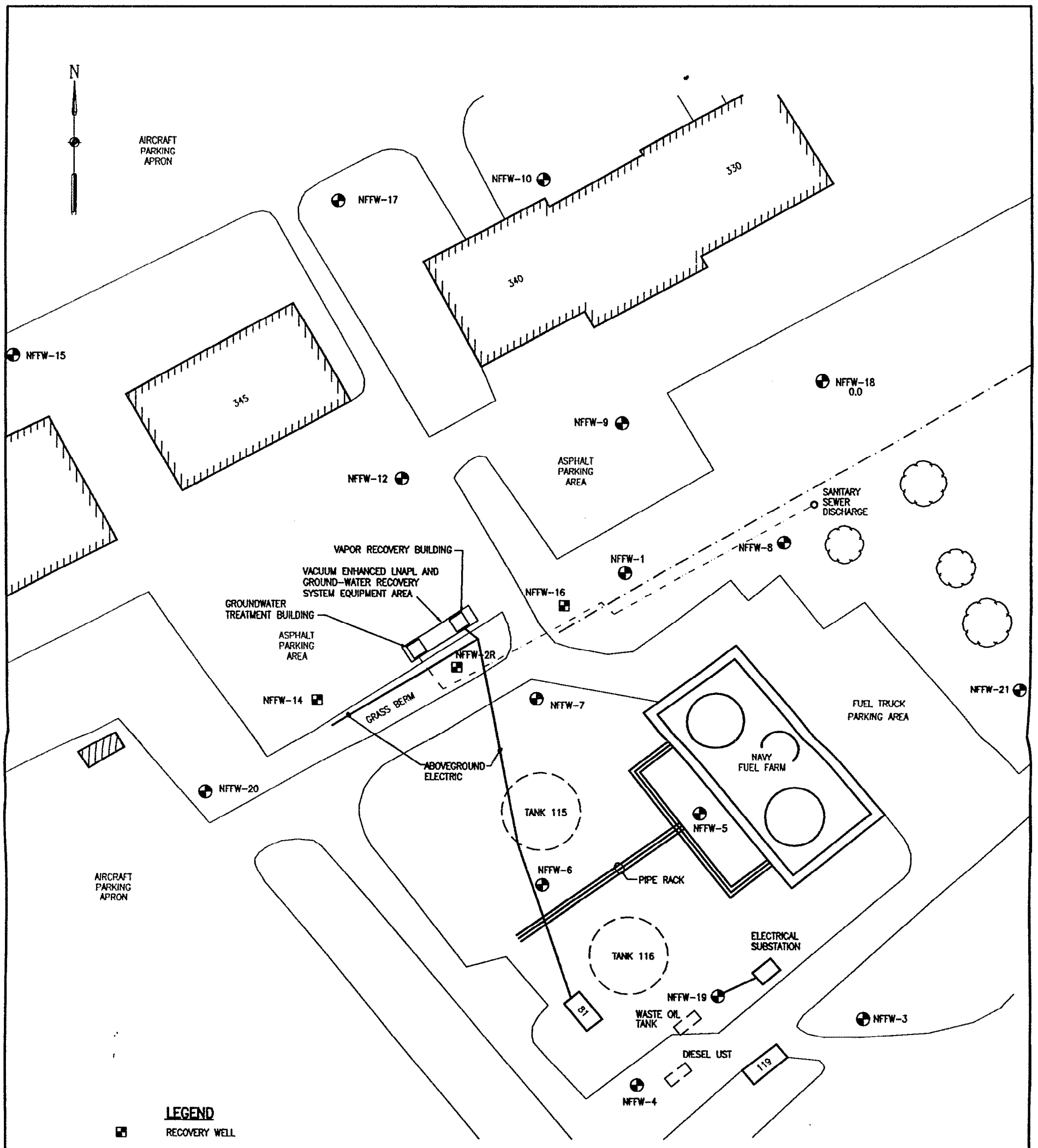
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	SITE LOCATION MAP					
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
HGP	SHD	CJV/PMH	CR	AS SHOWN	2-23-99	29600.74	1-1



NOTE:

BASE MAP DEVELOPED FROM EA FIELD MEASUREMENTS AND SITE PLAN DEVELOPED BY EA (1993). NO AS-BUILT DRAWINGS OF NEW FUEL FARM FACILITY WERE AVAILABLE FROM NAVY PERSONNEL PRIOR TO DEVELOPMENT OF BASE MAP. BASE MAP IS INTENDED AS A REFERENCE ONLY. ANY DECISIONS MADE BASED ON THE CONTENT OF THIS MAP ARE THE SOLE RESPONSIBILITY OF THE USER.

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EA ENGINEERING, SCIENCE, AND TECHNOLOGY

NAVY FUEL FARM
NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA

SITE PLAN

PROJECT MGR.	DESIGNED BY	DRAWN BY	CHECKED BY	DATE	SCALE	PROJECT NO.	FILE NAME	DRAWING NO.	FIGURE
HGP	MK	FDV	CGR	4-20-99	AS SHOWN	29600.74	SITE	-	1-2

2. GROUND-WATER AND LNAPL GAUGING DATA

This chapter presents and evaluates the remediation system's effectiveness at achieving the Remedial Action Objective based on the analysis of ground-water and LNAPL gauging at the Navy Fuel Farm. Section 2.1 presents historical gauging data and Section 2.2 presents the gauging data collected during the second year of the remediation systems operation.

2.1 HISTORICAL GROUND-WATER AND LNAPL GAUGING DATA

Ground-water level and LNAPL occurrence gauging data has been collected from the site monitoring wells since March 1994 and is presented in Appendix A. Regional ground-water flow direction has consistently been toward the north-northeast as illustrated in the following figures:

- Figure 2-1 shows potentiometric surface, or water table elevation, on 4 April 1994 prior to the operation of the pilot system.

- Figure 2-2 shows potentiometric surface on 8 December 1995 during the operation of the pilot system. This figure indicates that the pilot system intersects ground water and LNAPL flow from the area of the release (Tanks 115 and 116).

- Figure 2-3 shows potentiometric surface on 21 May 1998 during the operation of the current remedial system. This figure indicates that the size of the cone of depression has increased and flow from the area of the release (Tanks 115 and 116) is toward the recovery wells.

The gauging data also indicates a relationship between water table elevation and LNAPL occurrence. During periods of high water table elevation, LNAPL is present in only a few monitoring wells. During periods of low water table elevation, the occurrence of LNAPL

increases, both in extent and in thickness of the LNAPL layer observed in the monitoring wells. The following figures illustrate this relationship:

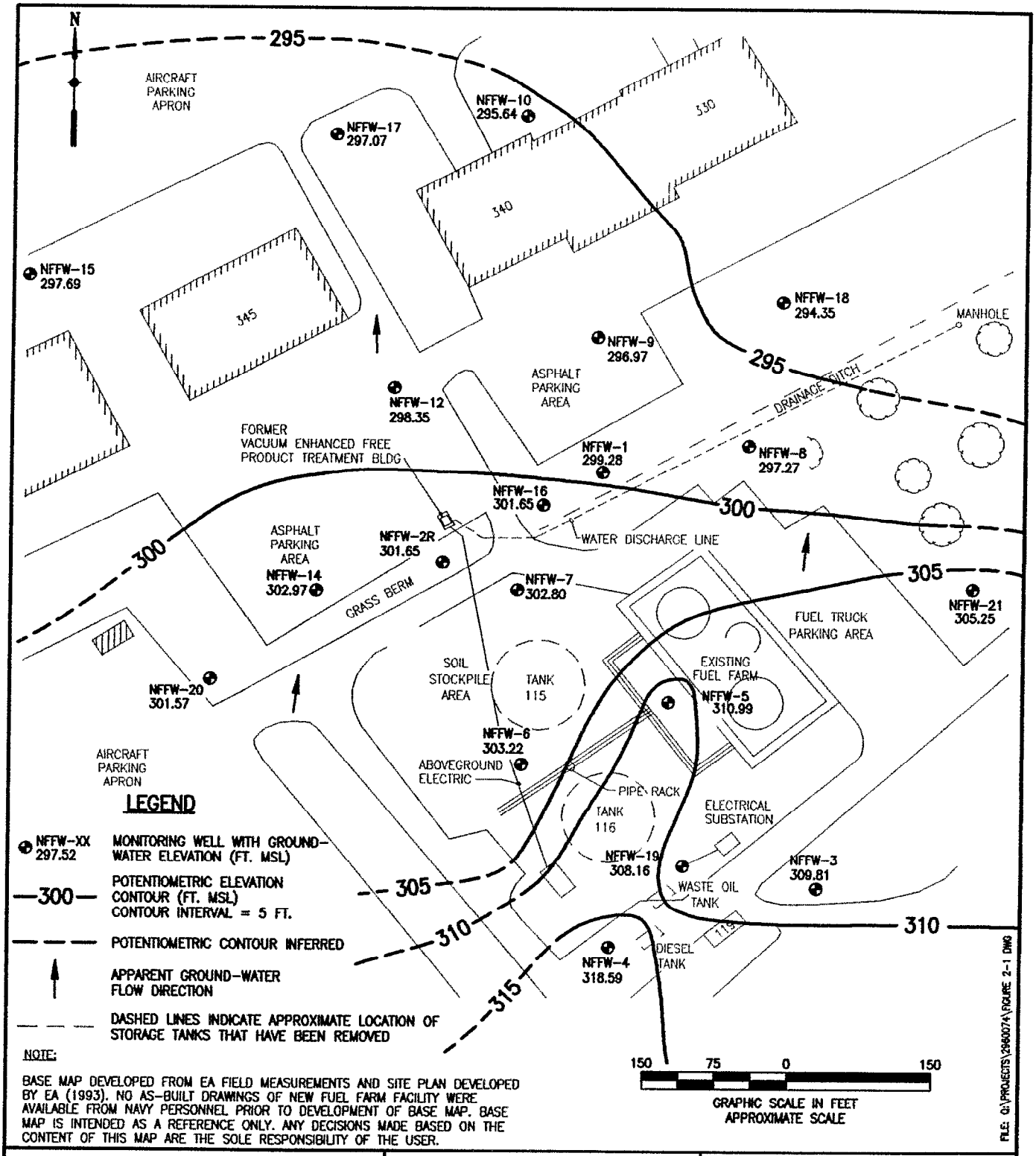
- Figure 2-4 is an isopach, or LNAPL thickness, map from 4 April 1994 during a period of high water table elevation. LNAPL was present in only one well (NFFW-6).

- Figure 2-5 shows LNAPL thickness on 21 December 1994 during a period of low water table elevation. This figure indicates that LNAPL is present in several monitoring wells. It also indicates that the operation of the pilot system in NFFW-2R has caused LNAPL to collect around the recovery well.

- Figure 2-6 shows the LNAPL thickness on 21 May 1998 during a high water table elevation period. This figure indicates that LNAPL is present only in the recovery wells where the water table is being depressed by the remediation system.

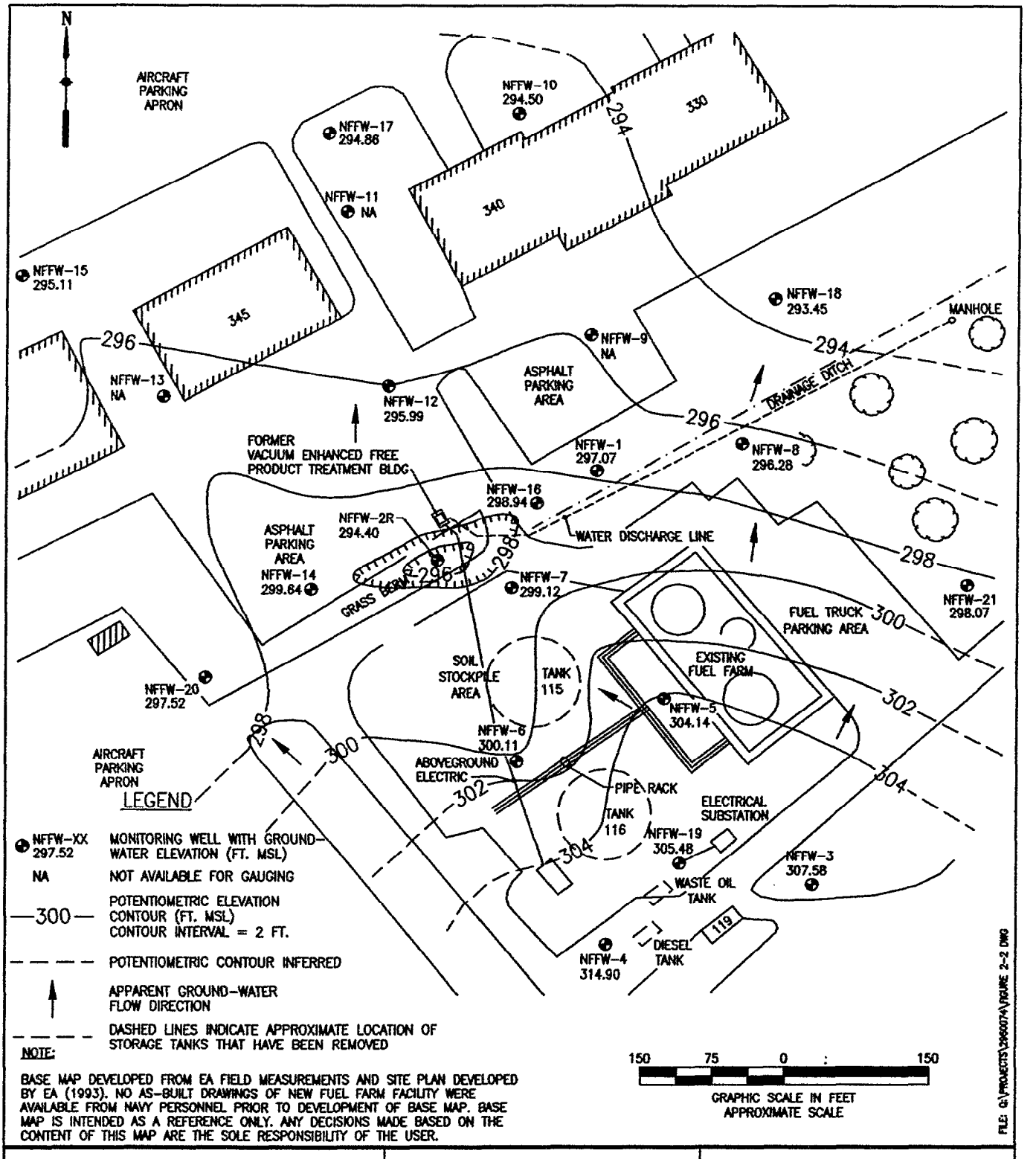
2.2 CURRENT GROUND-WATER AND LNAPL GAUGING DATA

Two ground-water level and LNAPL gauging events were conducted in 1999. The gauging data are presented in Appendix A. Figures 2-7 and 2-8 show the potentiometric surface maps of the ground water at the Navy Fuel Farm on 28 May 1999 and 7 October 1999. Ground-water flow remains northeasterly with a cone of depression apparent around NFFW-2R, NFFW-14 and NFFW-16. The cone of depression created by the recovery wells is directly down gradient from the release area (former tanks 115 and 116) and aids in drawing LNAPL into the recovery wells. The potentiometric surface maps are consistent with historical data. Figures 2-9 and 2-10 show isopach maps of the site from 28 May 1999 and 7 October 1999. Both gauging events were conducted during periods of high water table elevation and only small amounts of product were present in the recovery wells. These isopach maps are consistent with historical data.



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	POTENTIOMETRIC SURFACE 4 APRIL 1994

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
CR	BS	DWM	CR	1"=150'	2-18-00	29600.74	2-1



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	POTENTIOMETRIC SURFACE 8 DECEMBER 1995

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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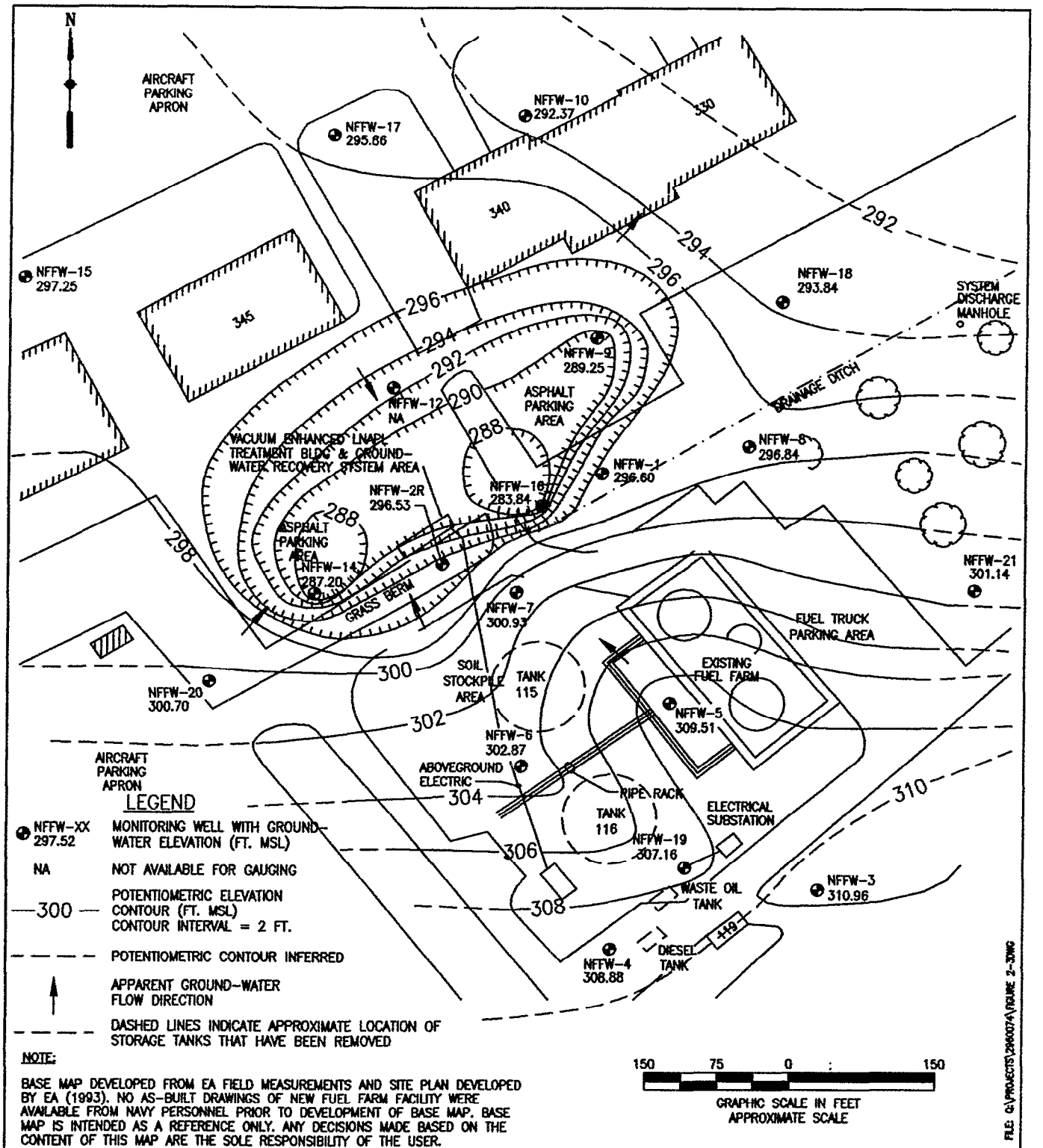

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	POTENTIOMETRIC SURFACE 21 MAY 1998					
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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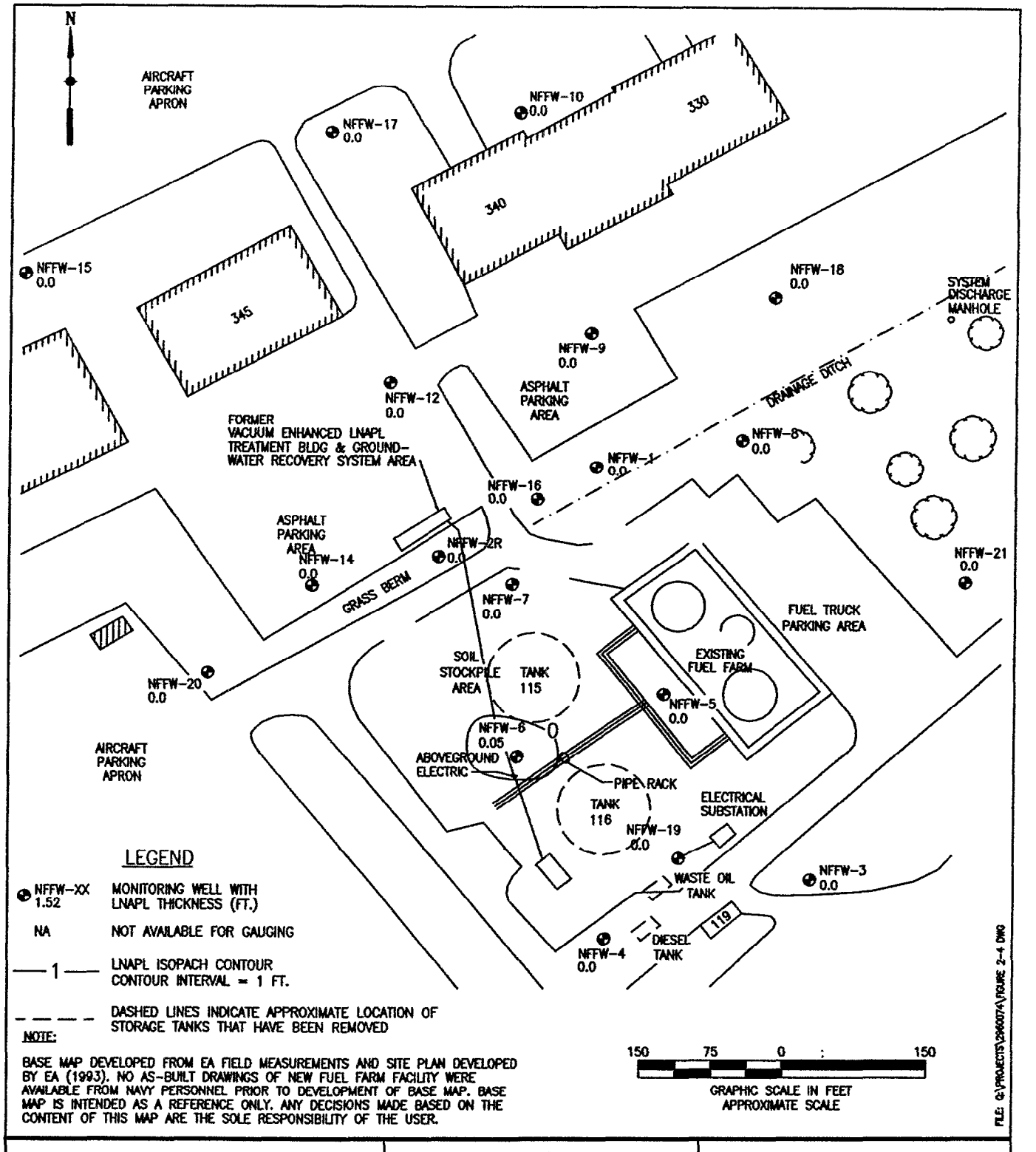

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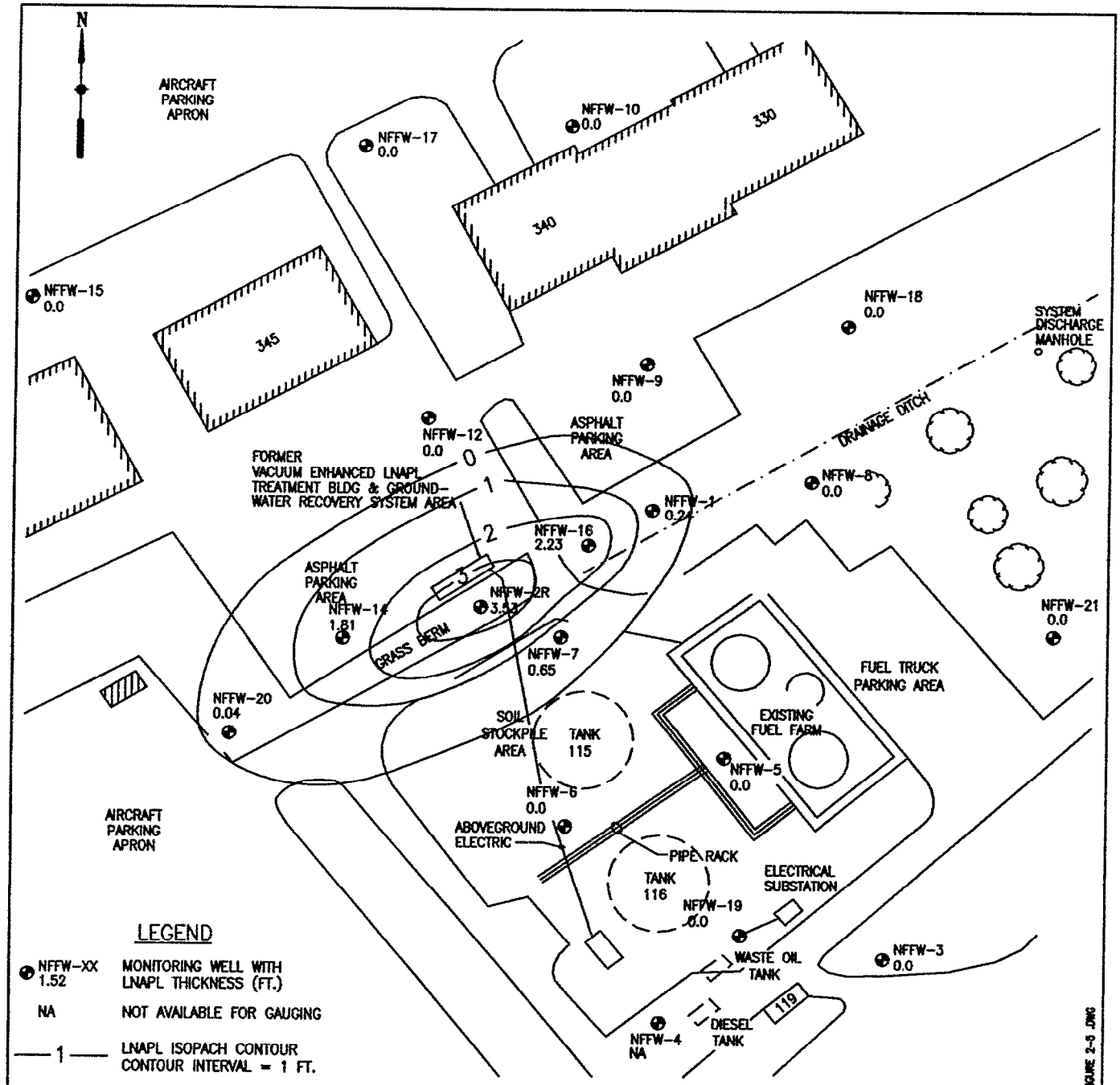
NAVY FUEL FARM
NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA

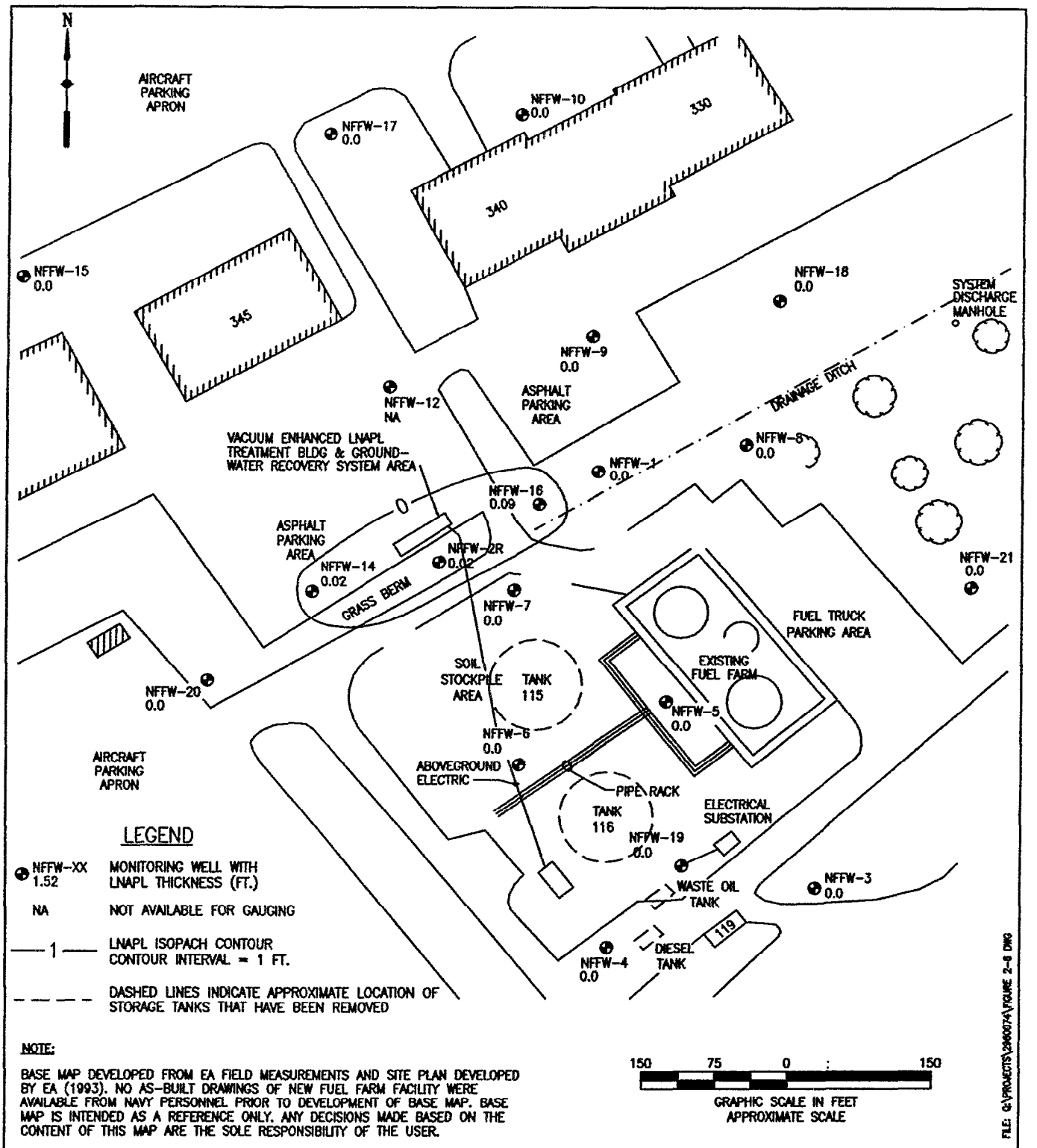
ISOPACH MAP OF THE LNAPL MEASURED IN MONITORING WELLS
4 APRIL 1994

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
CR	MK	DWM	CR	1"=150'	2-18-00	29600.74	2-4



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	ISOPACH MAP OF THE LNAPL MEASURED IN MONITORING WELLS 21 DECEMBER 1994

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
CR	MK	DWM	CR	1"=150'	2-18-00	29600.74	2-5



NOTE:

BASE MAP DEVELOPED FROM EA FIELD MEASUREMENTS AND SITE PLAN DEVELOPED BY EA (1993). NO AS-BUILT DRAWINGS OF NEW FUEL FARM FACILITY WERE AVAILABLE FROM NAVY PERSONNEL PRIOR TO DEVELOPMENT OF BASE MAP. BASE MAP IS INTENDED AS A REFERENCE ONLY. ANY DECISIONS MADE BASED ON THE CONTENT OF THIS MAP ARE THE SOLE RESPONSIBILITY OF THE USER.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	ISOPACH MAP OF THE LNAPL MEASURED IN MONITORING WELLS 21 MAY 1998

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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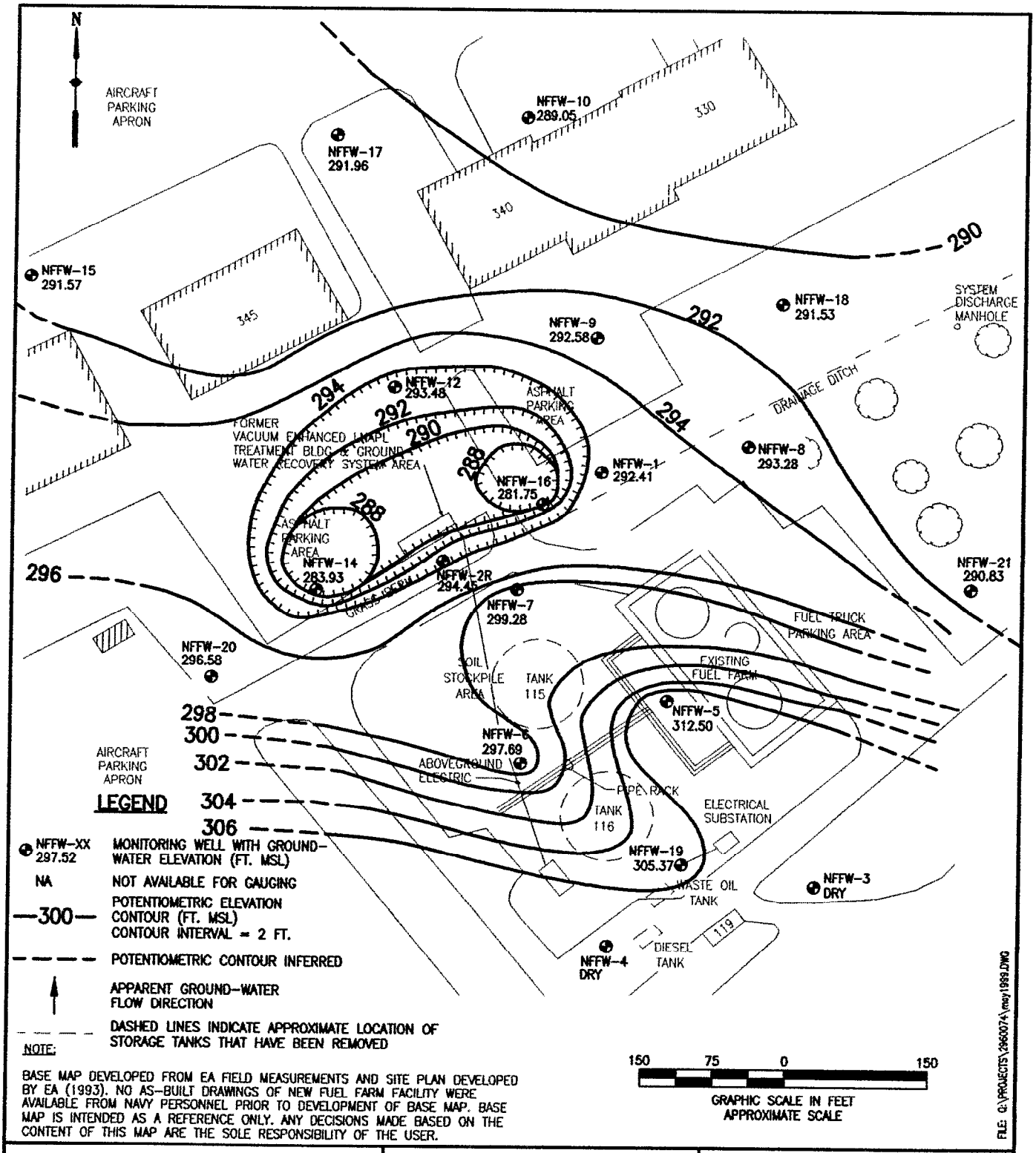

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

NAVY FUEL FARM
NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, PENNSYLVANIA

POTENTIOMETRIC SURFACE
28 MAY 1999

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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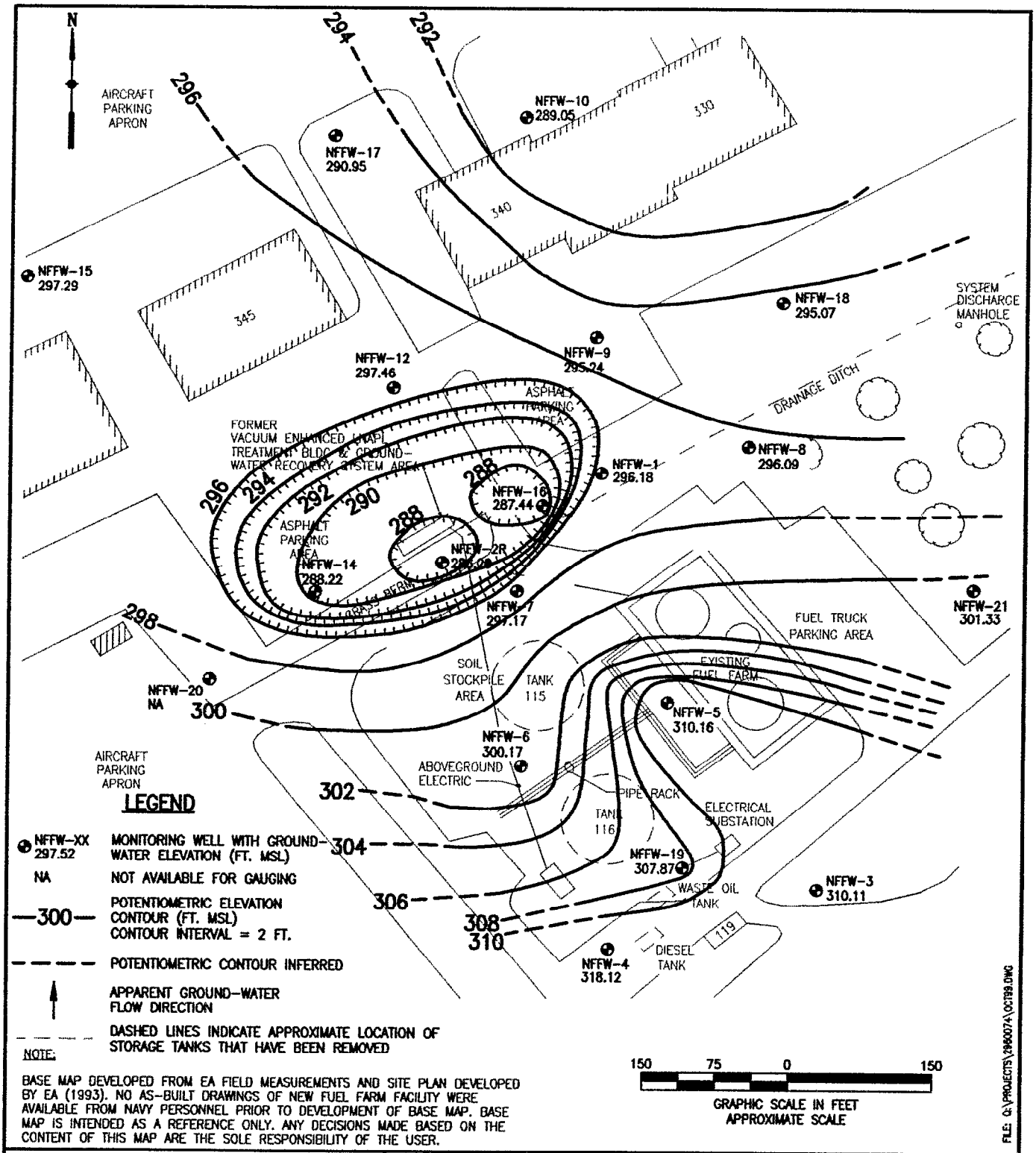

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	POTENTIOMETRIC SURFACE 7 OCTOBER 1999

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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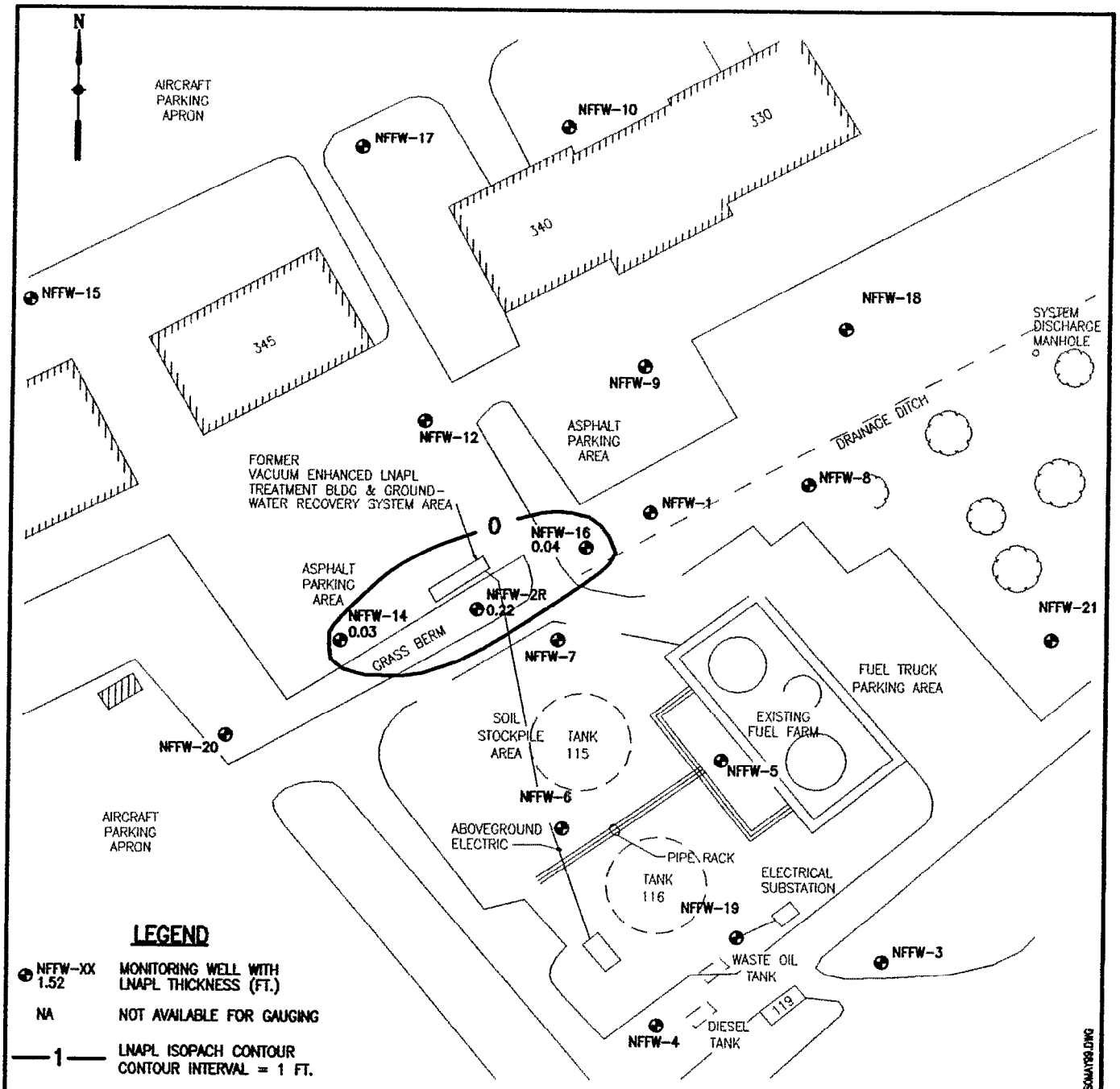

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	ISOPACH MAP OF THE LNAPL MEASURED IN MONITORING WELLS 28 MAY 1999

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
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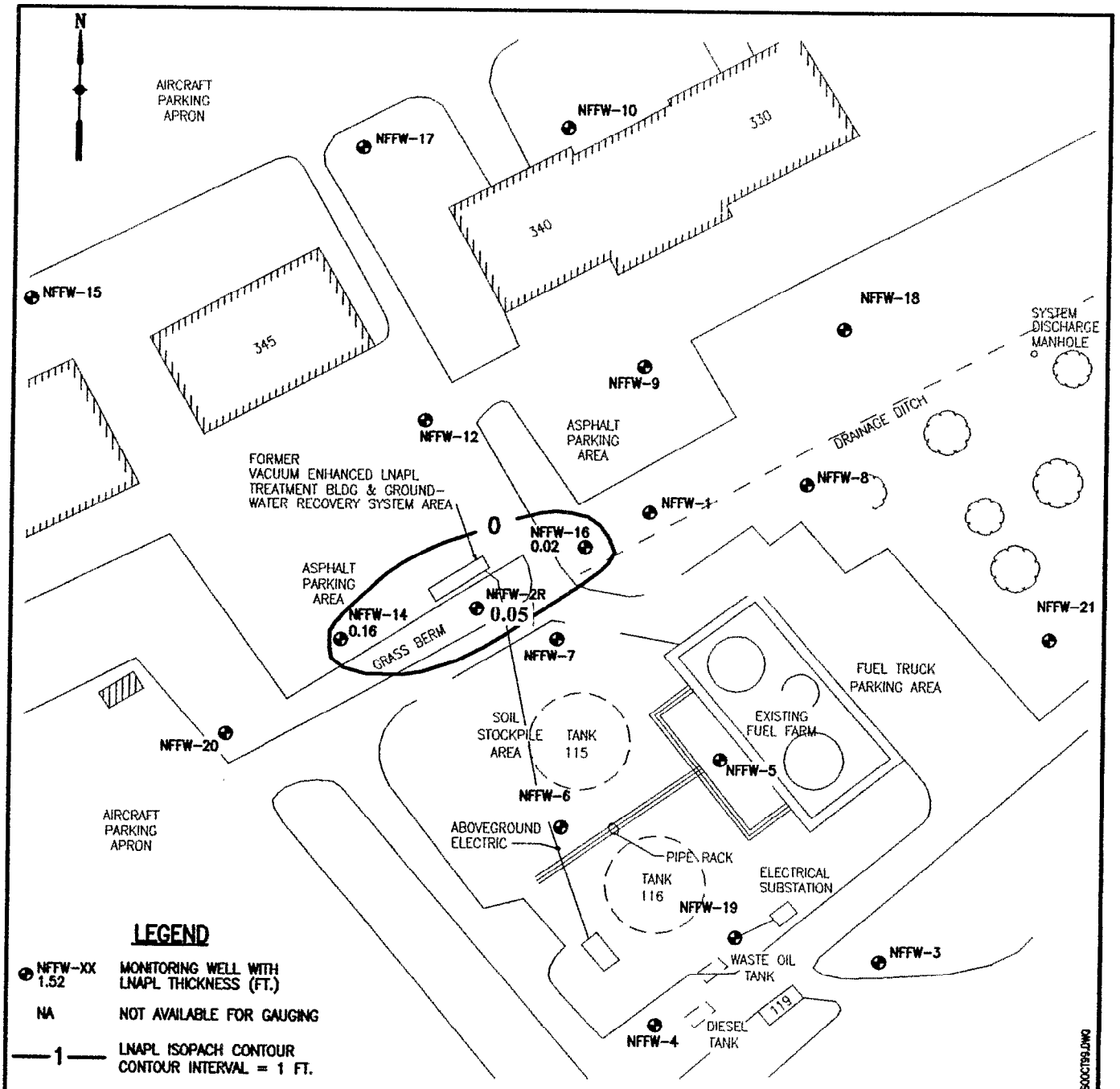


EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVY FUEL FARM NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PENNSYLVANIA	ISOPACH MAP OF THE LNAPL MEASURED IN MONITORING WELLS 7 OCTOBER 1999

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
HGP	MK	DWM	CR	1"=150'	2-18-00	29600.74	2-10

3. SYSTEM OPERATIONS

The Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System has been operating since 9 January 1998. As construction of different components of the system were completed the components were activated. The ground-water recovery/treatment, LNAPL recovery, and vapor extraction systems were operating by 9 February 1998. The Genesis SCADA system was not completely operational until 17 April 1998. System data recorded from 9 January 1998 to 26 January 1999 is presented in Table 3-1.

This chapter reviews the second year of the remediation systems operation. The Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System review is divided into the three components of the system which operate independently of each other as outlined in the O&M manual (EA October 1998). These components: the ground-water recovery and treatment system, the LNAPL recovery system and the vapor recovery and treatment system are reviewed in sections 3.1, 3.2, and 3.3 respectively. Each section includes a review of system operations and recommendations associated with the continuing operation of the component. Section 3.4 is the projected annual operating costs for the Vacuum Enhanced LNAPL and Ground-Water Recovery and Treatment System.

3.1 GROUND-WATER RECOVERY AND TREATMENT SYSTEM

3.1.1 System Operation

The ground-water recovery and treatment system has recovered and treated approximately 1,230,474 gallons of ground water from wells NFFW-2R, NFFW-14, and NFFW-16 during the second year of operation (Table 3-1). The ground-water recovery system operated continuously throughout the operating period. Ground-water recovery was minimal in the third quarter due to extended periods of low water table elevation.

Dissolved phase hydrocarbons recovered with the ground water during 1999 was the equivalent of 1.42 gallons of LNAPL (Table 3-1). The treated ground water is discharged to the base wastewater treatment system. Therefore, no discharge permits are required for the ground-water treatment system.

Ground-water level gauging data (January 1999 to December 1999), Section 2-2, indicates that the ground-water table is being depressed in the vicinity of the recovery wells. The depression of the ground-water table induces flow of LNAPL towards the recovery points and retards migration of petroleum products past the recovery points, north of the site.

3.1.2 System Sampling

A total of 36 ground-water samples were collected from before (influent), between, and after (effluent) the GACs of the system from 27 January 1999 through 30 December 1999. The ground-water samples were analyzed for BTEX and naphthalene by EPA Method 8020. The objective was to monitor breakthrough of the GACs and document pre-treatment of the water prior to discharge to the sanitary service. Table 3-2 summarizes the analytical results. The influent samples indicate that benzene concentration ranged from 66 μg/L to 710 μg/L; total BTEX concentration ranged from 239 μg/L to 713 μg/L and naphthalene concentration ranged from 110 μg/L to 320 μg/L. The between samples show that benzene was detected during 12 October and 30 November 1999 sampling events at 9 μg/L and 41 μg/L, respectively; toluene was detected at 1 μg/L on 12 October 1999; and total xylenes was detected at 2 μg/L on 30 March 1999. Based on the 12 October and 30 November sampling, the carbon in the lead GAC was replaced on 9 December 1999. However, the effluent samples of 30 December 1999 indicated that benzene, toluene and naphthalene were detected at 2 μg/L, 4 μg/L, and 13 μg/L, respectively. Because the carbon was recently replaced these results are suspect and future carbon replacement will depend on results of additional sampling.

3.1.3 Recommendations

The ground-water recovery system is operating as designed and no system upgrades are needed. Continued depression of the water table is recommended.

3.2 LNAPL RECOVERY AND STORAGE

3.2.1 System Operation

The LNAPL recovery and storage system was operated throughout 1999. LNAPL recovery from the individual recovery wells is detailed on Table 3-1. During 1999, approximately 43.6 gallons of LNAPL was recovered; this is an 83.5 percent decrease from the 282.17 gallons recovered in 1998. As shown in Figure 3-1, LNAPL recovery in 1999 was highest in the first quarter with approximately 27 gallons of LNAPL recovered. LNAPL recovery the rest of the year fluctuated from approximately 9 to 14 gallons of LNAPL per quarter. Figure 3-2 shows quarterly LNAPL recovery per well for 1999, and Figure 3-3 shows the cumulative LNAPL recovery for each well and the system. These figures show that LNAPL recovery spikes were evident in the first quarter 1999 in NFFW-16 and in the fourth quarter 1999 in NFFW-2R. The primary factor for this fluctuation in LNAPL recovery is that during periods of extremely low water table elevation the LNAPL/Air interface is below the LNAPL recovery pump intake. This adversely impacted LNAPL recovery because much of 1999 was characterized by low water table elevations. In addition, occasional maintenance issues with the LNAPL recovery pumps resulted in periods were LNAPL was not recovered from a well.

3.2.2 Recommendations

During 1999, the volume of LNAPL recovered decreased. However, LNAPL is still present in the subsurface and the remedial action objective has not been achieved. Therefore, continued operation of the LNAPL recovery system is recommended.

3.3 VAPOR RECOVERY AND TREATMENT SYSTEM

3.3.1 System Operation

The vapor recovery system recovered the equivalent of 136.66 gallons of LNAPL in the vapor phase over in 1999, the second year of remedial system operation. It appears that there is no significant change for the recovered LNAPL from vapor phase between the first year (133.18 gallons recovered in 1998) and the second year (136.66 gallons recovered in 1999) of remedial system operation.

The vapor recovery system was not operational during months of April, May, and June 1999 due to the malfunction of the flame arrestor. The flame arrestor on the thermal oxidizer was repaired and the vapor recovery system was operational on 20 July 1999. To maximize vapor recovery during the periods of low water table elevation (and subsequent loss of vacuum through the well screen), vapor recovery was concentrated on one recovery well at a time through the third quarter 1999. Vapor recovery was conducted on NFFW-2R from 14 July to 5 August; on NFFW-14 from 5 August to 9 September; and from NFFW-16 from 9 September to 31 December 1999. The SVE system experienced frequent down periods in NFFW-16 due to low propane for the thermal oxidizer in December 1999. The propane tank has been difficult to keep full because the phone line serving the remedial system is currently inoperable. Repair of the phone line is anticipated to be completed in early 2000.

The vapor recovery system has met the requirements of the air discharge permit the entire operating period. The discharge permit requires a minimum chamber temperature of 1410° F and a maximum effluent concentration of 300 ppm. Results of the monitoring of these system parameters in included in Table 3-1.

3.3.2 Recommendations

As outlined in the 1998 system performance report (EA 1999), operation costs of the vapor recovery and treatment system are substantial. It is anticipated that the remediation system will operate for another 2-3 years. Therefore, the conversion of the thermal oxidizer to catalytic oxidation is recommended.

3.4 PROJECTED ANNUAL OPERATION COSTS

The projected annual operating costs for the remediation system are based on the operation and maintenance costs for 1999. The activities covered under the projected operating costs include:

- Preparation of the Cost Impact Letter.
- Biweekly O&M site visits.
- Monthly Before, Between, and Effluent samples from the ground-water treatment system (36 samples per year) analyzed for BTEX and Naphthalene.
- Quarterly gauging of all site wells.
- Four unscheduled site visits.
- Monthly system operation reports.
- A yearly System Performance Report.
- Disposal of 100 gallons of LNAPL a year.
- Two change-outs of the carbon vessels.
- Propane supply for a year.

The cost for these tasks in 1999 dollars is $119,000.

TABLE 3-1 SYSTEM REPORT ON VACUUM ENHANCED LNAPL AND GROUND WATER RECOVERY AND TREATMENT SYSTEM NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

	NFFW-2R						NFFW-14						NFFW-16							Thermal -Oxidizer		Product Recovery			
	Ground-Water System				VER System		Ground-Water System				VER System		Ground-Water System				VER System		System Effluent Totalizer (gal)						
	Product Recovered		Ground-Water Recovered				Product Recovered		Ground-Water Recovered				Product Recovered		Ground-Water Recovered										
Date	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)		Chamber Temperature (F)	Effluent Concentration (ppmv)	LNAPL All Wells (gal)	Vapor Phase All Wells (gal)	Dissolved Phase All Wells (gal)	Total All Wells (gal)
01/02/98	0.00		(1)	(2)	(3)	(3)	0.00		(1)	(2)	(3)	(3)	0.00		(1)	(2)	(3)	(3)		(3)	(3)	(5)	(3)	(6)	
01/09/98	0.00	0.00	(1)	(2)	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1628750	(3)	(3)	(5)	(3)	(6)	
01/09/98	0.00	0.00	(1)	6.0	(3)	(3)	22.40	22.40	(1)	2.5	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1628750	(3)	(3)	22.40	(3)	(6)	22.40
01/13/98	3.40	0.85	(1)	3.0	(3)	(3)	42.40	5.00	(1)	1.0	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1653960	(3)	(3)	45.80	(3)	0.02	45.82
01/20/98	8.10	0.67	(1)	2.0	(3)	(3)	51.50	1.30	(1)	1.0	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1689130	(3)	(3)	59.60	(3)	0.06	59.65
01/28/98	13.30	0.65	(1)	-	(3)	(3)	55.30	0.48	(1)	-	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1742210	(3)	(3)	68.60	(3)	0.11	68.70
02/02/98	13.30	0.00	(1)	-	(3)	(3)	55.30	0.00	(1)	-	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1742210	(3)	(3)	68.60	(3)	0.11	68.70
02/09/98	13.80	0.07	(1)	-	(3)	(3)	64.02	1.25	(1)	-	(3)	(3)	0.00	0.00	(1)	(2)	(3)	(3)	1857420	(3)	(3)	77.82	(3)	0.21	78.02
02/16/98	13.80	0.00	(1)	3.3	12.44	(4)	65.94	0.27	(1)	-	12.39	(4)	0.00	0.00	(1)	(2)	12.61	(4)	1924760	1413	14.0	79.74	0.00	0.26	80.00
02/20/98	13.80	0.00	(1)	3.0	12.73	(4)	69.40	0.86	(1)	-	12.49	(4)	0.00	0.00	(1)	(2)	12.61	(4)	1964660	1410	25.0	83.20	22.43	0.30	105.93
02/23/98	17.40	1.20	(1)	2.8	12.49	(4)	69.50	0.03	(1)	-	12.49	(4)	0.00	0.00	(1)	(2)	12.61	(4)	2001060	1410	3.8	86.90	29.95	0.33	117.18
02/27/98	18.90	0.38	(1)	-	12.61	(4)	71.90	0.60	(1)	-	12.24	(4)	11.82	2.96	(1)	(2)	12.36	(4)	2041600	1410	-	102.62	33.05	0.37	136.03
03/02/98	19.17	0.09	(1)	-	12.98	19.0	71.90	0.00	(1)	-	12.73	9.9	11.82	0.00	(1)	(2)	12.98	6.9	2078240	1410	-	102.89	39.17	0.39	142.45
03/05/98	19.17	0.00	137	3.7	12.24	15.9	73.50	0.53	(1)	0.0	11.99	22.2	12.08	0.09	877	(2)	-	-	2110370	1410	1.9	104.75	43.40	0.41	148.56
03/09/98	19.17	0.00	27305	3.8	-	-	74.70	0.30	337	0.0	-	-	12.08	0.00	-	(2)	-	-	2149390	-	-	105.95	43.40	0.44	149.79
03/13/98	19.17	0.00	27809	3.7	11.50	12.9	74.70	0.00	367	0.0	11.75	8.5	12.18	0.02	5024	(2)	-	-	2150320	1410	2.0	106.05	43.40	0.44	149.89
03/16/98	(7)	(7)	29999	2.1	12.98	11.6	75.70	0.33	491	0.1	-	-	12.18	0.00	109999	0.30	-	-	2191350	1410	2.4	107.05	44.26	0.47	151.79
03/23/98	(7)	(7)	-	-	12.49	11.3	75.70	0.00	-	-	12.49	13.4	19.38	1.03	-	-	11.75	8.0	2193290	1410	-	114.25	45.27	0.47	159.99
04/02/98	19.17	0.00	-	-	11.99	11.1	77.50	0.18	-	-	12.24	10.0	19.38	0.00	-	-	12.24	10.5	2238360	1410	-	116.05	47.46	0.50	164.01
04/13/98	19.17	0.00	-	-	12.98	14.6	79.20	0.15	-	-	13.47	12.9	19.38	0.00	-	-	13.22	9.8	2318420	1410	1.7	117.75	52.68	0.56	170.99
04/17/98	19.17	0.00	29999	2.0	12.98	13.7	79.70	0.13	531	0.3	13.22	33.0	19.38	0.00	1059999	4.80	12.98	6.9	2346880	1410	1.8	118.25	57.31	0.58	176.13
04/22/98	19.17	0.00	-	-	13.22	12.2	79.70	0.00	-	-	13.47	-	19.38	0.00	-	-	13.47	6.1	2406460	1410	-	118.25	62.83	0.61	181.69
05/05/98	(7)	(7)	-	-	13.71	14.6	79.70	0.00	-	-	13.71	6.5	19.38	0.00	-	-	13.47	7.0	2550430	1410	2.0	92.08	85.04	0.69	177.81
05/21/98	22.47	1.84	-	-	11.50	6.9	82.10	0.15	-	-	11.75	7.8	27.58	0.51	-	-	10.77	9.9	2703620	1410	2.1	132.15	89.30	0.78	222.23
05/28/98	22.55	0.01	123026	-	13.22	9.0	82.10	(7)	22595	-	13.71	17.6	35.88	1.19	1659999	-	13.22	6.9	2755810	1412	-	140.53	90.74	0.81	232.07
06/12/98	22.55	(8)	(8)	(8)	13.22	7.4	83.04	0.06	25740	0.4	12.98	5.2	38.59	0.18	1829999	0.40	11.99	6.6	2777010	1410	-	144.18	94.09	0.81	239.08
06/23/98	22.55	(8)	(8)	(8)	(8)	(8)	83.19	0.01	29999	0.2	13.22	7.4	65.98	2.49	2352729	1.70	13.22	8.5	2830750	1410	-	171.72	99.55	0.83	272.10
07/10/98	22.55	(8)	(8)	(8)	(8)	(8)	83.64	0.03	29999	0.1	13.47	3.7	75.28	0.55	2490841	2.10	12.98	6.9	2844880	1410	1.7	181.47	102.13	0.83	284.42
07/28/98	22.55	0.00	-	-	-	-	83.64	0.00	-	-	-	-	75.30	0.00			-	-	-	-	-	181.49	102.13	0.83	284.44
07/31/98	22.55	0.00	128313	-	-	-	83.68	0.01	51559	0.7	12.24	10.0	77.78	0.83	3445104	1.30	-	-	2923400	1410	-	184.01	106.01	0.87	290.88
08/05/98	22.55	0.00	-	-	-	-	84.84	0.23	-	-	13.96	6.6	78.34	0.11	-	-	-	-	2931480	1410	0.9	185.73	108.02	0.87	294.62
08/14/98	30.95	0.93	-	-	13.96	7.6	86.44	0.18	-	-	14.20	5.4	79.28	0.10	-	-	-	-	2941320	1410	-	196.67	112.80	0.88	310.34
08/27/98	60.95	2.31	-	-	13.71	9.2	89.34	0.22	-	-	-	-	79.28	0.00	-	-	-	-	2960150	1410	2.9	229.57	125.03	0.89	355.48
09/11/98	68.25	0.49	-	-	-	-	89.64	0.02	-	-	-	-	79.32	0.00	-	-	-	-	2970340	-	-	237.21	125.03	0.90	363.13
09/16/98	68.25	0.00	129999	0.0	13.96	11.4	89.64	0.00	59999	0.0	14.70	0.0	79.38	0.01	5249999	0.20	14.70	0.0	2970620	1410	-	237.27	125.03	0.90	363.19
09/25/98	68.25	0.00	129999	3.5	-	-	89.64	0.00	59999	0.6	-	-	79.48	0.01	5349999	2.10	13.94	8.7	2973240	1410	3.4	237.37	125.05	0.90	363.32
10/14/98	68.25	0.00	-	0.0	-	-	90.44	0.04	-	0.0	14.70	0.0	79.48	0.00	-	4.50	12.49	9.5	2973240	1410	-	238.17	133.08	0.90	372.15
10/27/98	68.65	0.03	-	0.0	-	-	91.94	0.12	-	3.1	-	-	79.48	0.00	-	0.20	13.71	9.3	2978160	1410	1.9	240.07	133.18	0.91	374.16
11/03/98	68.65	0.00	-	-	-	-	92.64	0.10	-	-	-	-	82.68	0.46	-	-	13.71	10.0	2978160	1410	2.9	243.97	133.18	0.91	378.06
11/10/98	68.65	0.00	-	-	-	-	92.64	0.00	-	-	-	-	86.58	0.56	-	-	-	-	2978160	-	-	247.87	133.18	0.91	381.96
11/23/98	69.15	0.04	129999	0.0	-	-	94.24	0.12	15999	0.0	-	-	96.08	0.73	733544	0.20	11.99	12.3	2978230	1410	3.3	259.47	133.18	0.91	393.56
12/11/98	71.85	0.15	129999	-	-	-	95.84	0.09	179999	-	-	-	98.58	0.14	8119999	0.90	12.73	14.4	2978250	1410	-	266.27	133.18	0.91	400.36
12/21/98	71.85	0.00	129999	-	-	-	96.24	0.04	179999	-	-	-	99.88	0.13	8589999	1.00	12.49	17.2	2978250	1410	1.2	267.97	133.18	0.91	402.06

Notes: VER - Vapor Enhanced Product Recovery.
- Indicates data is not available.
(1) Genesis was not yet programmed to totalize flow from individual wells.
(2) PLC was not yet programmed to convert 4 to 20 mA signal to gpm.
(3) VER System was not turned on yet.
(4) Magnahelic gauges were not yet connected to the flow sensors.
(5) Product recovery pumps were not operating properly.
(6) System effluent totalizer was not installed yet.
(7) Product meter ran backwards due to vacuum on well.
(8) RW-2R off because groundwater pump motor is being replaced

\\LOVETON\Projects\Federal\DOD\Navy\projects\2960074\YEAR-SUM\Jan 99 to Jan 2000\2000Table3-1.doc

TABLE 3-1 SYSTEM REPORT ON VACUUM ENHANCED LNAPL AND GROUND WATER RECOVERY AND TREATMENT SYSTEM
NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

	NFFW-2R						NFFW-14						NFFW-16							Thermal -Oxidizer		Product Recovery			
	Ground-Water System				VER System		Ground-Water System				VER System		Ground-Water System				VER System								
	Product Recovered		Ground-Water Recovered				Product Recovered		Ground-Water Recovered				Product Recovered		Ground-Water Recovered										
Date	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)	Total (gal)	gpd (avg.)	Total (gal)	gpm	Vacuum (psia)	Flow (SCFM)	System Effluent Totalizer (gal)	Chamber Temperature (F)	Effluent Concentration (ppmv)	LNAPL All Wells (gal)	Vapor Phase All Wells (gal)	Dissolved Phase All Wells (gal)	Total All Wells (gal)
01/13/99	71.85	0.00	-	-	-	-	97.04	0.03	-	-	-	-	99.88	0.00	9317282	0.10	12.49	9.5	2978290	1410	-	268.77	133.18	0.91	402.86
01/26/99	71.85	0.00	-	-	-	-	97.04	0.00	179999	0.2	-	-	101.38	0.12	9834366	0.60	12.49	11.7	2984210	1410	3.6	270.27	141.68	0.91	412.85
01/13/99	71.85	0.00	-	-	-	-	97.04	0.03	-	-	-	-	116.18	0.09	9317282	0.10	12.49	9.5	2978290	1410	-	285.07	133.18	0.91	419.16
01/26/99	71.85	0.00	-	-	-	-	97.04	0.00	179999	0.2	-	-	116.18	0.00	9834366	0.60	12.49	11.7	2984210	1410	3.6	285.07	141.68	0.91	427.65
02/05/99	71.85	0.00	-	-	-	-	97.24	0.02	179999	0.1	-	-	116.18	0.00	10304872	0.20	12.49	13.5	3016630	1410	3.6	285.27	149.45	0.93	435.64
02/15/99	71.85	0.00	129999	0.6	-	-	99.34	0.21	179999	0.1	-	-	116.28	0.01	10789772	0.10	-	-	3054730	0	-	287.47	149.45	0.95	437.87
02/22/99	71.85	0.00	-	-	12.73	10.2	100.14	0.11	179999	0.1	-	-	116.48	0.03	11184873	0.10	13.22	10.9	3085220	1410	1.3	288.47	149.45	0.97	438.89
03/04/99	74.85	0.30	129999	0.0	11.50	7.7	100.14	0.00	179999	0.1	14.70	0.0	116.78	0.03	11589999	0.50	11.26	20.2	3112780	1410	-	291.77	159.55	0.99	452.30
03/30/99	75.25	0.02	129999	0.6	10.77	9.4	102.24	0.08	209999	0.3	14.70	0.0	119.08	0.09	12808153	0.80	10.52	-	3215400	1410	-	296.57	184.09	1.03	481.68
04/09/99	75.25	0.00	152073	0.2	-	-	103.24	0.10	209999	0.1	-	-	120.58	0.15	13273303	2.10	-	-	3316980	0	-	299.07	184.09	1.07	484.22
04/28/99	75.25	0.00	153884	0.3	-	-	103.34	0.01	209999	0.2	-	-	120.58	0.00	13409999	0.80	-	-	3337650	0	-	299.17	184.09	1.08	484.34
05/13/99	75.25	0.00	159999	0.2	-	-	103.64	0.02	209999	0.5	-	-	121.38	0.05	14109999	1.80	-	-	3438800	0	-	300.27	184.09	1.11	485.47
05/28/99	76.15	0.06	159999	0.4	-	-	104.84	0.08	209999	2.5	-	-	121.38	0.00	14679991	1.20	-	-	3485180	0	-	302.37	184.09	1.13	487.58
06/09/99	76.35	0.02	159999	-	-	-	107.24	0.20	220402	0.0	-	-	121.38	0.00	15229999	0.01	-	-	3526360	0	-	304.97	184.09	1.15	490.20
06/21/99	76.65	0.02	159999	0.7	-	-	107.24	0.00	222487	0.1	-	-	121.38	0.00	15798495	0.20	-	-	3550850	0	-	305.27	184.09	1.16	490.52
07/01/99	77.05	0.04	159999	0.2	-	-	107.24	0.00	222789	0.5	-	-	121.48	0.01	16275459	0.10	-	-	3560530	0	-	305.77	184.09	1.17	491.02
07/20/99	77.05	0.00	159999	0.1	12.98	-	107.24	0.00	222824	3.0	10.77	-	122.98	0.08	16549999	0.10	13.22	10.9	3563200	1410	-	307.27	194.47	1.17	502.91
08/05/99	79.55	0.16	159999	0.0	-	-	108.94	0.11	224730	0.0	11.01	-	123.08	0.01	17549999	0.10	-	-	3564040	1410	-	311.57	222.69	1.17	535.43
08/13/99	80.25	0.09	159999	0.0	-	-	109.24	0.04	225623	0.0	10.28	-	122.98	-0.01	17919999	0.10	-	-	3564040	1410	-	312.47	229.73	1.17	543.36
08/16/99	80.25	0.00	159999	0.0	-	-	110.84	0.53	225623	0.0	10.03	-	123.28	0.10	17960828	0.00	-	-	3564040	1410	-	314.37	230.95	1.17	546.49
09/09/99	80.25	0.00	159999	0.5	-	-	110.84	0.00	225628	0.0	-	-	123.28	0.00	18599999	0.10	12.73	-	3570910	1410	3.2	314.37	242.26	1.18	557.80
09/22/99	80.25	0.00	171993	0.7	-	-	111.24	0.03	229999	0.1	-	-	123.28	0.00	19189999	1.20	11.75	-	3621020	1410	-	314.77	249.95	1.20	565.91
10/07/99	81.95	0.11	179999	0.5	-	-	111.24	0.00	229999	4.6	-	-	123.38	0.01	19910374	1.60	-	-	3748650	0	-	316.57	249.95	1.27	567.78
10/12/99	82.05	0.02	179999	0.5	14.70	0.0	111.44	0.04	229999	3.2	14.70	0.0	123.38	0.00	19989266	1.70	-	-	3762520	1410	-	316.87	249.98	1.28	568.12
11/03/99	82.05	0.00	20733	0.8	14.70	0.0	112.04	0.03	259999	0.1	14.70	0.0	123.38	0.00	21039999	0.10	14.70	0.0	3932900	1410	-	317.47	257.45	1.37	576.28
11/09/99	82.05	0.00	204730	1.5	14.70	0.0	112.04	0.00	259999	3.6	12.49	8.8	123.38	0.00	21311185	0.10	12.24	5.8	3964320	1410	-	317.47	257.48	1.38	576.33
11/28/99	82.05	0.00	209999	0.2	14.70	0.0	112.34	0.02	259999	0.7	14.70	0.0	123.38	0.00	22289999	1.00	12.73	18.6	4046550	1410	-	317.77	264.34	1.42	583.52
12/08/99	82.05	0.00	209999	1.9	14.70	0.0	112.34	0.00	276540	0.5	14.70	0.0	123.38	0.00	22659999	1.00	11.50	10.7	4076440	1408	-	317.77	270.09	1.43	589.28
12/30/99	92.75	0.49	256115	1.6	14.70	0.0	112.34	0.00	279999	1.2	14.70	0.0	123.38	0.00	23657275	1.00	14.70	0.0	4226940	0	-	328.47	270.09	1.57	600.12

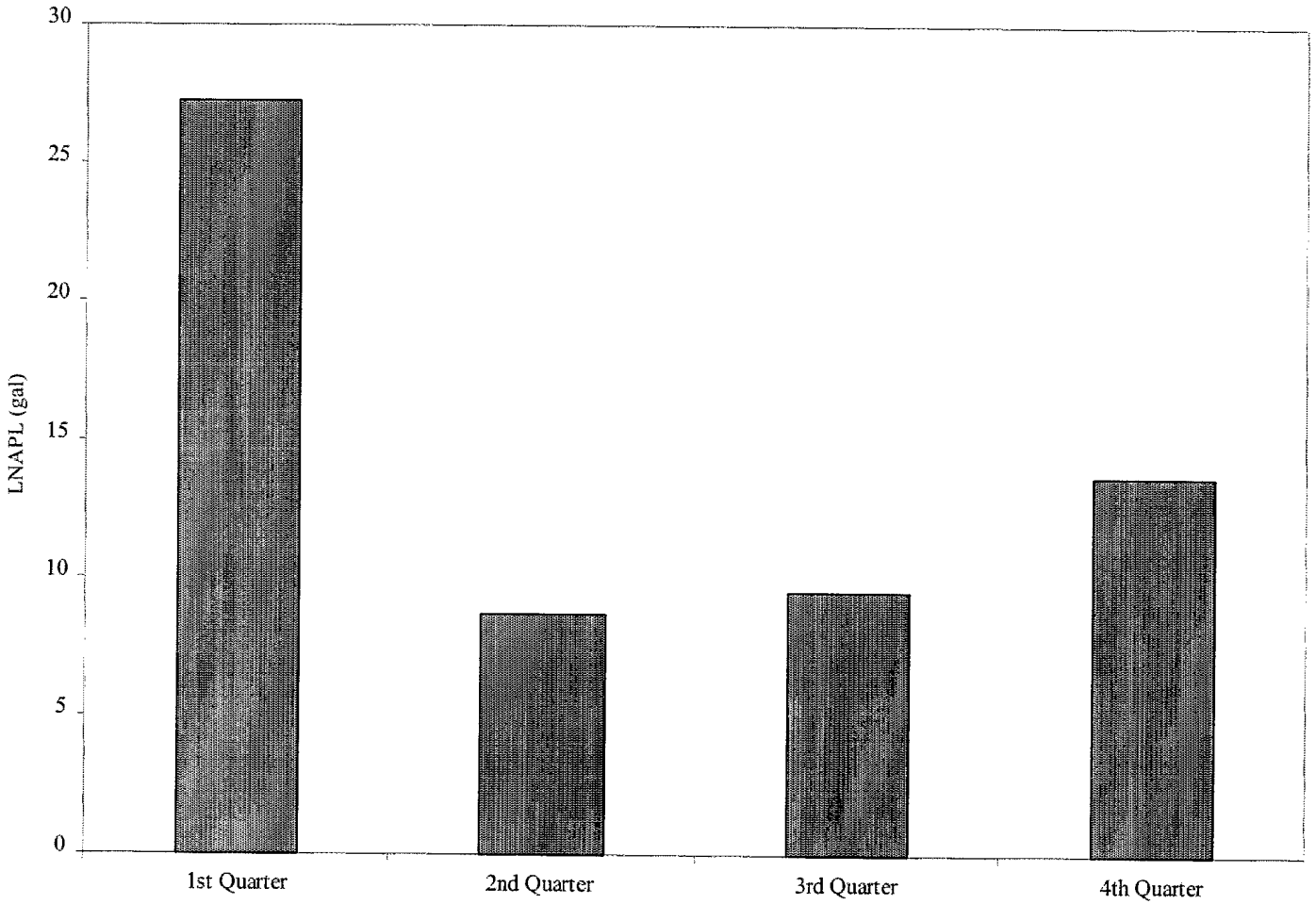
Notes: VER - Vapor Enhanced Product Recovery.
- Indicates data is not available.

TABLE 3-2 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED AT NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA JANUARY 1999 - DECEMBER 1999

Location	Date	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	Total BTEX (µg/l)	Naphthalene (µg/l)
Influent	01/27/99	200	21	25	129	375	150
	02/22/99	100	8	190	90	388	120
	03/30/99	66	20	62	91	239	110
	04/28/99	95	21	220	127	463	180
	05/13/99	52	9	2	82	239	120
	06/09/99	77	4	160	82	323	170
	07/20/99	710	98	270	175	713	320
	08/05/99	150	14	190	57	411	180
	09/09/99	94	8	190	41	333	140
	10/12/99	77	15	170	57	319	140
	11/30/99	74	2	140	28	244	130
	12/30/99	120	83	290	76	590	220
Between	01/27/99	ND	ND	ND	ND	ND	ND
	02/22/99	ND	ND	ND	ND	ND	ND
	03/30/99	ND	ND	ND	2	2	ND
	04/28/99	ND	ND	ND	ND	ND	ND
	05/13/99	ND	ND	ND	ND	ND	ND
	06/09/99	ND	ND	ND	ND	ND	ND
	07/20/99	ND	ND	ND	ND	ND	ND
	08/05/99	ND	ND	ND	ND	ND	ND
	09/09/99	ND	ND	ND	ND	ND	ND
	10/12/99	9	1	ND	ND	10	ND
	11/30/99	41	ND	ND	ND	41	ND
	12/30/99	ND	ND	ND	ND	ND	ND
Effluent	01/27/99	ND	ND	ND	ND	ND	ND
	02/22/99	ND	ND	ND	ND	ND	ND
	03/30/99	ND	ND	ND	ND	ND	ND
	04/28/99	ND	ND	ND	ND	ND	ND
	05/13/99	ND	ND	ND	ND	ND	ND
	06/09/99	ND	ND	ND	ND	ND	ND
	07/20/99	ND	ND	ND	ND	ND	ND
	08/05/99	ND	ND	ND	ND	ND	ND
	09/09/99	ND	ND	ND	ND	ND	ND
	10/12/99	ND	ND	ND	ND	ND	ND
	11/30/99	ND	ND	ND	ND	ND	ND
	12/30/99	2	4	ND	ND	6	13

Note: = Analyte not detected

FIGURE 3-1 TOTAL QUARTERLY LNAPL RECOVERY FOR 1999
VACUUM ENHANCED LNAPL AND GROUND-WATER RECOVERY AND TREATMENT SYSTEM
NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA



\\Loveton\projects\Federal\DOD\Navy\projects\2960074\YEAR-SUM\Jan 99 to Jan 2000\Figure3-1new.doc

FIGURE 3-2 QUARTERLY LNAPL RECOVERY FROM INDIVIDUAL WELLS FOR 1999
VACUUM ENHANCED LNAPL AND GROUND-WATER RECOVERY AND TREATMENT SYSTEM
NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

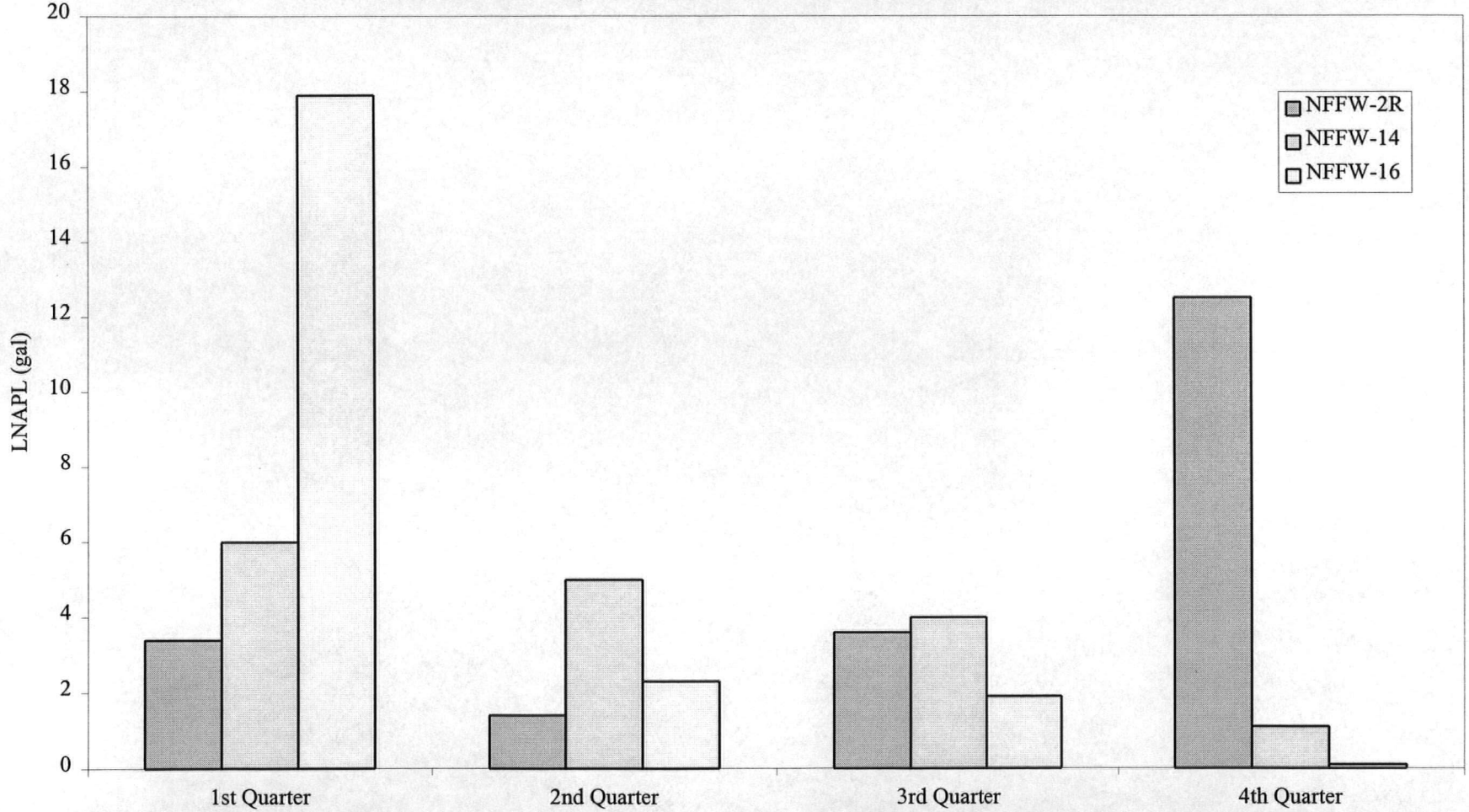


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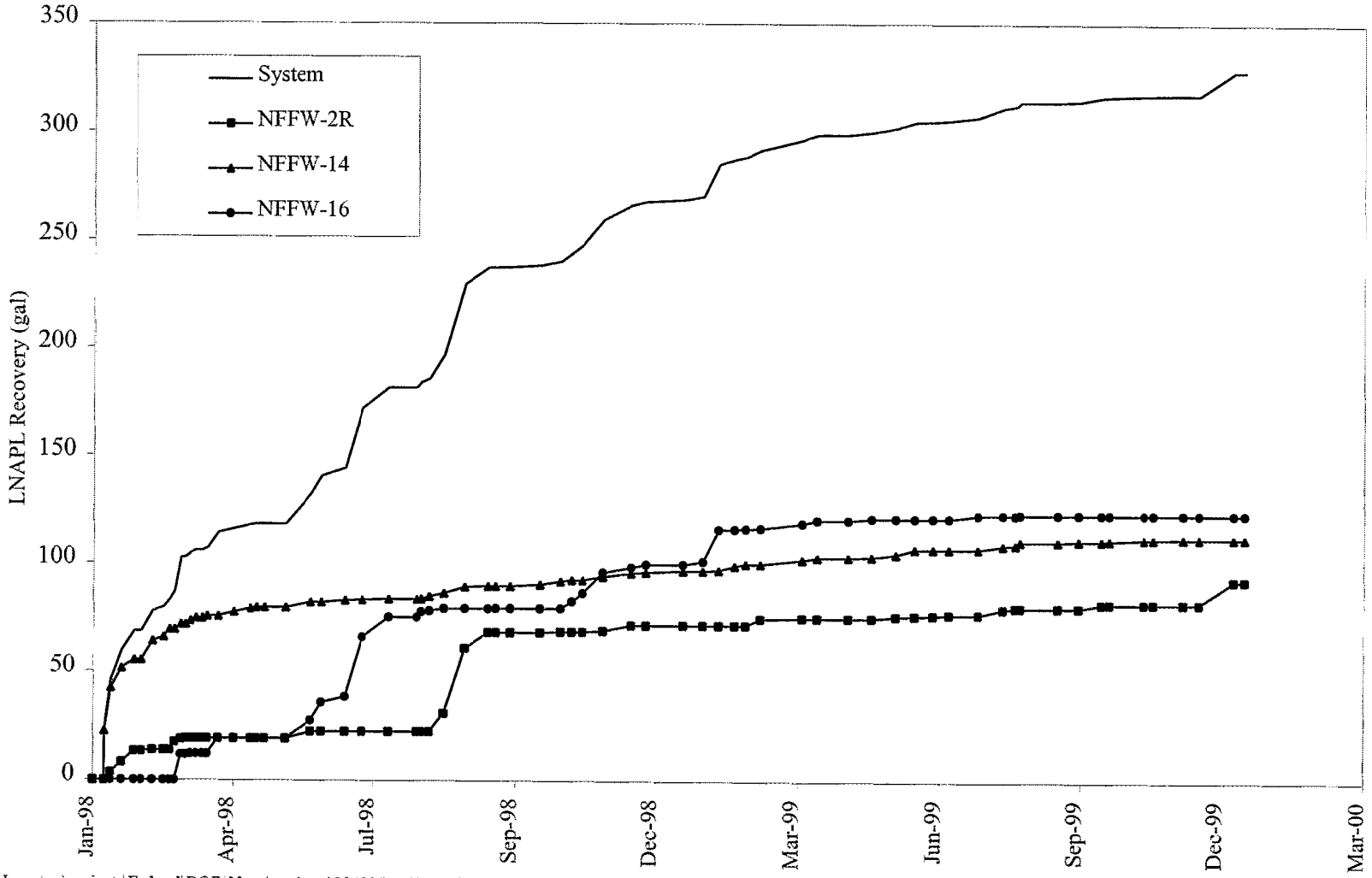
FIGURE 3-3 LNAPL RECOVERY FROM
VACUUM ENHANCED LNAPL AND GROUND-WATER RECOVERY AND TREATMENT SYSTEM
NAVY FUEL FARM, NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA



\\Loveton\projects\Federal\DOD\Navy\projects\2960074\YEAR-SUM\Jan 99 to Jan 2000\Figure3-3new.doc

4. CONCLUSIONS

The remedial action objective for the Navy Fuel Farm is LNAPL recovery. The Vacuum Enhanced LNAPL Recovery and Ground-Water Recovery and Treatment System effectiveness was assessed by evaluating the capture of LNAPL and the amount of LNAPL recovered.

An examination of the potentiometric, or water table elevation, maps indicates that operation of the recovery system has resulted in a cone of depression around the recovery wells. As a result, LNAPL and ground water from the Navy Fuel Farm flows toward the recovery wells. Therefore, the system has been effective in capturing LNAPL.

LNAPL recovery has decreased significantly (83.5 percent) since 1998. This decrease indicates that much of the LNAPL has been recovered. However, 46.3 gal of LNAPL was recovered in 1999, and recoverable amounts of LNAPL remain in the subsurface. As a result, continued operation of the Vacuum Enhanced LNAPL Recovery and Ground-Water Recovery and Treatment System is recommended. In addition, as previously reported (EA 1999), the thermal oxidizer should be converted to catalytic oxidation to reduce the cost of supplying propane as an auxiliary fuel supply.

Based on the decrease in the volume of LNAPL recovery, the remedial system is likely to operate for 2-3 more years. To facilitate site closure, EA recommends that the regulatory oversight of the fuel farm LNAPL recovery be transferred to PADEP. Once LNAPL thickness in monitoring and recovery wells is reduced to 0.01 ft or less, closure in accordance with PADEP ACT 2 should be pursued.

In conclusion, the Vacuum Enhanced LNAPL Recovery and Ground-Water Recovery and Treatment system has been effective, however, the remedial action objective has not been achieved and continued operation of the remedial system is recommended.

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APPENDIX A

GAUGING DATA

Notes:

- indicates that data is not available.

* indicates that the product meters ran backwards due to the vacuum on the well. No product recovery information is available for this period.

Well ID: **NFFW-1**
TOC: **311.18** ft amsl
Ground: **309.78** ft amsl
Depth of Well: **28.88** ft bgs
Depth to Screen **8.88** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	11.60	0.00	299.58	-	-	Lock 2C22 is rusty
04/04/94	-	11.90	0.00	299.28	-	-	
04/06/94	-	12.12	0.00	299.06	-	-	
04/07/94	-	12.30	0.00	298.88	-	-	
04/12/94	-	12.83	0.00	298.35	-	-	
04/20/94	-	13.04	0.00	298.14	-	-	
04/27/94	-	13.31	0.00	297.87	-	-	
05/04/94	-	14.17	0.00	297.01	-	-	
05/12/94	-	14.20	0.00	296.98	-	-	
05/13/94	-	14.27	0.00	296.91	-	-	
05/16/94	-	14.54	0.00	296.64	-	-	
05/24/94	-	15.35	0.00	295.83	-	-	
05/27/94	-	15.60	0.00	295.58	-	-	
06/03/94	-	16.35	0.00	294.83	-	-	
06/15/94	17.20	17.21	0.00	293.98	-	-	
06/16/94	17.29	17.30	0.01	293.89	-	-	
07/01/94	19.11	19.16	0.05	292.06	-	-	
07/13/94	20.92	21.10	0.18	290.24	0.25	0.25	Bailed 0.25 gal
08/05/94	-	17.42	0.00	293.76	-	0.25	
08/17/94	-	17.68	0.00	293.50	-	0.25	
08/30/94	-	16.20	0.00	294.98	-	0.25	
09/08/94	-	16.46	0.00	294.72	-	0.25	
09/14/94	-	17.07	0.00	294.11	-	0.25	
09/19/94	-	17.53	0.00	293.65	-	0.25	
09/30/94	-	17.88	0.00	293.30	-	0.25	Odor
10/17/94	20.27	20.33	0.06	290.90	-	0.25	
10/25/94	21.42	21.56	0.14	289.74	-	0.25	
11/11/94	23.20	23.55	0.35	287.93	-	0.25	
11/22/94	23.22	23.56	0.34	287.92	-	0.25	
12/07/94	21.19	21.46	0.27	289.95	-	0.25	
12/21/94	19.46	19.70	0.24	291.69	-	0.25	
01/04/95	19.32	19.48	0.16	291.84	-	0.25	
01/16/95	17.79	17.88	0.09	293.38	-	0.25	
01/23/95	-	16.87	0.00	294.31	-	0.25	
02/16/95	-	16.94	0.00	294.24	-	0.25	
02/28/95	-	15.96	0.00	295.22	-	0.25	
03/10/95	-	14.80	0.00	296.38	-	0.25	
03/29/95	-	14.84	0.00	296.34	-	0.25	
04/04/95	-	15.24	0.00	295.94	-	0.25	
04/27/95	-	16.49	0.00	294.69	-	0.25	
05/11/95	-	16.50	0.00	294.68	-	0.25	
05/24/95	-	16.85	0.00	294.33	-	0.25	
06/15/95	-	17.35	0.00	293.83	-	0.25	
06/29/95	-	18.11	0.00	293.07	-	0.25	Sheen
07/06/95	-	18.90	0.00	292.28	-	0.25	
07/25/95	20.01	20.02	0.01	291.17	-	0.25	
08/01/95	20.34	20.43	0.09	290.83	-	0.25	
08/21/95	23.10	23.42	0.32	288.04	-	0.25	
09/14/95	24.08	24.18	0.10	287.09	-	0.25	
09/28/95	22.55	22.65	0.10	288.62	-	0.25	
10/06/95	21.08	21.14	0.06	290.09	-	0.25	
10/25/95	-	16.17	0.00	295.01	-	0.25	
11/21/95	-	12.87	0.00	298.31	-	0.25	
12/08/95	-	14.11	0.00	297.07	-	0.25	
12/21/95	-	14.15	0.00	297.03	-	0.25	
01/23/96	-	12.98	0.00	298.20	-	0.25	
02/09/96	-	12.02	0.00	299.16	-	0.25	
02/19/96	-	13.25	0.00	297.93	-	0.25	

Well ID: **NFFW-1**
TOC: **311.18** ft amsl
Ground: **309.78** ft amsl
Depth of Well: **28.88** ft bgs
Depth to Screen **8.88** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/09/98	-	14.79	0.00	296.39	-	0.25	New System Started
01/13/98	-	14.76	0.00	296.42	-	0.25	
02/20/98	-	13.57	0.00	297.61	-	0.25	
02/27/98	-	12.87	0.00	298.31	-	0.25	
03/16/98	-	13.03	0.00	298.15	-	0.25	
05/21/98	-	14.58	0.00	296.60	-	0.25	
08/14/98	-	19.24	0.00	291.94	-	0.25	
10/14/98	-	19.63	0.00	291.55	-	0.25	
12/21/98	23.85	23.97	0.12	287.11	-	0.25	
01/13/99	21.29	21.30	0.01	289.87	-	0.25	
02/05/99	-	-	0.00	NG	-	0.25	
02/15/99	-	-	0.00	NG	-	0.25	
02/22/99	-	-	0.00	NG	-	0.25	
03/04/99	-	-	0.00	NG	-	0.25	
03/30/99	-	-	0.00	NG	-	0.25	
04/09/99	-	-	0.00	NG	-	0.25	
04/28/99	-	-	0.00	NG	-	0.25	
05/13/99	-	-	0.00	NG	-	0.25	
05/28/99	-	18.77	0.00	292.41	-	0.25	
06/09/99	-	-	0.00	NG	-	0.25	
06/21/99	-	-	0.00	NG	-	0.25	
07/01/99	-	-	0.00	NG	-	0.25	
07/20/99	-	-	0.00	NG	-	0.25	
08/05/99	-	-	0.00	NG	-	0.25	
08/13/99	-	-	0.00	NG	-	0.25	
08/16/99	-	-	0.00	NG	-	0.25	
09/09/99	-	-	0.00	NG	-	0.25	
09/22/99	-	-	0.00	NG	-	0.25	
10/07/99	-	15.00	0.00	296.18	-	0.25	
10/12/99	-	-	0.00	NG	-	0.25	
11/03/99	-	-	0.00	NG	-	0.25	
11/09/99	-	-	0.00	NG	-	0.25	
11/28/99	-	-	0.00	NG	-	0.25	
12/08/99	-	-	0.00	NG	-	0.25	
12/30/99	-	-	0.00	NG	-	0.25	

Well ID:	NFFW-2R	(Recovery Well)
TOC:	313.97	ft amsl
Ground:	312.53	ft amsl
Depth of Well:	35.50	ft bgs
Depth to Screen	5.50	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
03/30/94	-	12.58	0.00		302.57	-	-		-				START WELL @ 1600
03/31/94	-	13.50	0.00		301.65	-	0.00	1.25	0				1400 HOURS, PUMP AT 13.5 FT
04/04/94	-	13.50	0.00		301.65	-	0.00	-	-				NEED TO RESURVEY WELL
04/04/94	24.40	24.70	0.30		290.71	-	0.00	5.00	7122				1400 HOURS, PUMP RESET AT 17.5 FT
07/04/94	-	17.50	0.00		297.65	-	0.00		-				1100 HOURS
07/04/94	-	19.50	0.00		295.65	-	0.00	4.50	12212				
04/12/94	-	20.08	0.00		295.07	0.57	0.57	6.00	42122				Lowered pump to approx 21.72 ft
04/20/94	-	16.73	0.00		298.42	-	0.57	0.00	87452				Pump not running
04/27/94	-	15.25	0.00		299.90	0.28	0.85	6.00	89052				Lowered pump 1.5 ft
05/04/94	-	16.75	0.00		298.40	-	0.85	4.00	94562				lowered pump about 1 ft to 18.2 ft
05/12/94	16.00	16.02	0.02		299.15	-	0.85	0.00	97329				SYSTEM ALARM LIGHT ON, PUMPS OFF
05/13/94	16.23	16.25	0.02		298.92	-	0.85	0.00	-				1130 HRS, PUMPS TURNED BACK ON
05/13/94	23.50	23.52	0.02		291.65	-	0.85	-	97402				1300 HRS
05/16/94	24.21	24.23	0.02		290.94	42.48	43.33	2.50	108562				1205 HRS
05/24/94	24.19	27.08	2.89		290.58	34.68	78.01		18937				
05/27/94	27.41	27.42	0.01		287.74	92.98	170.99	1.00	131602				1200 hours
06/03/94	-	26.75	0.00		288.40	44.76	215.75	1.17	143542				1300 hrs, Product pump turned on, vacuum enhanced tested for 2 hours
06/07/94	-	-	-		-	-	215.75	1.71	148159				1650 hrs, 7.5" Hg vacuum
06/07/94	-	-	-		-	-	215.75	-	148162				1710 hrs; Decreased vacuum to 2.5" Hg
06/07/94	-	-	-		-	-	215.75	-	148162				1710 hrs
06/07/94	-	-	-		-	-	215.75	-	148182				1735 hrs
06/07/94	-	-	-		-	-	215.75	0.60	148188				1745 hrs
06/07/94	-	-	-		-	-	215.75	1.36	148222				1810 hrs
06/07/94	-	-	-		-	19.21	234.96	1.00	148232				1820 hrs
06/07/94	-	-	-		-	10.53	245.49	0.67	148242				1835 hrs
06/07/94	-	-	-		-	-	245.49	1.17	148277				1905 hrs
06/08/94	26.93	26.94	0.01		288.22	14.28	259.77	0.90	148961				0745 hrs
06/08/94	-	-	-		-	-	259.77	0.90	149185				1200 hrs
06/15/94	23.53	23.72	0.19		291.60	2.60	262.37	-	150232				1210 hrs; Turn on vacuum enhanced system
06/15/94	-	-	-		-	-	262.37	2.10	150247				1217 hrs; approx 4" Hg vacumm
06/15/94	-	-	-		-	-	262.37	3.50	150254				1219 hrs
06/15/94	-	-	-		-	-	262.37	0.75	150257				1223 hrs
06/15/94	-	-	-		-	-	262.37	2.30	150264				1226 hrs
06/15/94	-	-	-		-	-	262.37	2.05	150303				1245 hrs
06/15/94	-	-	-		-	-	262.37	1.39	150407				1400 hrs; shut off vacuum system at 1510
06/16/94	-	26.60	0.00		288.55	5.55	267.92	0.52	151026				0948 hrs; Started vacuum at 4" Hg
06/16/94	-	-	-		-	-	267.92	0.42	151031				1000 hrs
06/16/94	-	-	-		-	-	267.92	1.17	151038				1006 hrs
06/16/94	-	-	-		-	-	267.92	3.10	151044				1015 hours
06/16/94	-	-	-		-	-	267.92	1.20	151062				1030 hours
06/16/94	-	-	-		-	-	267.92	0.73	151073				1045 hours
06/20/94	-	-	-		-	12.52	280.44	0.28	152666				1030 hrs
06/21/94	-	-	-		-	4.92	285.36	0.17	152910				1040 hrs, Reconfigure system to place moisture trap before carbon
06/21/94	-	-	-		-	-	285.36	0.11	152941				1515 hrs; Start up vacuum enhanced system at 3" Hg; New air carbons
06/21/94	-	-	-		-	-	285.36	0.27	152956				1610 hrs; 99.5% treatment after 1st carbon-100% after 2nd carbon

Well ID:	NFFW-2R	(Recovery Well)
TOC:	313.97	ft amsl
Ground:	312.53	ft amsl
Depth of Well:	35.50	ft bgs
Depth to Screen	5.50	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
06/21/94	-	-	-		-	-	285.36	0.23	153006				1940 hrs; 87% removal after 1st carbon, 99.5% after 2nd carbon
06/22/94	-	-	-		-	-	285.36	-	153062				0800 hrs, System shut down - water over ride; restart at 3" Hg
06/22/94	25.50	28.25	2.75		289.29	9.81	295.17	-	153088				0930 hrs; Water over ride restart at 2.5" Hg, 8% removal after 1st carbon, 48% after 2nd
06/22/94	-	-	-		-	-	295.17	0.40	153100				1005 hrs; 17% removal after 1st carbon, 46% after 2nd
06/22/94	-	26.40	0.00		288.75	6.52	301.69	-	153109				1320 hrs
06/24/94	-	-	-		-	-	301.69	0.18	153502				0040 hrs; 4% removal after 1st carbon, 12.5% after 2nd
06/24/94	-	27.10	0.00		288.05	9.74	311.43	0.01	153558				0845 hours; turn vacuum enhaced system off continue recovery under normal conditions
07/01/94	27.19	28.65	1.46		287.77	-	311.43		153558				
07/13/94	32.05	33.28	1.23		282.94	-	311.43		153558				
07/13/94	32.05	33.28	1.23		282.94	8.45	319.88		153558				After bailing monitoring wells
08/05/94	22.95	23.63	0.68		292.11	-	319.88		153558				
08/05/94	22.95	23.63	0.68		292.11	-	319.88		153558				After bailing monitoring wells
08/17/94	22.98	24.47	1.49		291.98	1.16	321.04		153558				
08/17/94	22.98	24.47	1.49		291.98	-	321.04		153558				After bailing monitoring wells
08/30/94	20.08	20.35	0.27		295.03	-	321.04		153558				
09/08/94	19.54	19.73	0.19		295.59	-	321.04		153558				
09/14/94	21.15	21.63	0.48		293.94	-	321.04		153558				
09/19/94	21.07	22.00	0.93		293.96	-	321.04		153558				
09/30/94	22.63	24.00	1.37		292.34	-	321.04		153572				
10/17/94	27.11	33.27	6.16		287.24	-	321.04		153572				
10/25/94	29.95	36.47	6.52		284.35	-	321.04		153572				
11/11/94	33.35	35.30	1.95		281.55	-	321.04		153572				Installed winch lowered pump
11/22/94	-	-	0.00		NG	-	321.04		153572				IFP BROKE DURING GAUGING, NO INFORMATION AVAILABLE
12/07/94	30.08	34.15	4.07		284.54	318.04	639.07		153572				Tank gauged after bailing
12/21/94	25.73	29.26	3.53		288.96	110.74	749.82		153579				Tank Full
12/31/94	-	-	-		NG	45.00	794.82		153579				55 Gal Drum Full
01/04/95	25.12	28.98	3.86		289.53	-	794.82		153582				Tank & Drum Pumped out
01/16/95	24.11	29.11	5.00		290.39	10.95	805.76		153724				
01/23/95	25.12	28.98	3.86		289.53	0.95	806.71		153772				
02/16/95	21.28	23.18	1.90		293.62	0.24	806.95		154047				Replaced carbons
02/28/95	-	23.15	0.00		292.00	6.36	813.30		154167				Pump on ovende on arival
03/10/95	-	24.45	0.00		290.70	160.89	974.20		180222				
03/29/95	-	16.24	Sheen		298.91	33.24	1007.44		216109				Pump on ovende on arival
04/04/95	-	22.30	0.00		292.85	2.51	1009.95		236537				
04/27/95	-	26.15	0.00		289.00	134.25	1144.20		286732				
05/11/95	26.25	26.28	0.03		288.90	21.35	1165.55		296942				Pump Submurged on arrival
05/24/95	-	26.05	0.00		289.10	38.09	1203.64		316783				
06/15/95	-	27.70	0.00		287.45	61.20	1264.84		344582				Sampled Carbons
06/29/95	23.86	24.76	0.90		291.17	5.98	1270.83		347172				Tank Full
07/06/95	25.35	25.54	0.19		289.78	-	1270.83		347252				Tank Pumped out
07/25/95	25.61	26.45	0.84		289.43	20.31	1291.13		348509				System down
08/01/95	25.82	27.29	1.47		289.14	-	1291.13		348509				System down

Well ID:	NFFW-2R	(Recovery Well)
TOC:	313.97	ft amsl
Ground:	312.53	ft amsl
Depth of Well:	35.50	ft bgs
Depth to Screen	5.50	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
08/21/95	-	-	0.00		NG	-	1291.13		348509				Vacuum recovery system running, COULD NOT OPEN
09/14/95	-	Dry	0.00		Dry	-	1291.13		348509				Vacuum recovery system running
09/28/95	29.73	32.59	2.86		285.05	-	1291.13		348509				Vacuum recovery system running
10/06/95	26.55	27.95	1.40		288.42	1.23	1292.37		348509				Vacuum recovery system running
10/18/95	25.75	27.46	1.71		289.18	16.08	1308.44		358462				Vacuum recovery system running
10/25/95	26.62	26.72	0.10		288.52	4.30	1312.75		359305				Vacuum recovery system running
11/21/95	17.60	17.60	Sheen		297.55	-	1312.75		433812				Vac system off
12/08/95	20.71	21.05	0.34		294.40	-	1312.75		515782				
12/21/95	16.23	16.32	0.09		298.91	-	1312.75		534802				
01/23/96	-	14.35	0.00		300.80	-	1312.75		534851				Line Frozen
02/09/96	17.60	17.80	0.20		297.52	-	1312.75		535362				
02/19/96	-	17.00	0.00		298.15	-	1312.75		592952				
01/02/98	-	-	0.00	-	NG	-	1312.75	-	-	-	-	-	New System Started
01/09/98	-	15.38	0.00	48.6	298.59	-	1312.75	-	-	-	-	-	
01/09/98	26.18	26.30	0.12	36.5	287.57	-	1312.75	6.00	-	-	-	-	
01/13/98	-	26.90	0.00	36.0	287.07	3.40	1316.15	3.00	-	-	-	-	
01/20/98	-	-	0.00	36.0	NG	4.70	1320.85	2.00	-	-	-	-	
01/28/98	-	-	0.00	36.0	NG	5.20	1326.05	-	-	-	-	-	
02/02/98	-	-	0.00	-	NG	-	1326.05	-	-	-	-	-	
02/09/98	27.36	27.41	0.05	36.0	286.52	0.50	1326.55	-	-	-	-	-	
02/16/98	-	-	0.00	36.0	NG	-	1326.55	3.30	-	12.4	-	185	
02/20/98	22.80	26.35	3.55	35.9	284.53	-	1326.55	3.00	-	12.7	-	535	
02/23/98	-	-	0.00	35.9	NG	3.60	1330.15	2.80	-	12.5	-	725	
02/27/98	24.98	25.07	0.09	38.3	288.82	1.50	1331.65	-	-	12.6	-	-	
03/02/98	23.75	23.79	0.04	-	290.15	0.27	1331.92	-	-	13.0	19.0	-	
03/05/98	22.06	22.16	0.10	42.6	291.72	-	1331.92	3.70	137	12.2	15.9	486	
03/09/98	23.09	23.45	0.36	40.1	290.21	-	1331.92	3.80	27305	-	-	-	
03/13/98	17.42	17.45	0.03	47.6	296.49	-	1331.92	3.70	27809	11.5	12.9	-	
03/16/98	-	18.34	0.00	46.2	295.63	*	1331.92	2.10	29999	13.0	11.6	230	Product meter went backwards due to Vacuum at vault/Groundwater pump off
03/23/98	-	-	0.00	-	NG	*	1331.92	-	-	12.5	11.3	-	Product meter went backwards due to Vacuum at vault
04/02/98	-	10.74	0.00	53.4	303.23	-	1331.92	-	-	12.0	11.1	-	
04/13/98	-	11.02	0.00	52.7	302.95	-	1331.92	-	-	13.0	14.6	105	
04/17/98	-	-	0.00	48.8	NG	-	1331.92	2.00	29999	13.0	13.7	286	Cleaned screen on product pump/ installed flow meter
04/22/98	-	-	0.00	-	NG	-	1331.92	-	-	13.2	12.2	-	
05/05/98	23.97	25.00	1.03	-	288.07	*	1331.92	-	-	13.7	14.6	940	
05/21/98	17.40	17.42	0.02	-	296.53	3.30	1335.22	-	-	11.5	6.9	190	
05/28/98	-	-	0.00	48.5	NG	0.08	1335.30	-	123026	13.2	9.0	-	RW-2R not operating (variable frequency drive)
06/12/98	13.55	13.60	0.05	50.6	300.33	-	1335.30	-	123151	13.2	7.4	-	RW-2R not operating (variable frequency drive)
06/23/98	-	14.70	0.00	-	299.27	-	1335.30	-	123912	-	-	-	Pulled pump, motor siezed up, still under warrenty
07/10/98	15.20	15.21	0.01	48.7	298.75	*	1335.30	0.60	123912	14.0	5.4	396	
07/28/98	-	-	0.00	-	NG	-	1335.30	-	-	-	-	-	
07/31/98	-	-	0.00	-	NG	-	1335.30	-	128313	-	-	-	
08/05/98	-	-	0.00	-	NG	-	1335.30	-	-	-	-	-	
08/14/98	20.84	21.91	1.07	-	291.13	8.40	1343.70	-	-	14.0	7.6	-	
08/27/98	27.03	27.05	0.02	-	286.90	30.00	1373.70	-	-	13.7	9.2	880	
09/11/98	15.80	15.82	0.02	-	298.13	7.30	1381.00	-	-	-	-	-	

Well ID:	NFFW-2R	(Recovery Well)
TOC:	313.97	ft amsl
Ground:	312.53	ft amsl
Depth of Well:	35.50	ft bgs
Depth to Screen	5.50	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
09/16/98	-	-	0.00	44.3	NG	-	1381.00	0.00	129999	14.0	11.4	-	
09/25/98	-	-	0.00	57.8	NG	-	1381.00	3.50	129999	-	-	196	
10/14/98	23.30	24.00	0.70	57.3	289.36	-	1381.00	0.00	-	-	-	-	
10/27/98	24.97	25.12	0.15	57.5	288.72	0.40	1381.40	0.00	-	-	-	-	
11/03/98	29.55	29.63	0.08	-	284.27	-	1381.40	-	-	-	-	-	
11/10/98	-	-	0.00	-	NG	-	1381.40	-	-	-	-	-	
11/23/98	28.05	29.22	1.17	57.0	283.73	0.50	1381.90	0.00	129999	-	-	-	
12/11/98	31.80	31.82	0.02	57.7	282.13	2.70	1384.60	-	129999	-	-	-	
12/21/98	-	Dry	0.00	-	Dry	-	1384.60	-	129999	-	-	-	
01/13/99	-	Dry	0.00	57.7	Dry	-	1384.60	-	-	-	-	-	
01/26/99	-	Dry	0.00	57.7	Dry	-	1384.60	-	-	-	-	-	
02/05/99	31.44	31.45	0.01	57.7	282.51	-	1384.60	-	-	-	-	-	
02/15/99	29.30	29.35	0.05	57.7	284.58	-	1384.60	0.60	129999	-	-	-	
02/22/99	29.15	29.23	0.08	-	284.67	-	1384.60	-	-	12.7	10.2	410	
03/04/99	27.34	29.41	2.07	57.7	282.76	3.00	1387.60	0.00	129999	11.5	7.7	-	
03/30/99	28.48	28.40	-0.08	57.7	285.64	0.40	1388.00	0.60	129999	10.8	9.4	-	
04/09/99	27.65	27.85	0.20	57.7	285.95	-	1388.00	0.20	152073	-	-	-	
04/28/99	-	-	0.00	57.7	NG	-	1388.00	0.30	153864	-	-	-	
05/13/99	27.88	27.90	0.02	57.7	286.05	-	1388.00	0.20	159999	-	-	-	
05/28/99	19.11	19.33	0.22	-	294.45	0.90	1388.90	0.40	159999	-	-	-	
06/09/99	28.17	28.19	0.02	57.7	285.76	0.20	1389.10	-	159999	-	-	-	
06/21/99	21.40	22.16	0.76	57.7	291.15	0.30	1389.40	0.70	159999	-	-	-	
07/01/99	29.64	29.71	0.07	36.1	284.20	0.40	1389.80	0.20	159999	-	-	-	
07/20/99	30.10	30.15	0.05	37.2	283.78	-	1389.80	0.10	159999	13.0	-	550	
08/05/99	31.60	31.66	0.06	31.9	282.26	2.50	1392.30	0.00	159999	-	-	-	
08/13/99	28.99	29.04	0.05	33.1	284.89	0.70	1393.00	0.00	159999	-	-	-	
08/16/99	-	-	0.00	34.8	NG	-	1393.00	0.00	159999	-	-	-	
09/09/99	28.34	28.65	0.31	35.9	285.05	-	1393.00	0.50	159999	-	-	-	
09/22/99	28.01	28.05	0.04	39.2	285.89	-	1393.00	0.70	171993	-	-	-	
10/07/99	27.68	27.73	0.05	39.9	286.20	1.70	1394.70	0.50	179999	-	-	-	
10/12/99	14.68	15.17	0.49	45.9	298.37	0.10	1394.80	0.50	179999	14.7	0.0	-	
11/03/99	-	-	0.00	38.2	NG	-	1394.80	0.80	20733	14.7	0.0	-	
11/09/99	-	-	0.00	40.4	NG	-	1394.80	1.50	204730	14.7	0.0	-	
11/29/99	29.10	30.02	0.92	50.8	283.15	-	1394.80	0.20	209999	14.7	0.0	-	
12/08/99	31.16	31.25	0.09	39.4	282.64	-	1394.80	1.90	209999	14.7	0.0	-	
12/30/99	29.20	29.27	0.07	38.7	284.64	10.70	1405.50	1.60	256115	14.7	0.0	-	

Well ID: **NFFW-3**
TOC: **324.08** ft amsl
Ground: **321.92** ft amsl
Depth of Well: **26** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	12.18	0.00	310.40			NO LOCK
04/04/94	-	12.77	0.00	309.81			
04/12/94	-	9.84	0.00	312.74			
04/20/94	-	14.25	0.00	308.33			
05/12/94	-	17.03	0.00	305.55			
05/24/94	-	19.35	0.00	303.23			
06/03/94	-	23.40	0.00	299.18			
07/01/94	-	28.25	0.00	294.33			
07/13/94	-	Dry	0.00	Dry			
08/05/94	-	23.26	0.00	299.32			
08/17/94	-	25.90	0.00	296.68			
08/30/94	-	19.72	0.00	302.86			
09/08/94	-	22.39	0.00	300.19			
09/19/94	-	27.90	0.00	294.68			
09/30/94	-	28.18	0.00	294.40			
10/17/94	-	28.20	0.00	294.38			
10/25/94	-	28.19	0.00	294.39			
11/11/94	-	28.21	0.00	294.37			
11/22/94	-	28.21	0.00	294.37			
12/07/94	-	28.17	0.00	294.41			
12/21/94	-	28.19	0.00	294.39			
01/04/95	-	28.18	0.00	294.40			
01/23/95	-	25.76	0.00	296.82			
02/16/95	-	24.77	0.00	297.81			
02/28/95	-	21.06	0.00	301.52			
03/10/95	-	16.64	0.00	305.94			
03/29/95	-	16.48	0.00	306.10			
04/04/95	-	17.40	0.00	305.18			
04/27/95	-	21.42	0.00	301.16			
05/11/95	-	21.83	0.00	300.75			
05/24/95	-	23.29	0.00	299.29			
06/15/95	-	27.12	0.00	295.46			
06/29/95	-	28.22	0.00	294.36			
07/06/95	-	28.14	0.00	294.44			
07/25/95	-	28.15	0.00	294.43			
08/01/95	-	28.20	0.00	294.38			
08/21/95	-	Dry	0.00	Dry			
09/14/95	-	Dry	0.00	Dry			
09/28/95	-	Dry	0.00	Dry			
10/06/95	-	23.79	0.00	298.79			
10/25/95	-	15.80	0.00	306.78			
11/21/95	-	13.21	0.00	309.37			
12/08/95	-	15.00	0.00	307.58			
12/21/95	-	15.01	0.00	307.57			

Well ID:	NFFW-3	
TOC:	324.08	ft amsl
Ground:	321.92	ft amsl
Depth of Well:	26	ft bgs
Depth to Screen	6	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/23/96	-	12.26	0.00	310.32			
02/09/96	-	12.88	0.00	309.70			
02/19/96	-	13.94	0.00	308.64			
01/09/98	-	17.33	0.00	306.75	-	0.00	New System Started
02/20/98	-	13.39	0.00	310.69	-	0.00	
05/21/98	-	13.12	0.00	310.96	-	0.00	
12/21/98	-	Dry	0.00	Dry	-	0.00	
01/13/99	-	Dry	0.00	Dry	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	Dry	0.00	#VALUE!	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	13.97	0.00	310.11	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID:	**NFFW-4**	
TOC:	**320.61**	ft amsl
Ground:	**320.98**	ft amsl
Depth of Well:	**26**	ft bgs
Depth to Screen	**6**	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	8.39	0.00	318.47			NO LOCK
04/04/94	-	8.27	0.00	318.59			
04/12/94	-	9.93	0.00	316.93			
04/20/94	-	14.27	0.00	312.59			
05/12/94	-	15.02	0.00	311.84			
05/24/94	-	17.85	0.00	309.01			
06/03/94	-	22.15	0.00	304.71			
07/01/94	-	Dry	0.00	Dry			
07/13/94	-	Dry	0.00	Dry			
08/05/94	-	24.35	0.00	302.51			
08/17/94	-	Dry	0.00	Dry			
08/30/94	-	21.58	0.00	305.28			
09/08/94	-	23.07	0.00	303.79			
09/19/94	-	24.36	0.00	302.50			
09/30/94	-	Dry	0.00	Dry			
10/17/94	-	Dry	0.00	Dry			
10/25/94	-	Dry	0.00	Dry			
11/11/94	-	Dry	0.00	Dry			
11/22/94	-	Dry	0.00	Dry			
12/07/94	-	Dry	0.00	Dry			
12/21/94	-	Dry	0.00	Dry			
01/04/95	-	Dry	0.00	Dry			
01/23/95	-	23.89	0.00	302.97			
02/16/95	-	23.81	0.00	303.05			
02/28/95	-	21.66	0.00	305.20			
03/10/95	-	16.02	0.00	310.84			
03/29/95	-	14.47	0.00	312.39			
04/04/95	-	15.43	0.00	311.43			
04/27/95	-	19.81	0.00	307.05			
05/11/95	-	20.62	0.00	306.24			
05/24/95	-	21.87	0.00	304.99			
06/15/95	-	Dry	0.00	Dry			
06/29/95	-	Dry	0.00	Dry			
07/06/95	-	Dry	0.00	Dry			
07/25/95	-	Dry	0.00	Dry			
08/01/95	-	Dry	0.00	Dry			
08/21/95	-	Dry	0.00	Dry			
09/14/95	-	Dry	0.00	Dry			
09/28/95	-	Dry	0.00	Dry			
10/06/95	-	23.93	0.00	302.93			
10/25/95	-	16.73	0.00	310.13			
11/21/95	-	10.49	0.00	316.37			
12/08/95	-	11.96	0.00	314.90			
12/21/95	-	12.03	0.00	314.83			
01/23/96	-	9.17	0.00	317.69			

Well ID: **NFFW-5**
TOC. **316.54** ft amsl
Ground: **314.94** ft amsl
Depth of Well: **26** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	3.40	0.00	313.48	-	-	NO CAP OR LOCK
04/04/94	-	5.89	0.00	310.99	-	-	
04/12/94	-	4.13	0.00	312.75	-	-	
04/20/94	-	11.50	0.00	305.38	-	-	
05/12/94	-	12.12	0.00	304.76	-	-	
05/24/94	-	13.85	0.00	303.03	-	-	
06/03/94	-	15.48	0.00	301.40	-	-	
07/01/94	-	12.64	0.00	304.24	-	-	
07/13/94	-	20.95	0.00	295.93	-	-	
08/05/94	-	13.28	0.00	303.60	-	-	
08/17/94	-	14.23	0.00	302.65	-	-	
08/30/94	-	13.55	0.00	303.33	-	-	
09/08/94	-	16.38	0.00	300.50	-	-	
09/19/94	-	12.53	0.00	304.35	-	-	
09/30/94	-	12.94	0.00	303.94	-	-	
10/17/94	-	18.35	0.00	298.53	-	-	
10/25/94	-	12.34	0.00	304.54	-	-	
11/11/94	-	12.10	0.00	304.78	-	-	
11/22/94	-	4.57	0.00	312.31	-	-	
12/07/94	-	4.97	0.00	311.91	-	-	
12/21/94	-	15.04	0.00	301.84	-	-	
01/04/95	-	6.58	0.00	310.30	-	-	
01/23/95	-	5.69	0.00	311.19	-	-	
02/16/95	-	4.32	0.00	312.56	-	-	
02/28/95	-	2.85	0.00	314.03	-	-	
03/10/95	-	4.60	0.00	312.28	-	-	
03/29/95	-	13.06	0.00	303.82	-	-	
04/04/95	-	-	-	NG	-	-	
04/27/95	-	15.79	0.00	301.09	-	-	
05/11/95	-	5.91	0.00	310.97	-	-	
05/24/95	-	15.41	0.00	301.47	-	-	
06/15/95	-	16.96	0.00	299.92	-	-	
06/29/95	-	19.10	0.00	297.78	-	-	
07/06/95	-	19.96	0.00	296.92	-	-	
07/25/95	-	14.46	0.00	302.42	-	-	
08/01/95	-	18.88	0.00	298.00	-	-	
08/21/95	-	22.89	0.00	293.99	-	-	
09/14/95	-	8.49	0.00	308.39	-	-	
09/28/95	-	6.67	0.00	310.21	-	-	
10/06/95	-	4.17	0.00	312.71	-	-	
10/25/95	-	10.19	0.00	306.69	-	-	
11/21/95	-	6.09	0.00	310.79	-	-	
12/08/95	-	12.74	0.00	304.14	-	-	
12/21/95	-	5.70	0.00	311.18	-	-	

Well ID:	NFFW-5	
TOC:	316.54	ft amsl
Ground:	314.94	ft amsl
Depth of Well:	26	ft bgs
Depth to Screen	6	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/23/96	-	5.18	0.00	311.70	-	-	
02/09/96	-	2.85	0.00	314.03	-	-	
02/19/96	-	11.92	0.00	304.96	-	-	
01/09/98	-	3.86	0.00	312.68	-	-	New System Started
01/13/98	-	9.93	0.00	306.61	-	-	
02/20/98	-	3.94	0.00	312.60	-	-	
02/27/98	-	5.14	0.00	311.40	-	-	
03/16/98	-	5.42	0.00	311.12	-	-	
05/21/98	-	7.03	0.00	309.51	-	-	
08/14/98	-	17.44	0.00	299.10	-	-	
10/14/98	-	9.11	0.00	307.43	-	-	
12/21/98	-	23.00	0.00	293.54	-	-	
01/13/99	-	4.78	0.00	311.76	-	-	
02/05/99	-	-	0.00	NG	-	-	
02/15/99	-	-	0.00	NG	-	-	
02/22/99	-	-	0.00	NG	-	-	
03/04/99	-	-	0.00	NG	-	-	
03/30/99	-	-	0.00	NG	-	-	
04/09/99	-	-	0.00	NG	-	-	
04/28/99	-	-	0.00	NG	-	-	
05/13/99	-	-	0.00	NG	-	-	
05/28/99	-	4.04	0.00	312.50	-	-	
06/09/99	-	-	0.00	NG	-	-	
06/21/99	-	-	0.00	NG	-	-	
07/01/99	-	-	0.00	NG	-	-	
07/20/99	-	-	0.00	NG	-	-	
08/05/99	-	-	0.00	NG	-	-	
08/13/99	-	-	0.00	NG	-	-	
08/16/99	-	-	0.00	NG	-	-	
09/09/99	-	-	0.00	NG	-	-	
09/22/99	-	-	0.00	NG	-	-	
10/07/99	-	6.38	0.00	310.16	-	-	
10/12/99	-	-	0.00	NG	-	-	
11/03/99	-	-	0.00	NG	-	-	
11/09/99	-	-	0.00	NG	-	-	
11/28/99	-	-	0.00	NG	-	-	
12/08/99	-	-	0.00	NG	-	-	
12/30/99	-	-	0.00	NG	-	-	

Well ID: NFFW-6
TOC: 319.85 ft amsl
Ground: 319.05 ft amsl
Depth of Well: 26 ft bgs
Depth to Screen 6 ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	15.73	15.92	0.19	303.87	-	0.00	1000 HOURS
03/30/94	15.66	15.86	0.20	303.93	-	0.00	1400 HOURS
04/04/94	16.41	16.46	0.05	303.20	1.24	1.24	1000 HOURS
04/06/94	16.40	16.43	0.03	303.22	0.21	1.45	1200 HOURS
04/07/94	-	16.58	0.00	303.04	-	1.45	1100 HOURS
04/12/94	17.86	18.00	0.14	301.74	-	1.45	Lowered pump to approx 18 ft
04/20/94	-	18.09	0.00	301.53	0.41	1.86	1230 hours
04/27/94	18.17	18.19	0.02	301.45	-	1.86	1105 hours
05/04/94	19.22	19.29	0.07	300.39	-	1.86	0800 hours, lowered pump approx 1 ft
05/12/94	19.34	19.45	0.11	300.27	-	1.86	LOWERED PUMP ABOUT 1 FT
05/13/94	19.49	19.50	0.01	300.13	-	1.86	
05/16/94	-	20.04	0.00	299.58	-	1.86	
05/24/94	20.76	20.77	0.01	298.86	-	1.86	
05/27/94	21.04	21.05	0.01	298.58	-	1.86	
06/03/94	21.64	21.66	0.02	297.98	-	1.86	
06/15/94	23.20	23.24	0.04	296.41	-	1.86	
06/16/94	23.40	23.46	0.05	296.21	-	1.86	
06/21/94	24.40	24.50	0.10	295.21	-	1.86	Well TD 27.90
07/01/94	26.44	26.62	0.18	293.16	-	1.86	Pump set 4" from bottom of well, water and oil intakes above water
07/13/94	27.30	27.31	0.01	292.32	-	1.86	
08/05/94	21.38	21.40	0.02	298.24	-	1.86	
08/17/94	22.92	22.94	0.02	296.70	-	1.86	
08/30/94	20.62	20.65	0.03	299.00	-	1.86	
09/08/94	21.57	21.65	0.08	298.04	-	1.86	
09/14/94	22.93	23.01	0.08	296.68	-	1.86	
09/19/94	24.05	24.11	0.06	295.56	-	1.86	
09/30/94	-	24.05	0.00	295.57	-	1.86	
10/17/94	26.90	27.17	0.27	292.68	-	1.86	
10/25/94	-	27.89	0.00	291.73	-	1.86	
11/11/94	-	Dry	0.00	Dry	-	1.86	
11/22/94	-	Dry	0.00	Dry	-	1.86	
12/07/94	-	27.85	0.00	291.77	-	1.86	
12/21/94	-	24.82	0.00	294.80	-	1.86	
01/04/95	-	25.54	0.00	294.08	-	1.86	
01/16/95	-	23.09	0.00	296.53	-	1.86	
01/23/95	-	21.03	0.00	298.59	-	1.86	
02/16/95	-	22.20	0.00	297.42	-	1.86	
02/28/95	-	20.77	0.00	298.85	-	1.86	No Power To Pump
03/10/95	-	19.32	0.00	300.30	-	1.86	No Power To Pump
03/29/95	-	19.66	0.00	299.96	-	1.86	No Power To Pump
04/04/95	-	-	0.00	NG	-	1.86	No Power To Pump
04/27/95	-	21.82	0.00	297.80	-	1.86	No Power To Pump
05/11/95	-	21.82	0.00	297.80	-	1.86	No Power To Pump
05/24/95	-	22.40	0.00	297.22	-	1.86	No Power To Pump
06/15/95	-	22.97	0.00	296.65	-	1.86	No Power To Pump
06/29/95	-	24.86	0.00	294.76	-	1.86	No Power To Pump
07/06/95	-	25.74	0.00	293.88	-	1.86	No Power To Pump
07/25/95	-	25.98	0.00	293.64	-	1.86	No Power To Pump
08/01/95	-	25.48	0.00	294.14	-	1.86	No Power To Pump
08/21/95	-	Dry	0.00	Dry	-	1.86	Panel removed for repair

Well ID: **NFFW-6**
TOC: **319.85** ft amsl
Ground: **319.05** ft amsl
Depth of Well: **26** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
09/14/95	-	Dry	0.00	Dry	-	1.86	
09/28/95	-	27.71	0.00	291.91	-	1.86	
10/06/95	-	25.10	0.00	294.52	-	1.86	
10/25/95	-	20.15	0.00	299.47	-	1.86	
11/21/95	-	17.30	0.00	302.32	-	1.86	
12/08/95	-	19.51	0.00	300.11	-	1.86	
12/21/95	-	19.37	0.00	300.25	-	1.86	
01/23/96	-	17.10	0.00	302.52	-	1.86	
02/09/96	-	16.00	0.00	303.62	-	1.86	
02/19/96	-	18.40	0.00	301.22	-	1.86	
01/09/98	-	18.84	0.00	301.01	-	1.86	New System Started
01/13/98	-	19.31	0.00	300.54	-	1.86	
02/20/98	-	18.03	0.00	301.82	-	1.86	
02/27/98	-	17.39	0.00	302.46	-	1.86	
03/16/98	-	17.07	0.00	302.78	-	1.86	
05/21/98	-	16.98	0.00	302.87	-	1.86	
08/14/98	-	22.64	0.00	297.21	-	1.86	
10/14/98	25.19	25.21	0.02	294.62	-	1.86	
12/21/98	-	Dry	0.00	Dry	-	1.86	
01/13/99	27.29	27.39	0.10	292.37	-	1.86	
02/05/99	-	-	0.00	NG	-	1.86	
02/15/99	-	-	0.00	NG	-	1.86	
02/22/99	-	-	0.00	NG	-	1.86	
03/04/99	-	-	0.00	NG	-	1.86	
03/30/99	-	-	0.00	NG	-	1.86	
04/09/99	-	-	0.00	NG	-	1.86	
04/28/99	-	-	0.00	NG	-	1.86	
05/13/99	-	-	0.00	NG	-	1.86	
05/28/99	22.10	22.13	0.03	297.69	-	1.86	
06/09/99	-	-	0.00	NG	-	1.86	
06/21/99	-	-	0.00	NG	-	1.86	
07/01/99	-	-	0.00	NG	-	1.86	
07/20/99	-	-	0.00	NG	-	1.86	
08/05/99	-	-	0.00	NG	-	1.86	
08/13/99	-	-	0.00	NG	-	1.86	
08/16/99	-	-	0.00	NG	-	1.86	
09/09/99	-	-	0.00	NG	-	1.86	
09/22/99	-	-	0.00	NG	-	1.86	
10/07/99	-	19.68	0.00	300.17	-	1.86	
10/12/99	-	-	0.00	NG	-	1.86	
11/03/99	-	-	0.00	NG	-	1.86	
11/09/99	-	-	0.00	NG	-	1.86	
11/28/99	-	-	0.00	NG	-	1.86	
12/08/99	-	-	0.00	NG	-	1.86	
12/30/99	-	-	0.00	NG	-	1.86	

Well ID:	NFFW-7	
TOC:	314.46	ft amsl
Ground:	312.57	ft amsl
Depth of Well:	26	ft bgs
Depth to Screen	6	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	11.50	0.00	302.58	-	-	1030 HOURS, NO LOCK
03/30/94	-	11.42	0.00	302.66	-	-	1400 HOURS
04/04/94	-	11.28	0.00	302.80	-	-	1000 HOURS
04/06/94	-	11.99	0.00	302.09	-	-	1200 HOURS
04/07/94	-	12.16	0.00	301.92	-	-	1100 HOURS
04/12/94	-	13.57	0.00	300.51	-	-	1200 HOURS
04/20/94	-	14.08	0.00	300.00	-	-	
04/27/94	-	13.50	0.00	300.58	-	-	
05/04/94	-	14.64	0.00	299.44	-	-	
05/12/94	-	14.89	0.00	299.19	-	-	
05/13/94	-	14.93	0.00	299.15	-	-	
05/16/94	15.92	15.93	0.01	298.16	-	-	
05/24/94	16.92	16.96	0.04	297.15	-	-	
05/27/94	17.69	17.78	0.09	296.38	-	-	
06/03/94	18.52	18.60	0.08	295.55	-	-	
06/15/94	20.06	20.26	0.20	293.99	-	-	
06/16/94	20.38	20.56	0.18	293.68	-	-	
07/01/94	24.12	24.41	0.29	289.92	-	-	
07/13/94	26.57	26.95	0.38	287.46	0.50	0.50	BAILED 0.5 GAL
08/05/94	-	19.38	0.00	294.70	-	0.50	
08/17/94	20.24	20.25	0.01	293.84	-	0.50	
08/30/94	-	17.33	0.00	296.75	-	0.50	
09/08/94	18.41	18.42	0.01	295.67	-	0.50	SHEEN
09/14/94	19.96	19.97	0.01	294.12	-	0.50	
09/19/94	21.25	21.27	0.02	292.83	-	0.50	
09/30/94	21.10	21.10	Sheen	292.98	-	0.50	
10/17/94	24.76	24.90	0.14	289.30	-	0.50	
10/25/94	27.14	27.48	0.34	286.90	-	0.50	
11/11/94	-	Dry	0.00	Dry	-	0.50	28.08 Bottom
11/22/94	-	Dry	0.00	Dry	-	0.50	
12/07/94	27.88	28.08	0.20	286.17	-	0.50	
12/21/94	22.92	23.57	0.65	291.08	-	0.50	
01/04/95	23.17	23.91	0.74	290.81	1.00	1.50	Bailed Product
01/16/95	21.09	21.29	0.20	292.96	-	1.50	
01/23/95	19.05	19.12	0.07	295.02	-	1.50	
02/16/95	18.80	18.93	0.13	295.26	-	1.50	
02/28/95	17.17	17.22	0.05	296.90	-	1.50	
03/10/95	16.42	16.45	0.03	297.66	-	1.50	
03/29/95	14.98	14.98	0.01	299.10	-	1.50	product .005
04/04/95	16.46	16.51	0.05	297.61	-	1.50	
04/27/95	18.46	18.49	0.03	295.62	-	1.50	
05/11/95	17.90	17.96	0.06	296.17	-	1.50	
05/24/95	19.08	19.25	0.17	294.98	-	1.50	
06/15/95	-	-	0.00	NG	-	1.50	Well Knocked Over During Soil Removal Operations
06/29/95	22.02	22.25	0.23	292.03	-	1.50	Well is bent over
07/06/95	23.05	23.30	0.25	291.00	0.25	1.75	Bailed Product
07/25/95	23.35	23.50	0.15	290.71	-	1.75	Well is bent over
08/01/95	23.42	23.65	0.23	290.63	0.25	2.00	
08/21/95	-	Dry	0.00	Dry	-	2.00	
09/14/95	-	Dry	0.00	Dry	-	2.00	
09/28/95	-	Dry	0.00	Dry	-	2.00	

Well ID: **NFFW-7**
TOC: **314.46** ft amsl
Ground: **312.57** ft amsl
Depth of Well: **26** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
10/06/95	23.97	24.08	0.11	290.10	-	2.00	
10/25/95	-	16.86	0.00	297.22	-	2.00	
11/21/95	-	12.70	0.00	301.38	-	2.00	
12/08/95	-	14.96	0.00	299.12	-	2.00	
12/21/95	-	15.18	0.00	298.90	-	2.00	
01/23/96	-	12.83	0.00	301.25	-	2.00	
02/09/96	-	11.46	0.00	302.62	-	2.00	
02/19/96	-	14.12	0.00	299.96	-	2.00	
01/09/98	-	14.86	0.00	299.60	-	2.00	New System Started
01/13/98	-	15.71	0.00	298.75	-	2.00	
02/20/98	-	15.41	0.00	299.05	-	2.00	
02/27/98	-	14.34	0.00	300.12	-	2.00	
03/16/98	-	13.40	0.00	301.06	-	2.00	
05/21/98	-	13.53	0.00	300.93	-	2.00	
08/14/98	22.50	22.63	0.13	291.72	-	2.00	
10/14/98	22.80	24.13	1.33	289.17	-	2.00	
10/27/98	-	-	0.00	NG	1.00	3.00	Passive Bailer
11/03/98	-	-	0.00	NG	0.50	3.50	Passive Bailer
11/10/98	-	-	0.00	NG	0.50	4.00	Passive Bailer
11/23/98	-	-	0.00	NG	0.50	4.50	Passive Bailer
12/21/98	-	Dry	0.00	Dry	-	4.50	
01/13/99	-	Dry	0.00	Dry	-	4.50	
02/05/99	-	-	0.00	NG	-	4.50	
02/15/99	-	-	0.00	NG	-	4.50	
02/22/99	-	-	0.00	NG	-	4.50	
03/04/99	-	-	0.00	NG	-	4.50	
03/30/99	-	-	0.00	NG	-	4.50	
04/09/99	-	-	0.00	NG	-	4.50	
04/28/99	-	-	0.00	NG	-	4.50	
05/13/99	-	-	0.00	NG	-	4.50	
05/28/99	15.27	15.22	-0.05	299.28	-	4.50	
06/09/99	-	-	0.00	NG	-	4.50	
06/21/99	-	-	0.00	NG	-	4.50	
07/01/99	-	-	0.00	NG	-	4.50	
07/20/99	-	-	0.00	NG	-	4.50	
08/05/99	-	-	0.00	NG	-	4.50	
08/13/99	-	-	0.00	NG	-	4.50	
08/16/99	-	-	0.00	NG	-	4.50	
09/09/99	-	-	0.00	NG	-	4.50	
09/22/99	-	-	0.00	NG	-	4.50	
10/07/99	17.25	17.27	0.02	297.17	-	4.50	
10/12/99	-	-	0.00	NG	-	4.50	
11/03/99	-	-	0.00	NG	-	4.50	
11/09/99	-	-	0.00	NG	-	4.50	
11/28/99	-	-	0.00	NG	-	4.50	
12/08/99	-	-	0.00	NG	-	4.50	
12/30/99	-	-	0.00	NG	-	4.50	

Well ID: **NFFW-8**
TOC: **309.61** ft amsl
Ground: **308.49** ft amsl
Depth of Well: **27.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	12.25	0.00	297.82			1030 HOURS, NO LOCK
04/04/94	-	12.80	0.00	297.27			1000 HOURS
04/12/94	-	13.26	0.00	296.81			1200 HOURS
04/20/94	-	13.63	0.00	296.44			
05/12/94	-	14.80	0.00	295.27			
05/24/94	-	15.82	0.00	294.25			
06/03/94	-	16.94	0.00	293.13			
07/01/94	-	19.83	0.00	290.24			
07/13/94	21.78	21.79	0.01	288.29			
08/05/94	-	18.03	0.00	292.04			
08/17/94	-	18.83	0.00	291.24			
08/30/94	-	16.77	0.00	293.30			
09/08/94	-	17.51	0.00	292.56			
09/19/94	-	18.55	0.00	291.52			
09/30/94	-	18.69	0.00	291.38			
10/17/94	-	21.28	0.00	288.79			
10/25/94	-	21.97	0.00	288.10			
11/11/94	24.42	24.45	0.03	285.65			
11/22/94	24.71	24.76	0.05	285.35			
12/07/94	-	20.89	0.00	289.18			
12/21/94	-	20.20	0.00	289.87			
01/04/95	-	20.00	0.00	290.07			
01/23/95	-	16.48	0.00	293.59			
02/16/95	-	17.32	0.00	292.75			
02/28/95	-	15.38	0.00	294.69			
03/10/95	-	13.99	0.00	296.08			
03/29/95	-	14.88	0.00	295.19			
04/04/95	-	15.29	0.00	294.78			
04/27/95	-	16.51	0.00	293.56			
05/11/95	-	16.25	0.00	293.82			
05/24/95	-	17.01	0.00	293.06			
06/15/95	-	17.51	0.00	292.56			
06/29/95	-	18.02	0.00	292.05			
07/06/95	-	19.20	0.00	290.87			
07/25/95	-	19.02	0.00	291.05			
08/01/95	-	20.36	0.00	289.71			
08/21/95	23.37	23.37	Sheen	286.70			
09/14/95	26.21	26.32	0.11	283.85			
09/28/95	-	19.90	0.00	290.17			
10/06/95	-	17.48	0.00	292.59			
10/25/95	-	15.38	0.00	294.69			
11/21/95	-	12.59	0.00	297.48			
12/08/95	-	13.79	0.00	296.28			
12/21/95	-	13.78	0.00	296.29			
01/23/96	-	12.69	0.00	297.38			
02/09/96	-	12.12	0.00	297.95			
02/19/96	-	12.19	0.00	297.88			
01/09/98	-	14.63	0.00	294.98	-	0.00	New System Started
01/13/98	-	14.82	0.00	294.79	-	0.00	
02/20/98	-	13.05	0.00	296.56	-	0.00	
02/27/98	-	12.34	0.00	297.27	-	0.00	

Well ID:	**NFFW-8**	
TOC:	**309.61**	ft amsl
Ground:	**308.49**	ft amsl
Depth of Well:	**27.5**	ft bgs
Depth to Screen	**7.5**	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/16/98	-	12.12	0.00	297.49	-	0.00	
05/21/98	-	12.77	0.00	296.84	-	0.00	
08/14/98	-	17.02	0.00	292.59	-	0.00	
10/14/98	-	19.06	0.00	290.55	-	0.00	
12/21/98	23.70	23.89	0.19	285.55	-	0.00	
01/13/99	-	19.49	0.00	290.12	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	16.33	0.00	293.28	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	13.52	0.00	296.09	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-9**
TOC: **300.29** ft amsl
Ground: **300.45** ft amsl
Depth of Well: **26** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	2.92	0.00	297.69			1030 HOURS
04/04/94	-	3.64	0.00	296.97			1000 HOURS
04/12/94	-	3.91	0.00	296.70			1200 HOURS
04/20/94	-	4.25	0.00	296.36			
05/12/94	-	5.18	0.00	295.43			
05/24/94	-	6.19	0.00	294.42			
06/03/94	-	7.44	0.00	293.17			
07/01/94	-	9.91	0.00	290.70			
07/13/94	-	12.65	0.00	287.96			
08/05/94	-	8.62	0.00	291.99			
08/17/94	-	9.40	0.00	291.21			
08/30/94	-	7.33	0.00	293.28			
09/08/94	8.18	8.18	Sheen	292.43			
09/19/94	-	8.91	0.00	291.70			
09/30/94	-	9.14	0.00	291.47			
10/17/94	-	11.93	0.00	288.68			
10/25/94	-	11.50	0.00	289.11			
11/11/94	-	13.53	0.00	287.08			
11/22/94	-	13.15	0.00	287.46			
12/07/94	-	10.36	0.00	290.25			
12/21/94	-	10.64	0.00	289.97			
01/04/95	-	10.14	0.00	290.47			
01/23/95	-	-	0.00	NG			CAR PARKED ON WELL
02/16/95	-	7.54	0.00	293.07			
02/28/95	-	-	0.00	NG			CAR PARKED ON WELL
03/10/95	-	4.39	0.00	296.22			
03/29/95	-	5.54	0.00	295.07			
04/04/95	-	6.95	0.00	293.66			
04/27/95	-	7.10	0.00	293.51			
05/11/95	-	6.63	0.00	293.98			
05/24/95	-	7.58	0.00	293.03			
06/15/95	-	8.52	0.00	292.09			
06/29/95	-	7.95	0.00	292.66			
07/06/95	-	9.68	0.00	290.93			
07/25/95	-	9.45	0.00	291.16			
08/01/95	-	10.95	0.00	289.66			
08/21/95	-	14.49	0.00	286.12			
09/14/95	-	17.64	0.00	282.97			
09/28/95	-	9.85	0.00	290.76			
10/06/95	-	7.35	0.00	293.26			
10/25/95	-	6.04	0.00	294.57			
11/21/95	-	4.10	0.00	296.51			
12/08/95	-	-	0.00	NG			Car Over Well
12/21/95	-	-	0.00	NG			Well Under Snow
01/23/96	-	3.94	0.00	296.67			
02/09/96	-	3.60	0.00	297.01			
02/19/96	-	4.26	0.00	296.35			
01/09/98	-	5.13	0.00	295.16	-	0.00	New System Started
01/13/98	-	5.42	0.00	294.87	-	0.00	
02/20/98	-	3.87	0.00	296.42	-	0.00	
02/27/98	-	3.76	0.00	296.53	-	0.00	

Well ID:	**NFFW-9**	
TOC:	**300.29**	ft amsl
Ground:	**300.45**	ft amsl
Depth of Well:	**26**	ft bgs
Depth to Screen	**6**	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/16/98	-	9.54	0.00	290.75	-	0.00	
05/21/98	-	11.04	0.00	289.25	-	0.00	
08/14/98	-	8.46	0.00	291.83	-	0.00	
10/14/98	-	18.02	0.00	282.27	-	0.00	
12/21/98	-	16.15	0.00	284.14	-	0.00	
01/13/99	-	9.98	0.00	290.31	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	7.71	0.00	292.58	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	5.05	0.00	295.24	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-10**
TOC: **300.51** ft amsl
Ground: **300.85** ft amsl
Depth of Well: **37** ft bgs
Depth to Screen **7** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	5.33	0.00	295.77			NEEDS NEW LOCK
04/04/94	-	5.46	0.00	295.64			1000 HOURS
04/12/94	-	6.60	0.00	294.50			1200 HOURS
04/20/94	-	6.96	0.00	294.14			
05/12/94	-	3.65	0.00	297.45			
07/01/94	-	12.45	0.00	288.65			
07/13/94	-	15.78	0.00	285.32			
08/05/94	-	11.05	0.00	290.05			
08/17/94	-	11.31	0.00	289.79			
08/30/94	-	8.88	0.00	292.22			
09/08/94	-	9.56	0.00	291.54			
09/19/94	-	11.32	0.00	289.78			
09/30/94	-	11.23	0.00	289.87			
10/17/94	-	14.27	0.00	286.83			
10/25/94	-	15.66	0.00	285.44			
11/11/94	-	19.18	0.00	281.92			
11/22/94	-	19.77	0.00	281.33			
12/07/94	-	15.75	0.00	285.35			
12/21/94	-	13.83	0.00	287.27			
01/04/95	-	13.66	0.00	287.44			
01/23/95	-	10.27	0.00	290.83			
02/16/95	-	-	0.00	NG			BURIED UNDER SNOW
02/28/95	-	8.76	0.00	292.34			
03/10/95	-	7.72	0.00	293.38			
03/29/95	-	-	0.00	NG			CAR PARKED ON WELL
04/04/95	-	7.73	0.00	293.37			
04/27/95	-	8.91	0.00	292.19			
05/11/95	-	8.91	0.00	292.19			
05/24/95	-	9.53	0.00	291.57			
06/15/95	-	10.57	0.00	290.53			
06/29/95	-	-	0.00	NG			TRUCK PARKED ON WELL
07/06/95	-	-	0.00	NG			TRUCK PARKED ON WELL
07/25/95	-	12.86	0.00	288.24			
08/01/95	-	13.79	0.00	287.31			
08/21/95	-	17.75	0.00	283.35			
09/14/95	-	22.39	0.00	278.71			
09/28/95	-	15.00	0.00	286.10			
10/06/95	-	12.09	0.00	289.01			
10/25/95	-	8.24	0.00	292.86			
11/21/95	-	-	0.00	NG			Equipment over well
12/08/95	-	6.60	0.00	294.50			
12/21/95	-	-	0.00	NG			Manhole Filled With Ice
01/23/96	-	-	0.00	NG			Manhole Filled With Ice
02/09/96	-	-	0.00	NG			
02/19/96	-	-	0.00	NG			
01/09/98	-	7.74	0.00	292.77	-	0.00	New System Started
02/20/98	-	6.28	0.00	294.23	-	0.00	
05/21/98	-	8.14	0.00	292.37	-	0.00	
12/21/98	-	19.06	0.00	281.45	-	0.00	
01/13/99	-	14.92	0.00	285.59	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-10**
TOC: **300.51** ft amsl
Ground: **300.85** ft amsl
Depth of Well: **37** ft bgs
Depth to Screen **7** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	11.46	0.00	289.05	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	NA	0.00	#VALUE!	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-12**
TOC: **309.02** ft amsl
Ground: **309.13** ft amsl
Depth of Well: **26.5** ft bgs
Depth to Screen **6.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	8.73	0.00	298.63			1030 HOURS, NO LOCK
04/04/94	-	9.01	0.00	298.35			1000 HOURS
04/06/94	-	9.22	0.00	298.14			1200 HOUR
04/07/94	-	9.28	0.00	298.08			1100 HOURS
04/12/94	-	10.04	0.00	297.32			1200 HOURS
04/20/94	-	10.43	0.00	296.93			
04/27/94	-	10.74	0.00	296.62			
05/04/94	-	11.72	0.00	295.64			
05/12/94	-	11.95	0.00	295.41			
05/13/94	-	11.98	0.00	295.38			
05/16/94	-	12.35	0.00	295.01			
05/24/94	-	13.23	0.00	294.13			
05/27/94	-	13.65	0.00	293.71			
06/03/94	-	14.44	0.00	292.92			
06/15/94	15.74	15.75	0.02	291.62			
06/16/94	15.91	15.92	0.02	291.45			
07/01/94	18.03	18.11	0.08	289.32			
07/13/94	20.08	20.20	0.12	287.26	0.25	0.25	BAILED 0.25 GAL
08/05/94	16.92	16.94	0.02	290.44	-	0.25	
08/17/94	16.35	16.37	0.02	291.01	-	0.25	
08/30/94	-	14.17	0.00	293.19	-	0.25	
09/08/94	-	14.31	0.00	293.05	-	0.25	
09/14/94	-	14.17	0.00	293.19	-	0.25	
09/19/94	-	15.99	0.00	291.37	-	0.25	
09/30/94	-	16.77	0.00	290.59	-	0.25	
10/17/94	18.95	19.05	0.10	288.40	-	0.25	
10/25/94	-	20.80	0.00	286.56	-	0.25	
11/11/94	23.89	23.97	0.08	283.46	-	0.25	
11/22/94	-	-	0.00	NG	-	0.25	IFP BROKE DURING GAUGING, NO INFORMATION AVAILABLE
12/07/94	22.52	22.52	Sheen	284.84	-	0.25	
12/21/94	-	19.30	0.00	288.06	-	0.25	
01/04/95	-	19.10	0.00	288.26	-	0.25	
01/16/95	-	17.54	0.00	289.82	-	0.25	
01/23/95	-	15.95	0.00	291.41	-	0.25	
02/16/95	-	15.33	0.00	292.03	-	0.25	
02/28/95	-	14.14	0.00	293.22	-	0.25	
03/10/95	-	12.96	0.00	294.40	-	0.25	
03/29/95	-	12.32	0.00	295.04	-	0.25	
04/04/95	-	13.02	0.00	294.34	-	0.25	
04/27/95	-	14.64	0.00	292.72	-	0.25	
05/11/95	-	14.57	0.00	292.79	-	0.25	
05/24/95	-	15.19	0.00	292.17	-	0.25	
06/15/95	-	16.14	0.00	291.22	-	0.25	
06/29/95	-	17.14	0.00	290.22	-	0.25	
07/06/95	-	17.84	0.00	289.52	-	0.25	
07/25/95	-	18.88	0.00	288.48	-	0.25	
08/01/95	-	19.05	0.00	288.31	-	0.25	
08/21/95	22.37	22.38	0.01	284.99	-	0.25	
09/14/95	25.38	25.65	0.27	281.94	-	0.25	
09/28/95	21.56	21.64	0.08	285.79	-	0.25	
10/06/95	-	19.26	0.00	288.10	-	0.25	

Well ID: **NFFW-12**
TOC: **309.02** ft amsl
Ground: **309.13** ft amsl
Depth of Well: **26.5** ft bgs
Depth to Screen **6.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
10/25/95	-	13.78	0.00	293.58	-	0.25	
11/21/95	-	9.70	0.00	297.66	-	0.25	
12/08/95	-	11.37	0.00	295.99	-	0.25	
12/21/95	-	11.80	0.00	295.56	-	0.25	
01/23/96	-	10.37	0.00	296.99	-	0.25	
02/09/96	-	9.45	0.00	297.91	-	0.25	
02/19/96	-	10.60	0.00	296.76	-	0.25	
01/09/98	-	12.46	0.00	296.56	-	0.25	New System Started
01/13/98	-	12.42	0.00	296.60	-	0.25	
02/20/98	-	10.32	0.00	298.70	-	0.25	
02/27/98	-	9.58	0.00	299.44	-	0.25	
03/16/98	-	3.63	0.00	305.39	-	0.25	
08/14/98	-	15.63	0.00	293.39	-	0.25	
10/14/98	-	10.07	0.00	298.95	-	0.25	
12/21/98	-	23.89	0.00	285.13	-	0.25	
01/13/99	-	20.73	0.00	288.29	-	0.25	
02/05/99	-	-	0.00	NG	-	0.25	
02/15/99	-	-	0.00	NG	-	0.25	
02/22/99	-	-	0.00	NG	-	0.25	
03/04/99	-	-	0.00	NG	-	0.25	
03/30/99	-	-	0.00	NG	-	0.25	
04/09/99	-	-	0.00	NG	-	0.25	
04/28/99	-	-	0.00	NG	-	0.25	
05/13/99	-	-	0.00	NG	-	0.25	
05/28/99	15.50	15.52	0.02	293.48	-	0.25	
06/09/99	-	-	0.00	NG	-	0.25	
06/21/99	-	-	0.00	NG	-	0.25	
07/01/99	-	-	0.00	NG	-	0.25	
07/20/99	-	-	0.00	NG	-	0.25	
08/05/99	-	-	0.00	NG	-	0.25	
08/13/99	-	-	0.00	NG	-	0.25	
08/16/99	-	-	0.00	NG	-	0.25	
09/09/99	-	-	0.00	NG	-	0.25	
09/22/99	-	-	0.00	NG	-	0.25	
10/07/99	-	11.56	0.00	297.46	-	0.25	
10/12/99	-	-	0.00	NG	-	0.25	
11/03/99	-	-	0.00	NG	-	0.25	
11/09/99	-	-	0.00	NG	-	0.25	
11/28/99	-	-	0.00	NG	-	0.25	
12/08/99	-	-	0.00	NG	-	0.25	
12/30/99	-	-	0.00	NG	-	0.25	

Well ID:	**NFFW-14**	(Recovery Well)
TOC:	**314.40**	ft amsl
Ground:	**313.13**	ft amsl
Depth of Well:	**37.5**	ft bgs
Depth to Screen	**7.5**	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
03/30/94	-	10.28	0.00		302.88	-	0.00						1030 HOURS, NEEDS NEW LOCK
04/04/94	-	10.19	0.00		302.97	-	0.00						1000 HOURS
04/06/94	-	10.88	0.00		302.28	-	0.00						1200 HOUR
04/07/94	-	11.09	0.00		302.07	-	0.00						1100 HOURS
04/12/94	12.57	12.58	0.01		300.59	-	0.00						1200 HOURS
04/20/94	12.57	12.96	0.39		300.54	-	0.00						
04/27/94	12.65	12.67	0.02		300.51	-	0.00						bailed 12 oz product
05/04/94	13.85	13.89	0.04		299.30	-	0.00						bailed 32 oz of product
05/12/94	14.23	14.29	0.06		298.92	-	0.00						
05/13/94	14.17	14.18	0.01		298.99	-	0.00						BAILED PRODUCT
05/16/94	15.30	15.38	0.08		297.85	-	0.00						BAILED PRODUCT
05/24/94	16.44	16.50	0.06		296.71	-	0.00						BAILED PRODUCT
05/27/94	17.04	17.08	0.05		296.12	-	0.00						BAILED PRODUCT
06/03/94	17.93	17.98	0.05		295.22	-	0.00						BAILED PRODUCT
06/15/94	19.54	19.58	0.04		293.61	-	0.00						BAILED PRODUCT
06/16/94	19.72	19.83	0.11		293.43	-	0.00						BAILED PRODUCT
07/01/94	23.03	23.38	0.35		290.08	-	0.00						
07/13/94	26.70	31.74	5.04		285.80	10.00	10.00						BAILED APPROX 10 GAL
08/05/94	17.53	21.55	4.02		295.11	5.00	15.00						BAILED APPROX 5 GAL
08/17/94	17.70	21.78	4.08		294.93	7.00	22.00						BAILED APPROX 7 GAL
08/30/94	18.28	18.31	0.03		297.21	-	22.00						INSTALLED FAP ADDED 28" OF 4" CASING
09/08/94	19.15	19.42	0.27		296.30	-	22.00						
09/14/94	20.77	20.80	0.03		294.72	-	22.00						FIXED TANK-FULL PROBE
09/19/94	21.90	21.92	0.02		293.59	-	22.00						
09/30/94	22.35	22.36	0.01		293.14	-	22.00						
10/17/94	25.36	25.46	0.10		290.12	-	22.00						
10/25/94	27.86	33.50	5.64		286.90	-	22.00						Passive Bailer Installed After Gauging
11/11/94	31.31	36.54	5.23		283.50	1.10	23.10						Passive Bailer Installed
11/22/94	-	-	0.00		NG	5.00	28.10						0.2' OF WATER, 4' PRODUCT (APPROX) BAILED PROD, IFP BROKE DURING GAUGING
12/07/94	27.86	33.90	6.04		286.84	11.00	39.10						BAILED PRODUCT
12/21/94	23.47	25.28	1.81		291.78	3.00	42.10						BAILED PRODUCT
01/04/95	24.00	24.48	0.48		291.43	1.00	43.10						BAILED PRODUCT
01/16/95	22.35	22.56	0.21		293.11	-	43.10						
01/23/95	-	20.64	0.00		294.85	0.37	43.47						PRODUCT FROM PASSIVE BAILER
02/16/95	20.36	20.37	0.01		295.13	-	43.47						
02/28/95	-	18.93	0.00		296.56	-	43.47						
03/10/95	-	17.73	0.00		297.76	-	43.47						
03/29/95	16.60	16.76	0.16		298.87	-	43.47						MOVED PASSIVE SKIMMER TO WELL
04/04/95	18.29	18.54	0.25		297.17	-	43.47						

Well ID:	**NFFW-14**	(Recovery Well)
TOC:	**314.40**	ft amsl
Ground:	**313.13**	ft amsl
Depth of Well:	**37.5**	ft bgs
Depth to Screen	**7.5**	ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
04/27/95	20.22	20.67	0.45		295.21	-	43.47						LOWERED SKIMMER
05/11/95	20.11	20.35	0.24		295.35	0.37	43.84						
05/24/95	21.07	21.22	0.15		294.40	0.37	44.21						
06/15/95	21.86	22.12	0.26		293.60	-	44.21						
06/29/95	23.79	23.89	0.10		291.69	0.37	44.58						
07/06/95	24.52	24.58	0.06		290.96	-	44.58						
07/25/95	24.52	24.86	0.34		290.93	0.55	45.13						
08/01/95	25.44	25.64	0.20		290.02	0.37	45.50						
08/21/95	31.66	35.21	3.55		283.37	0.37	45.87						
09/14/95	33.93	34.45	0.52		279.16	0.37	46.24						
09/28/95	24.80	28.18	3.38		287.92	6.50	52.74						Bailed Product
10/06/95	22.12	22.77	0.65		290.96	-	52.74						
10/25/95	15.78	16.02	0.24		297.35	0.37	53.11						
11/21/95	11.29	12.03	0.74		301.77	-	53.11						
12/08/95	13.39	14.36	0.97		299.64	2.00	55.11						
12/21/95	-	-	0.00		NG	-	55.11						Covered Under Plowed Snow
01/23/96	-	-	0.00		NG	-	55.11						Covered Under Plowed Snow
01/02/98	-	-	0.00	-	NG	-	55.11	-	-	-	-	-	New System Started
01/09/98	-	15.44	0.00	52.00	298.96	-	55.11	-	-	-	-	-	
01/09/98	29.28	29.41	0.13	35.00	284.88	22.40	77.51	2.5	-	-	-	-	
01/13/98	-	29.71	0.00	35.00	284.69	20.00	97.51	1.0	-	-	-	-	
01/20/98	-	-	0.00	35.00	NG	9.10	106.61	1.0	-	-	-	-	
01/28/98	-	-	0.00	35.00	NG	3.80	110.41	-	-	-	-	-	
02/02/98	-	-	0.00	-	NG	-	110.41	-	-	-	-	-	
02/09/98	29.89	29.94	0.05	35.00	284.42	8.72	119.13	-	-	-	-	-	
02/16/98	-	-	0.00	34.70	NG	1.92	121.05	-	-	12.4	-	235	
02/20/98	-	-	0.00	34.90	NG	3.46	124.51	-	-	12.5	-	610	
02/23/98	-	-	0.00	34.70	NG	0.10	124.61	-	-	12.5	-	232	
02/27/98	29.42	29.55	0.13	34.60	284.74	2.40	127.01	-	-	12.2	-	-	
03/02/98	-	29.49	0.00	-	284.91	-	127.01	-	-	12.7	9.9	-	
03/05/98	29.80	29.84	0.04	34.70	284.53	1.60	128.61	0.0	9999	12.0	22.2	78	
03/09/98	28.97	29.03	0.06	35.80	285.32	1.20	129.81	0.0	337	-	-	-	
03/13/98	30.25	30.30	0.05	35.60	284.06	-	129.81	0.0	367	11.7	8.5	-	
03/16/98	28.88	28.90	0.02	35.20	285.48	1.00	130.81	0.1	491	-	-	85	
03/23/98	-	-	0.00	35.60	NG	-	130.81	-	-	12.5	13.4	-	
04/02/98	29.40	29.41	0.01	35.80	284.98	1.80	132.61	-	-	12.2	10.0	-	
04/13/98	29.75	29.76	0.01	35.50	284.63	1.70	134.31	-	-	13.5	12.9	30	
04/17/98	-	-	0.00	35.90	NG	0.50	134.81	0.3	531	13.2	33.0	243	Cleaned screen on product pump/ installed flow meter
04/22/98	-	-	0.00	-	NG	-	134.81	-	-	13.5	-	-	

Well ID: **NFFW-14** (Recovery Well)
TOC: **314.40** ft amsl
Ground: **313.13** ft amsl
Depth of Well: **37.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
05/05/98	28.00	28.94	0.94	-	284.64	-	134.81	-	-	13.7	6.5	320	
05/21/98	27.16	27.18	0.02	-	287.20	2.40	137.21	-	-	11.7	7.8	88	
05/28/98	-	-	0.00	44.70	NG	*	137.21	-	22595	13.7	17.6	-	
06/12/98	24.25	24.26	0.01	39.30	290.13	0.94	138.15	0.4	25740	13.0	5.2	-	
06/23/98	-	25.26	0.00	39.90	289.14	0.15	138.30	0.2	29999	13.2	7.4	-	
07/10/98	17.16	17.18	0.02	49.50	297.20	0.45	138.75	0.1	29999	13.5	3.7	385	
07/28/98	-	-	0.00	-	NG	-	138.75	-	-	-	-	-	
07/31/98	-	-	0.00	37.10	NG	0.04	138.79	0.7	51559	12.2	10.0	-	
08/05/98	-	-	0.00	-	NG	1.16	139.95	-	-	14.0	6.6	615	
08/14/98	27.07	27.13	0.06	-	287.22	1.60	141.55	-	-	14.2	5.4	-	
08/27/98	27.10	27.14	0.04	-	287.23	2.90	144.45	-	-	-	-	-	
09/11/98	17.74	17.77	0.03	-	296.60	0.30	144.75	-	-	-	-	-	
09/16/98	27.47	27.51	0.04	36.70	286.86	-	144.75	0.0	59999	14.7	0.0	-	
09/25/98	-	-	0.00	43.80	NG	-	144.75	0.6	59999	-	-	330	
10/14/98	-	23.25	0.00	39.40	291.15	0.80	145.55	0.0	-	14.7	0.0	-	
10/27/98	23.85	23.87	0.02	36.20	290.51	1.50	147.05	3.1	-	-	-	-	
11/03/98	23.70	23.74	0.04	-	290.63	0.70	147.75	-	-	-	-	-	
11/10/98	-	-	0.00	-	NG	-	147.75	-	-	-	-	-	
11/23/98	24.17	24.19	0.02	36.70	290.19	1.60	149.35	0.0	15999	-	-	-	
12/11/98	34.90	34.90	0.00	34.90	279.50	1.60	150.95	-	179999	-	-	-	
12/21/98	31.77	31.90	0.13	35.00	282.39	0.40	151.35	-	179999	-	-	-	
01/13/99	29.90	29.92	0.02	36.80	284.46	0.80	152.15	-	-	-	-	-	
01/26/99	28.90	28.93	0.03	43.60	285.44	-	152.15	0.2	179999	-	-	-	
02/05/99	28.06	28.07	0.01	37.60	286.32	0.20	152.35	0.1	179999	-	-	-	
02/15/99	28.89	28.90	0.01	37.50	285.49	2.10	154.45	0.1	179999	-	-	-	
02/22/99	28.72	28.74	0.02	37.30	285.64	0.80	155.25	0.1	179999	-	-	-	
03/04/99	27.02	29.04	2.02	36.70	283.60	-	155.25	0.1	179999	14.7	0.0	-	
03/30/99	27.54	27.60	0.06	39.60	286.75	2.10	157.35	0.3	209999	14.7	0.0	-	
04/09/99	15.83	15.85	0.02	49.10	298.53	1.00	158.35	0.1	209999	-	-	-	
04/28/99	-	-	0.00	49.80	NG	0.10	158.45	0.2	209999	-	-	-	
05/13/99	22.40	22.46	0.06	46.10	291.89	0.30	158.75	0.5	209999	-	-	-	
05/28/99	30.53	30.50	-0.03	34.10	283.93	1.20	159.95	2.5	209999	-	-	-	
06/09/99	29.12	29.15	0.03	38.80	285.22	2.40	162.35	0.0	220402	-	-	-	
06/21/99	-	21.33	0.00	44.20	293.07	-	162.35	0.1	222487	-	-	-	
07/01/99	28.02	28.05	0.03	40.40	286.32	-	162.35	0.5	222789	-	-	-	
07/20/99	29.19	29.20	0.01	38.20	285.19	-	162.35	3.0	222824	10.8	-	1700	
08/05/99	30.73	30.77	0.04	31.90	283.60	1.70	164.05	0.0	224730	11.0	-	-	
08/13/99	29.88	29.90	0.02	29.80	284.48	0.30	164.35	0.0	225623	10.3	-	-	
08/16/99	NA	NA	#VALUE!	35.50	#VALUE!	1.60	165.95	0.0	225623	10.0	-	-	
09/09/99	-	30.45	0.00	33.00	283.95	-	165.95	0.0	225628	-	-	-	

Well ID: **NFFW-14** (Recovery Well)
TOC: **314.40** ft amsl
Ground: **313.13** ft amsl
Depth of Well: **37.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
09/22/99	24.26	24.91	0.65	33.00	288.92	0.40	166.35	0.1	229999	-	-	-	
10/07/99	25.88	26.04	0.16	36.90	288.22	-	166.35	4.6	229999	-	-	-	
10/12/99	15.36	15.64	0.28	45.70	298.52	0.20	166.55	3.2	229999	14.7	0.0	-	
11/03/99	-	-	0.00	37.70	NG	0.60	167.15	0.1	259999	14.7	0.0	-	
11/09/99	-	-	0.00	40.20	NG	-	167.15	3.6	259999	12.5	8.8	-	
11/28/99	30.09	30.11	0.02	37.20	284.27	0.30	167.45	0.7	259999	14.7	0.0	-	
12/08/99	29.54	29.56	0.02	37.40	284.82	-	167.45	0.5	276540	14.7	0.0	-	
12/30/99	30.31	30.33	0.02	37.90	284.05	-	167.45	1.2	279999	14.7	0.0	-	

Well ID: **NFFW-15**
TOC: **308.42** ft amsl
Ground: **305.97** ft amsl
Depth of Well: **32.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	8.94	0.00	297.93			1030 HOURS, NO LOCK
04/04/94	-	9.18	0.00	297.69			1000 HOURS
04/12/94	-	10.46	0.00	296.41			1200 HOURS
04/20/94	-	10.39	0.00	296.48			
05/12/94	-	13.35	0.00	293.52			
06/24/94	-	14.61	0.00	292.26			
06/03/94	-	16.15	0.00	290.72			
07/01/94	-	21.48	0.00	285.39			
07/13/94	-	24.28	0.00	282.59			
08/05/94	-	17.29	0.00	289.58			
08/17/94	-	17.36	0.00	289.51			
08/30/94	-	13.95	0.00	292.92			
09/08/94	-	14.93	0.00	291.94			
09/19/94	-	17.32	0.00	289.55			
09/30/94	-	18.21	0.00	288.66			
10/17/94	-	21.37	0.00	285.50			
10/25/94	-	23.82	0.00	283.05			
11/11/94	-	27.50	0.00	279.37			
11/22/94	-	28.30	0.00	278.57			
12/07/94	-	23.33	0.00	283.54			
12/21/94	-	19.95	0.00	286.92			
01/04/95	-	20.56	0.00	286.31			
01/23/95	-	17.01	0.00	289.86			
02/16/95	-	17.17	0.00	289.70			
02/28/95	-	15.72	0.00	291.15			
03/10/95	-	13.42	0.00	293.45			
03/29/95	-	13.27	0.00	293.60			
04/04/95	-	14.01	0.00	292.86			
04/27/95	-	16.22	0.00	290.65			
05/11/95	-	16.70	0.00	290.17			
05/24/95	-	17.31	0.00	289.56			
06/15/95	-	18.50	0.00	288.37			
06/29/95	-	20.48	0.00	286.39			
07/06/95	-	21.55	0.00	285.32			
07/25/95	-	21.72	0.00	285.15			
08/01/95	-	22.04	0.00	284.83			
08/21/95	-	26.98	0.00	279.89			
09/14/95	-	31.88	0.00	274.99			
09/28/95	-	23.00	0.00	283.87			
10/06/95	-	18.91	0.00	287.96			
10/25/95	-	13.42	0.00	293.45			
11/21/95	-	9.48	0.00	297.39			
12/08/95	-	11.76	0.00	295.11			
12/21/95	-	12.46	0.00	294.41			
01/23/96	-	-	0.00	-			Covered With Plowed Snow
02/09/96	-	9.69	0.00	297.18			
02/19/96	-	10.92	0.00	295.95			
01/09/98	-	12.86	0.00	295.56	-	0.00	New System Started
02/20/98	-	9.92	0.00	298.50	-	0.00	
05/21/98	-	11.17	0.00	297.25	-	0.00	
12/21/98	-	27.29	0.00	281.13	-	0.00	

Well ID: **NFFW-15**
TOC: **308.42** ft amsl
Ground: **305.97** ft amsl
Depth of Well: **32.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/13/99	-	22.90	0.00	285.52	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	16.85	0.00	291.57	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	11.13	0.00	297.29	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-16** (Recovery Well)
TOC: **312.08** ft amsl
Ground: **310.67** ft amsl
Depth of Well: **32.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)		Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
03/30/94	-	11.40	0.00		301.54	-		0.00						1030 HOURS
04/04/94	-	11.29	0.00		301.65	-		0.00						1000 HOURS
04/06/94	-	11.83	0.00		301.11	-		0.00						1200 HOUR
04/07/94	-	12.11	0.00		300.83	-		0.00						1100 HOURS
04/12/94	-	13.08	0.00		299.86	-		0.00						1200 HOURS
04/20/94	-	13.44	0.00		299.50	-		0.00						
04/27/94	-	3.30	0.00		309.64	-		0.00						Invalid data?
05/04/94	-	14.15	0.00		298.79	-		0.00						
05/12/94	-	14.32	0.00		298.62	-		0.00						
05/13/94	-	14.39	0.00		298.55	-		0.00						
05/16/94	-	14.88	0.00		298.06	-		0.00						
05/24/94	-	15.71	0.00		297.23	-		0.00						
05/27/94	16.18	16.18	0.00		296.76	-		0.00						
06/03/94	16.04	16.07	0.03		296.90	-		0.00						
06/15/94	18.27	18.34	0.07		294.66	-		0.00						
06/16/94	18.49	18.56	0.07		294.45	-		0.00						
07/01/94	21.62	21.77	0.15		291.30	-		0.00						
07/13/94	24.18	24.68	0.50		288.70	0.25		0.25						BAILED 0.25 GAL
08/05/94	17.43	18.66	1.23		295.35	1.00		1.25						BAILED 1 GAL
08/17/94	18.52	19.26	0.74		294.32	0.50		1.75						BAILED 0.5 GAL
08/30/94	16.45	16.58	0.13		296.47	0.25		2.00						BAILED 0.25 GAL INSTALLED P SKIMMER
09/08/94	17.11	17.17	0.06		295.82	-		2.00						
09/14/94	20.77	20.80	0.03		292.17	-		2.00						
09/19/94	19.28	19.29	0.01		293.66	0.07		2.07						BAILED 250 ML
09/30/94	19.36	19.36	0.00		293.58	-		2.07						SHEEN
10/17/94	22.52	22.61	0.09		290.41	-		2.07						
10/25/94	24.86	26.20	1.34		287.91	-		2.07						
11/11/94	29.80	32.36	2.56		282.81	-		2.07						
11/22/94	31.22	34.19	2.97		281.33	-		2.07						
12/07/94	25.45	28.90	3.45		287.04	-		2.07						
12/21/94	20.88	23.11	2.23		291.77	4.00		6.07						Bailed Product
01/04/95	21.27	22.03	0.76		291.57	1.00		7.07						Bailed Product
01/16/95	19.33	19.64	0.31		293.57	1.00		8.07						Bailed Product
01/23/95	17.72	17.97	0.25		295.19	-		8.07						
02/16/95	17.58	17.73	0.15		295.34	-		8.07						Installed Bailer
02/28/95	-	16.41	0.00		296.53	-		8.07						
03/10/95	-	15.84	0.00		297.10	-		8.07						
03/29/95	-	14.90	0.00		298.04	0.25		8.32						Removed Bailer
04/04/95	-	15.47	0.00		297.47	-		8.32						
04/27/95	16.98	16.99	0.00		295.96	-		8.32						Product .005 thick
05/11/95	-	16.85	0.00		296.09	-		8.32						
05/24/95	17.59	17.60	0.01		295.35	-		8.32						
06/15/95	18.46	18.47	0.01		294.48	-		8.32						
06/29/95	19.78	19.86	0.08		293.15	-		8.32						
07/06/95	-	21.08	0.00		291.86	-		8.32						

Well ID: **NFFW-16** (Recovery Well)
TOC: **312.08** ft amsl
Ground: **310.67** ft amsl
Depth of Well: **32.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)		Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
07/25/95	21.75	21.83	0.08		291.18	-		8.32						
08/01/95	21.90	21.99	0.09		291.03	-		8.32						
08/21/95	27.72	29.10	1.38		285.04	-		8.32						
09/14/95	33.59	36.60	3.01		278.96	6.00		14.32						Bailed Product
09/28/95	27.05	27.81	0.76		285.79	-		14.32						
10/06/95	22.20	22.38	0.18		290.72	-		14.32						
10/25/95	-	15.92	0.00		297.02	-		14.32						
11/21/95	-	12.17	0.00		300.77	-		14.32						
12/08/95	-	14.00	0.00		298.94	-		14.32						
12/21/95	-	14.15	0.00		298.79	-		14.32						
01/23/96	-	12.55	0.00		300.39	-		14.32						
02/09/96	-	11.24	0.00		301.70	-		14.32						
02/19/96	-	13.26	0.00		299.68	-		14.32						
01/02/98	-	-	0.00	-	NG	-		14.32	-	-	-	-	-	New System Started
01/09/98	-	13.91	0.00	48.60	298.17	-	999977.60	14.32	-	-	-	-	-	
01/09/98	-	-	0.00	-	NG	-	999977.60	14.32	-	-	-	-	-	
01/13/98	-	14.16	0.00	52.10	297.92	-	999977.60	14.32	-	-	-	-	-	
01/20/98	-	-	0.00	-	NG	-	999977.60	14.32	-	-	-	-	-	
01/28/98	-	-	0.00	52.80	NG	-	999977.60	14.32	-	-	-	-	-	
02/02/98	-	13.18	0.00	53.40	298.90	-	999977.60	14.32	-	-	-	-	-	
02/09/98	28.13	30.79	2.66	38.00	278.98	11.82	999989.42	26.14	-	-	-	-	-	
02/16/98	-	-	0.00	42.50	NG	*	999988.84	26.14	-	-	12.6	-	452	
02/20/98	-	-	0.00	42.70	NG	0.26	999989.10	26.40	-	-	12.6	-	620	
02/23/98	-	-	0.00	42.50	NG	-	999989.10	26.40	-	-	12.6	-	426	
02/27/98	16.48	31.70	15.22	45.90	267.14	0.10	999989.20	26.50	-	-	12.4	-	-	
03/02/98	14.62	30.85	16.23	-	267.11	-	999989.20	26.50	-	-	13.0	6.9	-	GW system off b/c product system not recovering product
03/05/98	12.63	12.77	0.14	32.90	299.19	7.20	999996.40	33.70	-	877	-	-	-	6.7 gal of product was hand bailed
03/09/98	12.33	12.62	0.29	-	299.21	-	999996.40	33.70	-	-	-	-	-	
03/13/98	11.03	11.14	0.11	37.60	300.84	-	999996.40	33.70	-	5024	-	-	-	
03/16/98	20.48	24.20	3.72	40.60	284.64	-	999996.40	33.70	0.3	109999	-	-	-	
03/23/98	-	-	0.00	44.20	NG	-	999996.40	33.70	-	-	11.7	8.0	-	
04/02/98	28.45	28.64	0.19	49.70	283.27	-	999996.40	33.70	-	-	12.2	10.5	-	
04/13/98	29.42	29.49	0.07	46.30	282.53	8.20	1000004.60	41.90	-	-	13.2	9.8	173	
04/17/98	-	-	0.00	43.80	NG	8.30	2.90	50.20	4.8	1059999	13.0	6.9	420	installed flow sensor (water)
04/22/98	-	-	0.00	-	NG	2.71	5.61	52.91	-	-	13.5	6.1	-	
05/05/98	31.08	31.15	0.07	-	280.87	27.39	33.00	80.30	-	-	13.5	7.0	790	
05/21/98	28.02	28.11	0.09	-	283.89	9.30	42.30	89.60	-	-	10.8	9.9	209	
05/28/98	-	-	0.00	45.00	NG	0.02	42.32	89.62	-	1659999	13.2	6.9	-	
06/12/98	31.70	31.83	0.13	31.70	280.14	2.48	44.80	92.10	0.4	1829999	12.0	6.6	-	
06/23/98	30.98	31.11	0.13	36.50	280.86	0.56	45.36	92.66	1.7	2352729	13.2	8.5	-	
07/10/98	16.04	16.12	0.08	53.60	295.89	0.94	46.30	93.60	2.1	2490841	13.0	6.9	716	
07/28/98	-	-	0.00	-	NG	-	46.30	93.60	-	-	-	-	-	
07/31/98	-	-	0.00	42.10	NG	0.04	46.34	93.64	1.3	3445104	-	-	-	
08/05/98	-	-	0.00	-	NG	0.06	46.40	93.70	-	-	-	-	-	

Well ID: **NFFW-16** (Recovery Well)
TOC: **312.08** ft amsl
Ground: **310.67** ft amsl
Depth of Well: **32.5** ft bgs
Depth to Screen **7.5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Pressure Transducer	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)		Total LNAPL Recovered (gal)	Ground-water Flow Rate (gpm)	Ground-water Recovered (gal)	Vacuum at Vault (psia)	Flow Rate (SCFM)	Concentration (ppmv)	Comments
08/14/98	30.48	30.56	0.08	-	281.45	0.10	46.50	93.80	-	-	-	-	-	
08/27/98	30.70	32.30	1.60	-	278.39	-	46.50	93.80	-	-	-	-	-	
09/11/98	19.12	20.44	1.32	-	290.49	-	46.50	93.80	-	-	-	-	-	
09/16/98	27.55	29.10	1.55	42.80	281.63	3.20	49.70	97.00	0.2	5249999	14.7	0.0	-	
09/25/98	-	-	0.00	56.60	NG	3.90	53.60	100.90	2.1	5349999	13.9	8.7	-	
10/14/98	-	20.74	0.00	40.40	291.34	9.50	63.10	110.40	4.5	-	12.5	9.5	-	
10/27/98	24.12	24.17	0.05	35.70	287.87	2.50	65.60	112.90	0.2	-	13.7	9.3	640	
11/03/98	24.00	24.03	0.03	-	288.02	1.30	66.90	114.20	-	-	13.7	10.0	595	
11/10/98	-	-	0.00	-	NG	-	66.90	114.20	-	-	-	-	-	
11/23/98	23.87	23.88	0.01	37.30	288.19	1.50	68.40	115.70	0.2	733544	12.0	12.3	638	
12/11/98	29.98	29.99	0.01	36.80	282.08	11.30	79.70	127.00	0.9	8119999	12.7	14.4	-	
12/21/98	30.01	30.12	0.11	36.80	281.86	1.40	81.10	128.40	1.0	8599999	12.5	17.2	444	
01/13/99	31.25	31.28	0.03	37.90	280.77	2.10	83.20	130.50	0.1	9317282	12.5	9.5	-	
01/26/99	30.88	30.90	0.02	36.80	281.16	-	83.20	130.50	0.6	9834366	12.5	11.7	388	
02/05/99	30.12	30.14	0.02	37.30	281.92	-	83.20	130.50	0.2	10304872	12.5	13.5	435	
02/15/99	30.53	30.55	0.02	37.10	281.51	0.10	83.30	130.60	0.1	10789772	-	-	-	
02/22/99	30.38	30.40	0.02	36.50	281.66	0.20	83.50	130.80	0.1	11184873	13.2	10.9	385	
03/04/99	30.70	30.73	0.03	36.90	281.32	0.30	83.80	131.10	0.5	11589999	11.3	20.2	-	
03/30/99	29.77	29.76	-0.01	38.00	282.33	2.30	86.10	133.40	0.8	12808153	10.5	-	-	
04/09/99	31.85	31.90	0.05	35.70	280.14	1.50	87.60	134.90	2.1	13273303	-	-	-	
04/28/99	-	-	0.00	54.90	NG	-	87.60	134.90	0.8	13409999	-	-	-	
05/13/99	26.66	26.69	0.03	44.60	285.36	0.80	88.40	135.70	1.8	14109999	-	-	-	
05/28/99	30.40	30.36	-0.04	36.10	281.75	0.00	87.60	135.70	1.2	14679991	-	-	-	
06/09/99	30.22	30.27	0.05	36.60	281.77	-	87.60	135.70	0.0	15229999	-	-	-	
06/21/99	20.10	20.21	0.11	47.90	291.77	-	87.60	135.70	0.2	15798495	-	-	-	
07/01/99	29.56	29.59	0.03	37.40	282.46	0.10	87.70	135.80	0.1	16275459	-	-	-	
07/20/99	29.44	29.46	0.02	37.10	282.60	1.50	89.20	137.30	0.1	16549999	13.2	10.9	1800	
08/05/99	29.89	29.92	0.03	36.40	282.13	0.10	89.30	137.40	0.1	17549999	-	-	-	
08/13/99	28.06	28.20	0.14	36.80	283.76	-0.10	89.20	137.30	0.1	17919999	-	-	-	
08/16/99	-	-	0.00	36.70	NG	0.30	89.50	137.60	0.0	17960828	-	-	-	
09/09/99	28.17	28.22	0.05	36.90	283.82	-	89.50	137.60	0.1	18599999	12.7	-	450	
09/22/99	22.14	22.17	0.03	36.60	289.88	-	89.50	137.60	1.2	19189999	11.7	-	NA	
10/07/99	24.60	24.62	0.02	39.60	287.44	0.10	89.60	137.70	1.6	19910374	-	-	-	
10/12/99	11.19	11.20	0.01	48.60	300.87	-	89.60	137.70	1.7	19969266	-	#VALUE!	-	
11/03/99	-	-	0.00	37.20	NG	-	89.60	137.70	0.1	21039999	14.7	0.0	-	
11/09/99	-	-	0.00	44.20	NG	-	89.60	137.70	0.1	21311185	12.2	5.8	-	
11/28/99	31.16	31.20	0.04	36.60	280.85	-	89.60	137.70	1.0	22289999	12.7	18.6	-	
12/08/99	30.80	30.81	0.01	37.10	281.26	-	89.60	137.70	1.0	22659999	11.5	10.7	-	
12/30/99	27.46	27.49	0.03	41.30	284.56	-	89.60	137.70	1.0	23657275	14.7	0.0	-	

Well ID: **NFFW-17**
TOC: **301.08** ft amsl
Ground: **301.76** ft amsl
Depth of Well: **24** ft bgs
Depth to Screen **4** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	2.38	0.00	297.14			1030 HOURS
04/04/94	-	2.45	0.00	297.07			1000 HOURS
04/12/94	-	3.58	0.00	295.94			1200 HOURS
04/20/94	-	3.67	0.00	295.85			
05/12/94	-	5.97	0.00	293.55			
05/24/94	-	7.13	0.00	292.39			
06/03/94	-	8.26	0.00	291.26			
07/01/94	-	11.70	0.00	287.82			
07/13/94	-	14.15	0.00	285.37			
08/05/94	-	10.67	0.00	288.85			
08/17/94	-	9.78	0.00	289.74			
08/30/94	-	7.15	0.00	292.37			
09/08/94	-	7.62	0.00	291.90			
09/19/94	-	10.85	0.00	288.67			
09/30/94	-	9.98	0.00	289.54			
10/17/94	-	12.35	0.00	287.17			
10/25/94	-	14.15	0.00	285.37			
11/11/94	17.91	17.91	Sheen	281.61			
11/22/94	-	18.37	0.00	281.15			
12/07/94	-	15.44	0.00	284.08			
12/21/94	-	12.82	0.00	286.70			
01/04/95	-	12.62	0.00	286.90			
01/23/95	-	9.62	0.00	289.90			
02/16/95	-	-	0.00	NG			Well Buried in Snow
02/28/95	-	7.72	0.00	291.80			
03/10/95	-	6.35	0.00	293.17			
03/29/95	-	6.01	0.00	293.51			
04/04/95	-	6.49	0.00	293.03			
04/27/95	-	8.25	0.00	291.27			
05/11/95	-	8.45	0.00	291.07			
05/24/95	-	8.94	0.00	290.58			
06/15/95	-	9.77	0.00	289.75			
06/29/95	-	10.81	0.00	288.71			
07/06/95	-	11.78	0.00	287.74			
07/25/95	-	12.82	0.00	286.70			
08/01/95	-	13.17	0.00	286.35			
08/21/95	-	17.03	0.00	282.49			
09/14/95	-	21.62	0.00	277.90			
09/28/95	-	15.25	0.00	284.27			
10/06/95	-	11.22	0.00	288.30			
10/25/95	-	6.80	0.00	292.72			
11/21/95	-	2.62	0.00	296.90			
12/08/95	-	4.66	0.00	294.86			
12/21/95	-	-	0.00	NG			Covered With Snow
01/23/96	-	3.51	0.00	296.01			
02/09/96	-	2.78	0.00	296.74			
02/19/96	-	-	0.00	NG			
01/09/98	-	5.86	0.00	295.22	-	0.00	New System Started
02/20/98	-	3.46	0.00	297.62	-	0.00	
05/21/98	-	5.22	0.00	295.86	-	0.00	
12/21/98	-	18.33	0.00	282.75	-	0.00	

Well ID: NFFW-17
TOC: 301.08 ft amsl
Ground: 301.76 ft amsl
Depth of Well: 24 ft bgs
Depth to Screen 4 ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/13/99	-	15.07	0.00	286.01	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	9.12	0.00	291.96	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	4.13	0.00	296.95	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-18**
TOC: **308.47** ft amsl
Ground: **305.49** ft amsl
Depth of Well: **25** ft bgs
Depth to Screen **5** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	11.95	0.00	294.99			1030 HOURS, N0 LOCK
04/04/94	-	12.59	0.00	294.35			1000 HOURS
04/12/94	-	12.84	0.00	294.10			1200 HOURS
04/20/94	-	13.09	0.00	293.85			
05/12/94	-	13.95	0.00	292.99			
05/24/94	-	14.93	0.00	292.01			
06/03/94	-	16.12	0.00	290.82			
07/01/94	-	19.30	0.00	287.64			
07/13/94	-	22.05	0.00	284.89			
08/05/94	-	17.15	0.00	289.79			
08/17/94	-	18.17	0.00	288.77			
08/30/94	-	15.78	0.00	291.16			
09/08/94	-	16.74	0.00	290.20			
09/19/94	-	17.80	0.00	289.14			
09/30/94	-	17.91	0.00	289.03			
10/17/94	-	21.15	0.00	285.79			
10/25/94	-	21.48	0.00	285.46			
11/11/94	-	24.55	0.00	282.39			
11/22/94	-	24.83	0.00	282.11			
12/07/94	-	19.49	0.00	287.45			
12/21/94	-	19.27	0.00	287.67			
01/04/95	-	19.23	0.00	287.71			
01/23/95	-	15.23	0.00	291.71			
02/16/95	-	16.30	0.00	290.64			
02/28/95	-	14.12	0.00	292.82			
03/10/95	-	12.91	0.00	294.03			
03/29/95	-	14.07	0.00	292.87			
04/04/95	-	14.42	0.00	292.52			
04/27/95	-	15.59	0.00	291.35			
05/11/95	-	15.26	0.00	291.68			
05/24/95	-	16.11	0.00	290.83			
06/15/95	-	16.41	0.00	290.53			
06/29/95	-	17.12	0.00	289.82			
07/06/95	-	18.41	0.00	288.53			
07/25/95	-	18.25	0.00	288.69			
08/01/95	-	19.87	0.00	287.07			
08/21/95	-	23.80	0.00	283.14			
09/14/95	-	27.81	0.00	279.13			
09/28/95	-	18.70	0.00	288.24			
10/06/95	-	15.85	0.00	291.09			
10/25/95	-	14.39	0.00	292.55			
11/21/95	-	12.66	0.00	294.28			
12/08/95	-	13.49	0.00	293.45			
12/21/95	-	13.33	0.00	293.61			
01/23/96	-	12.64	0.00	294.30			
02/09/96	-	12.36	0.00	294.58			
02/19/96	-	12.91	0.00	294.03			
01/09/98	-	13.67	0.00	294.80	-	0.00	New System Started
02/20/98	-	12.50	0.00	295.97	-	0.00	
05/21/98	-	14.63	0.00	293.84	-	0.00	
12/21/98	-	25.96	0.00	282.51	-	0.00	

Well ID: NFFW-18
TOC: 308.47 ft amsl
Ground: 305.49 ft amsl
Depth of Well: 25 ft bgs
Depth to Screen 5 ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
01/13/99	-	19.70	0.00	288.77	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	16.94	0.00	291.53	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	13.40	0.00	295.07	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-19**
TOC: **323.00** ft amsl
Ground: **319.73** ft amsl
Depth of Well: **31** ft bgs
Depth to Screen **6** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	12.93	0.00	308.51	-	0.00	1030 HOURS
04/04/94	-	13.28	0.00	308.16	-	0.00	1000 HOURS
04/06/94	-	13.59	0.00	307.85	-	0.00	1200 HOUR
04/07/94	-	13.97	0.00	307.47	-	0.00	1100 HOURS
04/12/94	-	15.24	0.00	306.20	-	0.00	1200 HOURS
04/20/94	-	15.22	0.00	306.22	-	0.00	
04/27/94	-	15.31	0.00	306.13	-	0.00	
05/04/94	-	15.27	0.00	306.17	-	0.00	
05/12/94	-	18.50	0.00	302.94	-	0.00	
05/16/94	-	19.35	0.00	302.09	-	0.00	
05/24/94	-	14.35	0.00	307.09	-	0.00	
05/27/94	-	22.33	0.00	299.11	-	0.00	
06/03/94	-	25.46	0.00	295.98	-	0.00	
06/15/94	31.66	31.74	0.07	289.77	-	0.00	
06/16/94	32.23	32.30	0.07	289.20	-	0.00	
06/21/94	33.32	33.42	0.10	288.11	-	0.00	
07/01/94	33.33	33.43	0.10	288.10	-	0.00	
07/13/94	-	29.30	0.00	292.14	-	0.00	
08/05/94	-	28.13	0.00	293.31	-	0.00	
08/17/94	-	29.78	0.00	291.66	-	0.00	
08/30/94	-	24.02	0.00	297.42	-	0.00	
09/08/94	-	25.97	0.00	295.47	-	0.00	
09/14/94	-	29.87	0.00	291.57	-	0.00	
09/19/94	-	21.18	0.00	300.26	-	0.00	
10/17/94	-	33.37	0.00	288.07	-	0.00	ODOR
10/25/94	-	33.35	0.00	288.09	-	0.00	
11/11/94	-	33.34	0.00	288.10	-	0.00	
11/22/94	-	33.31	0.00	288.13	-	0.00	
12/07/94	33.26	33.26	Sheen	288.18	-	0.00	
12/21/94	-	33.29	0.00	288.15	-	0.00	
01/04/95	-	33.27	0.00	288.17	-	0.00	
01/16/95	-	32.11	0.00	289.33	-	0.00	
01/23/95	-	26.21	0.00	295.23	-	0.00	
02/16/95	-	26.73	0.00	294.71	-	0.00	
02/28/95	-	23.80	0.00	297.64	-	0.00	
03/10/95	-	18.67	0.00	302.77	-	0.00	
03/29/95	-	17.87	0.00	303.57	-	0.00	
04/04/95	-	18.81	0.00	302.63	-	0.00	
04/27/95	-	22.71	0.00	298.73	-	0.00	
05/11/95	-	23.23	0.00	298.21	-	0.00	
05/24/95	-	24.76	0.00	296.68	-	0.00	
06/15/95	-	28.10	0.00	293.34	-	0.00	
06/29/95	-	32.55	0.00	288.89	-	0.00	
07/06/95	-	23.28	0.00	298.16	-	0.00	
07/25/95	-	32.45	0.00	288.99	-	0.00	
08/01/95	-	33.26	0.00	288.18	-	0.00	
08/21/95	-	33.26	0.00	288.18	-	0.00	
09/14/95	-	-	0.00	NG	-	0.00	Did Not Have Key For Well
09/28/95	-	32.53	0.00	288.91	-	0.00	
10/06/95	-	26.15	0.00	295.29	-	0.00	
10/25/95	-	18.92	0.00	302.52	-	0.00	
11/21/95	-	14.58	0.00	306.86	-	0.00	
12/08/95	-	15.96	0.00	305.48	-	0.00	
12/21/95	-	16.01	0.00	305.43	-	0.00	
01/23/96	-	13.14	0.00	308.30	-	0.00	

Well ID: NFFW-19
TOC: 323.00 ft amsl
Ground: 319.73 ft amsl
Depth of Well: 31 ft bgs
Depth to Screen 6 ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
02/09/96	-	13.12	0.00	308.32	-	0.00	
02/19/96	-	14.46	0.00	306.98	-	0.00	
01/09/98	-	17.65	0.00	305.35	-	0.00	New System Started
01/13/98	-	17.33	0.00	305.67	-	0.00	
02/20/98	-	13.69	0.00	309.31	-	0.00	
02/27/98	-	12.94	0.00	310.06	-	0.00	
03/16/98	-	13.09	0.00	309.91	-	0.00	
05/21/98	-	15.84	0.00	307.16	-	0.00	
08/14/98	-	23.15	0.00	299.85	-	0.00	
10/14/98	-	28.79	0.00	294.21	-	0.00	
12/21/98	-	Dry	0.00	Dry	-	0.00	
01/13/99	-	32.08	0.00	290.92	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	17.63	0.00	305.37	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	15.13	0.00	307.87	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

Well ID: **NFFW-20**
TOC: **326.11** ft amsl
Ground: **323.36** ft amsl
Depth of Well: **34** ft bgs
Depth to Screen **14** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	23.16	0.00	301.39	-	-	1030 HOURS
04/04/94	-	22.98	0.00	301.57	-	-	1000 HOURS
04/12/94	-	25.41	0.00	299.14	-	-	1200 HOURS
04/20/94	-	25.90	0.00	298.65	-	-	
05/12/94	-	27.88	0.00	296.67	-	-	
05/24/94	-	29.45	0.00	295.10	-	-	
06/03/94	30.94	30.94	0.00	293.61	-	-	
07/01/94	34.29	34.84	0.55	290.19	-	-	
07/13/94	35.29	35.31	0.02	289.26	0.10	0.10	BAILED 0.10 GAL
08/05/94	-	32.04	0.00	292.51	-	0.10	
08/17/94	-	31.52	0.00	293.03	-	0.10	
08/30/94	-	29.45	0.00	295.10	-	0.10	
09/08/94	-	30.25	0.00	294.30	-	0.10	
09/19/94	-	31.60	0.00	292.95	-	0.10	
09/30/94	-	31.99	0.00	292.56	-	0.10	ODOR
10/17/94	33.30	33.55	0.25	291.22	-	0.10	Installed Pasive Bailer
10/25/94	35.09	35.13	0.04	289.45	0.25	0.35	Removed Bailer
11/11/94	35.57	35.77	0.20	288.95	-	0.35	
11/22/94	35.90	36.15	0.25	288.62	-	0.35	
12/07/94	36.00	36.29	0.29	288.51	-	0.35	
12/21/94	34.60	34.64	0.04	289.94	-	0.35	
01/04/95	-	33.31	0.00	291.24	-	0.35	
01/23/95	-	31.18	0.00	293.37	-	0.35	
02/16/95	-	31.10	0.00	293.45	-	0.35	
02/28/95	-	30.08	0.00	294.47	-	0.35	
03/10/95	-	28.41	0.00	296.14	-	0.35	
03/29/95	-	27.65	0.00	296.90	-	0.35	
04/04/95	-	28.80	0.00	295.75	-	0.35	
04/27/95	30.73	30.74	0.01	293.82	-	0.35	Product .005 thick
05/11/95	-	30.27	0.00	294.28	-	0.35	
05/24/95	-	30.27	0.00	294.28	-	0.35	
06/15/95	-	31.67	0.00	292.88	-	0.35	
06/29/95	32.55	33.54	0.99	291.87	-	0.35	
07/06/95	33.09	33.54	0.45	291.40	-	0.35	
07/25/95	35.05	35.29	0.24	289.47	-	0.35	
08/01/95	34.81	34.97	0.16	289.72	-	0.35	
08/21/95	35.08	35.39	0.31	289.43	-	0.35	
09/14/95	36.00	36.37	0.37	288.50	-	0.35	
09/28/95	36.13	36.50	0.37	288.37	-	0.35	
10/06/95	36.00	36.27	0.27	288.51	-	0.35	
10/25/95	-	28.77	0.00	295.78	-	0.35	
11/21/95	-	24.37	0.00	300.18	-	0.35	
12/08/95	-	27.03	0.00	297.52	-	0.35	
12/21/95	-	27.31	0.00	297.24	-	0.35	
01/23/96	-	24.72	0.00	299.83	-	0.35	
02/09/96	-	23.25	0.00	301.30	-	0.35	
02/19/96	-	26.08	0.00	298.47	-	0.35	
01/09/98	-	26.91	0.00	299.20	-	0.35	New System Started
01/13/98	-	27.25	0.00	298.86	-	0.35	
02/20/98	-	25.81	0.00	300.30	-	0.35	

Well ID: **NFFW-20**
TOC: **326.11** ft amsl
Ground: **323.36** ft amsl
Depth of Well: **34** ft bgs
Depth to Screen **14** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
02/27/98	-	25.17	0.00	300.94	-	0.35	
03/16/98	-	24.57	0.00	301.54	-	0.35	
05/21/98	-	25.41	0.00	300.70	-	0.35	
08/14/98	-	31.45	0.00	294.66	-	0.35	
10/14/98	33.96	33.99	0.03	292.09	-	0.35	
12/21/98	35.61	35.80	0.19	290.14	-	0.35	
01/13/99	36.07	36.32	0.25	289.57	0.25	0.60	
02/05/99	-	-	0.00	NG	-	0.60	
02/15/99	-	-	0.00	NG	-	0.60	
02/22/99	-	-	0.00	NG	-	0.60	
03/04/99	-	-	0.00	NG	-	0.60	
03/30/99	-	-	0.00	NG	-	0.60	
04/09/99	-	-	0.00	NG	-	0.60	
04/28/99	-	-	0.00	NG	-	0.60	
05/13/99	-	-	0.00	NG	-	0.60	
05/28/99	29.49	29.51	0.02	296.58	-	0.60	
06/09/99	-	-	0.00	NG	-	0.60	
06/21/99	-	-	0.00	NG	-	0.60	
07/01/99	-	-	0.00	NG	-	0.60	
07/20/99	-	-	0.00	NG	-	0.60	
08/05/99	-	-	0.00	NG	-	0.60	
08/13/99	-	-	0.00	NG	-	0.60	
08/16/99	-	-	0.00	NG	-	0.60	
09/09/99	-	-	0.00	NG	-	0.60	
09/22/99	-	-	0.00	NG	-	0.60	
10/07/99	-	dry	0.00	#VALUE!	-	0.60	
10/12/99	-	-	0.00	NG	-	0.60	
11/03/99	-	-	0.00	NG	-	0.60	
11/09/99	-	-	0.00	NG	-	0.60	
11/28/99	-	-	0.00	NG	-	0.60	
12/08/99	-	-	0.00	NG	-	0.60	
12/30/99	-	-	0.00	NG	-	0.60	

Well ID: **NFFW-21**
TOC: **318.91** ft amsl
Ground: **315.96** ft amsl
Depth of Well: **34** ft bgs
Depth to Screen **9** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
03/30/94	-	12.11	0.00	305.25			1030 HOURS, NO LOCK
04/04/94	-	12.11	0.00	305.25			1000 HOURS
04/12/94	-	13.32	0.00	304.04			1200 HOURS
04/20/94	-	18.94	0.00	298.42			
05/12/94	-	22.96	0.00	294.40			
05/24/94	-	25.55	0.00	291.81			
06/03/94	-	28.56	0.00	288.80			
07/01/94	-	36.47	0.00	280.89			
07/13/94	-	36.51	0.00	280.85			WELL DRY?
08/05/94	-	32.54	0.00	284.82			
08/17/94	-	32.78	0.00	284.58			
08/30/94	-	30.15	0.00	287.21			
09/08/94	29.27	29.28	0.01	288.09			SHEEN
09/19/94	-	32.95	0.00	284.41			
09/30/94	-	33.39	0.00	283.97			
10/17/94	-	36.47	0.00	280.89			
10/25/94	-	36.50	0.00	280.86			
11/11/94	-	36.51	0.00	280.85			
11/22/94	-	36.51	0.00	280.85			
12/07/94	36.48	36.48	Sheen	280.88			
12/21/94	-	36.48	0.00	280.88			
01/04/95	-	36.48	0.00	280.88			
01/23/95	-	29.31	0.00	288.05			
02/16/95	-	28.49	0.00	288.87			
02/28/95	-	25.38	0.00	291.98			
03/10/95	-	21.55	0.00	295.81			
03/29/95	-	21.07	0.00	296.29			
04/04/95	-	22.07	0.00	295.29			
04/27/95	-	25.12	0.00	292.24			
05/11/95	-	25.47	0.00	291.89			
05/24/95	-	26.82	0.00	290.54			
06/15/95	-	29.08	0.00	288.28			
06/29/95	-	32.33	0.00	285.03			
07/06/95	-	33.03	0.00	284.33			
07/25/95	-	34.18	0.00	283.18			
08/01/95	-	34.70	0.00	282.66			
08/21/95	-	36.45	0.00	280.91			
09/14/95	-	36.48	0.00	280.88			
09/28/95	-	36.49	0.00	280.87			
10/06/95	-	32.65	0.00	284.71			
10/25/95	-	22.82	0.00	294.54			
11/21/95	-	16.64	0.00	300.72			
12/08/95	-	19.29	0.00	298.07			
12/21/95	-	19.70	0.00	297.66			
01/23/96	-	14.89	0.00	302.47			
02/09/96	-	15.58	0.00	301.78			
02/19/96	-	17.61	0.00	299.75			
01/09/98	-	21.71	0.00	297.20	-	0.00	New System Started
02/20/98	-	16.34	0.00	302.57	-	0.00	
05/21/98	-	17.77	0.00	301.14	-	0.00	

Well ID: **NFFW-21**
TOC: **318.91** ft amsl
Ground: **315.96** ft amsl
Depth of Well: **34** ft bgs
Depth to Screen **9** ft bgs

Gauge Date	Depth To LNAPL (ft)	Depth To Water (ft)	LNAPL Thickness (ft)	Corrected GW Elevation (ft amsl)	LNAPL Recovered (gal)	Total LNAPL Recovered (gal)	Comments
12/21/98	-	36.50	0.00	282.41	-	0.00	
01/13/99	-	34.63	0.00	284.28	-	0.00	
02/05/99	-	-	0.00	NG	-	0.00	
02/15/99	-	-	0.00	NG	-	0.00	
02/22/99	-	-	0.00	NG	-	0.00	
03/04/99	-	-	0.00	NG	-	0.00	
03/30/99	-	-	0.00	NG	-	0.00	
04/09/99	-	-	0.00	NG	-	0.00	
04/28/99	-	-	0.00	NG	-	0.00	
05/13/99	-	-	0.00	NG	-	0.00	
05/28/99	-	28.08	0.00	290.83	-	0.00	
06/09/99	-	-	0.00	NG	-	0.00	
06/21/99	-	-	0.00	NG	-	0.00	
07/01/99	-	-	0.00	NG	-	0.00	
07/20/99	-	-	0.00	NG	-	0.00	
08/05/99	-	-	0.00	NG	-	0.00	
08/13/99	-	-	0.00	NG	-	0.00	
08/16/99	-	-	0.00	NG	-	0.00	
09/09/99	-	-	0.00	NG	-	0.00	
09/22/99	-	-	0.00	NG	-	0.00	
10/07/99	-	17.58	0.00	301.33	-	0.00	
10/12/99	-	-	0.00	NG	-	0.00	
11/03/99	-	-	0.00	NG	-	0.00	
11/09/99	-	-	0.00	NG	-	0.00	
11/28/99	-	-	0.00	NG	-	0.00	
12/08/99	-	-	0.00	NG	-	0.00	
12/30/99	-	-	0.00	NG	-	0.00	

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

15 February 1999

Mr. Matt Krumholtz
EA Engineering, Science, & Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 27 January 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990095. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Michael J. Walsh
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science, and Technology, Inc.
Willow Grove

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, Maryland 21152

Report 990095

February 1999

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EA Engineering, Science, and Technology Inc.

EA Laboratories Report# 990095

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1. NARRATIVE

EA LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990095**
Laboratory Project Manager: **Michael J. Walsh**
Report Date: **15 February 1999**

This report contains the results of the analysis of three water samples collected on 23 July 1998 in support of the referenced project.

SAMPLE RECEIPT

The samples and one trip blank arrived by Federal Express at EA Laboratories on 25 July 1998. Upon receipt, the samples and blank were inspected and compared with the chain-of-custody record. The samples and blank were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
INFLUENT	9900736
BETWEEN	9900737
EFFLUENT	9900738
TRIP BLANK	9900739

Following this narrative section is a glossary of data qualifiers (Table 1) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990095**
Laboratory Project Manager: **Michael J. Walsh**
Report Date: **15 February 1999**

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (EA900736 - EA900739)

Sample Chronology: Four samples and associated quality control were analyzed on 4 February 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Sample INFLUENT was analyzed at a 2X dilution in order to bring the concentrations of target analytes within instrument calibration range.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program

EA LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990095**
Laboratory Project Manager: **Michael J. Walsh**
Report Date: **15 February 1999**

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for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Michael J. Walsh 15 February 1999
Michael J. Walsh, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document. such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

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(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA LOVETON

Project Manager or Contact: MATT KRUMHOLZ
Phone: 771-4950

Project No. 29600.74

Project Name: WILLOW GROVE NAS

Dept.: 2121 Task: 7200

Sample Storage Location: VOA8

ATO Number: 8080

Page 1 of 1

Report #: 990095

Report Deliverables: 1 (2) 3 4 (D) E

EDD: Yes (No)

DUE TO CLIENT: 2-19-99

Parameters/Method Numbers for Analysis: BTEX/MTBE/NAPHTHALENE by 8020

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX/MTBE/NAPHTHALENE by 8020	EA Labs Accession Number	Remarks
1/27	1350	✓		INFLUENT	3	✓	990736	LPM: MJW
	1345	✓		BETWEEN	3	✓	990737	FAL-PS-090
✓	1340	✓		EFFLUENT	3	✓	990738	
				TRIP BLANK	1	✓	990739	
								L15491
								COC 00004609
								10 VOA

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	1/27/99 1400				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	1/29/99 1500	[signature]	1/29/99 1000	807505828420	Fed Ex. Puro. UPS

Cooler Temp. 5.0 C pH: Yes No Comments: Custody Seals Intact Yes No N/A

Hand Carr[redacted]

Other [redacted]

NOTE: Pl[redacted]dicate method number for analyses requested. This will help clarify any question[redacted] laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

3. BTEX DATA

A. QC Summary

3A-LCS

WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 LCS#: VL902044

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	53	106	(87-121)
Toluene	50	52	104	(81-125)
Chlorobenzene	50	55	110	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
VBLK01

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB902044

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A5874.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 2/4/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9900736

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A5882.D

Level: (low/med) Date Sampled: 1/27/99

% Moisture: not dec. 0 Date Analyzed: 2/4/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 2.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	200	
108-88-3	Toluene	21	
100-41-4	Ethylbenzene	25	
	m&p-Xylenes	110	
95-47-6	o-Xylene	19	
91-20-3	Naphthalene	150	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: BETWEEN

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9900737

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A5881.D

Level: (low/med) Date Sampled: 1/27/99

% Moisture: not dec. 0 Date Analyzed: 2/4/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9900738

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A5878.D

Level: (low/med) Date Sampled: 1/27/99

% Moisture: not dec. 0 Date Analyzed: 2/4/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
TRIP BLANK

Lab Name: EA LABORATORIES Report#: 990095

Lab Code: EA ENG Client: WILLOW G Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9900739

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A5877.D

Level: (low/med) Date Sampled: 1/27/99

% Moisture: not dec. 0 Date Analyzed: 2/4/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

APPENDIX B

LABORATORY ANALYTICAL RESULTS

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

12 March 1999

Mr. Carl G. Reitenbach
EA Engineering, Science, & Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Reitenbach:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 22 February 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990198. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Michael J. Walsh

Michael J. Walsh
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science, and Technology, Inc.
Willow Grove

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, Maryland 21152

Report 990198

March 1999

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EA Engineering, Science, and Technology Inc.
EA Laboratories Report# 990198

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   B. Sample Data

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      2. Data for Sample BETWEEN
      3. Data for Sample EFFLUENT

1. NARRATIVE

EA LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990198**
Laboratory Project Manager: **Michael J. Walsh**
Report Date: **12 March 1999**

This report contains the results of the analysis of three water samples collected on 22 February 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at EA Laboratories on 24 February 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
INFLUENT	9901527
BETWEEN	9901528
EFFLUENT	9901529

Following this narrative section is a glossary of data qualifiers (Table 1) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met

for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (EA9901527 - EA9901529)

Sample Chronology: Three samples and associated quality control were analyzed on 25 February 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data

EA LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990198**
Laboratory Project Manager: **Michael J. Walsh**
Report Date: **12 March 1999**

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quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Michael J. Walsh 12 March 1999
Michael J. Walsh, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document. such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

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(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA

Project Manager or Contact: Matt Kleinholz
Phone: (410) 771-4950

Project No. 29600.74
Dept.: 2121 Task: 7200

Project Name: Willow Grove N.A.S.

Sample Storage Location: VOA 1

ATO Number: 8090

Page 1 of 1

Report #: 990198

Report Deliverables: 1 2 3 4 D E

EDD: Yes/No

DUE TO CLIENT: 3.24.99

Parameters/Method Numbers for Analysis: 8260 / Methane

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	8260	Methane			EA Labs Accession Number	Remarks
2/22	1400	x		1 INFLUENT 2	3	x		1 Broken		9901527	LPM: MJW
↓	1355	x		BETTWEEN 1	3	x				9901528	EM-MS-003
↓	1350	x		EFFLUENT 1	3	x		2 Broken		9901529	
											L15603
											00000004724

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	2/23/99 1400				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	2/23/99 1000	Sonita Corum	2/24/99 1015	807505828441	Fed Ex Puro. UPS Hand Carried Other:

Cooler Temp. 4 C pH: ☐ Yes ☐ No Comments: Custody Seals Intact ☐ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Areas For Lab Use Only

3. BTEX DATA

A. QC Summary

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: EA LABORATORIES Report#: 990198

Lab Code: EA ENG Client: Willow Grov Method: 8020 LCS#: VL902255

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	47	94	(87-121)
Toluene	50	49	98	(81-125)
Chlorobenzene	50	49	98	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK01

Lab Name: EA LABORATORIES Report#: 990198

Lab Code: EA ENG Client: WILLOW GROVE Method: 8020 SDG No.:

Lab File ID: VB2A6144.D Lab Sample ID: VB902255

Date Analyzed: 2/25/99 Time Analyzed: 1125

GC Column: DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) N

Instrument ID: VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS01	VL902255	VB2A6145.D	1213
02	BETWEEN	#9901528	VB2A6151.D	1702
03	BETWEENMS	#9901528MS	VB2A6152.D	1737
04	BETWEENMSD	#9901528MSD	VB2A6153.D	1812
05	EFFLUENT	#9901529	VB2A6157.D	2032
06	INFLUENT	#9901527	VB2A6158.D	2107
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

FORM IV VOA

B. Sample Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: INFLUENT

Lab Name: EA LABORATORIES Report#: 990198

Lab Code: EA ENG Client: WILLOW GI Method: 8020 I SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9901527

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6158.D

Level: (low/med) Date Sampled: 2/22/99

% Moisture: not dec. 0 Date Analyzed: 2/25/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	100	
108-88-3	Toluene	8	
100-41-4	Ethylbenzene	190	
	m&p-Xylenes	78	
95-47-6	o-Xylene	12	
91-20-3	Naphthalene	120	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: BETWEEN

Lab Name: EA LABORATORIES Report#: 990198

Lab Code: EA ENG Client: WILLOW GI Method: 8020

SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9901528

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6151.D

Level: (low/med) Date Sampled: 2/22/99

% Moisture: not dec. 0 Date Analyzed: 2/25/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: EA LABORATORIES Report#: 990198

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9901529

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6157.D

Level: (low/med) Date Sampled: 2/22/99

% Moisture: not dec. 0 Date Analyzed: 2/25/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

12 April 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 30 March 1999.

Please contact me if you have any questions or require further information and refer to report 990366. Unless other arrangements are made, we reserve the right to dispose of your sample sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science and Technology Inc.
Willow Grove

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, Maryland 21152

Report 990366

April 1999

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Willow Grove
EA Laboratories Report No. 990366

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1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990366**
Laboratory Project Manager:**Mary E. Asper**
Report Date: **12 April 1999**

This report contains the results of the analysis of three water samples collected on 30 March 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at EA Laboratories on 1 April 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
INFLUENT	9902978
BETWEEN	9902979
EFFLUENT	9902980

Following this narrative section is the original chain-of-custody record and a glossary of data qualifiers (Table 1). Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech Inc.**
Site: **Willow Grove**
Project number: **29600.74**

EA Laboratories Report: **990366**
Laboratory Project Manager:**Mary E. Asper**
Report Date: **12 April 1999**

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (EA9902978 - EA9902980)

Sample Chronology: Three samples and associated quality control were analyzed on 07 April 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples with the following exceptions;

- sample INFLUENT had the surrogate recovery of bromofluorobenzene (143%) above the upper QC limit of 126%. This sample was reanalyzed with a similar surrogate recovery indicating a probable matrix influence.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 12 April 1999
Mary E. Asper, Laboratory Project Manager

2. CHAIN OF CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA

Project Manager or Contact: Matt Krumrock
Phone: (410) 771-4950

Project No. 29600.74

Project Name: Willow Grove NAS.

Dept.: 2121 Task: 7200

Sample Storage Location: VOA 17

ATO Number: 8091

Page 1 of 1

Report #: 990366

Report Deliverables: 1 (2) 3 4 (D) E

EDD: Yes/(No)

DUE TO CLIENT: 4-22-99

Parameters/Method Numbers for Analysis: BTEX/MTBE by 8021

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX/MTBE by 8021	EA Labs Accession Number	Remarks
3/30	1210	✓		INFLUENT	3	X	9902978	LPM: MEA
↓	1205	✓		BETWEEN	3	X	9902979	EAL-PS-090
↓	1200	✓		EFFLUENT	3	X	9902980	
								L15802
								COC#4925
								9 VOAS

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	3/30/99 1200				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	3/30/99 1200	Anita Corum	4/1/99 1015	807505828658	(Fed Ex) Puro. UPS Hand Carried Other:

Cooler Temp. 5°C pH: Yes/N/A No Comments: Custody Seals Intact Yes No

NOTE: Please ind[redacted] method number for analyses requested. This will help clarify any questions with l[redacted]tory techniques.

[redacted]

3. VOLATILES DATA

A. QC Summary

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 LCS#: VL904073

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	53	106	(87-121)
Toluene	50	54	108	(81-125)
Chlorobenzene	50	53	106	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
VBLK01

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB904073

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6543.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 4/7/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Results

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9902978

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6545.D

Level: (low/med) Date Sampled: 3/30/99

% Moisture: not dec. 0 Date Analyzed: 4/7/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	66	
108-88-3	Toluene	20	
100-41-4	Ethylbenzene	62	
	m&p-Xylenes	76	
95-47-6	o-Xylene	15	
91-20-3	Naphthalene	110	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENTRE

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9902978RE

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6550.D

Level: (low/med) Date Sampled: 3/30/99

% Moisture: not dec. 0 Date Analyzed: 4/7/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	45	
108-88-3	Toluene	7	
100-41-4	Ethylbenzene	54	
	m&p-Xylenes	55	
95-47-6	o-Xylene	11	
91-20-3	Naphthalene	97	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
BETWEEN

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9902979

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6546.D

Level: (low/med) Date Sampled: 3/30/99

% Moisture: not dec. 0 Date Analyzed: 4/7/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	2	
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: EFFLUENT

Lab Name: EA LABORATORIES Report#: 990366

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: #9902980

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6547.D

Level: (low/med) _____ Date Sampled: 3/30/99

% Moisture: not dec. 0 Date Analyzed: 4/7/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

17 May 1999

Mr. Matt Krumholz
EA Engineering, Science, & Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 28 April 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990500. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science, and Technology, Inc.
Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

Report 990500

May 1999

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EA Engineering, Science, and Technology Inc.
Severn Trent Laboratories Report# 990500

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1. NARRATIVE

Severn Trent LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

STL - Baltimore Report: **990500**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **17 May 1999**

This report contains the results of the analysis of three water samples collected on 28 April 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at Severn Trent Laboratories on 1 May 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Lab Number
EFFLUENT	9904112
BETWEEN	9904113
INFLUENT	9904114

Following this narrative section is a glossary of data qualifiers (Table 1) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Severn Trent LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

STL - Baltimore Report: **990500**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **17 May 1999**

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (STL9904112-STL9904114)

Sample Chronology: Three samples and associated quality control were analyzed on 12 May 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Sample INFLUENT was analyzed at a 2X dilution in order to bring the concentration of target analytes within calibration range.

Laboratory Method Performance: All laboratory method performance criteria were emt for the reported samples.

Sample Performance: All quality control were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program

Severn Trent LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech.,Inc.**
Site: **Willow Grove**
Project number: **29600.74**

STL - Baltimore Report: **990500**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **17 May 1999**

---

for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 17 May 1999
Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

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(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA - Loveton

Project Manager or Contact: Matt Krumholz
Phone: (410) 771-4950

Project No. 29600.74

Project Name: Willow Grove N.A.S.

Dept.: 2121 Task: 7200

Sample Storage Location: VOA 1 Y

ATO Number: 8092

Page 1 of 1 Report #: 99C50 O

Report Deliverables: 1 2 3 4 D E

EDD: Yes/No

DUE TO CLIENT: 6/1/99

Parameters/Method Numbers for Analysis: 8260 / NAPHALENE by 8020

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	8260 / NAPHALENE by 8020	EA Labs Accession Number	Remarks
4/28	1400	X		EFFLUENT	3	X	99C94112	LPM: MEA
	1405	X		BETWEEN	3	X	99C94113	EAL-RS.090
	1410	X		INFLUENT	3	Y	99C94114	
								L15992
								00C60508-9
								4 VOAs

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	4/28/99 1405				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	4/30/99 1000	[signature]	5/1/99 1030	8OTS 05 828614	Fed Ex. Puro. UPS Hand Carried Other:

Cooler Temp. 2.5°C pH: Yes No Comments: Custody Seals Intact Yes No None

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Area for Lab Use Only

3. BTEX DATA

A. QC Summary

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: EA LABORATORIES Report#: 990500

Lab Code: EA ENG Client: WILLOW GI Method: 8020 LCS#: VL905122

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	56	112	(87-121)
Toluene	50	57	114	(81-125)
Chlorobenzene	50	55	110	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
VBLK01

Lab Name: EA LABORATORIES Report#: 990500

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB905122

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6913.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 5/12/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: EA LABORATORIES Report#: 990500

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9904112

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6919.D

Level: (low/med) Date Sampled: 5/4/99

% Moisture: not dec. 0 Date Analyzed: 5/12/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: BETWEEN

Lab Name: EA LABORATORIES Report#: 990500

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9904113

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6922.D

Level: (low/med) Date Sampled: 5/4/99

% Moisture: not dec. 0 Date Analyzed: 5/12/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: EA LABORATORIES Report#: 990500

Lab Code: EA ENG Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9904114

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A6925.D

Level: (low/med) Date Sampled: 5/4/99

% Moisture: not dec. 0 Date Analyzed: 5/12/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 2.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	95	
108-88-3	Toluene	21	
100-41-4	Ethylbenzene	220	
	m&p-Xylenes	110	
95-47-6	o-Xylene	17	
91-20-3	Naphthalene	180	

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Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

27 May 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 13 May 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990565. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To Your Success

LABORATORY DATA REPORT

Prepared for:

Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

May 1999

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Willow Grove

Severn Trent Laboratories Report# 990565

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1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **990565**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **27 May 1999**

This report contains the results of the analysis of three water samples collected on 13 May 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by hand at Severn Trent Laboratories on 13 May 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9904656
BETWEEN	9904657
EFFLUENT	9904658

Following this narrative section is the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The

narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (STL9904656 - STL9904658)

Sample Chronology: Three samples and associated quality control were analyzed on 19 May 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 27 May 1999
Mary E. Asper, Laboratory Project Manager

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA

Project Manager or Contact: MATT KRUMHOLZ
Phone: (410) 771-9950

Project No. 29600.74

Project Name: WILLOW GROVE

Dept.: 2121 Task: 7200

Sample Storage Location: VOA 18

ATO Number: 8093

Page 1 of 1

Report #: 990565

Report Deliverables: 1 2 3 4 D E

EDD: Yes/No

DUE TO CLIENT: 6/6/99

Parameters/Method Numbers for Analysis: BTEX/NAPTHALENE by 8020

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX/NAPTHALENE by 8020	EA Labs Accession Number	Remarks
5/13/99	1400	X		INFLUENT	3	X	9904656	LPM: MEA
	1355	X		BETWEEN	3	X	9904657	EAL-PS-090
	1350	X		EFFLUENT	3	X	9904658	
								L15998
								00000 5159
								9 VOAS

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	5/13/99 1400				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	5/15/99 1000	[signature]	5/15/99 1009		Fed Ex Purol UPS Hand Carried Other:

Cooler Temp. 2.6 C pH: Yes X No Comments: Custody Seals Intact Yes No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Areas For Lab Use Only

3. VOLATILES DATA

A. Quality Control Data

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 990565

Lab Code: ST LABS Client: WILLOW GI Method: 8020 LCS#: VL905192

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	53	106	(87-121)
Toluene	50	55	110	(81-125)
Chlorobenzene	50	54	108	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
VBLK01

ab Name: ST LABORATORIES Report#: 990565

ab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

atrix: (soil/water) WATER Lab Sample ID: VB905192

ample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7005.D

evel: (low/med) Date Sampled:

Moisture: not dec. 0 Date Analyzed: 5/19/99

C Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

oil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: ST LABORATORIES Report#: 990565

Lab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9904656

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7009.D

Level: (low/med) Date Sampled: 5/13/99

% Moisture: not dec. 0 Date Analyzed: 5/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	52	
108-88-3	Toluene	9	
100-41-4	Ethylbenzene	2	
	m&p-Xylenes	72	
95-47-6	o-Xylene	10	
91-20-3	Naphthalene	120	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: BETWEEN

ab[illegible]me: ST LABORATORIES Report#: 990565

a[illegible]ode: ST LABS Client: WILLOW GI Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: #9904657

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7017.D

Level: (low/med) _____ Date Sampled: 5/13/99

% Moisture: not dec. 0 Date Analyzed: 5/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

ab Name: ST LABORATORIES Report#: 990565

ab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

atrix: (soil/water) WATER Lab Sample ID: #9904658

ample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7012.D

evel: (low/med) Date Sampled: 5/13/99

Moisture: not dec. 0 Date Analyzed: 5/19/99

C Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

oil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

24 June 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 9 June 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990703. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

June 1999

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Willow Grove
Severn Trent Laboratories Report# 990703

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      3. Data for Sample EFFLUENT

I. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **990703**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **24 June 1999**

This report contains the results of the analysis of three water samples collected on 9 June 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by hand at Severn Trent Laboratories on 12 June 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9905537
BETWEEN	9905538
EFFLUENT	9905539

Following this narrative section is the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **990703**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **24 June 1999**

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9905537 - ST9905539)

Sample Chronology: Three samples and associated quality control were analyzed on 17 June 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8020A. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **990703**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **24 June 1999**

detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E Asper 24 June 1999

Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA Loveton

Project Manager or Contact: Matt Rumbelz
Phone: (410) 771-4950

Project No. 29600.74
Dept.: 2121 Task: 7206

Project Name: Willow Grove NAS.

Sample Storage Location: VOA9

ATO Number: 8097

Page 1 of 1

Report #: 990703

Report Deliverables: 1 2 3 4 D E

EDD: Yes No

DUE TO CLIENT: 7/3/99

Parameters/Method Numbers for Analysis: BTEX/NAPTHALENE by 8020

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX/NAPTHALENE by 8020	EA Labs Accession Number	Remarks
6/9/99	1400	X		INFLUENT	3	X	9905537 ~~9905537~~	LPM: NEA
	1355	X		BETWEEN	3	X	9905538 ~~9905538~~	EAL-P3-090
	1350	X		EFFLUENT	3	X	9905539 ~~9905539~~	
								L16156
								COC000 5299
								9 VOAS

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[illegible]	6/8/99 1500				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[illegible]	6/9/99 1040	[illegible]	6/9/99 1040		Fed Ex. [redacted] UPS

Cooler Temp: [redacted] N/A C. pH: Yes [redacted] No Comments: Cooler [illegible] [redacted] Custody Seals Intact: Yes N/A No [redacted] Hand Carried [redacted] Other:

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

SEVERN TRENT LABORATORIES COOLER
Discrepancy Facsimile and Chains-of-C

Report: 990703

Project: Willow Grove NAS.
Received: 12-JUN-99 10:40
COC: COC0005299
Samples: 9905537-9905539

PLEASE DELIVER TO:
Company/Department:
Fax Number:
SENT BY:
Number of Pages(including cover page): 1 of

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 6/15/99
by(print) Sewell (sign)

1.	Did cooler come with a shipping slip, airbill, ect?	YES	NO	N/A
	If Yes, circle courier: ~~Federal Express~~ UPS Handcarried Other:			
	Enter Airbill Number here: 812 762 151 989			
2.	Were custody seals present on outside of cooler?	YES	NO	N/A
	How many and where: , seal date: , seal name			
3.	Were custody seals unbroken and intact at the time of arrival?	YES	**NO**	N/A
4.	Were the samples screened for radioactivity using the Geiger counter upon receipt?	YES	NO	N/A
5.	Were the Chains-of-Custody sealed in a plastic bag and taped inside of the lid?	YES	NO	N/A
6.	Were the Chains-of-Custody filled out properly(ink, signed, etc.)?	YES	**NO**	N/A
7.	Were the Chains-of-Custody relinquished by sampler?	YES	**NO**	N/A
8.	Did you sign the Chains-of-Custody papers in the appropriate places?	YES	NO	N/A
9.	Was project identifiable from Chains-of-Custody?	YES	NO	N/A
10.	If required, was enough ice used? Type of ice: Wet Blue Dry	YES	NO	N/A
11.	Was cooler temperature below 6C?	YES	NO	N/A
	Enter Cooler Temperature: No ice			
12.	Have designated person initial here to acknowledge receipt of cooler: (date) 6-15-99			

B. **LOG-IN PHASE:** Date samples were logged in: 6-15-99
by(print) Sewell (sign)

13.	Describe type of packing in cooler: No ice			
14.	Were all bottles sealed in separate plastic bags?	YES	NO	N/A
15.	Did all bottles arrive unbroken and were labels in good condition?	YES	**NO**	N/A
16.	Were all bottles labels complete(I.D., date, time, signature, preservative, etc.)?	YES	**NO**	N/A
17.	Were correct containers used for the analysis indicated on the Chains-of-Custody?	YES	**NO**	N/A
18.	Were correct preservatives added to the samples?	YES	**NO**	N/A
19.	Was a sufficient amount of sample sent for the analysis indicated on the Chain-of-Custody?	YES	**NO**	N/A
20.	Were bubbles absent in Volatiles samples?	YES	**NO**	N/A
22.	Were any samples subcontracted to an outside laboratory?	YES	NO	N/A
	If YES, enter LSOA# Subcontracting Laboratory Name:			
	EA Accession Numbers of subcontracted samples:			
23.	Were any Non-Conformance records initiated by SMO for this project?	YES	NO	N/A
	If YES, enter Non-Conformance Number: 4-MAO LPM notified:	YES	NO	N/A
	Reason for Non-Conformance: No ice in cooler			

***If any "NO" answers are bold a Non-Conformance Record is required from SMO.**
USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS

Special Notes:

Please respond within 24 hours of receipt of this facsimile if any changes are required to the Chain-of-Custody. Failure to notify Severn Trent Laboratories within 24 hours of receipt of this facsimile of any required changes could result in additional premiums and may not guarantee samples analyzed within holding time if changes to the analysis are required.

Confidentiality Notice

This facsimile transmission, including this Cover Sheet and any accompanying documents (individually and collectively), contains information from Severn Trent Laboratories. This transmission is intended solely for the use of the individual or entity to which it is addressed and may contain information that is privileged, or confidential. If the reader of this message is not the intended recipient or an employee or agent responsible for delivering this transmission to the intended recipient, you are hereby notified that any reproduction, dissemination, distribution, or other use of this transmission or its substance is strictly prohibited. If you have received this transmission in error, you are directed to contact us and arrange for the return of this transmission at our expense.

THE SEVERN TRENT LABORATORIES DIFFERENCE - COMMITTED TO YOUR SUCCESS.

For Project Specific Inquires, Contact your Laboratory Project Manager at (410) 771-4920

Effective: 05 MAY 1999

3. VOLATILES DATA

A. Quality Control Data

3A-LCS

WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 990703

Lab Code: ST LABS Client: WILLOW GI Method: 8020 LCS#: VL90[illegible]8

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	50	100	(87-121)
Toluene	50	51	102	(81-125)
Chlorobenzene	50	52	104	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: ST LABORATORIES Report#: 990703

Lab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB906173

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7380.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 6/17/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: INFLUENT

Lab Name: ST LABORATORIES Report#: 990703

Lab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9905537

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7386.D

Level: (low/med) Date Sampled: 6/9/99

% Moisture: not dec. 0 Date Analyzed: 6/17/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	77	
108-88-3	Toluene	4	
100-41-4	Ethylbenzene	160	
	m&p-Xylenes	73	
95-47-6	o-Xylene	9	
91-20-3	Naphthalene	170	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: BETWEEN

Lab Name: ST LABORATORIES Report#: 990703

Lab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9905538

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7385.D

Level: (low/med) Date Sampled: 6/9/99

% Moisture: not dec. 0 Date Analyzed: 6/17/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: EFFLUENT

Lab Name: ST LABORATORIES Report#: 990703

Lab Code: ST LABS Client: WILLOW GI Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9905539

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7382.D

Level: (low/med) Date Sampled: 6/9/99

% Moisture: not dec. 0 Date Analyzed: 6/17/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

EA Engineering, Science, and Technology

New Castle Corporate Commons
92 Read's Way, Suite 109
New Castle, DE 19720
Telephone: 302-325-3560
Fax: 302-325-3648

13 October 1999

Northern Division
Naval Facilities Engineering Command (Code 4022)
Mail Stop 82
10 Industrial Highway
Lester, Pennsylvania 191132-2090
Attn.: Mr. Jim Briggs

RE: Contract No. N62472-92-D-1296, Contract Task Order No. 0074
Remedial System at Navy Fuel Farm
Willow Grove, Naval Air Station Joint Reserve Base (NASJRB)
Third Quarter 1999

Dear Mr. Briggs:

This letter summarizes the monitoring results of the remediation system installed at the Naval Fuel Farm Facility, NASJRB, Willow Grove, Horsham Township, Pennsylvania. This report covers the work performed and system operation during the period 1 July – 7 October 1999.

PROGRESS SUMMARY

Remediation operations at the NASJRB Willow Grove Fuel Farm under CTO 0074 continued in June 1999. The product recovery system at NFFW-2R, NFFW-14 and NFFW-16 was operational throughout the quarter. The total free product recovered by the product recovery system in this quarter was 10.2-gal. Free product recovery is summarized below:

Free Product Recovery
Third Quarter 1999
NAS Willow Grove, Navy Fuel Farm

Well	July 1999	August 1999	September 1999	Totals
NFFW-2R	2.5	0.1	1.7	4.3
NFFW-14	1.7	1.9	0.4	4
NFFW-16	1.6	0.2	0.1	1.9
Totals	5.8	2.2	2.2	**10.2**

The flame arrestor on the thermal oxidizer was repaired and the vapor recovery system was operational on 20 July 1999. To maximize vapor recovery during the periods of low water table elevation (and subsequent loss of vacuum through the well screen), vapor recovery was

concentrated on one recovery well at a time throughout the quarter. Vapor recovery was conducted on NFFW-2R from 14 July to 5 August; on NFFW-14 from 5 August to 9 September; and from NFFW-16 from 9 September to 7 October 1999. The equivalent of approximately 65.8-gal of free product was recovered in the vapor phase in the third quarter. Table 1 presents a summary of product recovery.

During the third quarter 185,544 gallons of groundwater was recovered from NFFW-2R, NFFW-14, and NFFW-16. The majority of ground water was recovered in September (177,740-gal) with significantly less recovered in July (3,510-gal) and August (4,294-gal). Two 1000-lb granular activated carbon (GAC) units in series treated the recovered ground water. Monthly water samples were collected from before (influent), between, and after (effluent) the GACs and analyzed for BTEX and naphthalene. The results from the water samples are presented below and the laboratory data is included as ATTACHMENT 1.

Sample Point	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	Naphthalene (µg/L)
Influent	7/20/99	710	98	270	175	713	320
	8/5/99	150	14	190	57	411	180
	9/9/99	94	8	190	41	333	140
Between	7/20/99	ND	ND	ND	ND	ND	ND
	8/5/99	ND	ND	ND	ND	ND	ND
	9/9/99	ND	ND	ND	ND	ND	ND
Effluent	7/20/99	ND	ND	ND	ND	ND	ND
	8/5/99	ND	ND	ND	ND	ND	ND
	9/9/99	ND	ND	ND	ND	ND	ND

PROJECTED ACTIVITIES FOR THE NEXT MONTH

- Perform operation and maintenance visits.
- Gauge all monitoring and recovery wells

Please contact me at (410) 771-4950 if you have any questions or require additional information.

Sincerely,

EA Engineering, Science, and Technology

Carl G. Reitenbach, P.E.
CTO Manager

cc: file - 29600.74
J. Colter (NAVFAC)
P. Greco (Willow Grove NAS)
R. Pace/PMO (EA)
Pam Reigh (PADEP)
M. Krumholz (EA - w/o attachments)
G. Porter (EA - w/o attachments)

P:\Federal\DOD\Navy\projects\2960074\REPORTS\MONTHLY\3rdQuarter1999.doc

TABLE 1
SUMMARY OF PRODUCT RECOVERY AT NAVY FUEL FARM FACILITY, NASJRB, WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

Well ID	Product Recovered Prior to 12/28/97 (gal)[1]	Product Recovered in Third Quarter 1999 (gal)	Total Product Recovered since 12/28/98 under CTO 0074 (gal)	Total Product Recovered (gal)
NFFW-1	0.25	0	0	0.25
NFFW-2R	1429.64	4.3	80.95	1510.59
NFFW-6	1.86	0	0	1.86
NFFW-7	2.00	0	2.50	4.50
NFFW-12	0.25	0	0	0.25
NFFW-14	67.29	4	111.3	178.59
NFFW-16	14.32	1.9	123.28	137.6
NFFW-19	0	0	0	0.00
NFFW-20	0.35	0	0.25	0.60
Soil Vapor	400.83[2]	65.8[3]	249.89[3]	650.72[3]
Ground-Water	NA	0.1[4]	1.24[4]	1.24[4]
TOTAL	1916.79	76.1	569.41	2486.2

Note:
- NA — This data is not available.
- 1 — This column represents the amount of product recovered prior to 12/28/98 under CTO 0009.
- 2 — This number represents the gallon equivalent of VOC's recovered in a vapor stream from NFFW-2R.
- 3 — This number represents the gallon equivalent of VOC's recovered in the vapor stream from NFFW-2R, NFFW-14 and NFFW-16 as part of the Vapor Enhanced Recovery (VER) system.
- 4 — This number represents the gallon equivalent of VOC's recovered from NFFW-2R, NFFW-14 and NFFW-16 as part of the ground-water recovery system.

ATTACHMENT 1
Laboratory Data

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152
Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

5 August 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 20 ~~June~~ July 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 990946. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Post-it® Fax Note 7671	Date 8-31	# of pages ▶ ~~20~~ 19
To C. Reitenbach	From J. Leffler	
Co./Dept. EA Delaware	Co. EA Loveton	
Phone #	Phone #	
Fax #	Fax #	

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

August 1999

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Willow Grove

Severn Trent Laboratories Report# 990946

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2. CHAIN OF CUSTODY

3. VOLATILES DATA

   A. QC Summary

      1. Laboratory Control Sample
      2. Method Blank

   B. Sample Data

      1. Data for Sample INFLUENT
      2. Data for Sample BETWEEN
      3. Data for Sample EFFLUENT

1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **990946**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **5 August 1999**

This report contains the results of the analysis of three water samples collected on 20 July 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by hand at Severn Trent Laboratories on 21 July 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9907416
BETWEEN	9907417
EFFLUENT	9907418

Following this narrative section are a table of analytical methods (Table 1), a glossary of data qualifiers (Table 2), codes associated with manual integration of chromatographic peaks (Table 3) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune,

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **990946**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **5 August 1999**

calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9907416 - ST9907418)

Sample Chronology: Three samples and associated quality control were analyzed on 02 Aug 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8021A. All holding times were met.

The batch MS/MSD was performed on another client's sample. All data associated with these QC analyses have been included in this report to fulfill reporting requirements. However, recoveries were not evaluated since they do not apply to the samples associated with this report.

Sample INFLUENT was reanalyzed at a 5X dilution to bring the target analytes within instrument calibration.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **990946**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **5 August 1999**

conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 5 August 1999
Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY INORGANIC ANALYSIS DATA QUALIFIERS [1]

C ***(Concentration) qualifiers:***

- **B** Reported value is less than the project-specified Reporting Limit (RL), but greater than the method-specified Instrument Detection Limit (IDL) or Method Detection Limit (MDL).
- **U** Analyte analyzed for but not detected (concentration is less than the method-specified Instrument Detection Limit (IDL) or Method Detection Limit (MDL).

Q ***(Quality control) qualifiers:***

- **E** Reported value is estimated because of presence of interference.
- **M** Duplicate injection precision not met.
- **N** Spiked sample recovery is not within control limits.
- **S** Reported value is determined by the method of standard additions (MSA).
- **W** Postdigestion spike for furnace Atomic Absorption Spectrophotometric (AAS) AAS analysis is out of control limits (85-115%) and sample absorbance is less than 50% of spike absorbance.
- ***** Duplicate analyses is not within control limits.
- **+** Correlation coefficient for MSA is less than 0.995.

M ***(Method) qualifiers:***

- **P** Inductively Coupled Plasma (ICP)
- **A** Flame AAS
- **F** Furnace AAS
- **CV** Cold Vapor AAS
- **AV** Automated Cold Vapor AAS
- **AS** Semiautomated Spectrophotometric
- **C** Manual Spectrophotometric
- **T** Titrimetric
- **NR** Analyte is not required to be determined.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 . . . . . Software failed to integrate peak or integrated peak improperly

M2 . . . . . Multiple peaks within window, analyst's discretion used in peak identification.

M3 . . . . . Close eluting or near-coelution of interferences.

M4 . . . . . Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 . . . . . Adding/removing area due to positive baseline deflection matrix effect.

M6 . . . . . Adding/removing area due to negative baseline deflection matrix effect.

M7 . . . . . Retention time shifts.

M8 . . . . . Skimming vs. dropped baseline.

M9 . . . . . Adding area due to peak splitting .

M10 . . . . Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA DELAWARE

Project Manager or Contact: MATT KRUMHOLZ
Phone: 410 771 4950

Project No. 29600.74

Project Name: WILLOW GROVE NAS.

Dept.: 21 21 Task: 7200

Sample Storage Location: VOA 16

ATO Number: 8100

Page 1 of 1 Report #: 990946

Parameters/Method Numbers for Analysis: 8021A

Report Deliverables: 1 (2) 3 4 D (E)

EDD: Yes/(No)

DUE TO CLIENT: 8/12/99

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	EA Labs Accession Number	Remarks
7/20	1430	X		INFLUENT	3	990946	LPM: MEA
	1440	X		BETWEEN	3	990947	
↓	1450	X		EFFLUENT	3	990948	
							L16389
							00000554
							9600.5

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	7/20/99 1500				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	7/21/99 1200	[signature]	7/21/99 1030	8750587871	Fed Ex Puro. UPS Hand Carried Other:

Cooler Temp. 15 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—[illegible] Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Area [illegible] Lab Use Only

3. VOLATILES DATA

A. Quality Control Data

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 990946

Lab Code: ST LABS Client: WILLOW GI Method: 8021 LCS#: VL908021

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	53	106	(87-121)
Toluene	50	54	108	(81-125)
Chlorobenzene	50	53	106	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

FORM III-LCS VOA-1

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK01

Lab Name: ST LABORATORIES Report#: 990946

Lab Code: ST LABS Client: WILLOW GROVE Method: 8021 SDG No.:

Lab File ID: VB2A7707.D Lab Sample ID: VB908021

Date Analyzed: 8/2/99 Time Analyzed: 1201

GC Column: DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) N

Instrument ID: VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS01	VL908021	VB2A7708.D	1237
02	BETWEEN	#9907417	VB2A7711.D	1439
03	EFFLUENT	#9907418	VB2A7712.D	1515
04	REFERENCE	#9907529	VB2A7714.D	1627
05	REFERENCEMS	#9907529MS	VB2A7715.D	1703
06	REFERENCEMSD	#9907529MSD	VB2A7716.D	1740
07	INFLUENT	#9907416	VB2A7717.D	1816
08				
09				
10				
11				
12				
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30				

COMMENTS:

FORM IV VOA

B. Sample Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: ST LABORATORIES Report#: 990946

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9907416

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7717.D

Level: (low/med) Date Sampled: 7/20/99

% Moisture: not dec. 0 Date Analyzed: 8/2/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	170	
108-88-3	Toluene	98	
100-41-4	Ethylbenzene	270	
	m&p-Xylenes	130	
95-47-6	o-Xylene	45	
91-20-3	Naphthalene	320	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
BETWEEN

Lab Name: ST LABORATORIES Report#: 990946

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix (soil/water) WATER Lab Sample ID: #9907417

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7711.D

Level: (low/med) Date Sampled: 7/20/99

% Moisture: not dec. 0 Date Analyzed: 8/2/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: ST LABORATORIES Report#: 990946

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9907418

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7712.D

Level: (low/med) Date Sampled: 7/20/99

% Moisture: not dec. 0 Date Analyzed: 8/2/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152
Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

19 August 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 5 August 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 991037. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Post-it® Fax Note 7671	Date 8-31	# of pages ▸ 20
To C. Reitenbach	From J. Leffler	
Co./Dept. EA Delaware	Co. EA Loveton	
Phone #	Phone #	
Fax #	Fax #	

Committed To Your Success

LABORATORY DATA REPORT

Prepared for:

Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

August 1999

a part of

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Willow Grove

Severn Trent Laboratories Report# 991037

---

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      2. Method Blank

   B. Sample Data

      1. Data for Sample INFLUENT
      2. Data for Sample BETWEEN
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1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **991037**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **19 August 1999**

This report contains the results of the analysis of three water samples collected on 5 August 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at Severn Trent Laboratories on 7 August 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9908161
BETWEEN	9908162
EFFLUENT	9908163

Following this narrative section are a glossary of data qualifiers (Table 1), codes associated with manual integration of chromatographic peaks (Table 2) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **991037**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **19 August 1999**

tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9908161 - ST9908163)

Sample Chronology: Three samples and associated quality control were analyzed on 09 Aug 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8021A. All holding times were met.

The batch MS/MSD was performed on another client's sample. All data associated with these QC analyses have been included in this report to fulfill reporting requirements. However, recoveries were not evaluated since they do not apply to the samples associated with this report.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data.

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**
Site: **Willow Grove**
Project number: **29600.74**

ST Laboratories Report: **991037**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **19 August 1999**

Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 19 August 1999
Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 . . . . . Software failed to integrate peak or integrated peak improperly

M2 . . . . . Multiple peaks within window, analyst's discretion used in peak identification.

M3 . . . . . Close eluting or near-coelution of interferences.

M4 . . . . . Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 . . . . . Adding/removing area due to positive baseline deflection matrix effect.

M6 . . . . . Adding/removing area due to negative baseline deflection matrix effect.

M7 . . . . . Retention time shifts.

M8 . . . . . Skimming vs. dropped baseline.

M9 . . . . . Adding area due to peak splitting .

M10 . . . . Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

Comp[redacted]Name:	Project Manager or Contact:
EA	MATT KRUMHOLZ Phone: (410) 771-4950
Project No. 29600.74	Project Name:
Dept.: 2131 Task: 7200	WILLOW GROVE, NAS.
Sample Storage Location: VOAA6	ATO Number: 8101
Page 1 of 1	Report #: 991037

Para[redacted]s/Method Numbers for Analysis

Chain of Custody [redacted]cord

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Report Deliverables: 1 (2) 3 4 (D) E

EDD: Yes/No

DUE TO CLIENT: 8/25/99

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	8021 GC/MS/PHENOLS by 8270	EA Labs Accession Number	Remarks
8/5/99	1410	X		INFLUENT	3	✓	9908161	LPM: WEA
	1405	X		BETWEEN	3	✓	9908162	EAL-PS-090
↓	1400	X		EFFLUENT	3	✓	9908163	
								L16495
								C00005653
								9VOAS

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	8/5/99 1500				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	8/6/99 0900	[signature]	8/11/99 1030	8131 9551 7207	Fed Ex. Puro. UPS

Cooler Temp 2.5°C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☒ No

Hand Carried

Other:

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

Severn Trent Laboratories

Discrepancy Facsimile and Chain

Report: 991037

Project: Willow Grove
Received: 07-AUG-99 10:30
COC: COC0005653
Samples: 9908161-9908163

PLEASE DELIVER TO:
Company/Department:
Fax Number:
SENT BY:
Number of Pages(including cover page): 1 of

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 8-7-99

by(print) Stewart (sign)

1.	Did cooler come with a shipping slip, airbill, ect?	YES	NO	N/A
	If Yes, circle courier: Federal Express UPS Handcarried Other:			
	Enter Airbill Number here: 8131 9351 7207			
2.	Were custody seals present on outside of cooler?	YES	NO	N/A
	How many and where: , seal date: , seal name			
3.	Were custody seals unbroken and intact at the time of arrival?	YES	NO	N/A
4.	Were the samples screened for radioactivity using the Geiger counter upon receipt?	YES	NO	N/A
5.	Were the Chains-of-Custody sealed in a plastic bag and taped inside of the lid?	YES	NO	N/A
6.	Were the Chains-of-Custody filled out properly(ink, signed, etc.)?	YES	NO	N/A
7.	Were the Chains-of-Custody relinquished by sampler?	YES	NO	N/A
8.	Did you sign the Chains-of-Custody papers in the appropriate places?	YES	NO	N/A
9.	Was project identifiable from Chains-of-Custody?	YES	NO	N/A
10.	If required, was enough ice used? Type of ice: Wet Blue Dry	YES	NO	N/A
11.	Was cooler temperature below 6C?	YES	NO	N/A
	Enter Cooler Temperature: 7.15 °C			
12.	Have designated person initial here to acknowledge receipt of cooler: (date) 8-7-99			

B. **LOG-IN PHASE:** Date samples were logged in: 8-7-99

by(print) Stewart (sign)

13.	Describe type of packing in cooler: blue ice / foam bubble wrap			
14.	Were all bottles sealed in separate plastic bags?	YES	NO	N/A
15.	Did all bottles arrive unbroken and were labels in good condition?	YES	NO	N/A
16.	Were all bottles labels complete(I.D., date, time, signature, preservative, etc.)?	YES	NO	N/A
17.	Were correct containers used for the analysis indicated on the Chains-of-Custody?	YES	NO	N/A
18.	Were correct preservatives added to the samples?	YES	NO	N/A
19.	Was a sufficient amount of sample sent for the analysis indicated on the Chain-of-Custody?	YES	NO	N/A
20.	Were bubbles absent in Volatiles samples?	YES	NO	N/A
22.	Were any samples subcontracted to an outside laboratory?	YES	NO	N/A
	If YES, enter LSOA#: Subcontracting Laboratory Name:			
	EA Accession Numbers of subcontracted samples:			
23.	Were any Non-Conformance records initiated by SMO for this project?	YES	NO	N/A
	If YES, enter Non-Conformance Number: 4-1845 LPM notified:	YES	NO	N/A
	Reason for Non-Conformance: Cooler Temp 7.15°C			

***If any "NO" answers are bold a Non-Conformance Record is required from SMO.**

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS

Special Notes:

Please respond within 24 hours of receipt of this facsimile if any changes are required to the Chain-of-Custody. Failure to notify Severn Trent Laboratories within 24 hours of receipt of this facsimile of any required changes could result in additional premiums and may not guarantee samples analyzed within holding time if changes to the analysis are required.

Confidentiality Notice

This facsimile transmission, including this Cover Sheet and any accompanying documents (individually and collectively), contains information from Severn Trent Laboratories. This transmission is intended solely for the use of the individual or entity to which it is addressed and may contain information that is privileged, or confidential. If the reader of this message is not the intended recipient or an employee or agent responsible for delivering this transmission to the intended recipient, you are hereby notified that any reproduction, dissemination, distribution, or other use of this transmission or its substance is strictly prohibited. If you have received this transmission in error, you are directed to contact us and arrange for the return of this transmission at our expense.

THE SEVERN TRENT LABORATORIES DIFFERENCE - COMMITTED TO YOUR SUCCESS.

For Project Specific Inquires, Contact your Laboratory Project Manager at (410) 771-4920

Effective: 05 MAY 1999

3. VOLATILES DATA

A. Quality Control Data

3A-LCS

WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 991037

Lab Code: ST LABS Client: WILLOW GI Method: 8021 LCS#: VL908092

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	52	104	(87-121)
Toluene	50	54	108	(81-125)
Chlorobenzene	50	54	108	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments: _____

FORM III-LCS VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: ST LABORATORIES Report#: 991037

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB908092

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7769.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 8/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: INFLUENT

Lab Name: ST LABORATORIES Report#: 991037

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9908161

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7772.D

Level: (low/med) Date Sampled: 8/5/99

% Moisture: not dec. 0 Date Analyzed: 8/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	150	
108-88-3	Toluene	14	
100-41-4	Ethylbenzene	190	
	m&p-Xylenes	45	
95-47-6	o-Xylene	12	
91-20-3	Naphthalene	180	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
BETWEEN

Lab Name: ST LABORATORIES Report#: 991037

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9908162

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7777.D

Level: (low/med) Date Sampled: 8/5/99

% Moisture: not dec. 0 Date Analyzed: 8/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: ST LABORATORIES Report#: 991037

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9908163

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A7776.D

Level: (low/med) Date Sampled: 8/5/99

% Moisture: not dec. 0 Date Analyzed: 8/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

September 28, 1999

Mr. Matt Krumholtz
EA Engineering, Science and Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

Re: Willow Grove (29600.74)

Dear Mr. Krumholtz:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 9 September 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 991218. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To Your Success

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science and Technology, Inc.
Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

September 1999

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Willow Grove
Severn Trent Laboratories Report# 991218

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1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991218**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **28 September 1999**

This report contains the results of the analysis of three water samples collected on 9 September 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at Severn Trent Laboratories on 13 September 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis. The cooler temperature was received at 10 degrees celsius. We were instructed by you to note in the narrative and proceed with analysis.

Client Sample Designation	STL Number
INFLUENT	9909791
BETWEEN	9909792
EFFLUENT	9909793

Following this narrative section are a glossary of data qualifiers (Table 1), codes associated with manual integration of chromatographic peaks (Table 2) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune,

calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9909791 - ST9909793)

Sample Chronology: Three samples and associated quality control were analyzed on 14 September 1999 for benzene, toluene, ethylbenzene, and xylenes (BTEX) plus naphthalene by USEPA SW-846, Methods 5030A/8021A. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data.

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991218**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **28 September 1999**

Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 28 September 1999

Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 . . . . . Software failed to integrate peak or integrated peak improperly

M2 . . . . . Multiple peaks within window, analyst's discretion used in peak identification.

M3 . . . . . Close eluting or near-coelution of interferences.

M4 . . . . . Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 . . . . . Adding/removing area due to positive baseline deflection matrix effect.

M6 . . . . . Adding/removing area due to negative baseline deflection matrix effect.

M7 . . . . . Retention time shifts.

M8 . . . . . Skimming vs. dropped baseline.

M9 . . . . . Adding area due to peak splitting .

M10 . . . . Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

Company Name:	Project Manager or Contact:
EA DELAWARE	CARL REITENBACH Phone: 302-325-3560
Project No. 29600.74	Project Name:
Dept.: 2121 Task: 7200	WILLOW GROVE N.A.S.
Sample Storage Location: VOA 8	ATO Number: 8103
Page 1 of 1	Report #: 991218

Parameter Method Numbers for Analysis

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Report Deliverables: 1 (2) 3 4 (D) E

EDD: Yes (No)

DUE TO CLIENT: 10/4/99

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	8021 8020	1664	EA Labs Accession Number	Remarks
9/9/99	1430	X		INFLUENT	3	✓		9909791	LPM: MEA
	1420	X		BETWEEN	3	✓		9909792	EAL PS-490
↓	1410	X		EFFLUENT	3	✓		9909793	
									L16081
									COC000 5838 9 VOA

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	9/9/99 1500				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	9/9/99	Sonita Cour	9/13/99 1015	813193577549	(Fed Ex) Puro. UPS Hand Carried Other:

Cooler Temp. 10 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

SEVERN TRENT LABORATORIES COOLER
Discrepancy Facsimile and Chains-of-C

Report: 991218

Project: Willow Grove N.A.S.
Received: 13-SEP-99 10:15
COC: COC0005838
Samples: 9909791-9909793

PLEASE DELIVER TO:
Company/Department:
Fax Number:
SENT BY:
Number of Pages(including cover page): 1 of

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9/13/99
by(print) Sanita Corum (sign) Sanita Corum

1. *Did cooler come with a shipping slip, airbill, ect?* YES NO N/A
   If Yes, circle courier: Federal Express UPS Handcarried Other:
   Enter Airbill Number here: 8/3/9351/5497
2. Were custody seals present on outside of cooler? YES NO N/A
   How many and where: , seal date: , seal name
3. Were custody seals unbroken and intact at the time of arrival? YES NO N/A
4. Were the samples screened for radioactivity using the Geiger counter upon receipt? YES NO N/A
5. Were the Chains-of-Custody sealed in a plastic bag and taped inside of the lid? YES NO N/A
6. Were the Chains-of-Custody filled out properly(ink, signed, etc.)? YES NO N/A
7. Were the Chains-of-Custody relinquished by sampler? YES NO N/A
8. Did you sign the Chains-of-Custody papers in the appropriate places? YES NO N/A
9. Was project identifiable from Chains-of-Custody? YES NO N/A
10. If required, was enough ice used? Type of ice: Wet Blue Dry YES NO N/A
11. Was cooler temperature below 6C? YES NO N/A
    Enter Cooler Temperature: 10°C
12. Have designated person initial here to acknowledge receipt of cooler: SCL (date) 9/13/99

B. LOG-IN PHASE: Date samples were logged in:
by(print) Sanita Corum (sign) Sanita Corum

13. Describe type of packing in cooler: bubble wrap
14. Were all bottles sealed in separate plastic bags? YES NO N/A
15. Did all bottles arrive unbroken and were labels in good condition? YES NO N/A
16. Were all bottles labels complete(I.D., date, time, signature, preservative, etc.)? YES NO N/A
17. Were correct containers used for the analysis indicated on the Chains-of-Custody? YES NO N/A
18. *Were correct preservatives added to the samples?* YES NO N/A
19. Was a sufficient amount of sample sent for the analysis indicated on the Chain-of-Custody? YES NO N/A
20. Were bubbles absent in Volatiles samples? YES NO N/A
22. Were any samples subcontracted to an outside laboratory? YES NO N/A
    If YES, enter LSOA#: Subcontracting Laboratory Name:
    EA Accession Numbers of subcontracted samples:
23. Were any Non-Conformance records initiated by SMO for this project? YES NO N/A
    If YES, enter Non-Conformance Number: 60824 LPM notified: YES NO N/A
    Reason for Non-Conformance: Cooler temp 6' 10°C

***If any "NO" answers are bold a Non-Conformance Record is required from SMO.**
USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS

Special Notes:

Please respond within 24 hours of receipt of this facsimile if any changes are required to the Chain-of-Custody. Failure to notify Severn Trent Laboratories within 24 hours of receipt of this facsimile of any required changes could result in additional premiums and may not guarantee samples analyzed within holding time if changes to the analysis are required.

Confidentiality Notice

This facsimile transmission, including this Cover Sheet and any accompanying documents (individually and collectively), contains information from Severn Trent Laboratories. This transmission is intended solely for the use of the individual or entity to which it is addressed and may contain information that is privileged, or confidential. If the reader of this message is not the intended recipient or an employee or agent responsible for delivering this transmission to the intended recipient, you are hereby notified that any reproduction, dissemination, distribution, or other use of this transmission or its substance is strictly prohibited. If you have received this transmission in error, you are directed to contact us and arrange for the return of this transmission at our expense.

THE SEVERN TRENT LABORATORIES DIFFERENCE - COMMITTED TO YOUR SUCCESS.

For Project Specific Inquires, Contact your Laboratory Project Manager at (410) 771-4920
Effective: 05 MAY 1999

3. VOLATILES DATA

A. Quality Control Data

3A-LCS
WATER VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 991218

Lab Code: ST LABS Client: WILLOW GI Method: 8021 LCS#: VL909145

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	54	108	(87-121)
Toluene	50	56	112	(81-125)
Chlorobenzene	50	55	110	(81-133)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
VBLK01

Lab Name: ST LABORATORIES Report#: 991218

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB909145

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8023.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 9/14/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
INFLUENT

Lab Name: ST LABORATORIES Report#: 991218

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9909791

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8028.D

Level: (low/med) Date Sampled: 9/9/99

% Moisture: not dec. 0 Date Analyzed: 9/14/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	94	
108-88-3	Toluene	8	
100-41-4	Ethylbenzene	190	
	m&p-Xylenes	29	
95-47-6	o-Xylene	12	
91-20-3	Naphthalene	140	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
BETWEEN

Lab Name: ST LABORATORIES Report#: 991218

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9909792

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8027.D

Level: (low/med) Date Sampled: 9/9/99

% Moisture: not dec. 0 Date Analyzed: 9/14/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: ST LABORATORIES Report#: 991218

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9909793

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8024.D

Level: (low/med) Date Sampled: 9/9/99

% Moisture: not dec. 0 Date Analyzed: 9/14/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

October 30, 1999

Mr. Carl Reitenbach
EA Engineering, Science and Technology, Inc.
New Castle Corporate Commons
92 Read's Way, Suite 109
New Castle, DE 19720

Re: Willow Grove (29600.74)

Dear Mr. Reitenbach:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 12 October 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 991445. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science and Technology, Inc.
Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

October 1999

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Willow Grove
Severn Trent Laboratories Report# 991445

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3. VOLATILES DATA

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      2. Method Blank

   B. Sample Data

      1. Data for Sample INFLUENT
      2. Data for Sample BETWEEN
      3. Data for Sample EFFLUENT

1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991445**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **30 October 1999**

This report contains the results of the analysis of three water samples collected on 12 October 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at Severn Trent Laboratories on 14 October 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9911194
BETWEEN	9911195
EFFLUENT	9911196

Following this narrative section are a glossary of data qualifiers (Table 1), codes associated with manual integration of chromatographic peaks (Table 2) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument

tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9911194 - ST9911196)

Sample Chronology: Three samples and associated quality control were analyzed on 19 October 1999 for the client specified list of analytes by USEPA SW-846, Methods 5030B/8021B. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data.

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991445**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **30 October 1999**

Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

30 October 1999

Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 . . . . Software failed to integrate peak or integrated peak improperly

M2 . . . . Multiple peaks within window, analyst's discretion used in peak identification.

M3 . . . . Close eluting or near-coelution of interferences.

M4 . . . . Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 . . . . Adding/removing area due to positive baseline deflection matrix effect.

M6 . . . . Adding/removing area due to negative baseline deflection matrix effect.

M7 . . . . Retention time shifts.

M8 . . . . Skimming vs. dropped baseline.

M9 . . . . Adding area due to peak splitting .

M10 . . . Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA Engineering

Project Manager or Contact: Carl Reitenbach
Phone: (302) 325-3560

Project No. 29600 74

Project Name: Willow Grove NAS

Dept. 3131 Task: 7200

Sample Storage Location: VOA 7

ATO Number:

Page 1 of 1

Report #: 991445

Report Deliverables: 1 2 3 4 D E

EDD: Yes/No

DUE TO CLIENT: 11/4/99

Parameter Method Numbers for Analysis: 8021 Bzn/MTBE + Ketones 10/14/99

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	EA Labs Accession Number	Remarks
10/12	1550	X		INFLUENT	3	9911194	LPM: MEA
	1540	X		BETWEEN	3	9911195	STLPS-090
	1530	X		EFFLUENT	3	9911196	
							Method changed after talking with Carl Reitenbach on 10/14/99 MEA
							L16929
							9 VOA
							COC 0606005

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	10/12/99 1400				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	10/13/99 1200	Sanita Conn	10/14/99 0945	GOCO 8168485038	Fed Ex. Puro. UPS Hand Carried Other:

Cooler Temp. 5 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

3. VOLATILES DATA

A. Quality Control Data

3A-LCS

SOIL VOLATILE LABORATORY CONTROL SAMPLE RECOVERY

Lab Name: ST LABORATORIES Report#: 991445

Lab Code: ST LABS Client: WILLOW GI Method: 8021 LCS#: VL910194

Level:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	REC.
Benzene	50	53	106	(87-119)
Toluene	50	56	112	(82-117)
Chlorobenzene	50	57	114	(75-119)

Column to be used to flag recovery with an asterisk

* Values outside of QC limits

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: ST LABORATORIES Report#: 991445

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB910194

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8362.D

Level: (low/med) Date Sampled:

% Moisture: not dec. 0 Date Analyzed: 10/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

B. Sample Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: INFLUENT

Lab Name: ST LABORATORIES Report#: 991445

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9911194

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8367.D

Level: (low/med) Date Sampled: 10/12/99

% Moisture: not dec. 0 Date Analyzed: 10/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	77	
108-88-3	Toluene	15	
100-41-4	Ethylbenzene	170	
	m&p-Xylenes	50	
95-47-6	o-Xylene	7	
91-20-3	Naphthalene	140	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
BETWEEN

Lab Name: ST LABORATORIES Report#: 991445

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9911195

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8366.D

Level: (low/med) Date Sampled: 10/12/99

% Moisture: not dec. 0 Date Analyzed: 10/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	9	
108-88-3	Toluene	1	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
EFFLUENT

Lab Name: ST LABORATORIES Report#: 991445

Lab Code: ST LABS Client: WILLOW GI Method: 8021 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9911196

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VB2A8363.D

Level: (low/med) Date Sampled: 10/12/99

% Moisture: not dec. 0 Date Analyzed: 10/19/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U
91-20-3	Naphthalene	5	U

FORM I VOA

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

December 16, 1999

Mr. Carl Reitenbach
EA Engineering, Science and Technology, Inc.
New Castle Corporate Commons
92 Read's Way, Suite 109
New Castle, DE 19720

Re: Willow Grove (29600.74)

Dear Mr. Reitenbach:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove project on 30 November 1999. The electronic data deliverables (EDD) will follow. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 991717. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

EA Engineering, Science and Technology, Inc.
Willow Grove

Prepared by:

Severn Trent Laboratories
19 Loveton Circle
Sparks, Maryland 21152

Report 991717

December 1999

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Severn Trent Laboratories Report# 991717

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1. NARRATIVE

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991717**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **16 December 1999**

This report contains the results of the analysis of three water samples collected on 30 November 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at Severn Trent Laboratories on 01 December 1999. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	STL Number
INFLUENT	9913145
BETWEEN	9913146
EFFLUENT	9913147

Following this narrative section are a glossary of data qualifiers (Table 1), codes associated with manual integration of chromatographic peaks (Table 2) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where

method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (ST9913145- ST9913147)

Sample Chronology: Three samples and associated quality control were analyzed on 9 and 10 December 1999 for the client specified list of analytes by USEPA SW-846, Methods 5030B/8021B. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exceptions;

The ending standard, VB2A8826, had the average percent difference (16.4%) from the initial calibration slightly above the QC limit of 15%. This high percent difference may be indicative of slight positive bias for the samples associated with this standard.

Sample Performance: All quality control criteria were met for the reported samples with the following exceptions:

The batch MS, performed on sample EFFLUENT, had the surrogate recovery of bromofluorobenzene (130%) slightly above the upper QC limit of 126%.

The batch MS/MSD, performed on sample EFFLUENT, had the recoveries of benzene (150%/132%) above the upper QC limit of 121%. The individual MS also had the recovery of toluene (128%) above the upper QC limit of 125%.

SEVERN TRENT LABORATORIES
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci. & Tech., Inc.**	ST Laboratories Report: **991717**
Site: **Willow Grove**	Laboratory Project Manager: **Mary E. Asper**
Project number: **29600.74**	Report Date: **16 December 1999**

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report as been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper 16 December 1999

Mary E. Asper, Laboratory Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

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E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 .... Software failed to integrate peak or integrated peak improperly

M2 .... Multiple peaks within window, analyst's discretion used in peak identification.

M3 .... Close eluting or near-coelution of interferences.

M4 .... Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 .... Adding/removing area due to positive baseline deflection matrix effect.

M6 .... Adding/removing area due to negative baseline deflection matrix effect.

M7 .... Retention time shifts.

M8 .... Skimming vs. dropped baseline.

M9 .... Adding area due to peak splitting .

M10 ... Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA DELAWARE

Project Manager or Contact: CARL RETTENBACH

Phone: 302-325-3560

Project No. 29600.777

Project Name: WILLOW GROVE N.A.S.

Dept.: 2632 Task: 7200

Sample Storage Location: VOA 15

ATO Number:

Page 1 of 1 Report #: 991717

Report Deliverables: 1 2 3 4 (D) E

EDD: (Yes/No) Excel Summary

DUE TO CLIENT: 12/25/99

Parameters/Method Numbers for Analysis: BTEX/MTBE 8020

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	EA Labs Accession Number	Remarks
11/30	1645	X		INFLUENT	3 ✓	991314[illegible]	LPM: MEA
↓	1640	X		BETWEEN	3 ✓	991314[illegible]	STL-PS-0910
↓	1635	X		EFFLUENT	3 ✓	991314[illegible]	
							L17214
							9 Voa
							CCC006348

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	12/1/99 700				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	12/1/99 700	[signature]	12/4/99 10:30	816 848 753 93	(Fed Ex.) Puro. UPS

Cooler Temp. 5 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☒ No

Hand Carried

Other:

NOTE: Please indicate method number for analyses requested. This will help clarify any questions [illegible] laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Areas for Lab Use Only

00200

Seventrent Laboratories
STL Baltimore

19 Loveton Circle
Sparks, Maryland 21152
(410) 771-4920

Committed to *Your* Success

COOLER RECEIPT CHECKLIST

Report: 991717

Project: Willow Grove N.A.S.
Received: 04-DEC-99 10:30
COC: COC0006348
Samples: 9913145-9913147

A. COOLER INSPECTION:

Date cooler was opened: 12-4-99 (Date) Phyllis Zeeter (Custodian Signature)

1. Did cooler come ~~with a shipping~~ slip, air bill, etc? YES NO N/A NCR# _____
1a. Circle courier: Federal Express UPS ***Air bill Number from Chain-of-Custody*** 816184875393
1b. Circle, if applicable: Handcarried Other

2. Custody seals were present on outside of cooler? YES NO N/A NCR# _____
3. Custody seals were unbroken at the time of arrival? YES NO N/A NCR# _____
4. Chain-of-Custody (COC)records were present and legible? YES NO N/A NCR# _____
5. Were the COC records completed? YES NO N/A NCR# _____
6. Was cooler temperature 4C ± 2C? YES NO N/A NCR# _____ 5°

B. SAMPLE INSPECTION

9. All bottles arrived unbroken? YES NO N/A NCR# _____
10. All bottles labels were legible and complete? YES NO N/A NCR# _____
11. Containers were correct for the analysis listed on the COC? YES NO N/A NCR# _____
12. Were preservatives checked (except VOA vials)? YES NO N/A NCR# _____
13. Were bubbles absent in Volatiles samples? YES NO N/A NCR# _____

Special Notes:

Sanita Corum (Sample Management Officer) 12/6/99 (Date)

September 29, 1999/mmu

020002

3. VOLATILES DATA

A. QC Summary

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

EPA SAMPLE NO.	SMC1 #	TOT OUT
01 VLCS01*	118	0
02 VBLK01	99	0
03 EFFLUENT	108	0
04 EFFLUENTMS	130 *	1
05 EFFLUENTMSD	119	0
06 BETWEEN	121	0
07 VLCS02	116	0
08 VBLK02	96	0
09 INFLUENT	112	0
10 INFLUENTMS	122	0
11 INFLUENTMSD	112	0

QC LIMITS

SMC1 = Bromofluorobenzene (69-126)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

FORM II VOA-1

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No EFFLUENT

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Benzene	50	0.0	75	150 *	87 - 121
Toluene	50	0.0	64	128 *	81 - 125

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Benzene	50	66	132 *	13	21	87 - 121
Toluene	50	58	116	10	27	81 - 125

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 2 outside limits

Spike Recovery: 3 out of 4 outside limits

COMMENTS: _____

FORM III VOA-1

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name STL BALTIMORE Contract: 991717

Lab Code ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix Spike - EPA Sample No INFLUENT

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Benzene	50	74	130	112	87 - 121
Toluene	50	2.4	60	116	81 - 125

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Benzene	50	130	112	0	21	87 - 121
Toluene	50	58	112	4	27	81 - 125

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD 0 out of 2 outside limits

Spike Recovery: 0 out of 4 outside limits

COMMENTS:

FORM III VOA-1

030004

LCS Recovery Report

Lab Name : STL Baltimore File ID : VB2A8809.D Instrument: VB2

Sample : VL912093 Date Analyzed: 9 Dec 199

Matrix : WATER Method : AB291207.M

Client : 991717 Project : WILLOW GROVE

Spike Compound	Spike Added	Spike Res	Spike %Rec	QC Limits % Rec
Benzene	50	60.4	121	87-121
Toluene	50	54.0	108	81-125
Ethylbenzene	50	56.5	113	50-150

* - Indicates values outside of QC limits

LCS Recovery Report

Lab Name : STL Baltimore File ID : VB2A8830.D Instrument: VB2

Sample : VL912102 Date Analyzed: 10 Dec 199

Matrix : WATER Method : AB291207.M

Client : 991717 Project : WILLOW GROVE

Spike Compound	Spike Added	Spike Res	Spike %Rec	QC Limits % Rec
Benzene	50	57.9	116	87-121
Toluene	50	50.5	101	81-125
Ethylbenzene	50	51.4	103	50-150

* - Indicates values outside of QC limits

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK01

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Lab File ID: VB2A8811.D Lab Sample ID: VB912093

Date Analyzed: 12/9/99 Time Analyzed: 12:30

GC Column: DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID: VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS01	VL912093	VB2A8809.D	11:02
02	EFFLUENT	9913147	VB2A8815.D	14:25
03	EFFLUENTMS	9913147MS	VB2A8817.D	15:23
04	EFFLUENTMSD	9913147MSD	VB2A8818.D	15:52
05	BETWEEN	9913146	VB2A8821.D	17:19

COMMENTS

4A

EPA SAMPLE NO.

VOLATILE METHOD BLANK SUMMARY

VBLK02

Lab Name STL BALTIMORE Contract: 991717

Lab Code ST LABS Case No.: WILLOW SAS No.: SDG No.:

Lab File ID VB2A8832.D Lab Sample ID: VB912102

Date Analyzed 12/10/99 Time Analyzed: 15:55

GC Column DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLBK02	VL912102	VB2A8830.D	14:57
02	INFLUENT	9913145	VB2A8833.D	16:25
03	INFLUENTMS	9913145MS	VB2A8834.D	16:54
04	INFLUENTMSD	9913145MSD	VB2A8835.D	17:23

COMMENTS

FORM IV VOA

B. Sample Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BETWEEN

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix (soil/water): WATER Lab Sample ID: 9913146

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8821.D

Level (low/med): LOW Date Received: 12/4/99

% Moisture: not dec _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

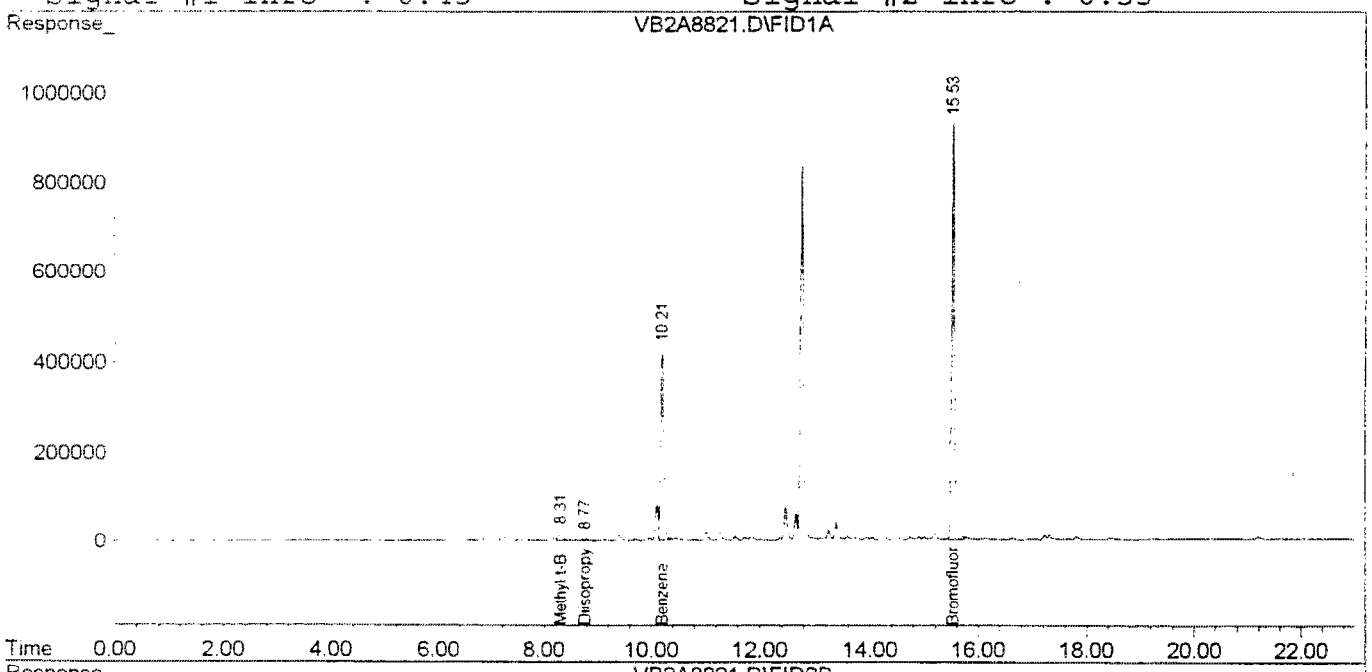
CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	41	
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

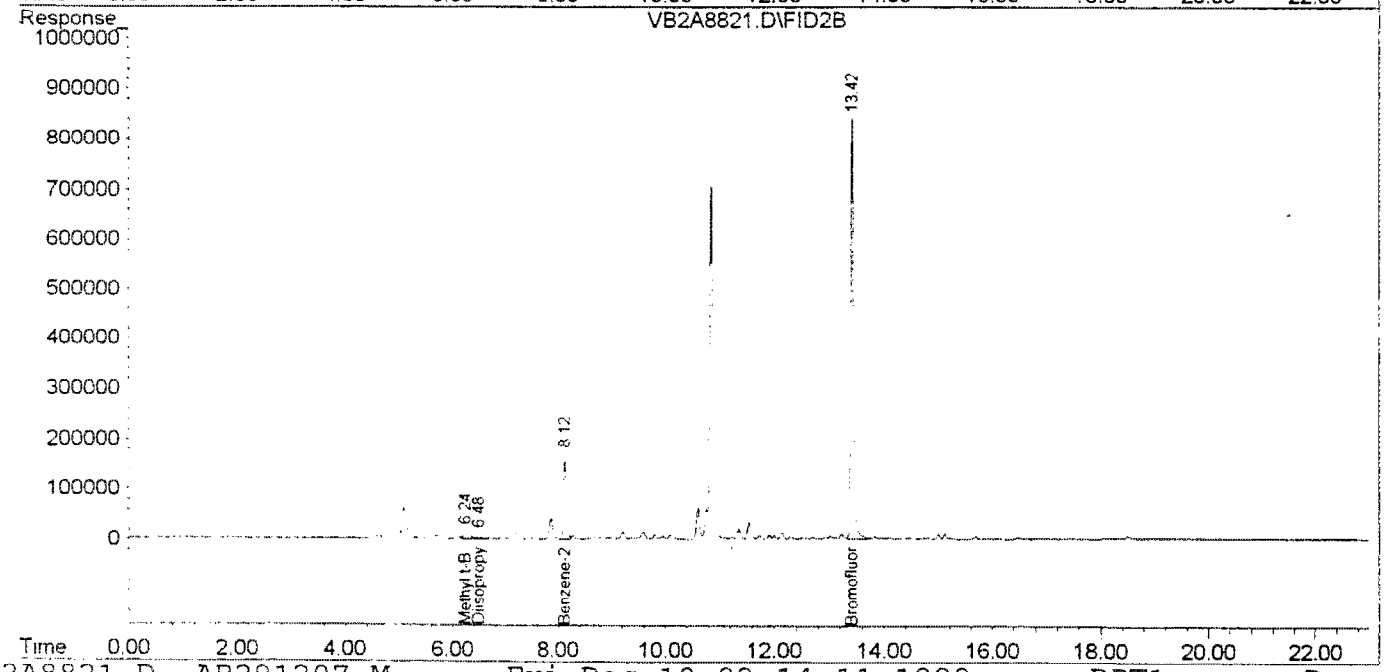
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8821.D\FID1A.CH Vial: 16
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8821.D\FID2B.CH
Acq On : 9 Dec 1999 5:19 pm Operator: MER
Sample : 9913146 Inst : VB2
Misc : RPT#991717 BETWEEN Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 9:13 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8821.D\FID1A.CH Vial: 16
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8821.D\FID2B.CH
Acq On : 9 Dec 1999 5:19 pm Operator: MER
Sample : 9913146 Inst : VB2
Misc : RPT#991717 BETWEEN Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 9:13 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	15.53	13.42	31746230	29510127	60.352	49.713
Spiked Amount 50.000			Recovery	=	120.70%	99.43%
Target Compounds						
1) Methyl t-Butyl E	8.31	6.24	972929	748388	7.664	6.209
2) Diisopropyl Ethe	8.77	6.48	212388	185060	1.602m	1.502m
3) Benzene	10.21	8.12	17233244	6640008	41.173	27.568 #

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

EFFLUENT

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9913147

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8815.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec. _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

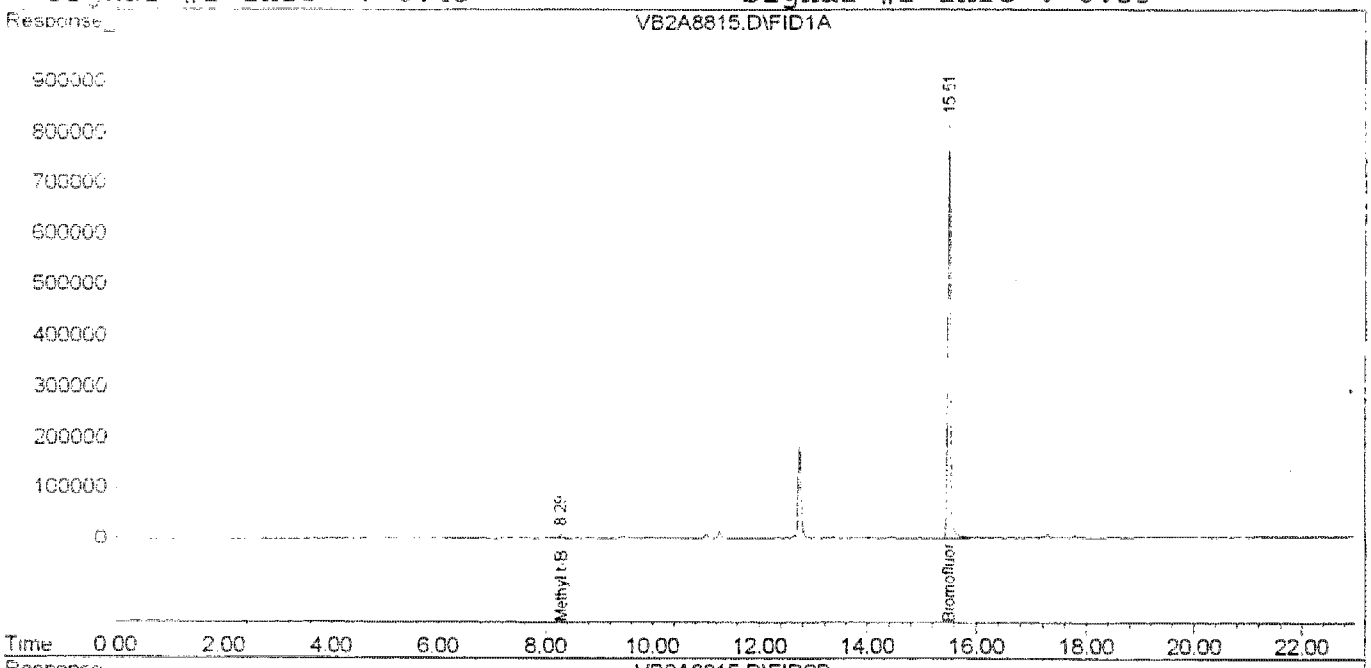
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

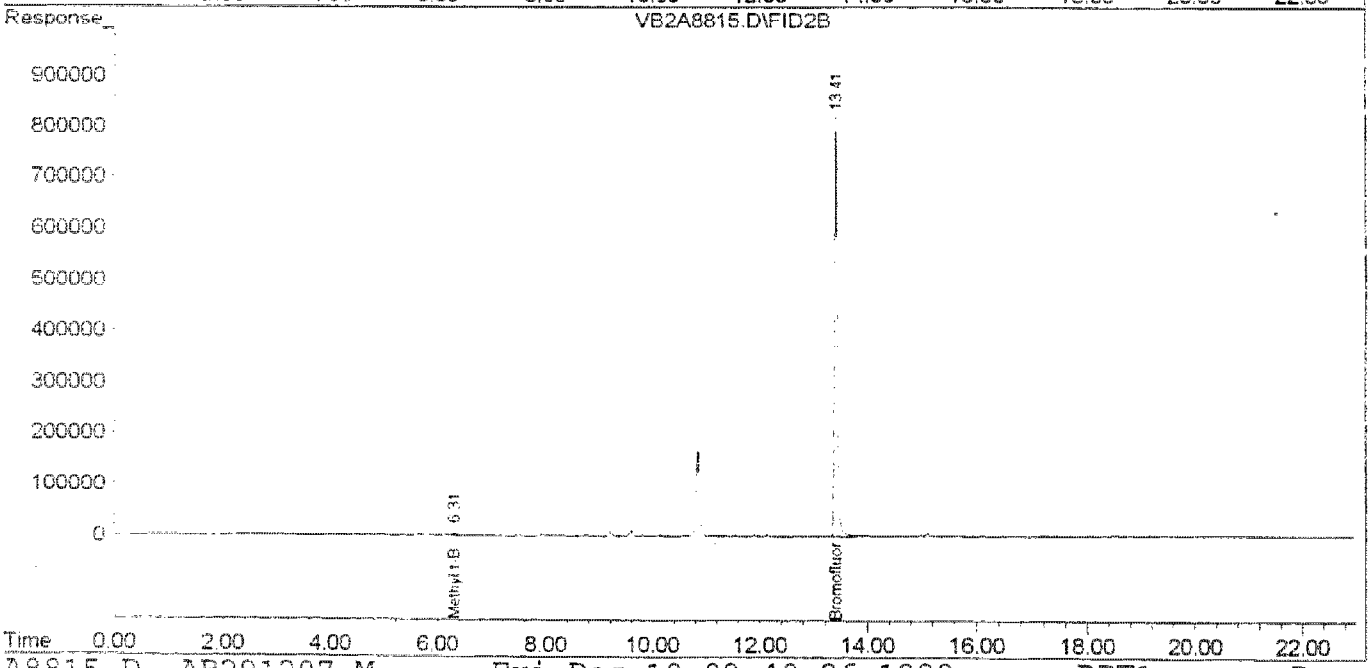
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8815.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8815.D\FID2B.CH
Acq On : 9 Dec 1999 2:25 pm Operator: MER
Sample : 9913147 Inst : VB2
Misc : RPT#991717 EFFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 15:04 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030014

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8815.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8815.D\FID2B.CH
Acq On : 9 Dec 1999 2:25 pm Operator: MER
Sample : 9913147 Inst : VB2
Misc : RPT#991717 EFFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 15:04 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	15.51	13.41	28271933	28704574	53.747m	48.356m
Spiked Amount 50.000			Recovery	=	107.49%	96.71%
Target Compounds						
1) Methyl t-Butyl E	8.29	6.31	298314	219654	2.350m	1.822m

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

INFLUENT

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix (soil/water): WATER Lab Sample ID: 9913145

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8833.D

Level (low/med): LOW Date Received: 12/4/99

% Moisture: not dec. Date Analyzed: 12/10/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

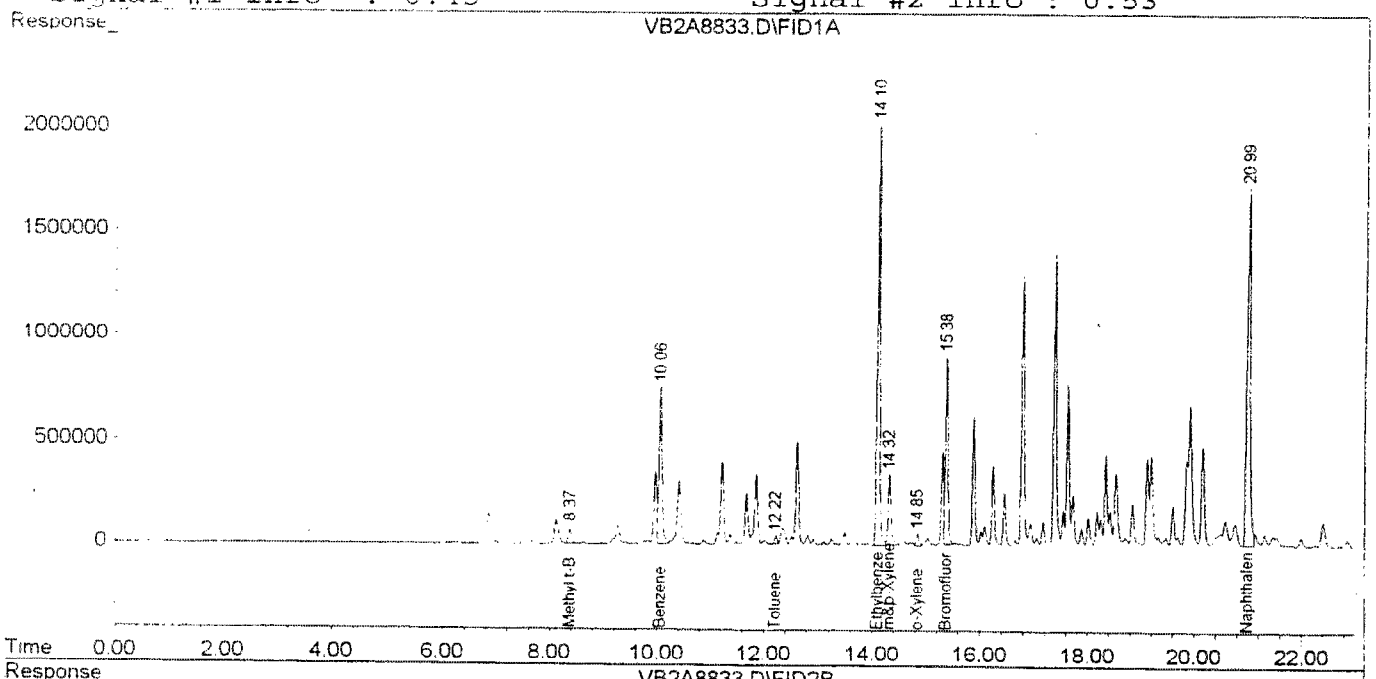
CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	74	
108-88-3	Toluene	2	
100-41-4	Ethylbenzene	140	
91-20-3	Naphthalene	130	
	m&p-Xylenes	24	
95-47-6	o-Xylene	4	

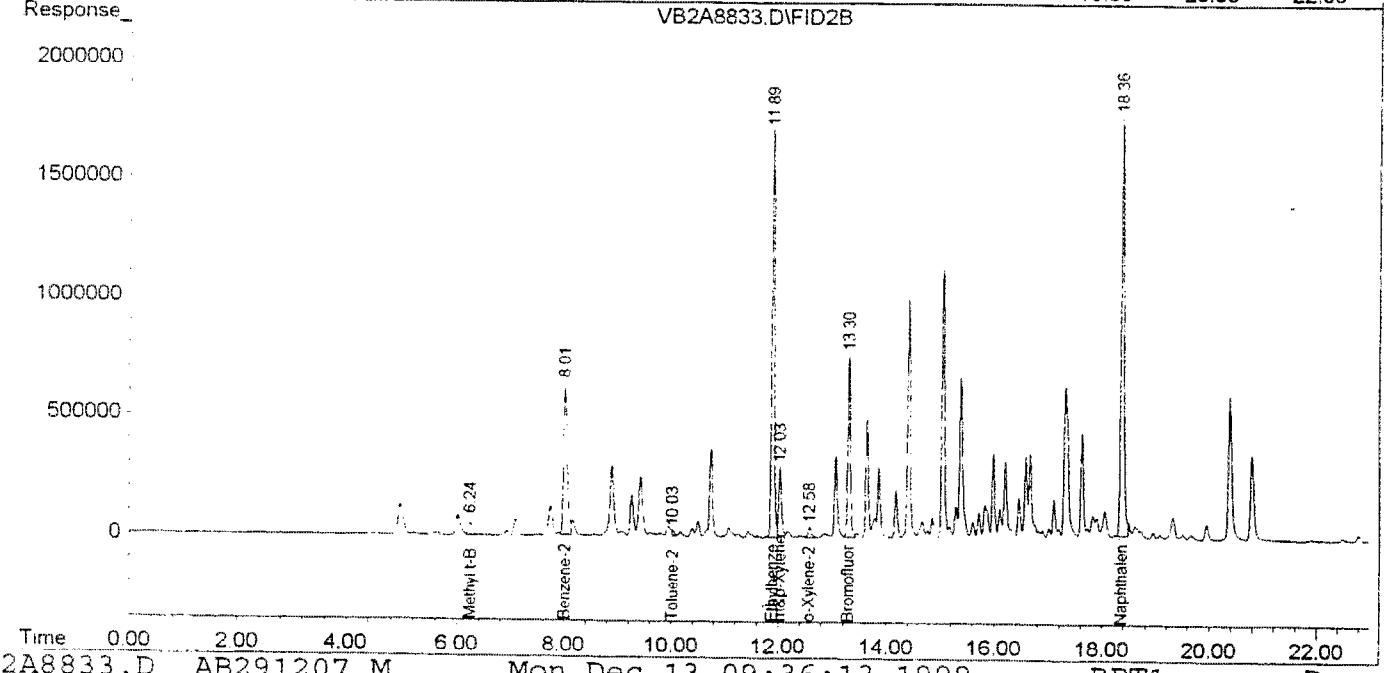
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8833.D\FID1A.CH Vial: 7
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8833.D\FID2B.CH
Acq On : 10 Dec 1999 4:25 pm Operator: MER
Sample : 9913145 Inst : VB2
Misc : RPT#991717 INFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:35 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8833.D\FID1A.CH Vial: 7
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8833.D\FID2B.CH
Acq On : 10 Dec 1999 4:25 pm Operator: MER
Sample : 9913145 Inst : VB2
Misc : RPT#991717 INFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:35 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.38	13.30	29395816	24672762	55.883m	41.564m#
Spiked Amount	50.000			Recovery	=	111.77%	83.13%
	Target Compounds						
1)	Methyl t-Butyl E	8.37	6.24	3092179	2744565	24.358m	22.770m
3)	Benzene	10.06	8.01	30768366	29470263	73.511m	122.354m#
4)	Toluene	12.22	10.03	1215919	670143	2.444m	1.166m#
6)	Ethylbenzene	14.10	11.89	66836438	58639676	143.519m	109.096m
7)	m&p-Xylenes	14.32	12.03	12573824	9995304	23.643m	16.240m
8)	o-Xylene	14.85	12.58	2084634	2046196	4.172m	3.589
13)	Naphthalene	20.99	18.36	73052171	64987811	132.599m	104.072m

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

C. Standards Data

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:13:10 1999

Calibration Files
5 =VB2A8776.D 50 =VB2A8775.D 100 =VB2A8777.D
200 =VB2A8778.D 0.9 =VB2A8774.D

		Compound	5	50	100	200	0.9	Avg		%RSD
1)		Methyl t-Butyl Ether	1.097	1.397	1.266	1.251	1.337	1.269	E5	8.90
2)		Diisopropyl Ether	1.145	1.457	1.332	1.275	1.419	1.326	E5	9.33
3)	T	Benzene	4.574	5.502	3.743	2.609	4.500	4.186	E5	25.80
4)	T	Toluene	4.682	5.663	4.703	4.559	5.273	4.976	E5	9.51
5)		Chlorobenzene	5.531	6.587	5.570	5.304	6.085	5.816	E5	8.90
6)	T	Ethylbenzene	4.460	5.269	4.356	4.213	4.987	4.657	E5	9.66
7)		m&p-Xylenes	5.323	6.038	4.860	4.401	5.968	5.318	E5	13.27
8)		o-Xylene	4.886	5.705	4.785	4.427	5.178	4.996	E5	9.58
9)	S	Bromofluorobenzene	4.944	6.206	5.168	4.419	5.564	5.260	E5	12.76
10)		1,3-Dichlorobenzene	5.357	6.097	4.899	4.228	6.116	5.340	E5	15.12
11)		1,4-Dichlorobenzene	6.646	7.233	5.856	5.213	7.499	6.490	E5	14.68
12)		1,2-Dichlorobenzene	5.077	5.565	4.527	3.713	5.162	4.809	E5	14.88
13)		Naphthalene	6.312	5.686	5.027	5.004	5.517	5.509	E5	9.79

AVG 12.48

Signal #2 Calibration Files
5 =VB2A8776.D 50 =VB2A8775.D 100 =VB2A8777.D
200 =VB2A8778.D 0.9 =VB2A8774.D

		Compound	5	50	100	200	0.9	Avg		%RSD
1)		Methyl t-Butyl Ether-2	1.186	1.236	1.146	1.163	1.296	1.205	E5	5.05
2)		Diisopropyl Ether-2	1.184	1.266	1.136	1.148	1.427	1.232	E5	9.75
3)		Benzene-2	3.596	2.179	1.937	1.975	2.357	2.409	E5	28.43
4)		Toluene-2	6.050	6.073	5.063	5.040	6.515	5.748	E5	11.52
5)		Chlorobenzene-2	6.870	6.866	5.859	5.763	7.484	6.568	E5	11.21
6)		Ethylbenzene-2	5.628	5.603	4.651	4.624	6.369	5.375	E5	13.77
7)		m&p-Xylenes-2	6.617	6.486	5.307	5.011	7.352	6.155	E5	15.80
8)		o-Xylene-2	5.974	5.990	5.039	4.991	6.511	5.701	E5	11.62
9)	S	Bromofluorobenzene-2	6.100	6.476	5.486	4.634	6.984	5.936	E5	15.33
10)		1,3-Dichlorobenzene-2	6.678	6.596	5.391	4.775	7.587	6.205	E5	18.01
11)		1,4-Dichlorobenzene-2	7.809	7.585	6.350	5.815	8.864	7.285	E5	16.66
12)		1,2-Dichlorobenzene-2	5.907	~~5.~~851	4.887	4.361	6.261	5.453	E5	14.58
13)		Naphthalene-2	7.386	5.906	5.464	5.801	6.665	6.244	E5	12.40

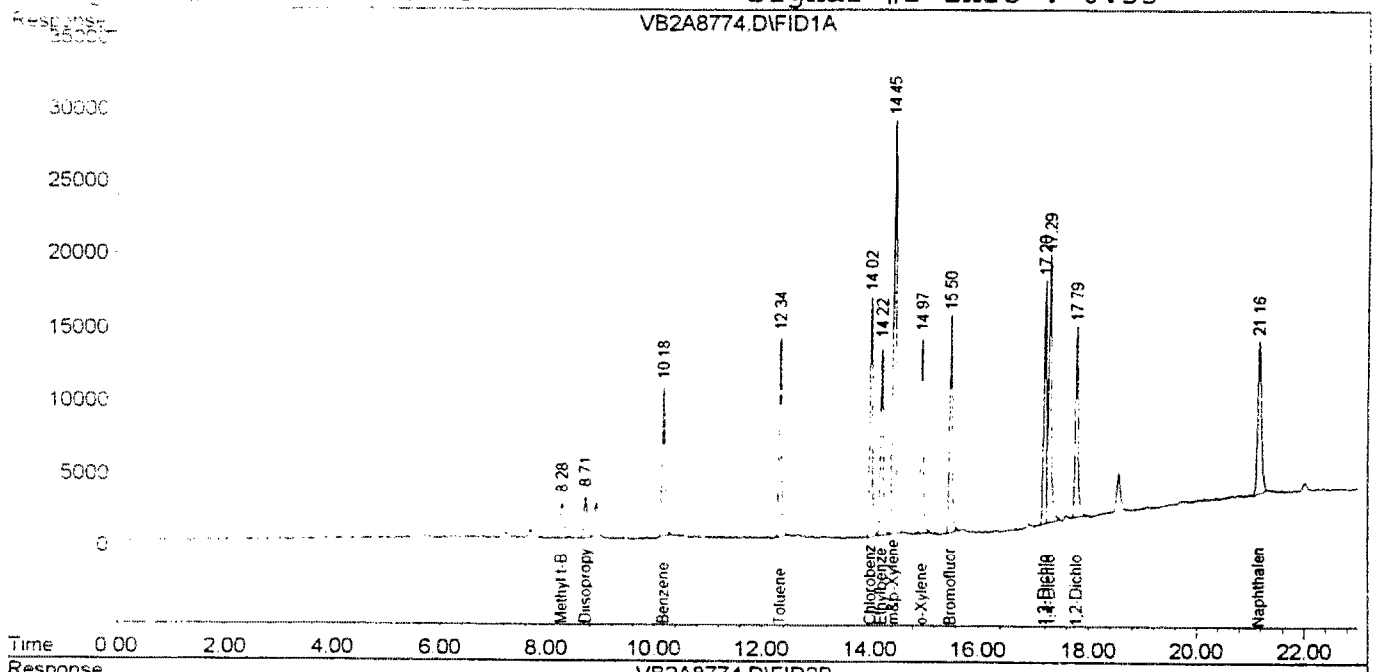
AVG = 14.14

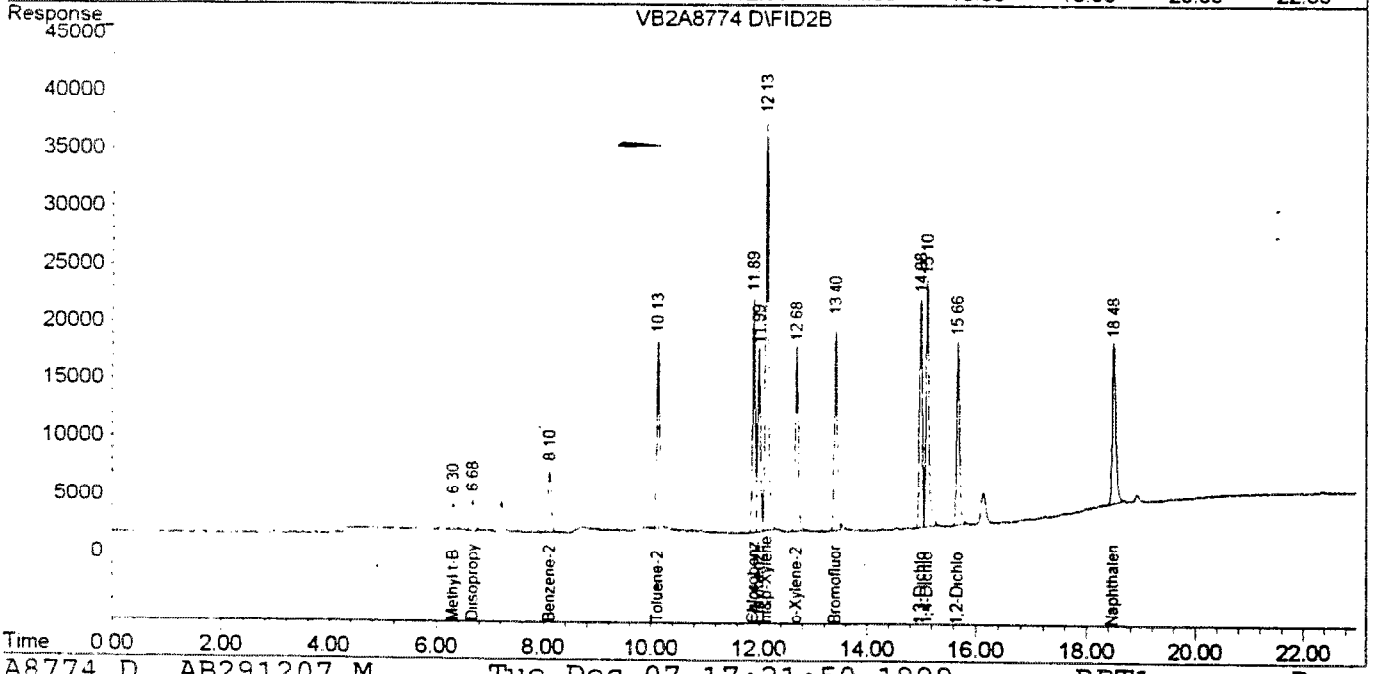
(#) = Out of Range

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8774.D\FID1A.CH Vial: 9
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8774.D\FID2B.CH
Acq On : 7 Dec 1999 2:39 pm Operator: MER
Sample : STD#29044 Inst : VB2
Misc : INITIAL CALIBRATION VSTD0.9,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:12 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030021

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8774.D\FID1A.CH Vial: 9
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8774.D\FID2B.CH
Acq On : 7 Dec 1999 2:39 pm Operator: MER
Sample : STD#29044 Inst : VB2
Misc : INITIAL CALIBRATION VSTD0.9,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:12 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Initial Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

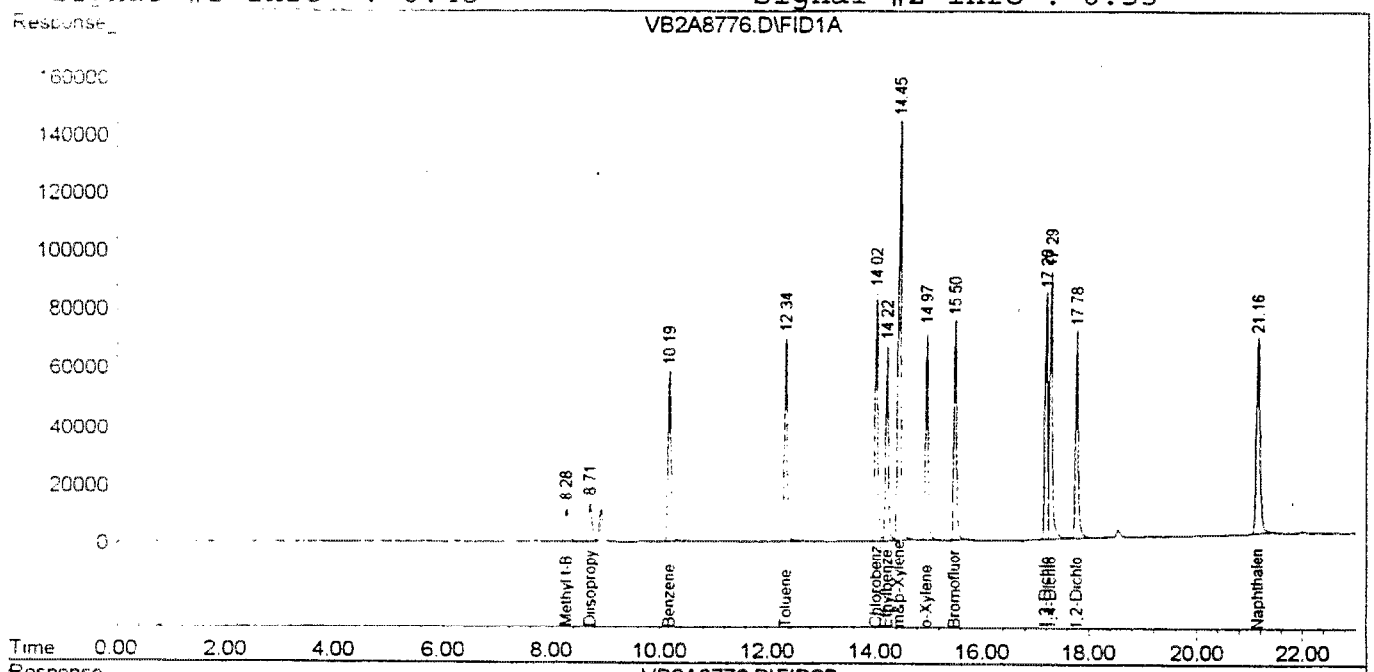
	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.50	13.40	500787	628576	0.923m	0.937m
Spiked Amount	50.000			Recovery	=	1.85%	1.87%
	Target Compounds						
1)	Methyl t-Butyl E	8.28	6.30	120306	116638	0.933m	0.872m
2)	Diisopropyl Ethe	8.71	6.68	127729	128386	0.951m	0.944m
3)	Benzene	10.18	8.10	404994	212095	0.786m	0.478m#
4)	Toluene	12.34	10.13	474547	586306	0.908m	0.877m
5)	Chlorobenzene	14.02	11.89	547688	673536	0.894m	0.877m
6)	Ethylbenzene	14.23	11.99	448874	573208	0.929	0.932
7)	m&p-Xylenes	14.45	12.13	1074296	1323359	1.621m	1.537m
8)	o-Xylene	14.97	12.68	466057	585985	0.886m	0.885m
10)	1,3-Dichlorobenz	17.20	14.98	550458	682821	0.981m	0.955m
11)	1,4-Dichlorobenz	17.29	15.10	674951	797768	0.992m	0.941m
12)	1,2-Dichlorobenz	17.79	15.66	464585	563469	0.920m	0.897m
13)	Naphthalene	21.16	18.48	496524	599839	0.850m	0.826m

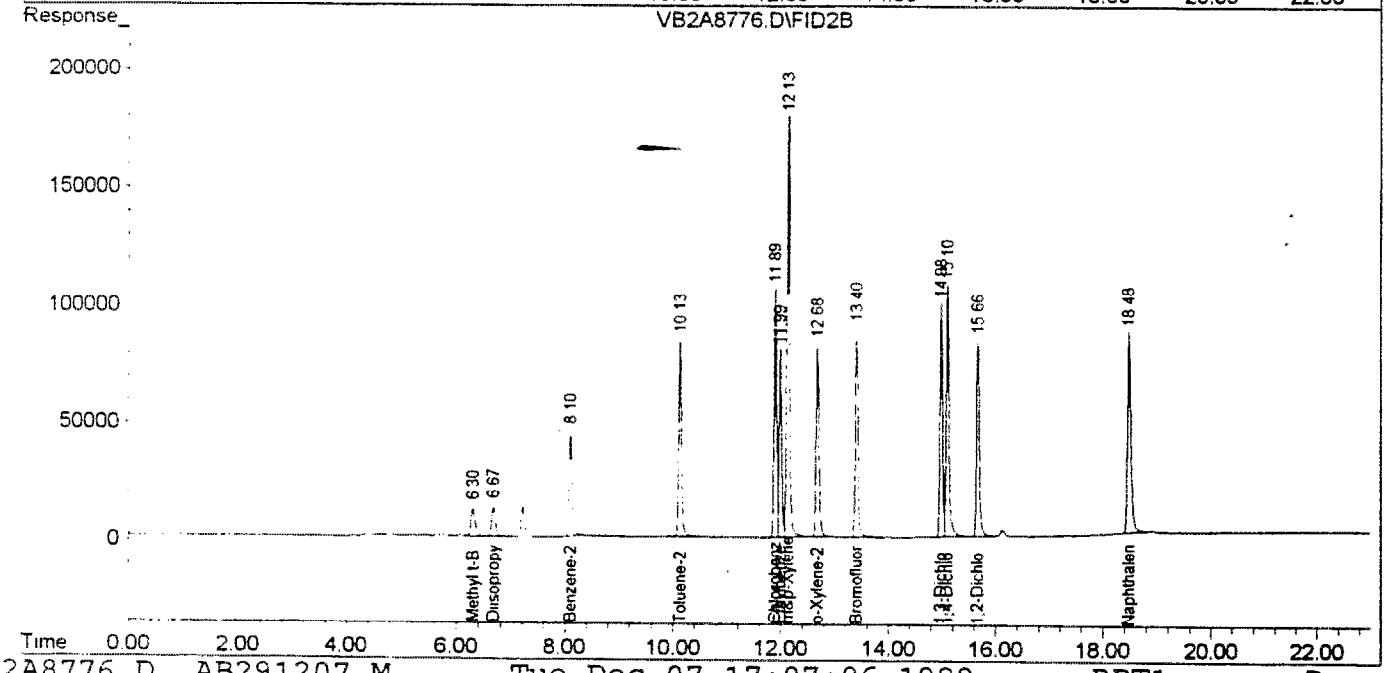
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8776.D\FID1A.CH Vial: 11
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8776.D\FID2B.CH
Acq On : 7 Dec 1999 3:37 pm Operator: MER
Sample : STD#29046 Inst : VB2
Misc : INITIAL CALIBRATION VSTD5.0,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030023

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8776.D\FID1A.CH Vial: 11
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8776.D\FID2B.CH
Acq On : 7 Dec 1999 3:37 pm Operator: MER
Sample : STD#29046 Inst : VB2
Misc : INITIAL CALIBRATION VSTD5.0,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Initial Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

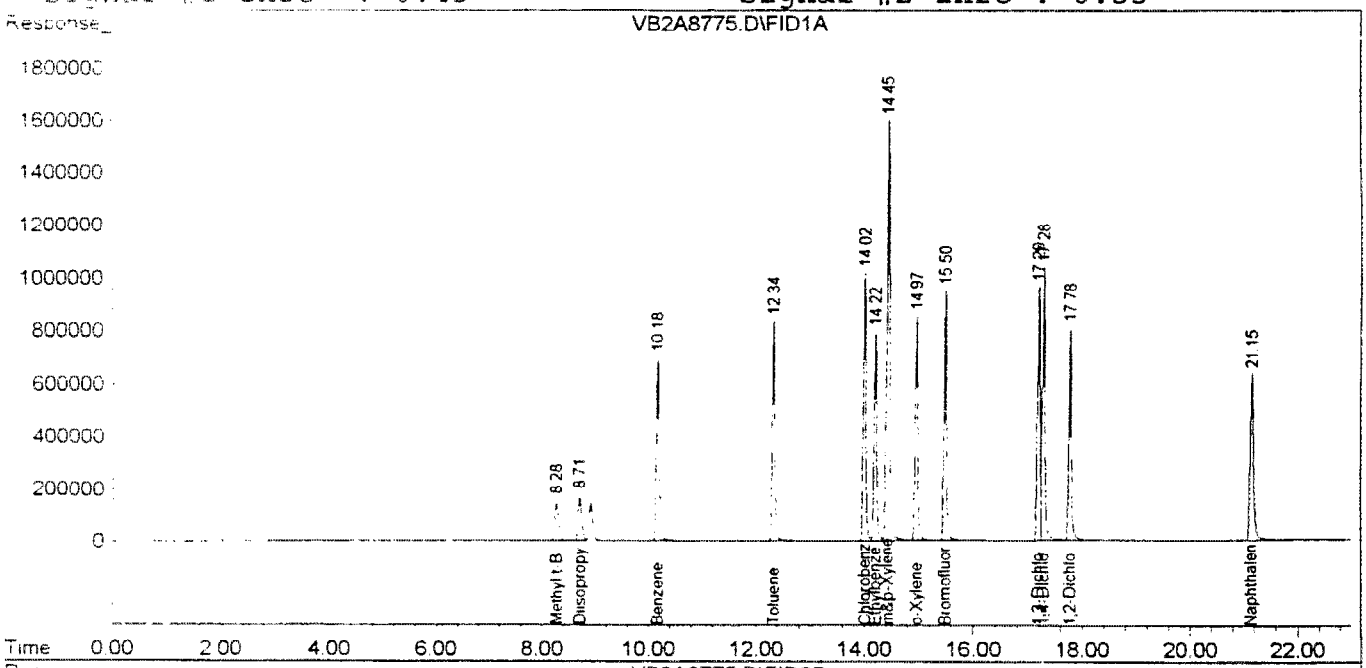
	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.50	13.40	2472002	3050221	4.555	4.548
Spiked Amount	50.000			Recovery	=	9.11%	9.10%
	Target Compounds						
1)	Methyl t-Butyl E	8.28	6.30	548467	593043	4.252	4.435
2)	Diisopropyl Ethe	8.72	6.67	572623	592160	4.265	4.353
3)	Benzene	10.19	8.11	2286961	1797960	4.436	4.049
4)	Toluene	12.35	10.13	2341201	3025219	4.481	4.527
5)	Chlorobenzene	14.02	11.90	2765649	3435186	4.513	4.475
6)	Ethylbenzene	14.23	11.99	2229756	2813960	4.617	4.576
7)	m&p-Xylenes	14.45	12.13	5323454	6617360	8.032	7.687
8)	o-Xylene	14.97	12.68	2442759	2987008	4.641	4.513
10)	1,3-Dichlorobenz	17.20	14.98	2678632	3338946	4.776	4.669
11)	1,4-Dichlorobenz	17.29	15.10	3322898	3904733	4.882	4.607
12)	1,2-Dichlorobenz	17.78	15.66	2538688	2953360	5.026	4.702
13)	Naphthalene	21.16	18.48	3155882	3692932	5.405	5.083

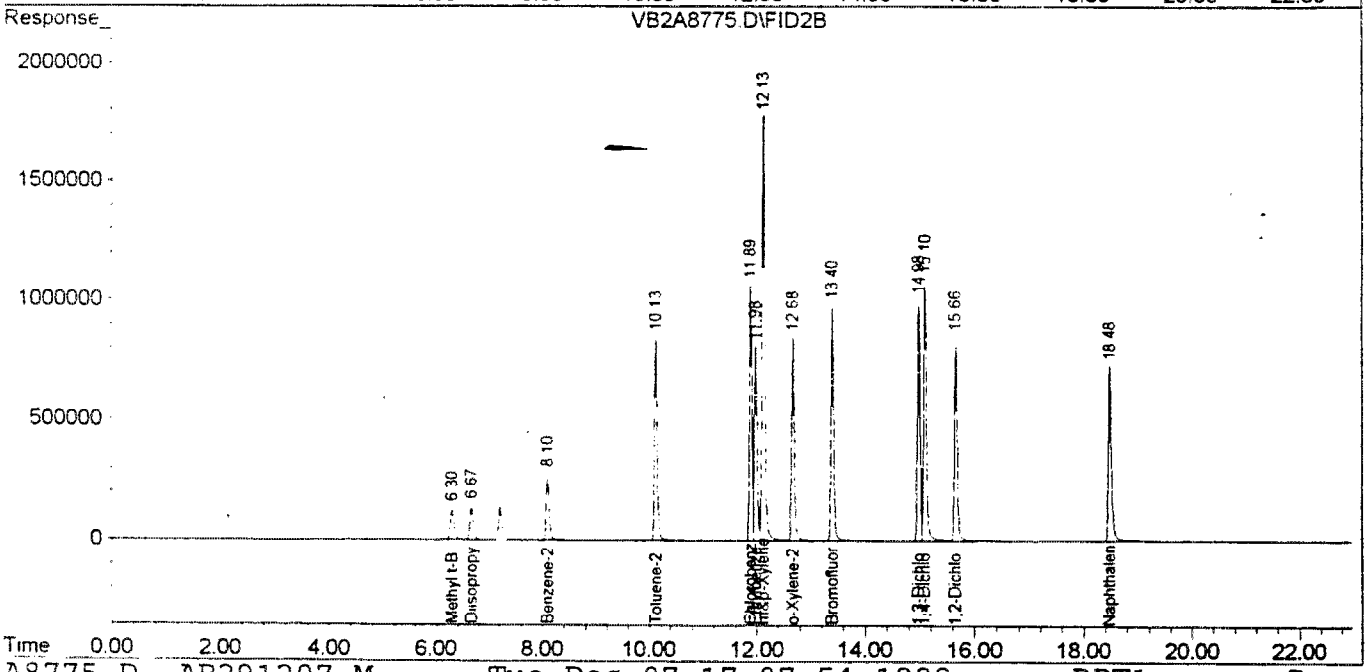
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8775.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8775.D\FID2B.CH
Acq On : 7 Dec 1999 3:08 pm Operator: MER
Sample : STD#29045 Inst : VB2
Misc : INITIAL CALIBRATION VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030025

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8775.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8775.D\FID2B.CH
Acq On : 7 Dec 1999 3:08 pm Operator: MER
Sample : STD#29045 Inst : VB2
Misc : INITIAL CALIBRATION VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Initial Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

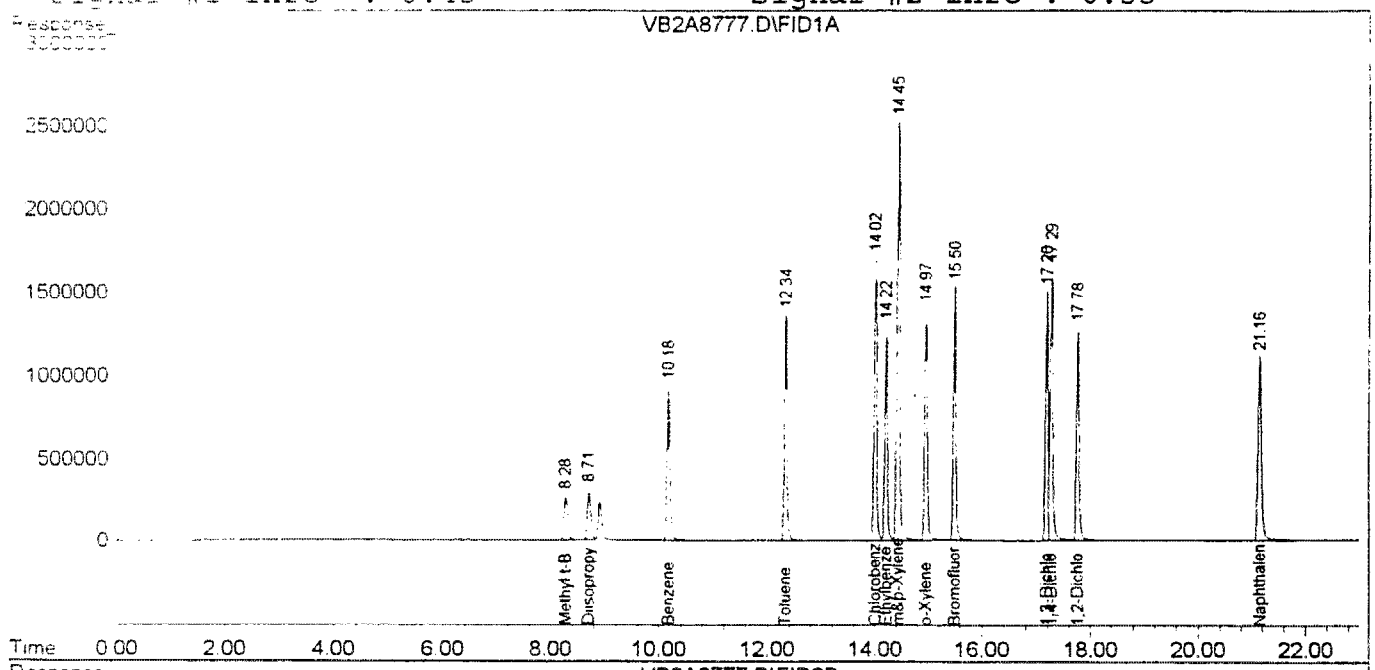
	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9 S	Bromofluorobenze	15.50	13.40	31029529	32379006	57.172	48.277	
Spiked Amount	50.000			Recovery	=	114.34%	96.55%	
	Target Compounds							
1)	Methyl t-Butyl E	8.28	6.30	6987073	6178187	54.172	46.206	
2)	Diisopropyl Ethe	8.71	6.67	7284174	6331423	54.256	46.542	
3)	Benzene	10.19	8.10	27510285	10896743	53.357	24.537	#
4)	Toluene	12.34	10.13	28317452	30366651	54.194	45.436	
5)	Chlorobenzene	14.02	11.89	32935614	34328903	53.745	44.719	
6)	Ethylbenzene	14.22	11.98	26343096	28014223	54.547	45.557	
7)	m&p-Xylenes	14.45	12.13	60379105	64860765	91.097	75.349	
8)	o-Xylene	14.97	12.68	28523926	29952490	54.196	45.252	
10)	1,3-Dichlorobenz	17.20	14.98	30485023	32982019	54.355	46.120	
11)	1,4-Dichlorobenz	17.29	15.10	36166680	37926640	53.131	44.752	
12)	1,2-Dichlorobenz	17.78	15.66	27823966	29253668	55.082	46.577	
13)	Naphthalene	21.15	18.48	28431216	29530972	48.696	40.647	

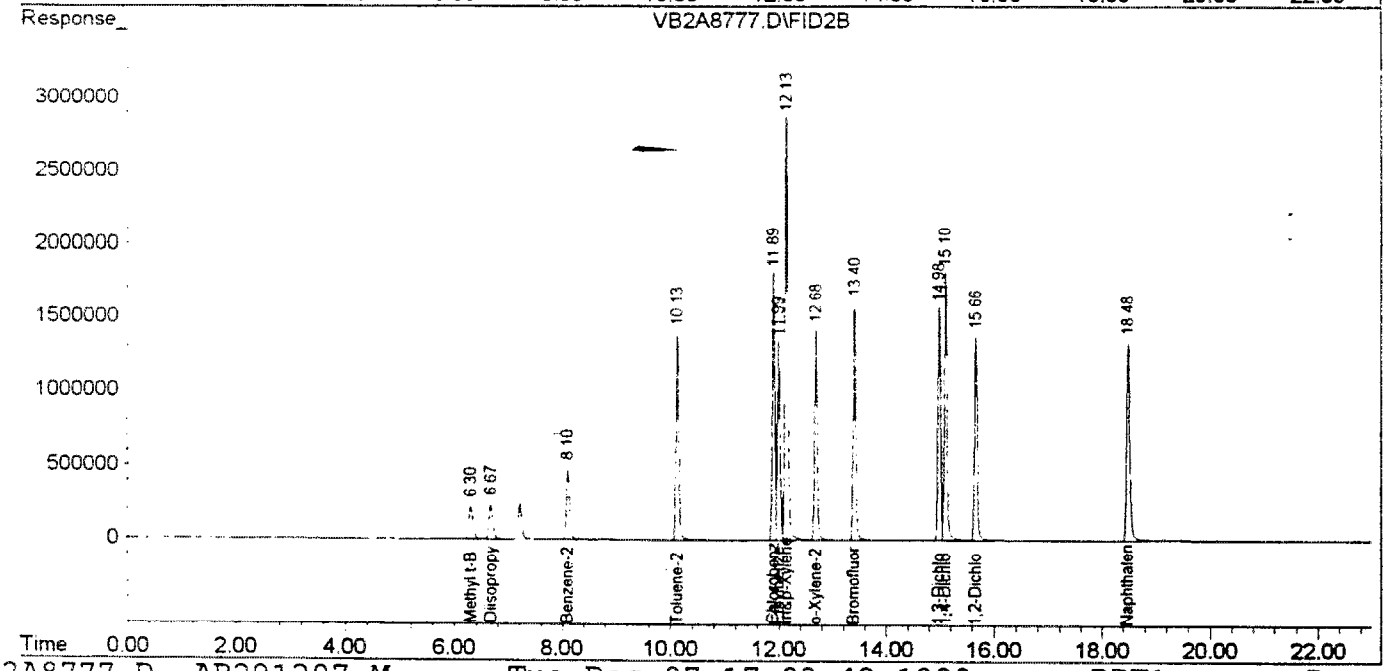
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8777.D\FID1A.CH Vial: 12
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8777.D\FID2B.CH
Acq On : 7 Dec 1999 4:06 pm Operator: MER
Sample : STD#29047 Inst : VB2
Misc : INITIAL CALIBRATION VSTD100,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030027

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8777.D\FID1A.CH Vial: 12
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8777.D\FID2B.CH
Acq On : 7 Dec 1999 4:06 pm Operator: MER
Sample : STD#29047 Inst : VB2
Misc : INITIAL CALIBRATION VSTD100,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:01 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Initial Calibration
Calibrn Meth. : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

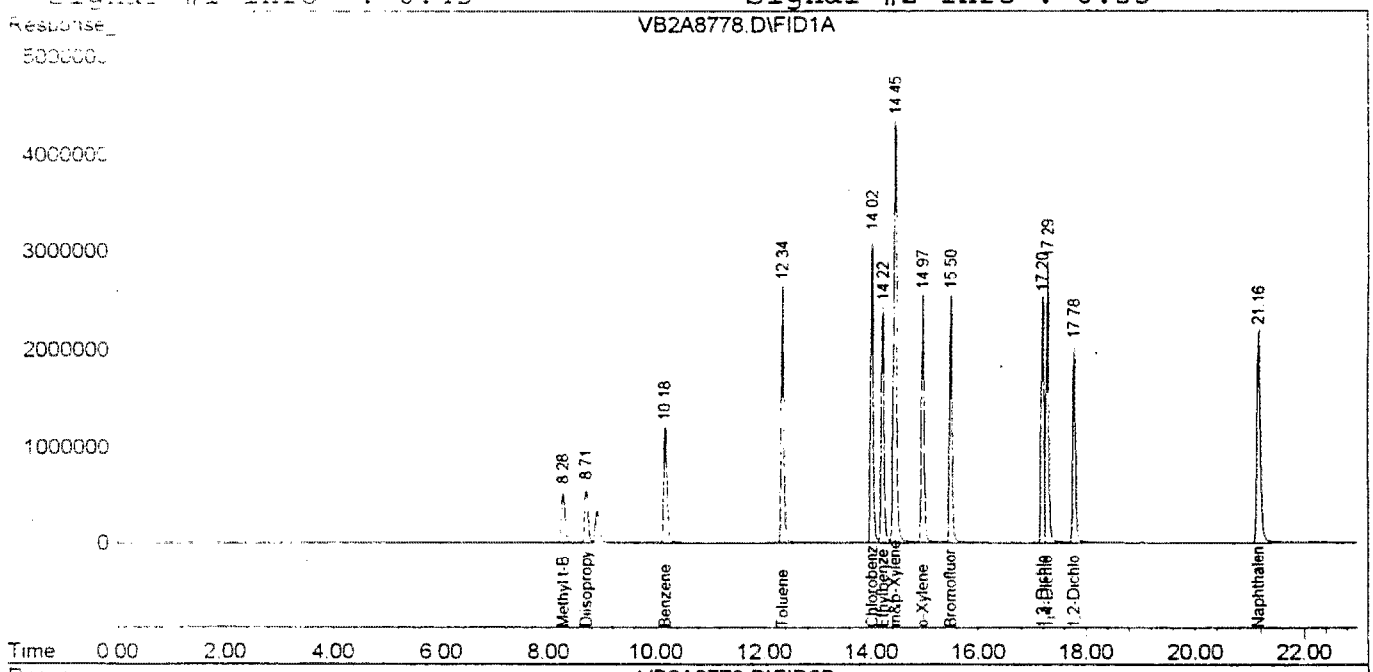
	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9 S	Bromofluorobenze	15.50	13.40	51679155	54856409	95.218	81.790	
Spiked Amount	50.000			Recovery	=	190.44%	163.58%	
	Target Compounds							
1)	Methyl t-Butyl E	8.28	6.30	12657200	11462536	98.133	85.727	
2)	Diisopropyl Ethe	8.71	6.67	13317298	11356883	99.194	83.485	
3)	Benzene	10.18	8.10	37432807	19365862	72.602	43.608	#
4)	Toluene	12.34	10.13	47026123	50626300	89.999	75.750	
5)	Chlorobenzene	14.02	11.89	55701193	58589946	90.895	76.323	
6)	Ethylbenzene	14.22	11.99	43564775	46512684	90.208	75.639	
7)	m&p-Xylenes	14.45	12.13	97203588	106.1E6	146.655	123.310	
8)	o-Xylene	14.97	12.68	47850334	50391942	90.917	76.132	
10)	1,3-Dichlorobenz	17.20	14.98	48985994	53912682	87.343	75.388	
11)	1,4-Dichlorobenz	17.29	15.10	58562716	63498854	86.032	74.926	
12)	1,2-Dichlorobenz	17.78	15.66	45267000	48867083	89.614	77.805	
13)	Naphthalene	21.16	18.48	50273973	54641395	86.107	75.209	

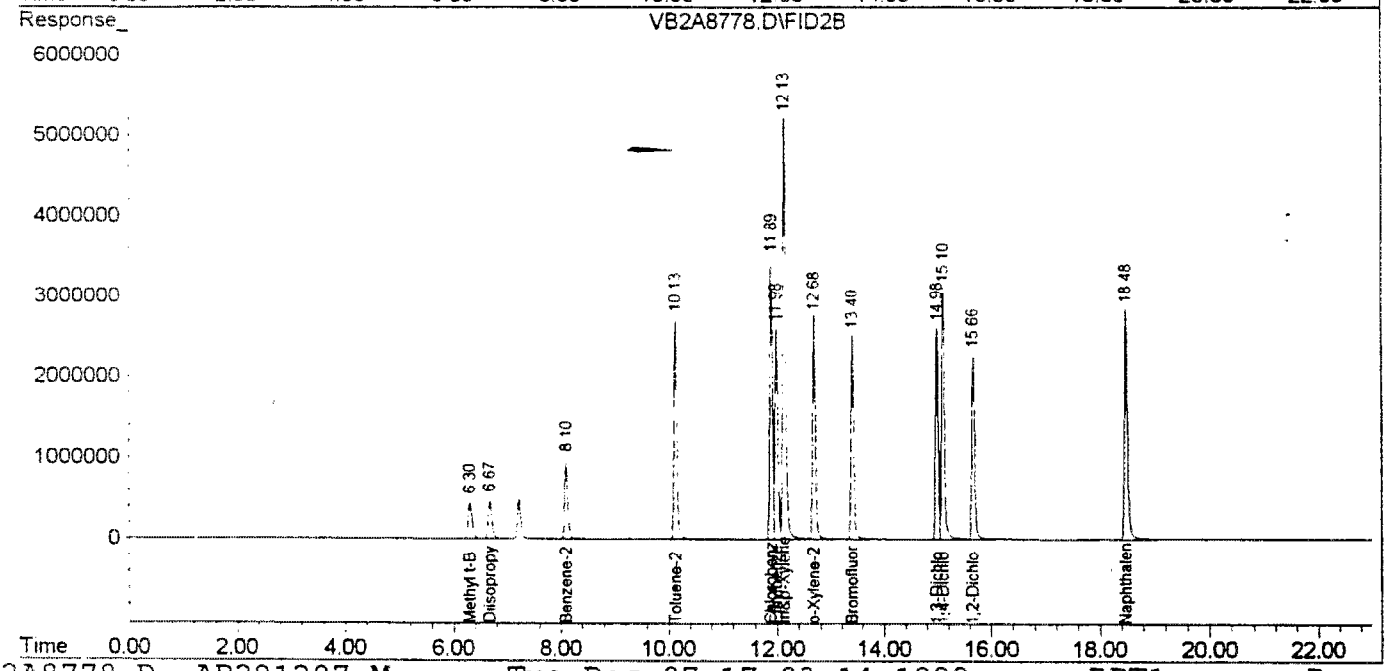
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8778.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8778.D\FID2B.CH
Acq On : 7 Dec 1999 4:35 pm Operator: MER
Sample : STD#29048 Inst : VB2
Misc : INITIAL CALIBRATION VSTD200,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:02 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030029

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8778.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8778.D\FID2B.CH
Acq On : 7 Dec 1999 4:35 pm Operator: MER
Sample : STD#29048 Inst : VB2
Misc : INITIAL CALIBRATION VSTD200,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:02 1999 Quant Results File: AB291206.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291206.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 09:19:00 1999
Response via : Initial Calibration
Calibrat. Meth : AB291206.M

Internal Std. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9 S	Bromofluorobenze	15.50	13.40	88379096	92684723	162.837	138.192
Spiked Amount	50.000			Recovery	=	325.67%	276.38%
	Target Compounds						
1	Methyl t-Butyl E	8.28	6.30	25010855	23254692	193.913	173.920
2	Diisopropyl Ethe	8.71	6.68	25491230	22951258	189.872	168.715
3	Benzene	10.19	8.10	52170256	39490502	101.186	88.924
4	Toluene	12.34	10.13	91185803	100.8E6	174.513	150.838
5	Chlorobenzene	14.02	11.89	106.1E6	115.3E6	173.106	150.138
6	Ethylbenzene	14.22	11.99	84254716	92484534	174.462	150.399
7	m&p-Xylenes	14.45	12.13	176.0E6	200.4E6	265.582	232.844
8	o-Xylene	14.97	12.68	88538132	99818404	168.226	150.805
10	1,3-Dichlorobenz	17.20	14.98	84568793	95493169	150.788	133.531
11	1,4-Dichlorobenz	17.29	15.10	104.3E6	116.3E6	153.166	137.237
12	1,2-Dichlorobenz	17.78	15.66	74265981	87215188	147.022	138.862
13	Naphthalene	21.16	18.48	100.1E6	116.0E6	171.408	159.699

(*)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID1A.CH Vial: 14
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID2B.CH
Acq On : 7 Dec 1999 5:04 pm Operator: MER
Sample : VI912073 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	126.947	103.748	E3	R	18.3#	74	0.00
2		Diisopropyl Ether	132.552	131.157	E3	R	1.1	90	0.00
3	m	Benzene	418.554	404.331	E3	R	3.4	73	0.00
4	m	Toluene	497.611	489.556	E3	R	1.6	86	0.00
5		Chlorobenzene	581.560	579.219	E3	R	0.4	88	0.00
6	m	Ethylbenzene	465.697	473.646	E3	R	-1.7	90	0.00
7		m&p-Xylenes	531.811	567.992	E3	R	-6.8	94	0.00
8		o-Xylene	499.613	549.502	E3	R	-10.0	96	0.00
9	s	Bromofluorobenzene	526.022	593.998	E3	R	-12.9	96	0.00
10		1,3-Dichlorobenzene	533.950	582.479	E3	R	-9.1	96	0.00
11		1,4-Dichlorobenzene	648.959	691.510	E3	R	-6.6	96	0.00
12		1,2-Dichlorobenzene	480.884	550.705	E3	R	-14.5	99	0.00
13		Naphthalene	550.924	600.410	E3	R	-9.0	106	0.00

AVG = 7.34

Signal #2

1		Methyl t-Butyl Ether-2	120.534	121.331	E3	R	-0.7	98	0.00
2		Diisopropyl Ether-2	123.207	126.917	E3	R	-3.0	100	0.00
3		Benzene-2	240.860	212.788	E3	R	11.7	98	0.00
4		Toluene-2	574.828	572.088	E3	R	0.5	94	0.00
5		Chlorobenzene-2	656.833	661.808	E3	R	-0.8	96	0.00
6		Ethylbenzene-2	537.505	527.998	E3	R	1.8	94	0.00
7		m&p-Xylenes-2	615.471	614.340	E3	R	0.2	95	0.00
8		o-Xylene-2	570.111	578.476	E3	R	-1.5	97	0.00
9	S	Bromofluorobenzene-2	593.606	613.770	E3	R	-3.4	95	0.00
10		1,3-Dichlorobenzene-2	620.542	640.607	E3	R	-3.2	97	0.00
11		1,4-Dichlorobenzene-2	728.482	725.245	E3	R	0.4	96	0.00
12		1,2-Dichlorobenzene-2	545.314	580.928	E3	R	-6.5	99	0.00
13		Naphthalene-2	624.447	629.395	E3	R	-0.8	107	0.00

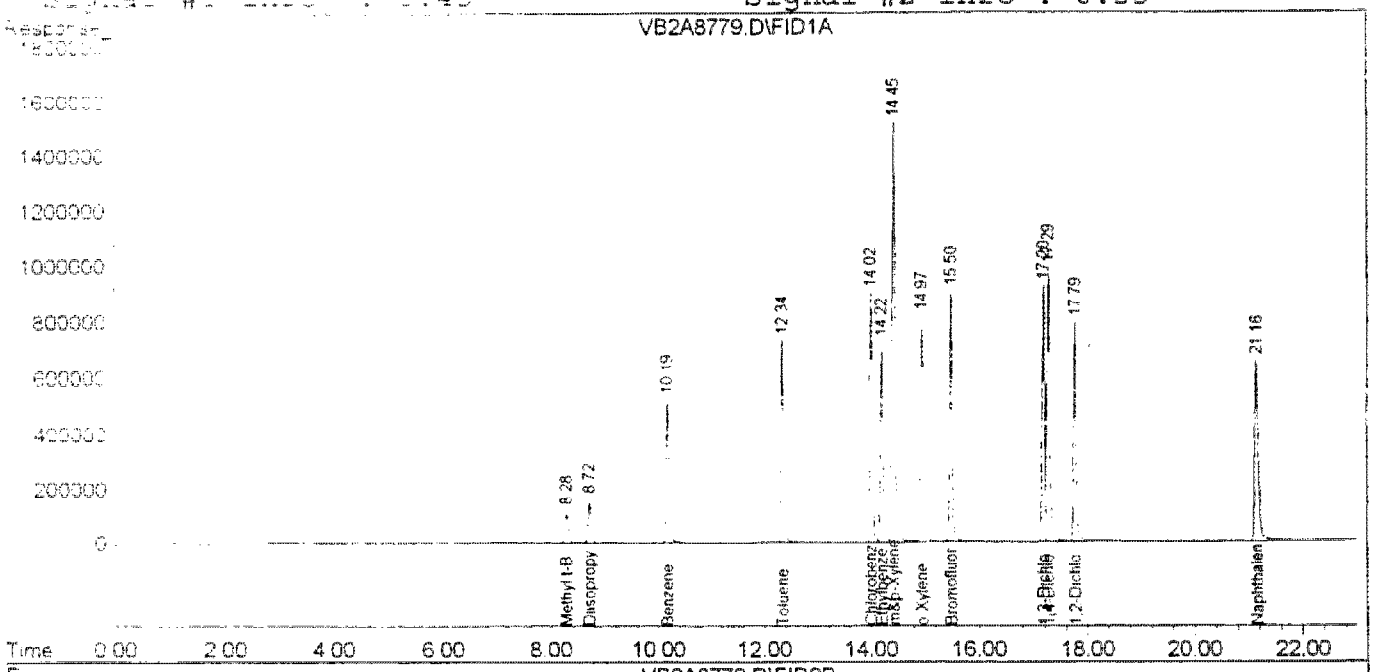
AVG = 2.65

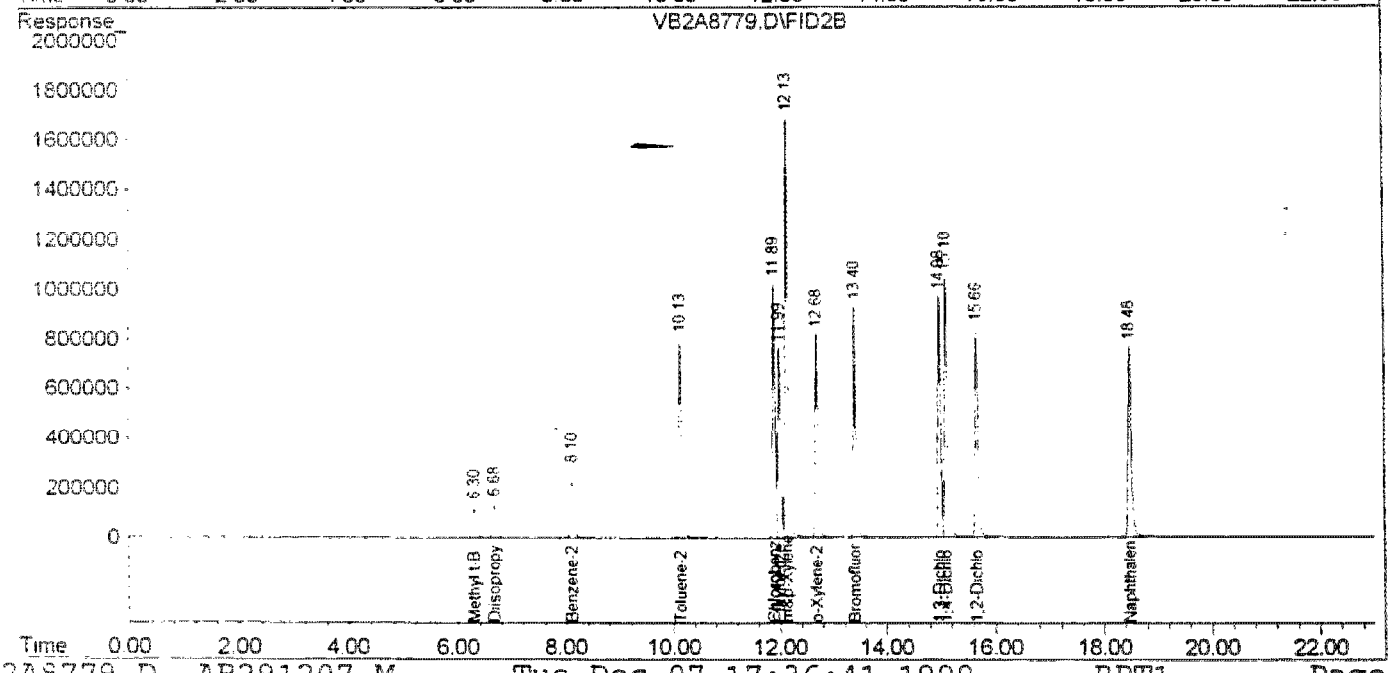
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID1A.CH Vial: 14
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID2B.CH
Acq On : 7 Dec 1999 5:04 pm Operator: MER
Sample : VI912073 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:35 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response Via : Multiple Level Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 1.45 Signal #2 Info : 0.53





030032

Signal #1 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID1A.CH Vial: 14
Signal #2 : O:\ORG\VOA\VB2\07DEC99\VB2A8779.D\FID2B.CH
Acq On : 7 Dec 1999 5:04 pm Operator: MER
Sample : VI912073 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 7 17:35 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291206.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.50	13.40	29699895	30688504	56.461	51.698
Spiked Amount	50.000			Recovery	=	112.92%	103.40%
	Target Compounds						
1)	Methyl t-Butyl E	8.29	6.31	5187403	6066560	40.863	50.331
2)	Diisopropyl Ethe	8.72	6.68	6557856	6345857	49.474	51.506
3)	Benzene	10.19	8.10	20216562	10639409	48.301	44.173
4)	Toluene	12.34	10.13	24477814	28604408	49.191	49.762
5)	Chlorobenzene	14.02	11.89	28960950	33090383	49.799	50.379
	Ethylbenzene	14.23	11.99	23682279	26399890	50.853	49.116
	m&p-Xylenes	14.45	12.13	56799183	61433966	106.803	99.816
8)	o-Xylene	14.97	12.68	27475082	28923779	54.993	50.734
10)	1,3-Dichlorobenz	17.20	14.98	29123934	32030365	54.544	51.617
11)	1,4-Dichlorobenz	17.29	15.10	34575477	36262236	53.278	49.778
12)	1,2-Dichlorobenz	17.79	15.66	27535266	29046419	57.260	53.266
13)	Naphthalene	21.16	18.48	30020483	31469729	54.491	50.396

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

030033

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID1A.CH Vial: 2
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID2B.CH
Acq On : 9 Dec 1999 9:57 am Operator: MER
Sample : STD#29077 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	126.947	135.616	E3	R	-6.8	97	0.07
2		Diisopropyl Ether	132.552	154.204	E3	R	-16.3#	106	0.07
3	m	Benzene	418.554	511.007	E3	R	-22.1#	93	0.07
4	m	Toluene	497.611	543.244	E3	R	-9.2	96	0.07
5		Chlorobenzene	581.560	652.629	E3	R	-12.2	99	0.07
6	m	Ethylbenzene	465.697	519.589	E3	R	-11.6	99	0.07
7		m&p-Xylenes	531.811	609.967	E3	R	-14.7	101	0.07
8		o-Xylene	499.613	592.454	E3	R	-18.6#	104	0.07
9	s	Bromofluorobenzene	526.022	630.501	E3	R	-19.9#	102	0.07
10		1,3-Dichlorobenzene	533.950	623.872	E3	R	-16.8#	102	0.06
11		1,4-Dichlorobenzene	648.959	723.074	E3	R	-11.4	100	0.06
12		1,2-Dichlorobenzene	480.884	573.386	E3	R	-19.2#	103	0.07
13		Naphthalene	550.924	613.323	E3	R	-11.3	108	0.09

AVG = 14.62

Signal #2

1		Methyl t-Butyl Ether-2	120.534	129.582	E3	R	-7.5	105	0.05
2		Diisopropyl Ether-2	123.207	132.243	E3	R	-7.3	104	0.05
3		Benzene-2	240.860	224.619	E3	R	6.7	103	0.05
4		Toluene-2	574.828	585.098	E3	R	-1.8	96	0.05
5		Chlorobenzene-2	656.833	668.986	E3	R	-1.9	97	0.05
6		Ethylbenzene-2	537.505	538.765	E3	R	-0.2	96	0.05
7		m&p-Xylenes-2	615.471	625.241	E3	R	-1.6	96	0.05
8		o-Xylene-2	570.111	581.268	E3	R	-2.0	97	0.05
9	S	Bromofluorobenzene-2	593.606	617.730	E3	R	-4.1	95	0.05
10		1,3-Dichlorobenzene-2	620.542	642.762	E3	R	-3.6	97	0.05
11		1,4-Dichlorobenzene-2	728.482	736.303	E3	R	-1.1	97	0.05
12		1,2-Dichlorobenzene-2	545.314	568.576	E3	R	-4.3	97	0.05
13		Naphthalene-2	624.447	606.400	E3	R	2.9	103	0.05

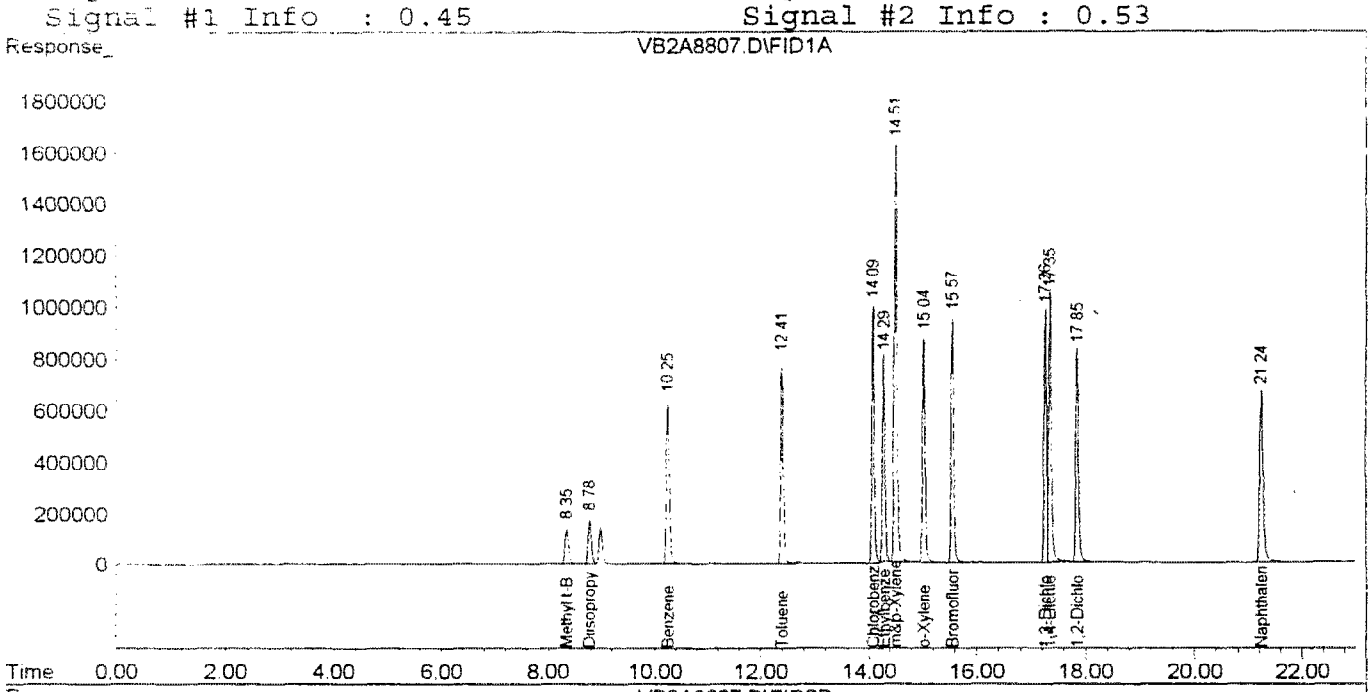
AVG = 3.15

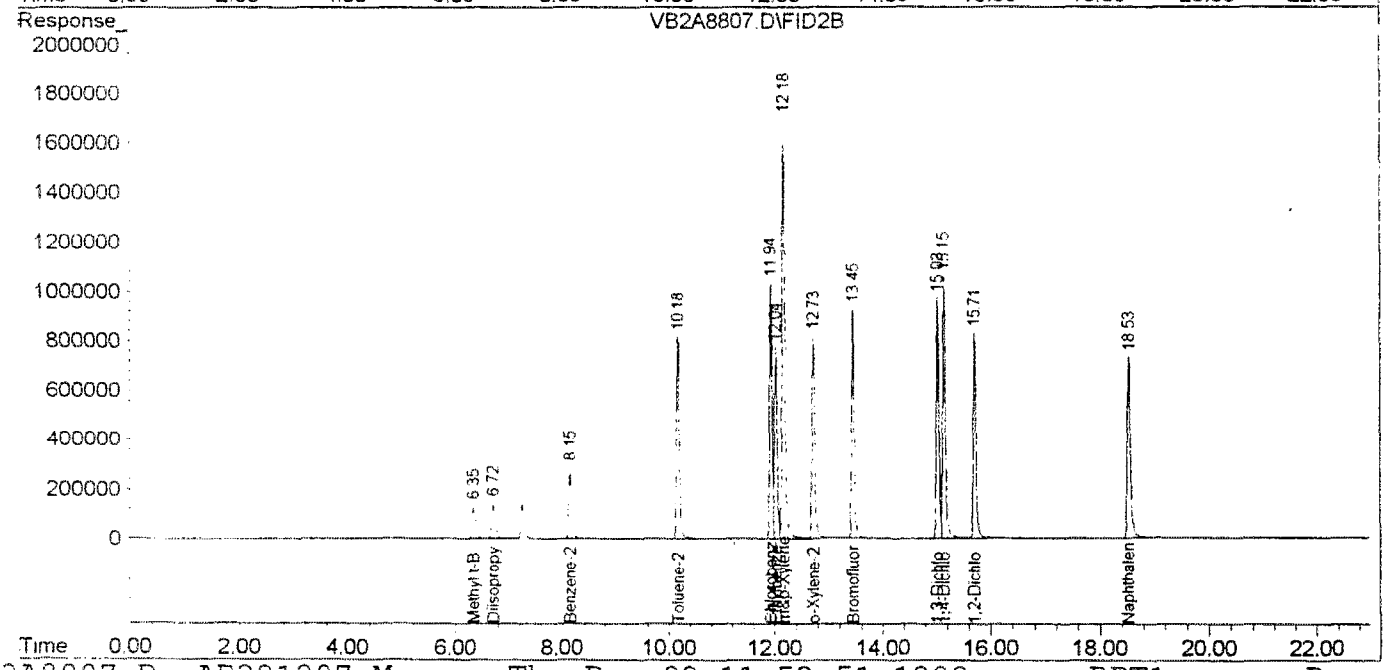
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID1A.CH Vial: 2
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID2B.CH
Acq On : 9 Dec 1999 9:57 am Operator: MER
Sample : STD#29077 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 11:49 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030035

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID1A.CH Vial: 2
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8807.D\FID2B.CH
Acq On : 9 Dec 1999 9:57 am Operator: MER
Sample : STD#29077 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 11:49 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.57	13.45	31525039	30886504	59.931m	52.032
Spiked Amount	50.000			Recovery	=	119.86%	104.06%
	Target Compounds						
1)	Methyl t-Butyl E	8.35	6.35	6780805	6479100	53.414	53.753
2)	Diisopropyl Ethe	8.78	6.72	7710214	6612158	58.168m	53.667
3)	Benzene	10.25	8.15	25550349	11230949	61.044m	46.629
4)	Toluene	12.41	10.18	27162181	29254882	54.585m	50.893
5)	Chlorobenzene	14.09	11.94	32631432	33449291	56.110m	50.925
6)	Ethylbenzene	14.29	12.04	25979452	26938274	55.786m	50.117m
7)	m&p-Xylenes	14.51	12.18	60996663	62524071	114.696m	101.587
8)	o-Xylene	15.04	12.73	29622702	29063412	59.291m	50.978
10)	1,3-Dichlorobenz	17.26	15.03	31193605	32138098	58.420m	51.790
11)	1,4-Dichlorobenz	17.35	15.15	36153719	36815143	55.710m	50.537
12)	1,2-Dichlorobenz	17.85	15.71	28669307	28428797	59.618m	52.133
13)	Naphthalene	21.24	18.53	30666166	30319991	55.663m	48.555

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID1A.CH Vial: 21
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID2B.CH
Acq On : 9 Dec 1999 7:44 pm Operator: MER
Sample : STD#29080 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	126.947	145.280	E3	R	-14.4	104	0.02
2		Diisopropyl Ether	132.552	157.414	E3	R	-18.8#	108	0.02
3	m	Benzene	418.554	333.546	E3	R	20.3#	61	0.02
4	m	Toluene	497.611	553.797	E3	R	-11.3	98	0.02
5		Chlorobenzene	581.560	665.648	E3	R	-14.5	101	0.02
6	m	Ethylbenzene	465.697	525.480	E3	R	-12.8	100	0.02
7		m&p-Xylenes	531.811	608.239	E3	R	-14.4	101	0.02
8		o-Xylene	499.613	591.239	E3	R	-18.3#	104	0.02
9	s	Bromofluorobenzene	526.022	637.626	E3	R	-21.2#	103	0.02
10		1,3-Dichlorobenzene	533.950	638.084	E3	R	-19.5#	105	0.02
11		1,4-Dichlorobenzene	648.959	729.956	E3	R	-12.5	101	0.02
12		1,2-Dichlorobenzene	480.884	584.581	E3	R	-21.6#	105	0.02
13		Naphthalene	550.924	625.927	E3	R	-13.6	110	0.04

AVG = 16.40

Signal #2

1		Methyl t-Butyl Ether-2	120.534	118.817	E3	R	1.4	96	0.02
2		Diisopropyl Ether-2	123.207	120.806	E3	R	1.9	95	0.02
3		Benzene-2	240.860	200.699	E3	R	16.7#	92	0.02
4		Toluene-2	574.828	530.334	E3	R	7.7	87	0.01
5		Chlorobenzene-2	656.833	614.741	E3	R	6.4	90	0.02
6		Ethylbenzene-2	537.505	491.338	E3	R	8.6	88	0.02
7		m&p-Xylenes-2	615.471	568.206	E3	R	7.7	88	0.02
8		o-Xylene-2	570.111	532.594	E3	R	6.6	89	0.02
9	S	Bromofluorobenzene-2	593.606	576.790	E3	R	2.8	89	0.02
10		1,3-Dichlorobenzene-2	620.542	585.343	E3	R	5.7	89	0.02
11		1,4-Dichlorobenzene-2	728.482	672.187	E3	R	7.7	89	0.02
12		1,2-Dichlorobenzene-2	545.314	526.698	E3	R	3.4	90	0.02
13		Naphthalene-2	624.447	560.406	E3	R	10.3	95	0.02

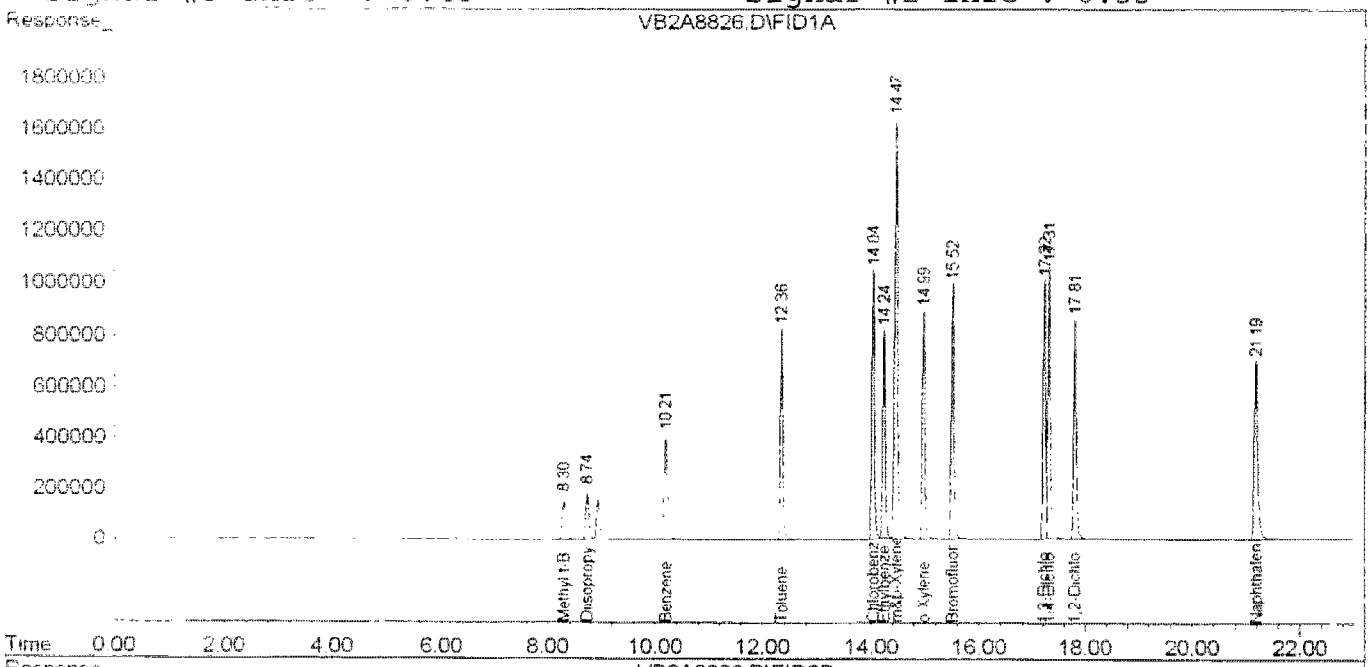
AVG = 6.68

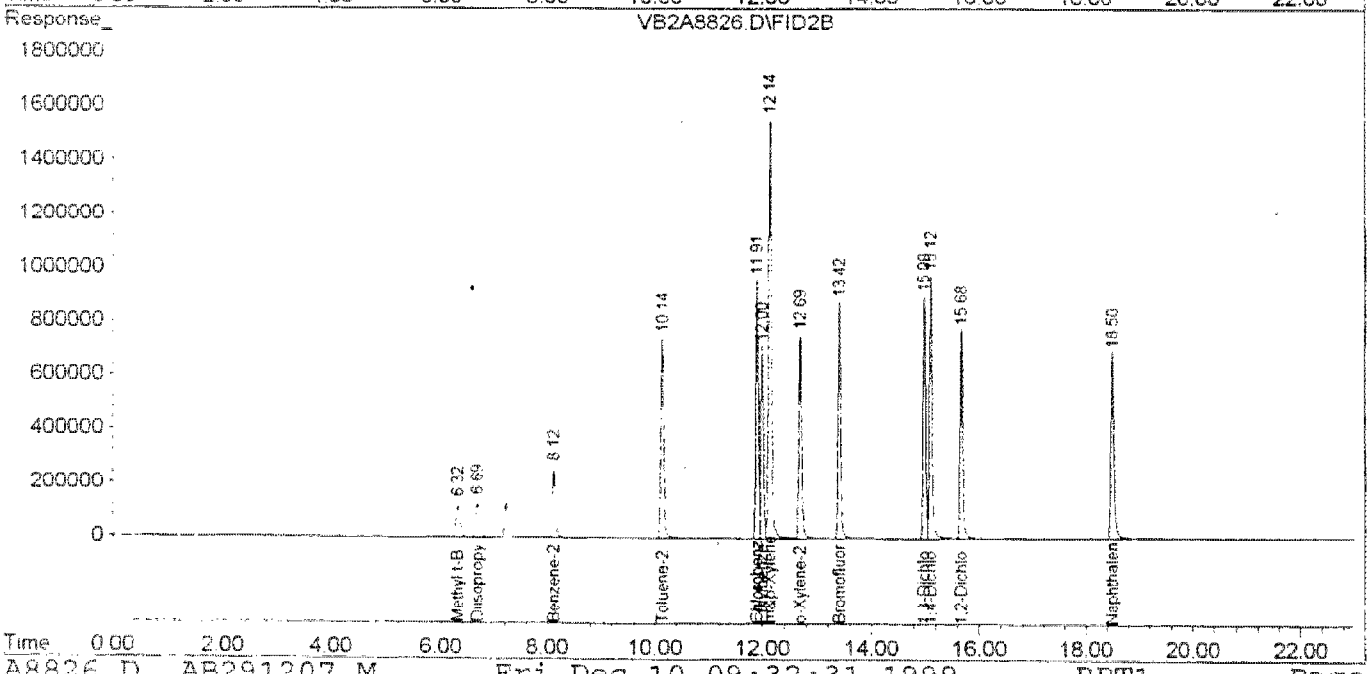
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID1A.CH Vial: 21
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID2B.CH
Acq On : 9 Dec 1999 7:44 pm Operator: MER
Sample : STD#29080 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 9:31 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030038

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID1A.CH Vial: 21
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8826.D\FID2B.CH
Acq On : 9 Dec 1999 7:44 pm Operator: MER
Sample : STD#29080 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 9:31 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.52	13.42	31881278	28839495	60.608m	48.584
Spiked Amount	50.000			Recovery	=	121.22%	97.17%
	Target Compounds						
1)	Methyl t-Butyl E	8.30	6.32	7263989	5940860	57.221m	49.288
2)	Diisopropyl Ethe	8.74	6.69	7870697	6040284	59.378m	49.025
3)	Benzene	10.21	8.12	16677322	10034933	39.845m	41.663
4)	Toluene	12.36	10.14	27689835	26516722	55.646m	46.130
	Chlorobenzene	14.04	11.91	33282387	30737031	57.230m	46.796
	Ethylbenzene	14.24	12.00	26274012	24566924	56.419m	45.706
7)	m&p-Xylenes	14.47	12.14	60823875	56820631	114.371m	92.321
8)	o-Xylene	14.99	12.70	29561965	26629705	59.170m	46.710
0)	1,3-Dichlorobenz	17.22	15.00	31904205	29267170	59.751m	47.164
11)	1,4-Dichlorobenz	17.31	15.12	36497812	33609330	56.241m	46.136
12)	1,2-Dichlorobenz	17.81	15.68	29229040	26334909	60.782m	48.293
3)	Naphthalene	21.19	18.50	31296343	28020279	56.807m	44.872

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID1A.CH Vial: 3
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID2B.CH
Acq On : 10 Dec 1999 2:28 pm Operator: MER
Sample : STD#29092 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	126.947	125.329	E3	R	1.3	90	-0.12
2		Diisopropyl Ether	132.552	147.136	E3	R	-11.0	101	-0.12
3	m	Benzene	418.554	459.161	E3	R	-9.7	83	-0.13
4	m	Toluene	497.611	496.818	E3	R	0.2	88	-0.12
5		Chlorobenzene	581.560	606.240	E3	R	-4.2	92	-0.12
6	m	Ethylbenzene	465.697	469.665	E3	R	-0.9	89	-0.12
7		m&p-Xylenes	531.811	562.053	E3	R	-5.7	93	-0.12
8		o-Xylene	499.613	549.568	E3	R	-10.0	96	-0.12
9	s	Bromofluorobenzene	526.022	596.200	E3	R	-13.3	96	-0.12
10		1,3-Dichlorobenzene	533.950	594.438	E3	R	-11.3	97	-0.12
11		1,4-Dichlorobenzene	648.959	697.581	E3	R	-7.5	96	-0.12
12		1,2-Dichlorobenzene	480.884	538.563	E3	R	-12.0	97	-0.13
13		Naphthalene	550.924	584.097	E3	R	-6.0	103	-0.16

AVG=7.16

Signal #2

1		Methyl t-Butyl Ether-2	120.534	107.751	E3	R	10.6	87	-0.09
2		Diisopropyl Ether-2	123.207	105.942	E3	R	14.0	84	-0.09
3		Benzene-2	240.860	175.642	E3	R	27.1#	81	-0.10
4		Toluene-2	574.828	462.486	E3	R	19.5#	76	-0.10
5		Chlorobenzene-2	656.833	544.646	E3	R	17.1#	79	-0.10
6		Ethylbenzene-2	537.505	423.126	E3	R	21.3#	76	-0.10
7		m&p-Xylenes-2	615.471	489.648	E3	R	20.4#	75	-0.10
8		o-Xylene-2	570.111	464.858	E3	R	18.5#	78	-0.10
9	S	Bromofluorobenzene-2	593.606	507.329	E3	R	14.5	78	-0.10
10		1,3-Dichlorobenzene-2	620.542	518.666	E3	R	16.4#	79	-0.10
11		1,4-Dichlorobenzene-2	728.482	595.255	E3	R	18.3#	78	-0.10
12		1,2-Dichlorobenzene-2	545.314	464.665	E3	R	14.8	79	-0.10
13		Naphthalene-2	624.447	509.802	E3	R	18.4#	86	-0.11

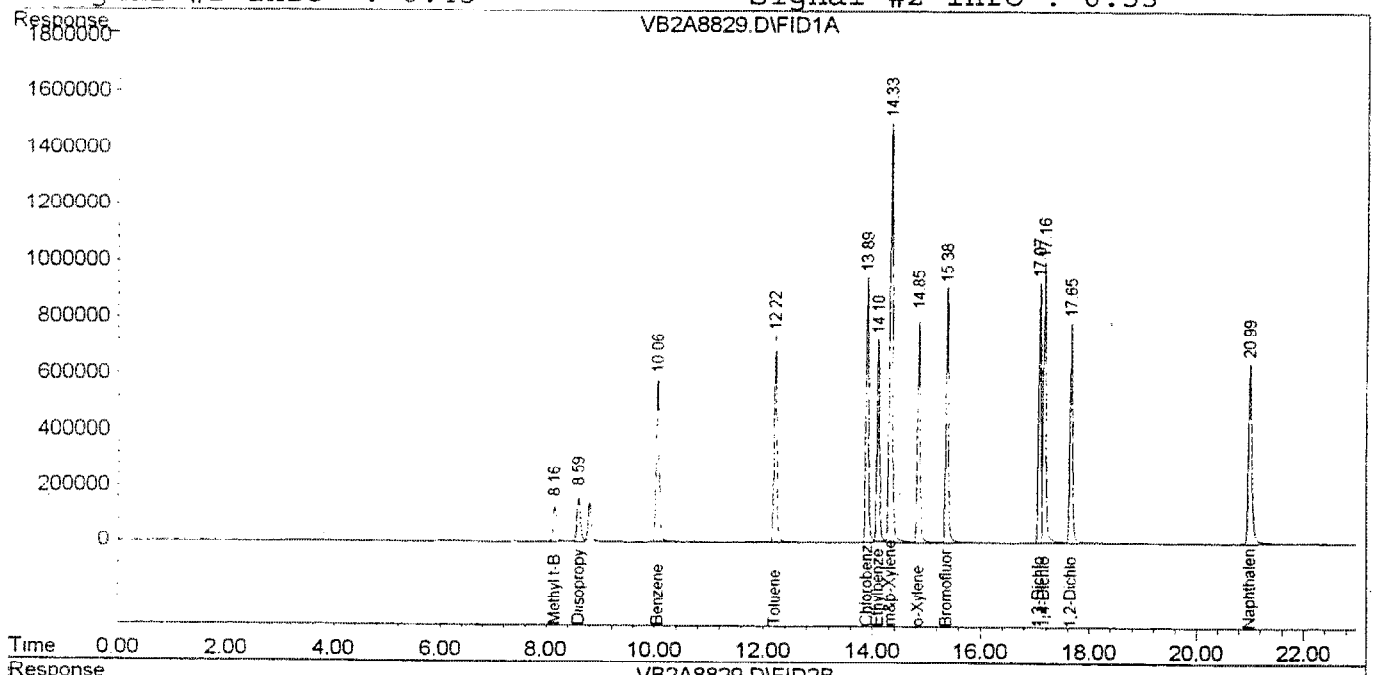
AVG=17.76

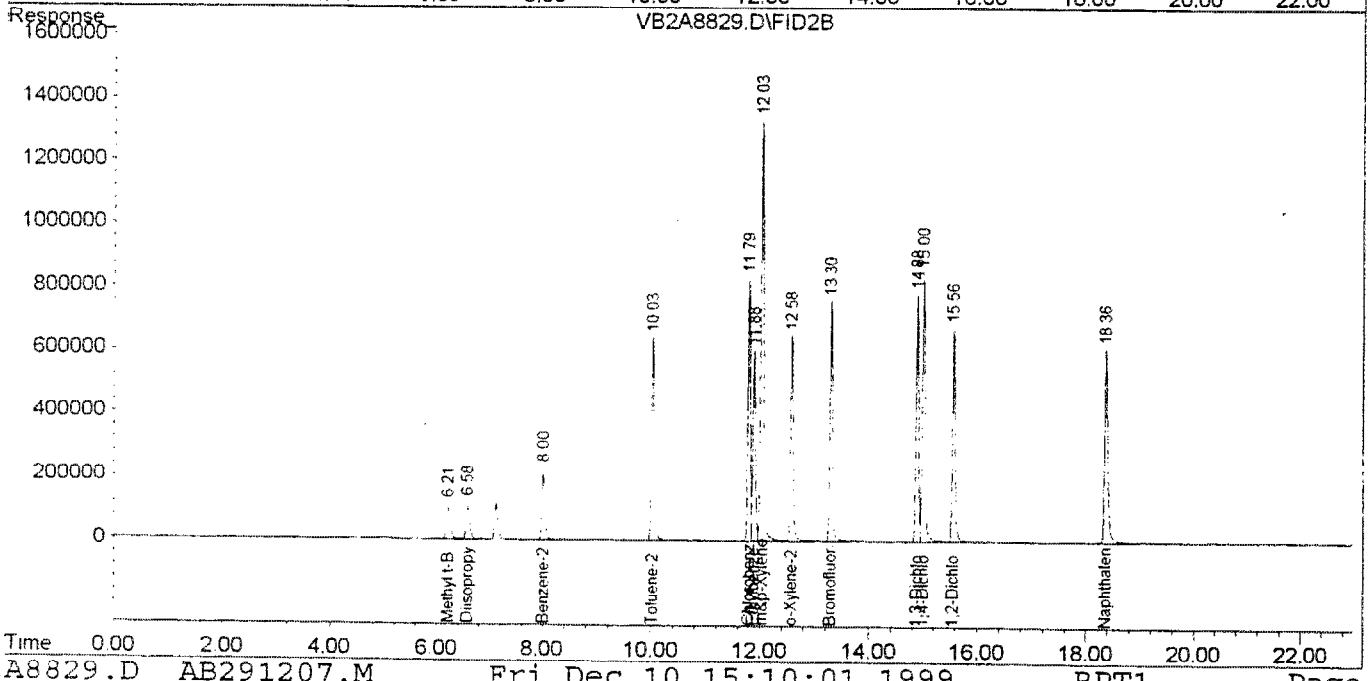
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID1A.CH Vial: 3
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID2B.CH
Acq On : 10 Dec 1999 2:28 pm Operator: MER
Sample : STD#29092 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 15:08 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030041

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID1A.CH Vial: 3
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8829.D\FID2B.CH
Acq On : 10 Dec 1999 2:28 pm Operator: MER
Sample : STD#29092 Inst : VB2
Misc : DAILY QC VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 15:08 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9, S	Bromofluorobenze	15.38	13.30	29810002	25366451	56.671	42.733m
	Spiked Amount 50.000			Recovery	=	113.34%	85.47%
	Target Compounds						
1)	Methyl t-Butyl E	8.16	6.21	6266472	5387573	49.363	44.698m
2)	Diisopropyl Ethe	8.59	6.58	7356785	5297093	55.501m	42.993m
3)	Benzene	10.06	8.00	22958045	8782080	54.851	36.461m#
4)	Toluene	12.22	10.03	24840881	23124315	49.920	40.228m
5)	Chlorobenzene	13.89	11.79	30312019	27232292	52.122m	41.460m
6)	Ethylbenzene	14.10	11.88	23483252	21156302	50.426m	39.360m
7)	m&p-Xylenes	14.33	12.03	56205266	48964813	105.686	79.557
8)	o-Xylene	14.85	12.58	27478398	23242890	54.999	40.769m#
10)	1,3-Dichlorobenz	17.07	14.88	29721896	25933295	55.664m	41.791m
11)	1,4-Dichlorobenz	17.16	15.00	34879060	29762755	53.746	40.856
12)	1,2-Dichlorobenz	17.66	15.56	26928141	23233252	55.997	42.605m
13)	Naphthalene	21.00	18.36	29204841	25490083	53.011	40.820m

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID1A.CH Vial: 11
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID2B.CH
Acq On : 10 Dec 1999 6:21 pm Operator: MER
Sample : STD#29100 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	126.947	118.553	E3	R	6.6	85	-0.11
2		Diisopropyl Ether	132.552	133.321	E3	R	-0.6	92	-0.11
3	m	Benzene	418.554	505.356	E3	R	-20.7#	92	-0.12
4	m	Toluene	497.611	522.245	E3	R	-5.0	92	-0.11
5		Chlorobenzene	581.560	621.274	E3	R	-6.8	94	-0.12
6	m	Ethylbenzene	465.697	501.230	E3	R	-7.6	95	-0.11
7		m&p-Xylenes	531.811	590.032	E3	R	-10.9	98	-0.11
8		o-Xylene	499.613	576.099	E3	R	-15.3#	101	-0.11
9	s	Bromofluorobenzene	526.022	621.017	E3	R	-18.1#	100	-0.12
10		1,3-Dichlorobenzene	533.950	595.998	E3	R	-11.6	98	-0.12
11		1,4-Dichlorobenzene	648.959	704.645	E3	R	-8.6	97	-0.12
12		1,2-Dichlorobenzene	480.884	580.962	E3	R	-20.8#	104	-0.12
13		Naphthalene	550.924	632.725	E3	R	-14.8	111	-0.15

AVG= 11.34

Signal #2

1		Methyl t-Butyl Ether-2	120.534	98.988	E3	R	17.9#	80	-0.08
2		Diisopropyl Ether-2	123.207	98.623	E3	R	20.0#	78	-0.08
3		Benzene-2	240.860	173.544	E3	R	27.9#	80	-0.09
4		Toluene-2	574.828	483.610	E3	R	15.9#	80	-0.09
5		Chlorobenzene-2	656.833	556.051	E3	R	15.3#	81	-0.09
6		Ethylbenzene-2	537.505	452.226	E3	R	15.9#	81	-0.09
7		m&p-Xylenes-2	615.471	516.118	E3	R	16.1#	80	-0.09
8		o-Xylene-2	570.111	484.726	E3	R	15.0	81	-0.09
9	S	Bromofluorobenzene-2	593.606	527.348	E3	R	11.2	81	-0.09
10		1,3-Dichlorobenzene-2	620.542	539.191	E3	R	13.1	82	-0.09
11		1,4-Dichlorobenzene-2	728.482	610.338	E3	R	16.2#	80	-0.09
12		1,2-Dichlorobenzene-2	545.314	472.857	E3	R	13.3	81	-0.09
13		Naphthalene-2	624.447	531.542	E3	R	14.9	90	-0.10

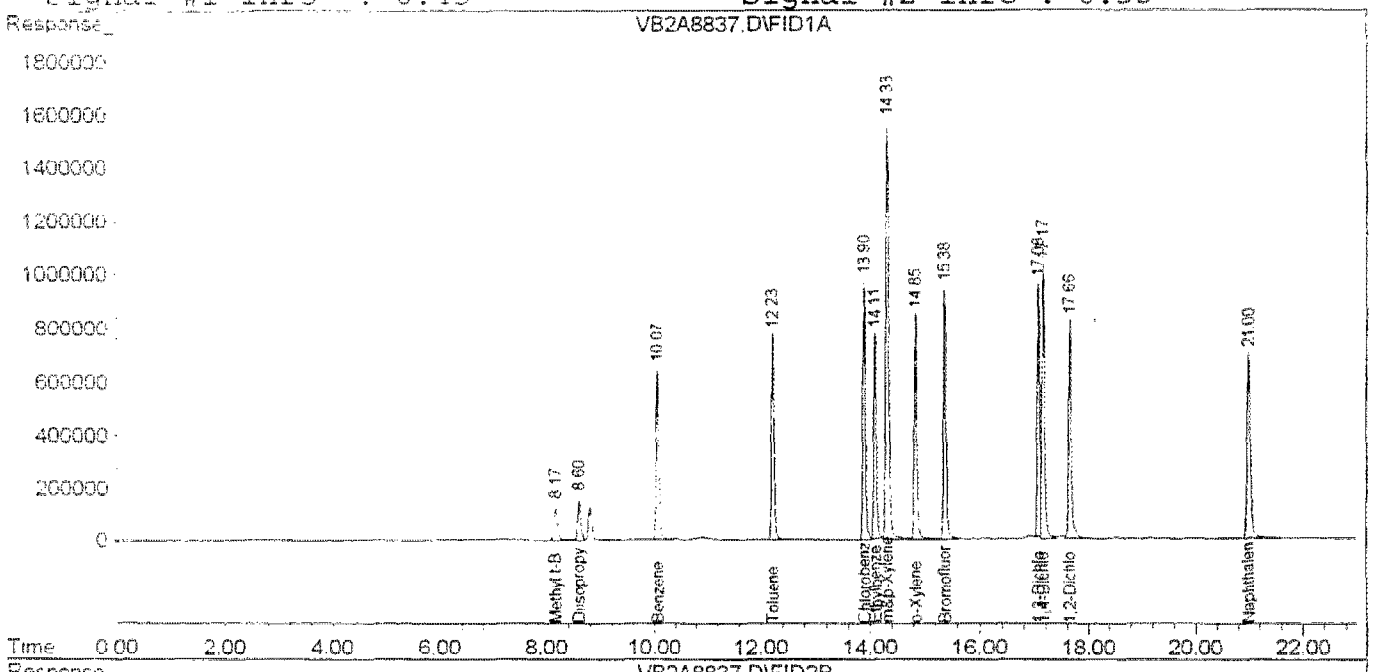
AVG= 16.36

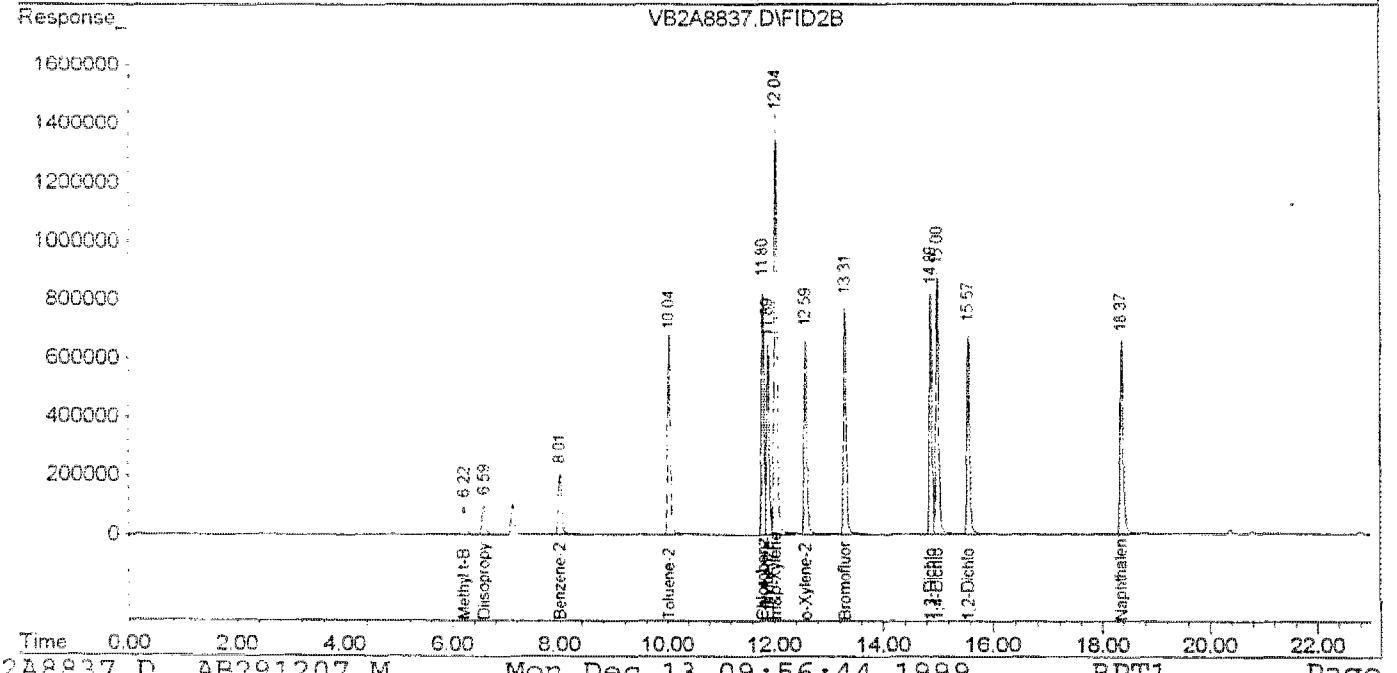
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID1A.CH Vial: 11
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID2B.CH
Acq On : 10 Dec 1999 6:21 pm Operator: MER
Sample : STD#29100 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:56 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID1A.CH Vial: 11
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8837.D\FID2B.CH
Acq On : 10 Dec 1999 6:21 pm Operator: MER
Sample : STD#29100 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:56 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.38	13.31	31050850	26367382	59.030	44.419
Spiked Amount	50.000			Recovery	=	118.06%	88.84%
	Target Compounds						
1)	Methyl t-Butyl E	8.17	6.22	5927642	4949384	46.694	41.062
2)	Diisopropyl Ethe	8.60	6.59	6666030	4931127	50.290m	40.023
3)	Benzene	10.07	8.01	25267823	8677207	60.369	36.026 #
4)	Toluene	12.23	10.04	26112234	24180514	52.475	42.066
[illegible]	Chlorobenzene	13.90	11.80	31063699	27802541	53.414m	42.328m
[illegible]	Ethylbenzene	14.11	11.89	25061491	22611310	53.815m	42.067m
7)	m&p-Xylenes	14.33	12.04	59003159	51611824	110.948	83.857
8)	o-Xylene	14.85	12.59	28804966	24236283	57.655	42.511 #
10)	1,3-Dichlorobenz	17.08	14.89	29799908	26959570	55.810m	43.445m
11)	1,4-Dichlorobenz	17.17	15.01	35232234	30516887	54.290	41.891
12)	1,2-Dichlorobenz	17.66	15.57	29048120	23642837	60.406	43.356 #
13)	Naphthalene	21.00	18.37	31636234	26577080	57.424	42.561 #

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

D. Raw QC Data

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

VBLK01

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB912093

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8811.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec. _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

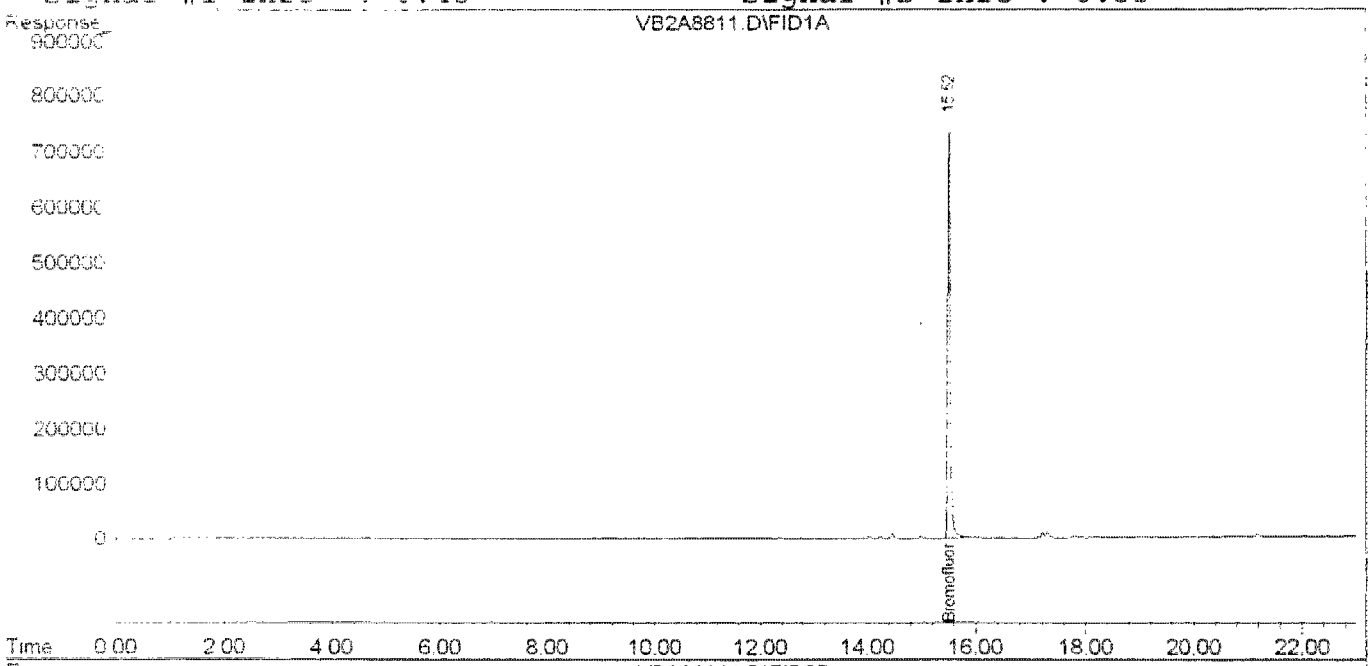
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

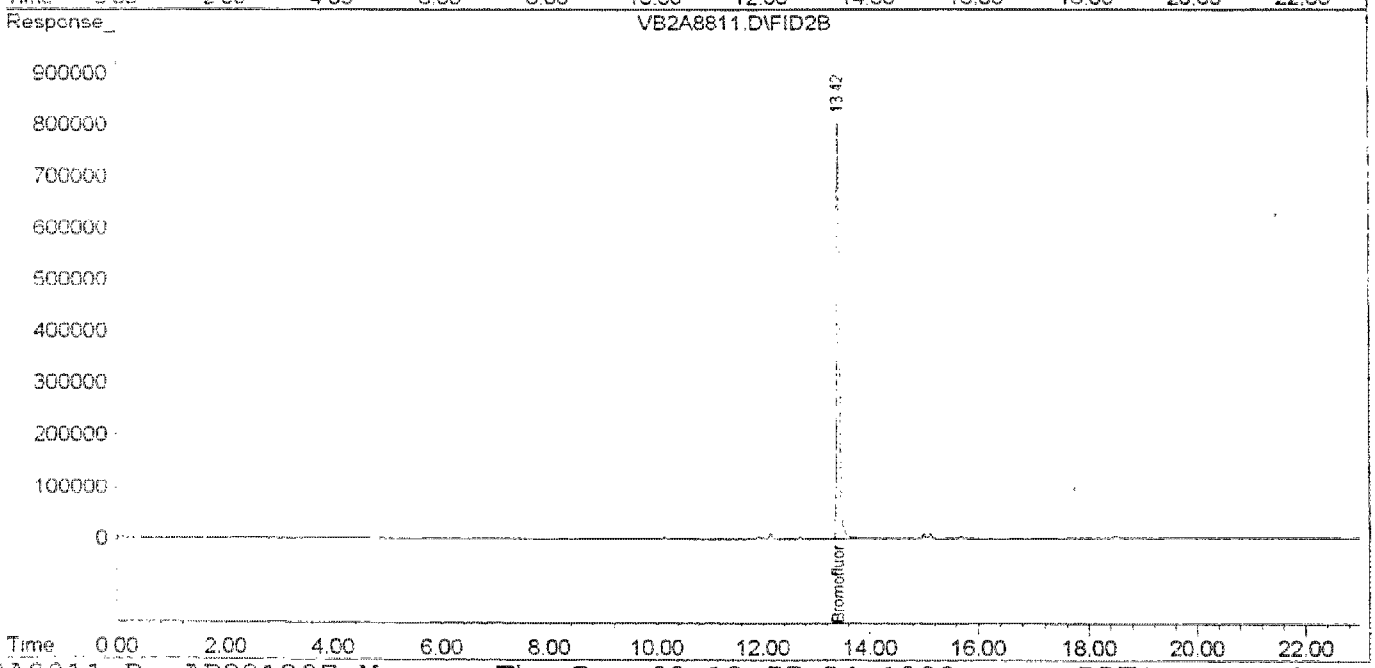
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8811.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8811.D\FID2B.CH
Acq On : 9 Dec 1999 12:30 pm Operator: MER
Sample : VB912093 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 12:56 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030047

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8811.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8811.D\FID2B.CH
Acq On : 9 Dec 1999 12:30 pm Operator: MER
Sample : VB912093 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 12:56 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	15.52	13.42	25944889	28248497	49.323	47.588
Spiked Amount 50.000			Recovery	=	98.65%	95.18%

Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix (soil/water): WATER Lab Sample ID: VB912102

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8832.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec Date Analyzed: 12/10/99

GC Column: DB-VRX ID 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

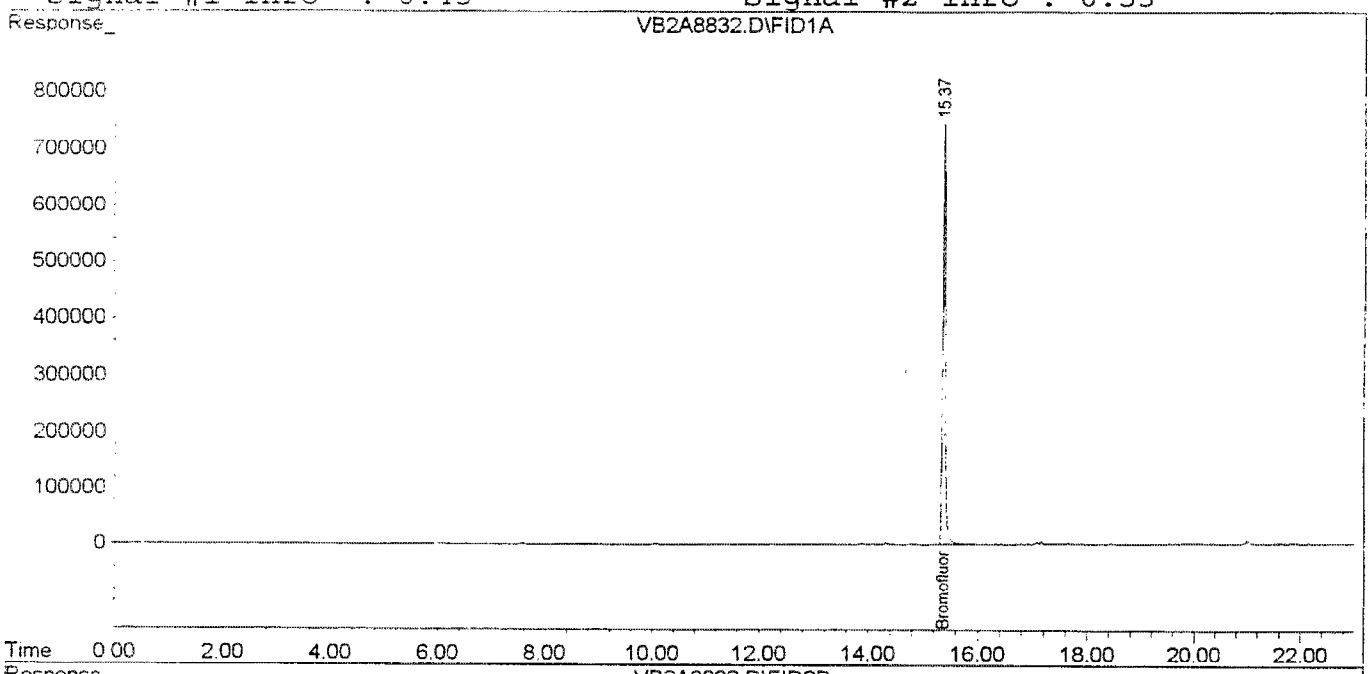
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

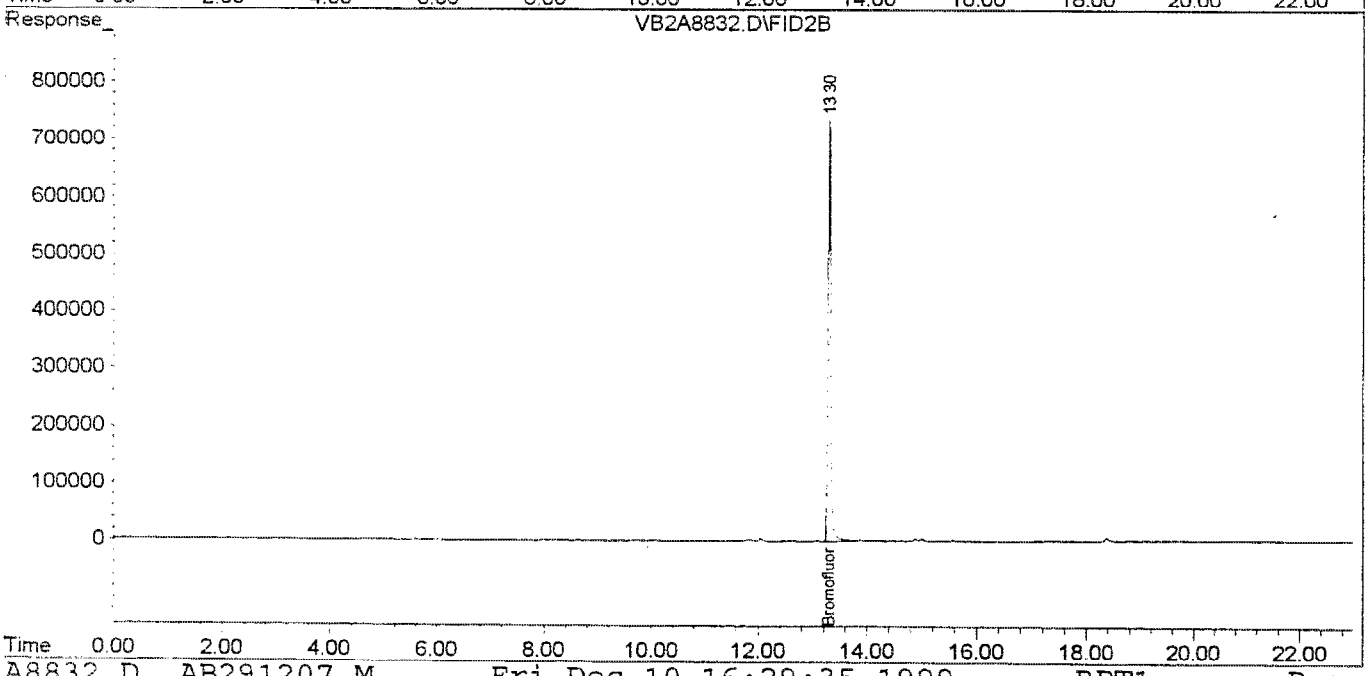
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8832.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8832.D\FID2B.CH
Acq On : 10 Dec 1999 3:55 pm Operator: MER
Sample : VB912102 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 16:29 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030050

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8832.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8832.D\FID2B.CH
Acq On : 10 Dec 1999 3:55 pm Operator: MER
Sample : VB912102 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 16:29 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	15.38	13.30	25306159	25485032	48.109	42.933
Spiked Amount 50.000			Recovery	=	96.22%	85.87%

Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFFLUENTMS

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9913147MS

Sample wt/vol. 5.0 (g/ml) ML Lab File ID: VB2A8817.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

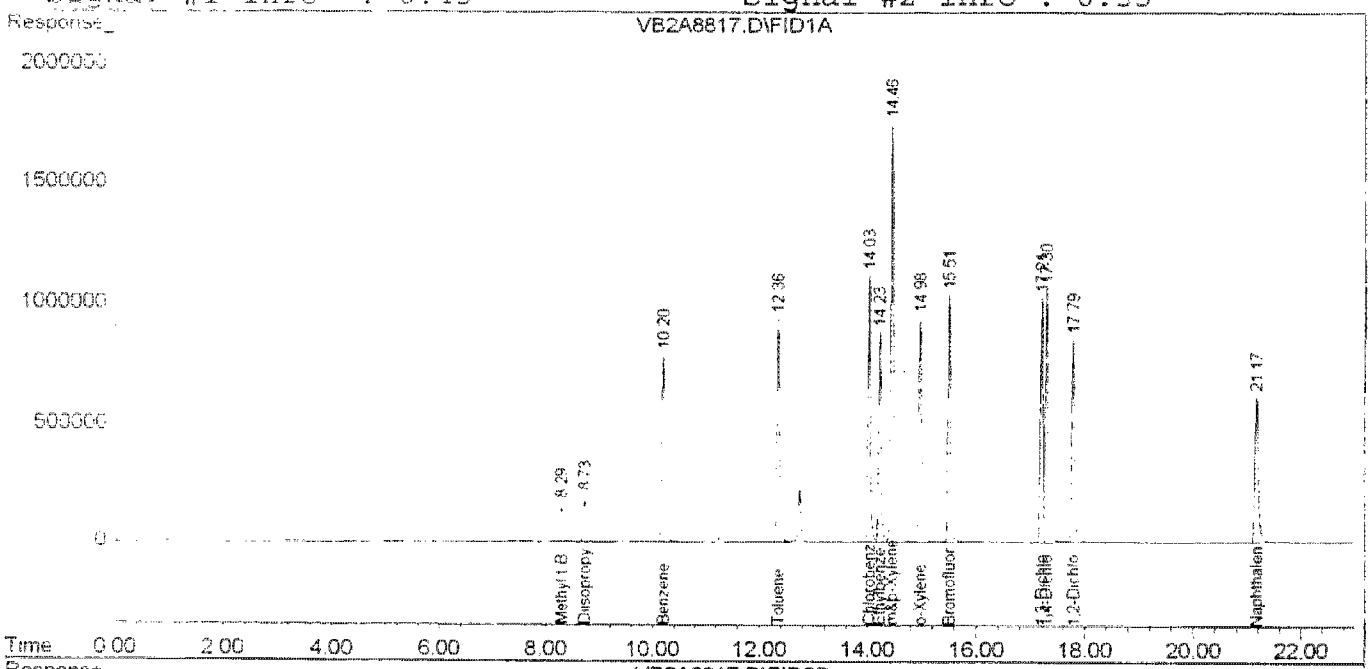
CONCENTRATION UNITS:

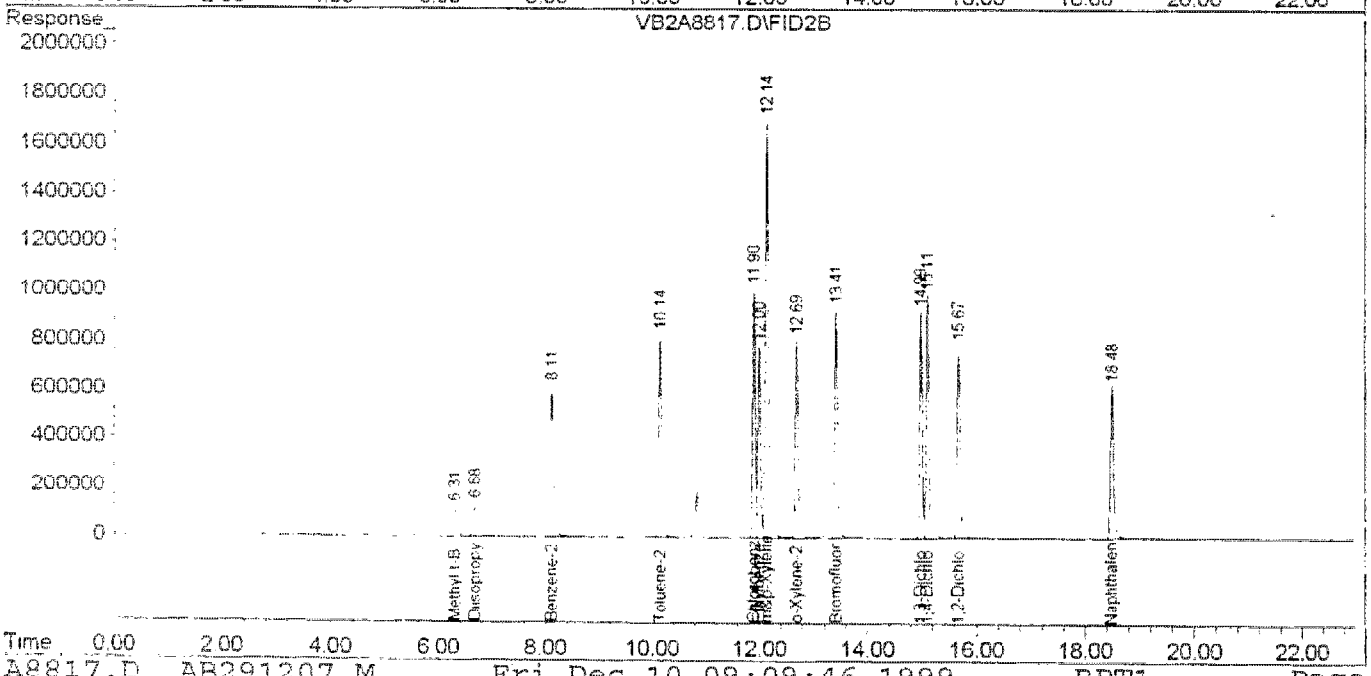
CAS NO.	COMPOUND (ug/L or ug/Kg)	UG/L	Q
71-43-2	Benzene	75	
108-88-3	Toluene	64	
100-41-4	Ethylbenzene	64	
91-20-3	Naphthalene	50	
	m&p-Xylenes	130	
95-47-6	o-Xylene	64	

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8817.D\FID1A.CH Vial: 12
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8817.D\FID2B.CH
Acq On : 9 Dec 1999 3:23 pm Operator: MER
Sample : 9913147MS Inst : VB2
Misc : RPT#991717 EFFLUENTMS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 15:47 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030053

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8817.D\FID1A.CH Vial: 12
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8817.D\FID2B.CH
Acq On : 9 Dec 1999 3:23 pm Operator: MER
Sample : 9913147MS Inst : VB2
Misc : RPT#991717 EFFLUENTMS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 15:47 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	15.51	13.41	34265247	30838966	65.140	51.952	
Spiked Amount	50.000			Recovery	=	130.28%	103.90%	
	Target Compounds							
1)	Methyl t-Butyl E	8.29	6.31	6959288	5393864	54.820	44.750	
2)	Diisopropyl Ethe	8.73	6.68	7779766	5624903	58.692	45.654	
3)	Benzene	10.20	8.11	31277560	24958547	74.728	103.623	#
4)	Toluene	12.36	10.14	31992776	29771212	64.293	51.792	
	Chlorobenzene	14.03	11.90	36435305	32497542	62.651	49.476	
	Ethylbenzene	14.24	12.00	29608013	27161905	63.578	50.533	
7)	m&p-Xylenes	14.46	12.14	66791352	62469653	125.592	101.499	
8)	o-Xylene	14.98	12.69	32064204	28848978	64.178	50.602	
10)	1,3-Dichlorobenz	17.21	14.99	32348803	30217147	60.584	48.695	
11)	1,4-Dichlorobenz	17.30	15.11	37683885	34052794	58.068	46.745	
12)	1,2-Dichlorobenz	17.79	15.67	29729048	26767933	61.822	49.087	
13)	Naphthalene	21.17	18.49	27528612	24890537	49.968	39.860	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

EFFLUENTMSD

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9913147MSD

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8818.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec. _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

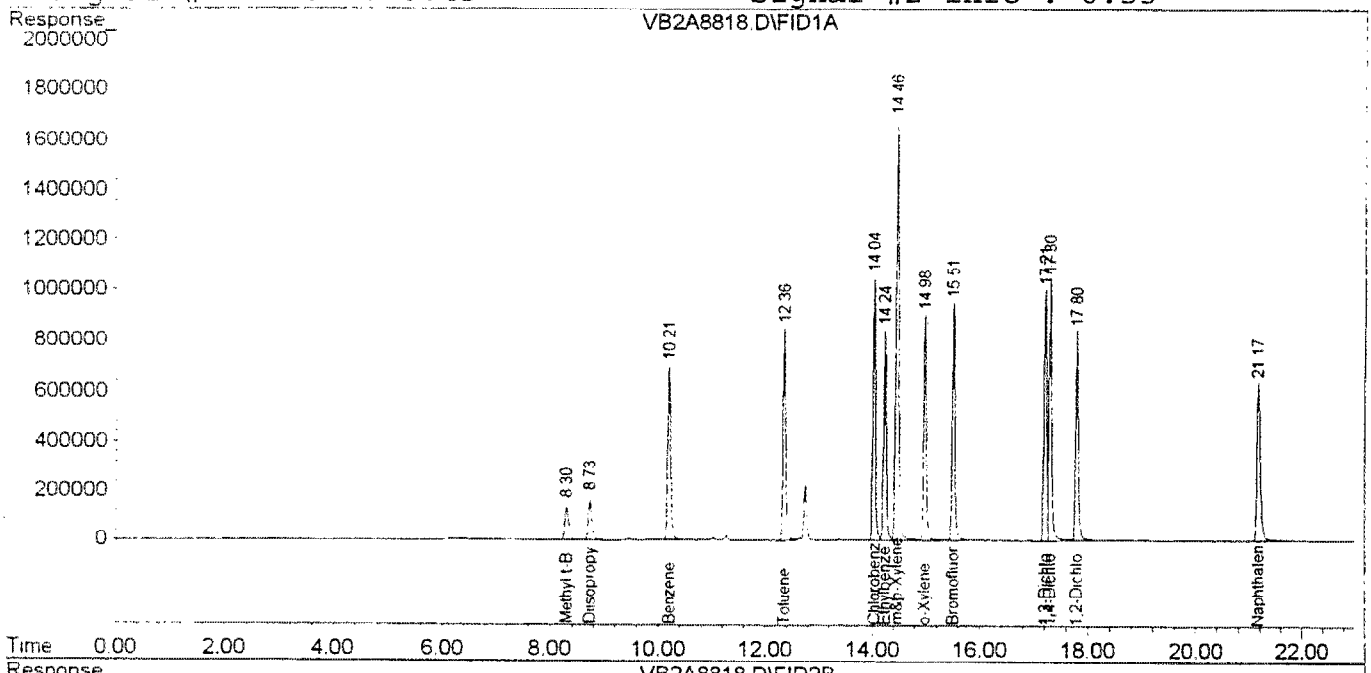
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	66	
108-88-3	Toluene	58	
100-41-4	Ethylbenzene	60	
91-20-3	Naphthalene	53	
	m&p-Xylenes	120	
95-47-6	o-Xylene	62	

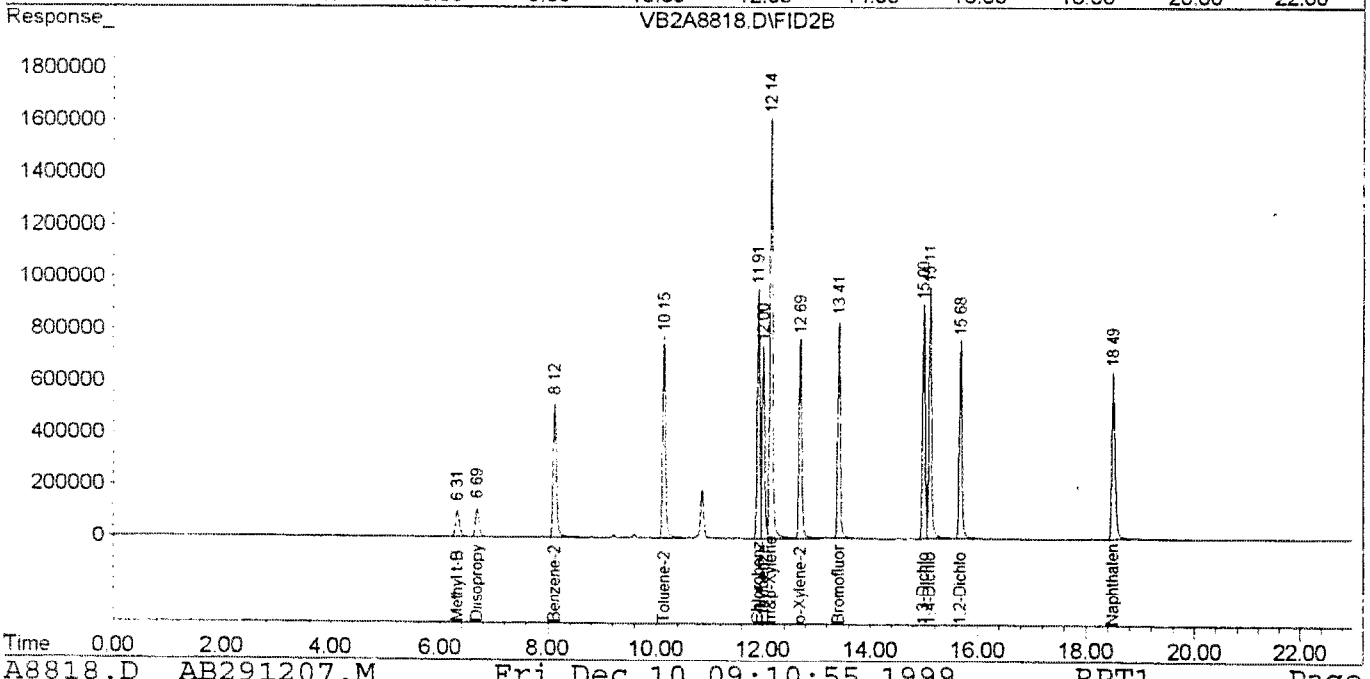
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8818.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8818.D\FID2B.CH
Acq On : 9 Dec 1999 3:52 pm Operator: MER
Sample : 9913147MSD Inst : VB2
Misc : RPT#991717 EFFLUENTMSD Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 16:16 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030056

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8818.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8818.D\FID2B.CH
Acq On : 9 Dec 1999 3:52 pm Operator: MER
Sample : 9913147MSD Inst : VB2
Misc : RPT#991717 EFFLUENTMSD Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 16:16 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	15.52	13.42	31405471	27981586	59.704	47.138	
Spiked Amount	50.000			Recovery	=	119.41%	94.28%	
	Target Compounds							
1)	Methyl t-Butyl E	8.30	6.31	6384806	5356001	50.295	44.436	
2)	Diisopropyl Ethe	8.73	6.69	7243157	5439340	54.644	44.148	
3)	Benzene	10.21	8.12	27431800	21566724	65.539	89.541	#
4)	Toluene	12.36	10.15	28802826	27712737	57.882	48.210	
5)	Chlorobenzene	14.04	11.91	34050494	30820565	58.550	46.923	
6)	Ethylbenzene	14.24	12.00	27994886	25572321	60.114	47.576	
7)	m&p-Xylenes	14.46	12.15	63969044	59302005	120.285	96.352	
8)	o-Xylene	14.99	12.70	30781661	27307581	61.611	47.899	
10)	1,3-Dichlorobenz	17.21	15.00	31667452	29627589	59.308	47.745	
11)	1,4-Dichlorobenz	17.30	15.12	37022291	33331887	57.049	45.755	
12)	1,2-Dichlorobenz	17.80	15.68	29058299	26074180	60.427	47.815	
13)	Naphthalene	21.18	18.49	28978371	26087632	52.600	41.777	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

INFLUENTMS

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix (soil/water) WATER Lab Sample ID: 9913145MS

Sample wt/vol 5.0 (g/ml) ML Lab File ID: VB2A8834.D

Level (low/med) LOW Date Received: 12/4/99

% Moisture: not dec Date Analyzed: 12/10/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume (uL) Soil Aliquot Volume: _____ (uL)

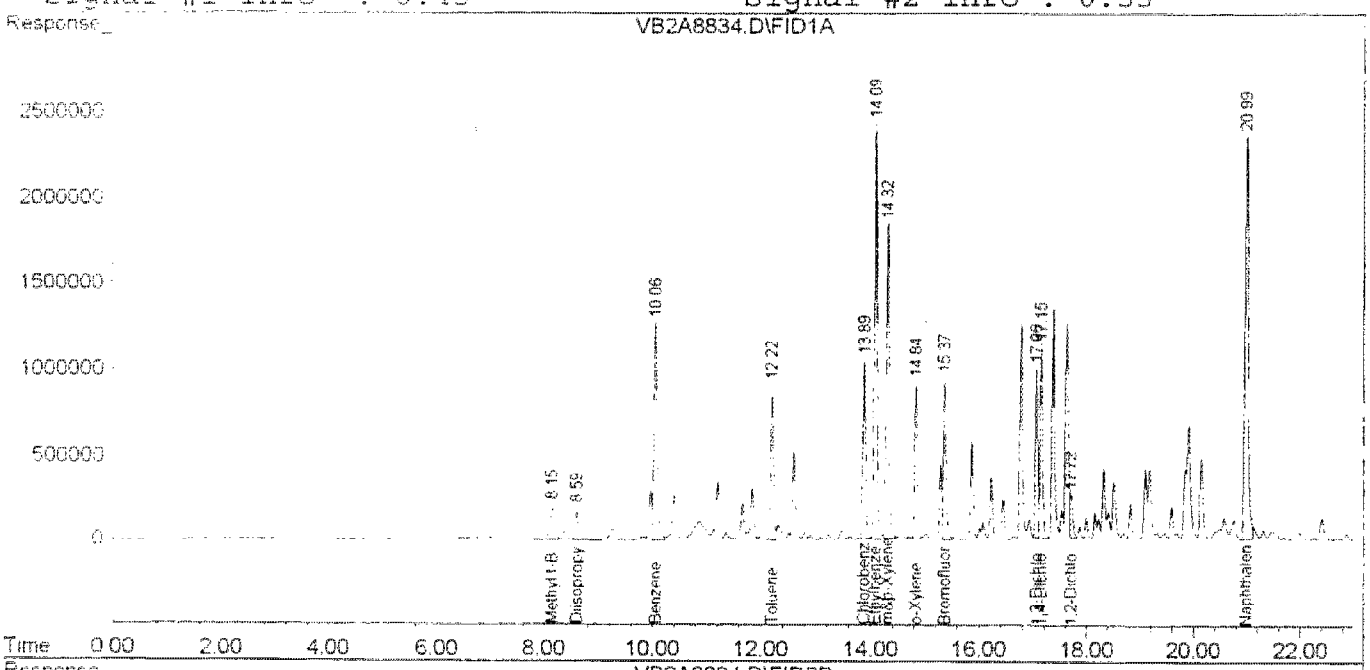
CONCENTRATION UNITS:

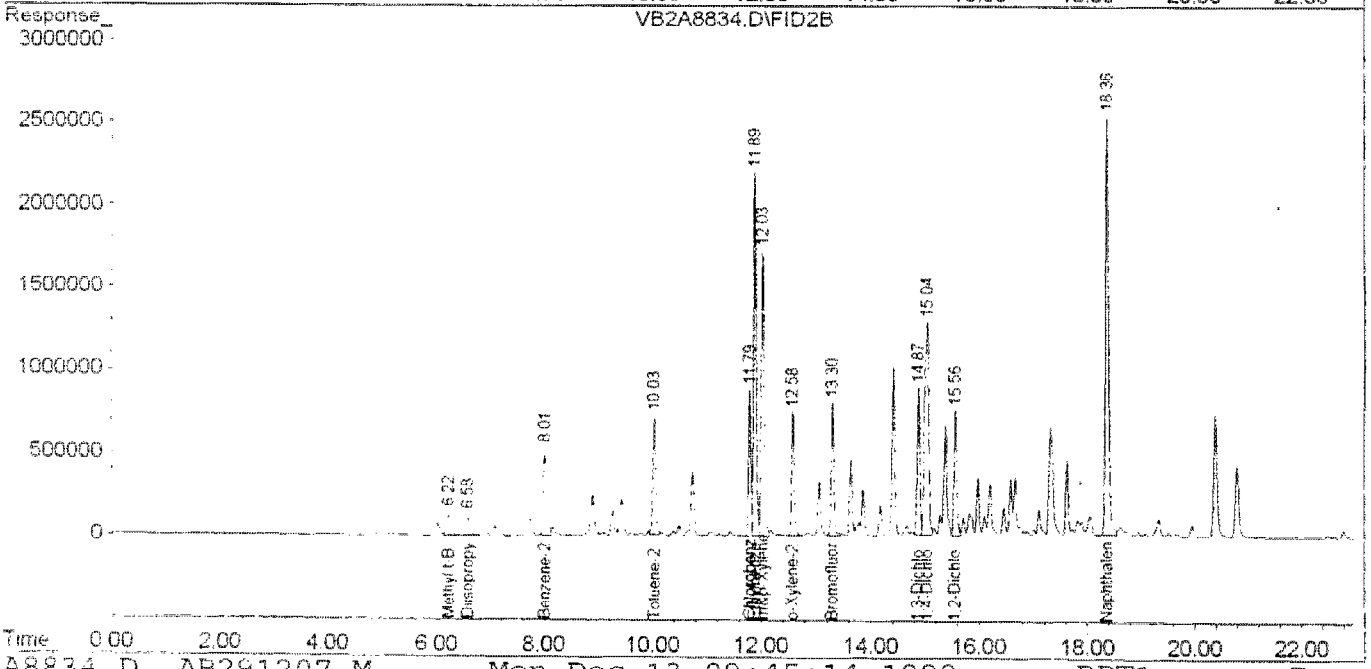
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	130	
108-88-3	Toluene	60	
100-41-4	Ethylbenzene	180	
91-20-3	Naphthalene	180	
	m&p-Xylenes	130	
95-47-6	o-Xylene	59	

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8834.D\FID1A.CH Vial: 8
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8834.D\FID2B.CH
Acq On : 10 Dec 1999 4:54 pm Operator: MER
Sample : 9913145MS Inst : VB2
Misc : RPT#991717 INFLUENTMS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:44 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030059

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8834.D\FID1A.CH Vial: 8
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8834.D\FID2B.CH
Acq On : 10 Dec 1999 4:54 pm Operator: MER
Sample : 9913145MS Inst : VB2
Misc : RPT#991717 INFLUENTMS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:44 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	15.37	13.30	32017070	26489339	60.866	44.624m#
Spiked Amount	50.000			Recovery	=	121.73%	89.25%
	Target Compounds						
1)	Methyl t-Butyl E	8.15	6.22	11361598	7217101	89.499m	59.876 #
2)	Diisopropyl Ethe	8.60	6.58	7456293	5193317	56.252	42.151 #
3)	Benzene	10.06	8.01	53228980	23320012	127.173	96.820m
4)	Toluene	12.22	10.03	30083794	25694688	60.456m	44.700m#
	Chlorobenzene	13.89	11.79	33241737	28469704	57.160m	43.344m
	Ethylbenzene	14.09f	11.89	82803398	76837866	177.805m	142.953m
7)	m&p-Xylenes	14.32	12.03	68238505	62019412	128.313m	100.767m
8)	o-Xylene	14.84	12.58	29283691	25736276	58.613m	45.143m
10)	1,3-Dichlorobenz	17.06	14.87	31443302	29739528	58.888m	47.925m
11)	1,4-Dichlorobenz	17.15	15.04	37038761	67986446	57.074m	93.326m#
12)	1,2-Dichlorobenz	17.72	15.56	8507815	26617927	17.692m	48.812m#
13)	Naphthalene	20.99	18.36	101.5E6	95814881	184.293m	153.439m

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

INFLUENTMSD

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix (soil/water): WATER Lab Sample ID: 9913145MSD

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8835.D

Level (low/med): LOW Date Received: 12/4/99

% Moisture: not dec Date Analyzed: 12/10/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

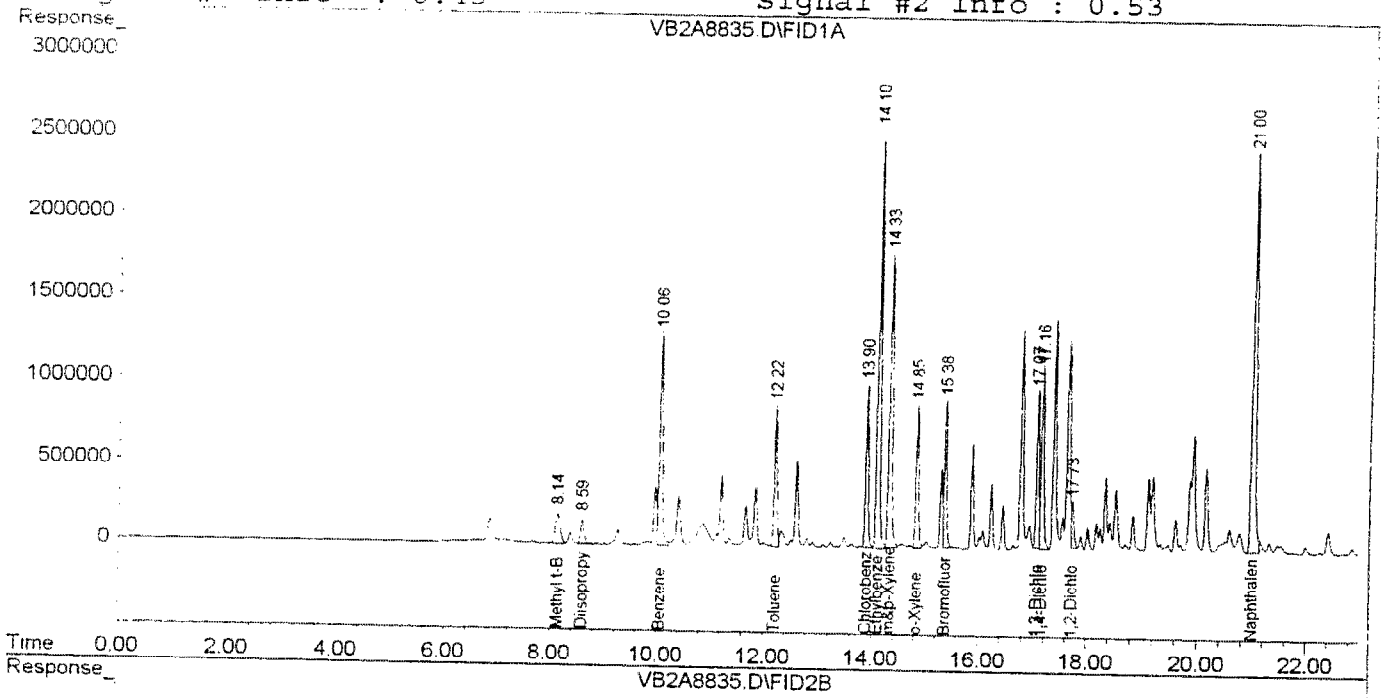
CAS NO	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	130	
108-88-3	Toluene	58	
100-41-4	Ethylbenzene	190	
91-20-3	Naphthalene	190	
	m&p-Xylenes	130	
95-47-6	o-Xylene	58	

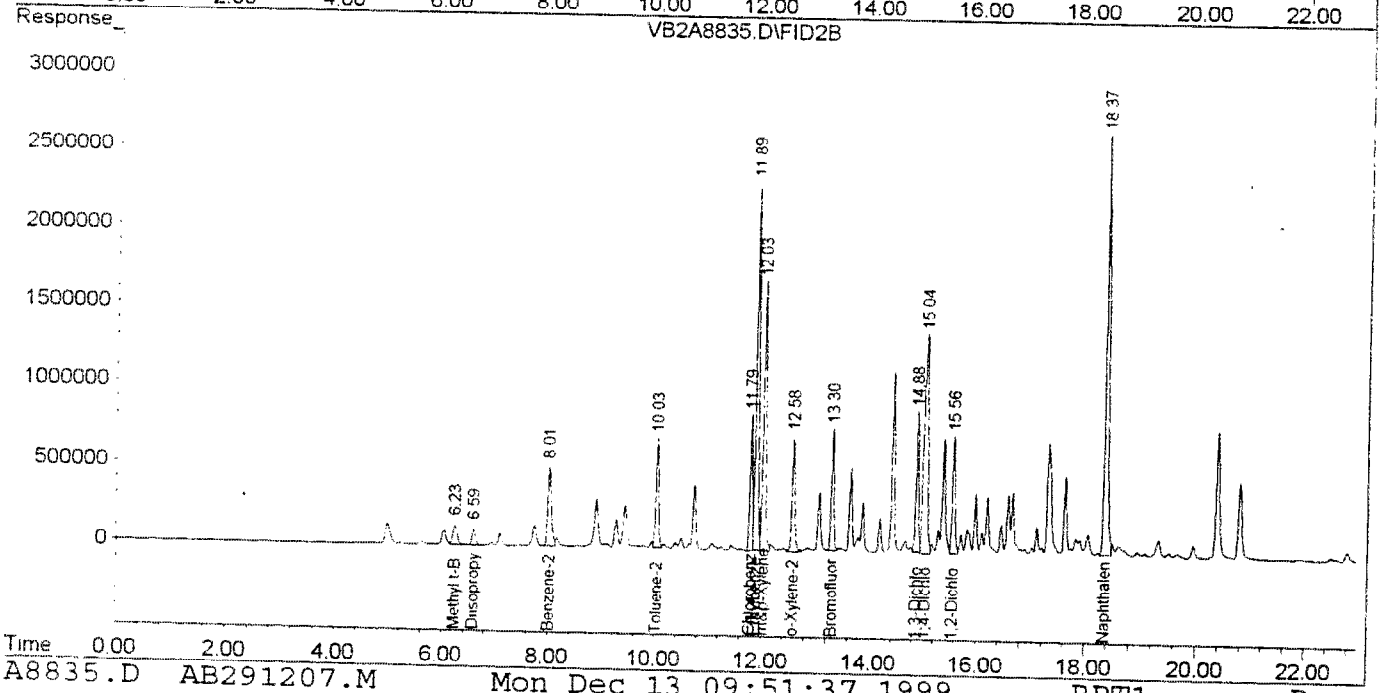
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8835.D\FID1A.CH Vial: 9
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8835.D\FID2B.CH
Acq On : 10 Dec 1999 5:23 pm Operator: MER
Sample : 9913145MSD Inst : VB2
Misc : RPT#991717 INFLUENTMSD Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:50 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030062

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8835.D\FID1A.CH Vial: 9
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8835.D\FID2B.CH
Acq On : 10 Dec 1999 5:23 pm Operator: MER
Sample : 9913145MSD Inst : VB2
Misc : RPT#991717 INFLUENTMSD Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 13 9:50 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9)	S Bromofluorobenze	15.38	13.30	29421759	24297920	55.933m	40.933m#
	Spiked Amount 50.000			Recovery	=	111.87%	81.87%
	Target Compounds						
1)	Methyl t-Butyl E	8.14	6.23	11845381	7635462	93.310m	63.347 #
2)	Diisopropyl Ethe	8.59	6.59	6785517	4946818	51.191	40.150
3)	Benzene	10.06	8.01	54865550	22672619	131.084	94.132m#
4)	Toluene	12.22	10.03	28912587	24644263	58.103m	42.872m#
5)	Chlorobenzene	13.90	11.79	32144299	26785528	55.273m	40.780m#
6)	Ethylbenzene	14.10	11.89	87904206	81491020	188.758m	151.610m
7)	m&p-Xylenes	14.33	12.03	67416352	61174607	126.767m	99.395
8)	o-Xylene	14.85	12.58	28725698	25945332	57.496m	45.509
10)	1,3-Dichlorobenz	17.07	14.88	31296250	29717471	58.613m	47.890m
11)	1,4-Dichlorobenz	17.16	15.04	36595836	71989628	56.392m	98.821 #
12)	1,2-Dichlorobenz	17.73	15.56	9565882	26041697	19.892m	47.755m#
13)	Naphthalene	21.00	18.37	106.1E6	99324612	192.574m	159.060m

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

VLCS01

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VL912093

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8809.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec. _____ Date Analyzed: 12/9/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

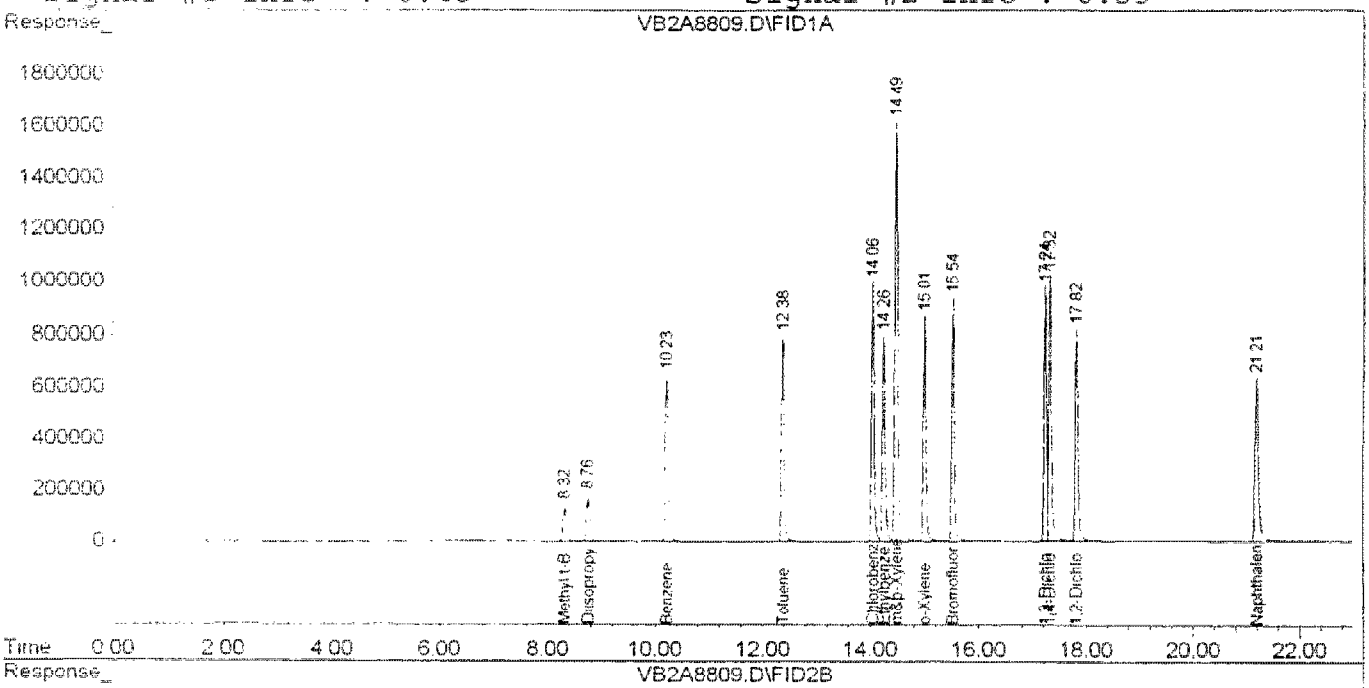
CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	60	
108-88-3	Toluene	54	
100-41-4	Ethylbenzene	56	
91-20-3	Naphthalene	52	
	m&p-Xylenes	110	
95-47-6	o-Xylene	59	

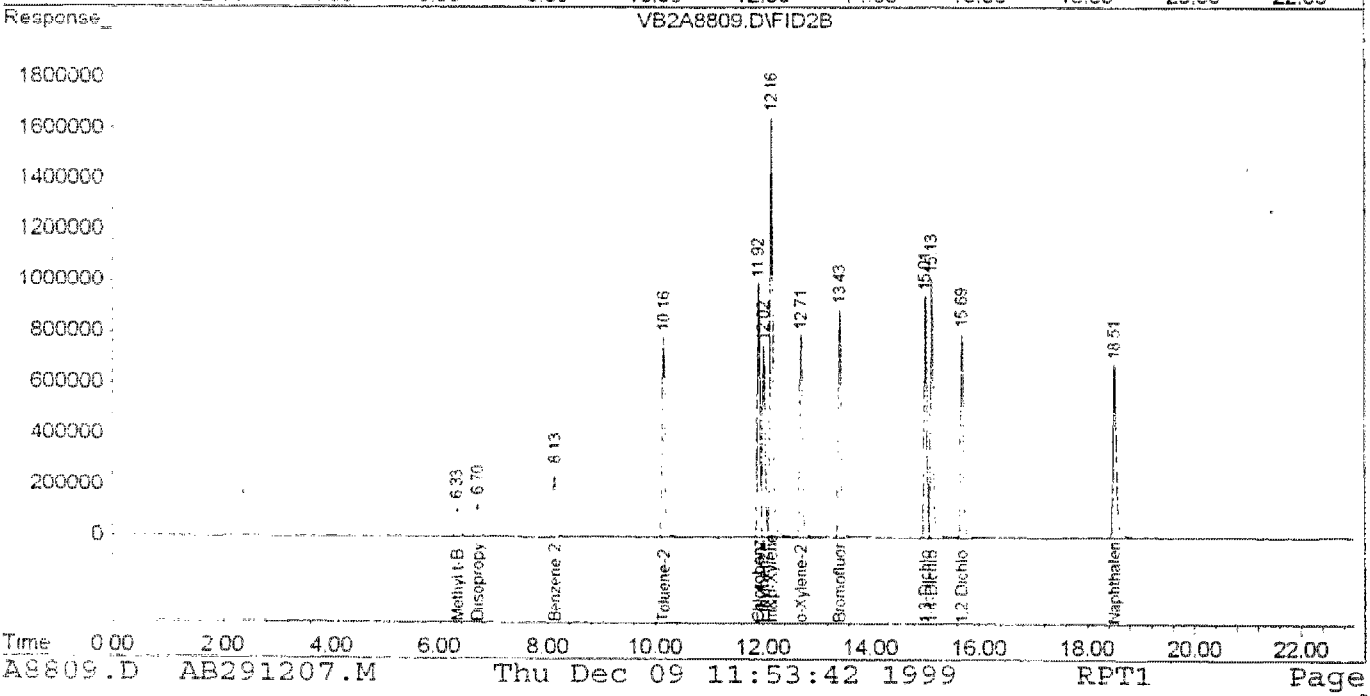
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8809.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8809.D\FID2B.CH
Acq On : 9 Dec 1999 11:02 am Operator: MER
Sample : VL912093 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 11:25 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





0300866

Signal #1 : O:\ORG\VOA\VB2\09DEC99\VB2A8809.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\09DEC99\VB2A8809.D\FID2B.CH
Acq On : 9 Dec 1999 11:02 am Operator: MER
Sample : VL912093 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 9 11:25 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	15.54	13.43	30983923	29436002	58.902	49.588	
Spiked Amount	50.000			Recovery	=	117.80%	99.18%	
	Target Compounds							
1)	Methyl t-Butyl E	8.32	6.33	6008140	5627893	47.328	46.691	
2)	Diisopropyl Ethe	8.76	6.70	7282578	6018787	54.941	48.851	
3)	Benzene	10.23	8.13	25283054	10001824	60.406	41.526	#
4)	Toluene	12.38	10.16	26885741	28050252	54.030	48.798	
5)	Chlorobenzene	14.06	11.93	32012132	31835933	55.045	48.469	
6)	Ethylbenzene	14.26	12.02	26309251	25909644	56.494	48.204	
7)	m&p-Xylenes	14.49	12.16	61042483	60426793	114.782	98.180	
8)	o-Xylene	15.01	12.71	29488065	28098851	59.022	49.287	
10)	1,3-Dichlorobenz	17.24	15.01	30972673	30953137	58.007	49.881	
11)	1,4-Dichlorobenz	17.32	15.13	36321703	35085286	55.969	48.162	
12)	1,2-Dichlorobenz	17.82	15.69	28595848	27603918	59.465	50.620	
13)	Naphthalene	21.21	18.51	28902340	27927437	52.462	44.723	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

103006

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VLCS02

Lab Name: STL BALTIMORE Contract: 991717

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix (soil/water): WATER Lab Sample ID: VL912102

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB2A8830.D

Level: (low/med) LOW Date Received: 12/4/99

% Moisture: not dec Date Analyzed: 12/10/99

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

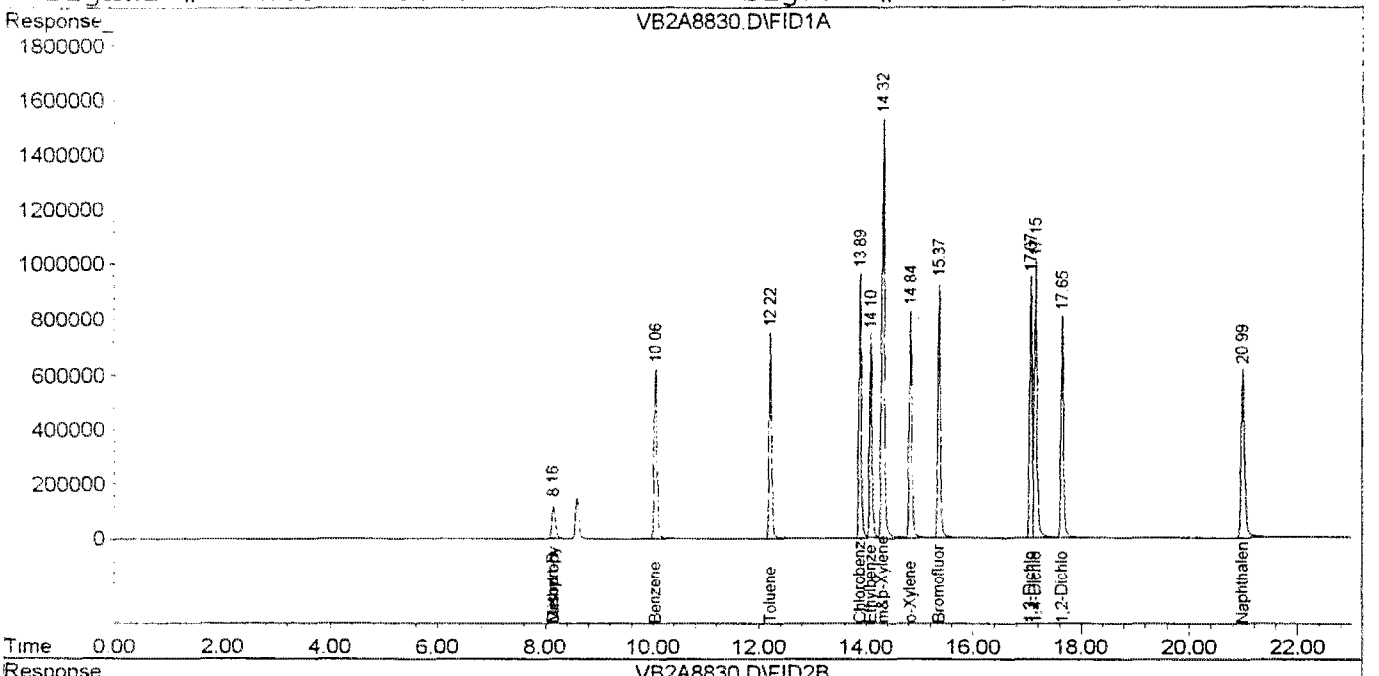
CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	58	
108-88-3	Toluene	50	
100-41-4	Ethylbenzene	51	
91-20-3	Naphthalene	50	
	m&p-Xylenes	110	
95-47-6	o-Xylene	56	

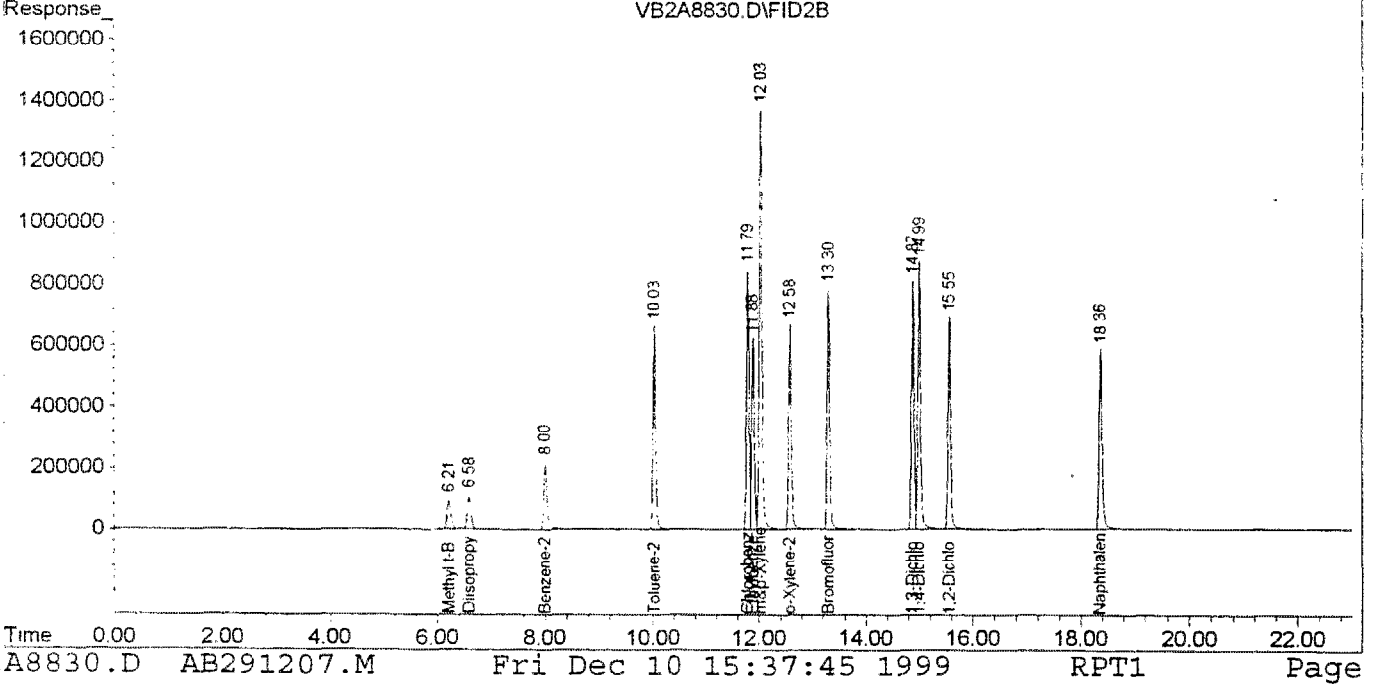
FORM I VOA

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8830.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8830.D\FID2B.CH
Acq On : 10 Dec 1999 2:57 pm Operator: MER
Sample : VL912102 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 15:37 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





C30068

Signal #1 : O:\ORG\VOA\VB2\10DEC99\VB2A8830.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\10DEC99\VB2A8830.D\FID2B.CH
Acq On : 10 Dec 1999 2:57 pm Operator: MER
Sample : VL912102 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Dec 10 15:37 1999 Quant Results File: AB291207.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291207.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291207.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9)	S Bromofluorobenze	15.37	13.30	30449682	25930990	57.887	43.684
	Spiked Amount 50.000			Recovery	=	115.77%	87.37%
	Target Compounds						
1)	Methyl t-Butyl E	8.16	6.21	5751313	4731176	45.305	39.252
2)	Diisopropyl Ethe	8.16f	6.58	5796884	5095459	43.733m	41.357
3)	Benzene	10.06	8.01	24217027	8982514	57.859	37.294 #
4)	Toluene	12.22	10.03	25128415	23529637	50.498	40.933
5)	Chlorobenzene	13.89	11.79	30634177	27433808	52.676m	41.767m
6)	Ethylbenzene	14.10f	11.88	23925978	21508052	51.377m	40.015m
7)	m&p-Xylenes	14.32	12.03	57230765	50338576	107.615	81.789
8)	o-Xylene	14.84	12.58	27838998	23720781	55.721	41.607 #
10)	1,3-Dichlorobenz	17.07	14.87	30342424	26629132	56.826m	42.913m
11)	1,4-Dichlorobenz	17.16	14.99	35111039	30016367	54.104	41.204
12)	1,2-Dichlorobenz	17.65	15.56	27598680	23647611	57.392	43.365
13)	Naphthalene	20.99	18.36	27751249	23819090	50.372	38.144

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

E. Laboratory Logs

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 28947 Start Date: [illegible] Page No.: 74

Directory : 07DEC99 IS\SS Vol: 4ul MS Vol: 5ul Method: AB[illegible] Book No.: 25

File ID	ALS	Sample Information			Time	Comments
VB2A8774	9	STD#29044	INITIAL CALIBRATION	VSTD0.9,W	[illegible] pm	O.K
VB2A8775	10	STD#29045	INITIAL CALIBRATION	VSTD50,W	[illegible]:08 pm	O.K.
VB2A8776	11	STD#29046	INITIAL CALIBRATION	VSTD5.0,W	[illegible]:37 pm	O.K
VB2A8777	12	STD#29047	INITIAL CALIBRATION	VSTD100,W	4:06 pm	O.K.
VB2A8778	13	STD#29048	INITIAL CALIBRATION	VSTD200,W	4:35 pm	O.K.
VB2A8779	14	VI912073	ICV/LCS		[illegible]:04 pm	O.K.

11

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments: CALIBRATION NAMED AB29120

Analyst: Megan Ruby Date: 12/7/99

C00071

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 28947 Start Date: [illegible] Page No.: 76

Directory : 09DEC99 IS\SS Vol: 4ul MS Vol: 5ul Method: AB291[illegible].M Book No.: 25

File ID	ALS		Sample Information	Inj Time	Comments	pH
VB2A8806	1	PRIME	PRIME	[illegible]:28 am	—	—
VB2A8807	2	STD#29077	DAILY QC VSTD50,W	[illegible]:57 am	O.K	—
VB2A8808	3	STD#29078	DAILY QC VSTD50,W	1[illegible]:33 am	N.N	—
VB2A8809	4	VL912093	VLCS,W	11:02 am	O.K.	—
VB2A8810	5	I BLANK	I BLANK	12:00 pm	—	—
VB2A8811	6	VB912093	VBLK,W	12:30 pm	O.K.	—
VB2A8812	7	9912978RE	RPT#991688 RW11 INFRE	12:58 pm	O.K.	2
VB2A8813	8	9912975RE	RPT#991688 RW3 INFRE,25X	1:28 pm	O.K.	2
VB2A8814	9	I BLANK	I BLANK	1:56 pm	—	—
VB2A8815	10	9913147	RPT#991717 EFFLUENT	2:25 pm	O.K.	2
VB2A8816	11	I BLANK	I BLANK	2:54 pm	—	—
VB2A8817	12	9913147MS	RPT#991717 EFFLUENTMS	3:23 pm	O.K	2.
VB2A8818	13	9913147MSD	RPT#991717 EFFLUENTMSD	3:52 pm	O.K.	2
VB2A8819	14	9913146	RPT#991717 BETWEEN,20X	4:21 pm	R.R. @ 1X	2.
VB2A8820	15	I BLANK	I BLANK	4:50 pm	—	—
VB2A8821	16	9913146	RPT#991717 BETWEEN	5:19 pm	O.K.	2.
VB2A8822	17	I BLANK	I BLANK	5:48 pm	—	—
VB2A8823	18	9913145	RPT#991717 INFLUENT,40X	6:17 pm	R.R. @ 1X	2.
VB2A8824	19	I BLANK	I BLANK	6:46 pm	—	—
VB2A8825	20	STD#29079	ENDING STANDARD VSTD50,W	7:15 pm	N.G.	—
VB2A8826	21	STD#29080	ENDING STANDARD VSTD50,W	7:44 pm	O.K.	—

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments:

Analyst: Megan Ruley Date: 12/10/99

030072

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 28947 Start Date: 10 De[illegible] Page No.: 77

Directory : 10DEC99 IS\SS Vol: 4ul MS Vol: 5ul Method: AB[illegible] Book No.: 25

File ID	ALS	Sample Information		Inj.Time	Comments	pH
VB2A8827	1	I BLANK	I BLANK	11:46 am	—	—
VB2A8828	2	STD#29091	DAILY QC VSTD50,W	1:48 pm	N.G	—
VB2A8829	3	STD#29092	DAILY QC VSTD50,W	[illegible]:28 pm	o.k.	—
VB2A8830	4	VL912102	VLCS,W	[illegible]:57 pm	o.k	—
VB2A8831	5	I BLANK	I BLANK	3:26 pm	—	—
VB2A8832	6	VB912102	VBLK,W	3:55 pm	o-k.	—
VB2A8833	7	9913145	RPT#991717 INFLUENT	4:25 pm	o.k	2
VB2A8834	8	9913145MS	RPT#991717 INFLUENTMS	4:54 pm	o.k.	2
VB2A8835	9	9913145MSD	RPT#991717 INFLUENTMSD	5:23 pm	o.k.	2
VB2A8836	10	STD#29099	ENDING STANDARD VSTD50,W	5:52 pm	N.G.	—
VB2A8837	11	STD#29100	ENDING STANDARD VSTD50,W	6:21 pm	o-k.	—

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments:

Analyst: Megan Bubp Date: 12/13/99

03607

Volatiles Lab Standards/QC Sample Logbook

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Cl
29077	STD	8021	VOC	28946	200ppm	5ul	20ml	50ppb	H_2O	12/9/99	12/9/99	N
29078	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
29079												
29080	STD		VOC	28946								
VL912093	LCS		BTEX LCS	28947	200ppm	5ul	20ml	50ppb				
VB912093	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H_2O	12/9/99	12/9/99	Me
V29081	STD	8260	8260mix	28970	50ppm	.4ul	5ml	.4ppb	H_2O	12/9/99	12/9/99	Sa
V29082						1.0ul		1.0ppb				
V29083						2.0ul		2.0ppb				
V29084						5.0ul		5.0ppb				
V29085						10ul		10ppb				
V29086						20ul		20ppb				
VL912094	LCS		8260 MS	28966		5ul		50ppb				
29087	STD	8260	8260 mix	28970	50ppm	5ul	25ml	50ppb	H_2O	12/9/99	12/9/99	Ch
VL912095	LCS		8260 MS	28966								
VB912095	BLK		N/A									
29088	STD	8260	8260 mix	28970	50ppm	25ul	25ml	50ppb	H_2O	12.9.99	N/A	
VL912096	LCS		8260 MS	28966								
VB912096	BLK		N/A									
29089	STD	8260	8260 #2	ACCU# A9040221	5ml	—	—	varies	MeOH	—	1/1/01	
29090	STD	8260	8260mix | Ketones	28970/29068	50ppm	5ul	25ml	10ppb	H_2O	12/10/99	12/10/99	NE
VB912101	BLK	8260	N/A	N/A								
VL912101	LCS	8260	8260ms | Ketones	28966/29068	50ppm	5ul	25ml	10ppb	H_2O	12/10/99	12/10/99	NE
29091	STD	8021	VOC	28946	200ppm	5ul	20ml	50ppb	H_2O	12/10/99	12/10/99	ME
29092	STD		VOC	28946								
VL912102	LCS		BTEX LCS	28947	200ppm	5ul	20ml	50ppb				
VB912102	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H_2O	12/10/99	12/10/99	ME

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Reviewed by: Megan Ruby Date: 12/10/99

STL Baltimore — Volatiles Lab Standards/QC Sample Logbook

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem.
29093	Work STD	8260	8260 #1	STL # 28941A	2000 ppm	25ml	16mls	8 ppm	2W756 MeOH	12/10/99	12/17/99	SS
			8260 #2	STL # 29039	varied			50 ppm				
			8260 #3	Lot # MS99-185	varied			25/50/100 ppm				
			8260 #4	STL # 28878D	10 mg/ppm	25ml		25/50/250 ppm				
			ABD	Lot # A1100204	2000 ppm	25ml		50 ppm				
			Gases	STL # 27643	2000 ppm			50 ppm				
29094			8260 MS	STL # 28624H	200 ppm	1ml	4mls	50 ppm				
			ADD MS	STL # 28879C	200 ppm			50 ppm				
29095			8260 IS	Lot # MS100151	200 ppm			50 ppm				
29096			8260 SS	Lot # MM100205	200 ppm			50 ppm				
29097	STD	8260	8260 mix	29093	50 ppm	5ml	5mls	50 ppb	H_2O	12/10/99	12/10/99	SS
VL912103	LCS		8260 MS	29094								
VB912103	BLK		N/A									
29098	STD	8260	8260 MIX	29093	50 ppm	25ml	25ml	50 ppb	H_2O	12.10.99	N/A	CW
VL912104	LCS		8260 MS	29094								
VB912104	BLK		N/A									
29099	STD	8021	VOC	28946	200 ppm	5ml	20ml	50 ppb	H_2O	12/10/99	12/10/99	MCW
29100	STD	8021	VOC	28946	200 ppm	5ml	20ml	50 ppb	H_2O	12/10/99	12/10/99	MCW
29101	STD	624	8260 MS	29094	50 ppm	10ml	25ml	20 ppb	H_2O	12/10/99	N/A	CW
VB912105	BLK		N/A									
29102	STD	8260	8260 mix	29093	50 ppm	5ml	5ml	50 PPB	H_2O	12/11/99	12/11/99	CW
VL912111	LCS		8260 MS	29094								
VB912111	BLK		N/A									
29103	STD	8260	8260 mix	29093	50 ppm	5ml	5ml	50 PPB	H_2O	12/12/99	12/12/99	CW
VL912121	LCS		8260 MS	29094								
VB912121	BLK		N/A									

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Date: 12/13/99

STL Baltimore — Volatiles Lab Standards/QC Sample Logbook

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem
29077	STD	8021	VOC	28946	200ppm	5ul	20ml	50ppb	H_2O	12/9/99	12/9/99	MEK
29078	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
29079	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
29080	STD	↓	VOC	28946	↓	↓	↓	↓	↓	↓	↓	↓
VL912093	LCS	↓	BTEX LCS	28947	200ppm	5ul	20ml	50ppb	↓	↓	↓	↓
VB912093	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H_2O	12/9/99	12/9/99	MEK
V29081	STD	8260	8260mix	28970	50ppm	4ul	2ml	4ppb	~~H_2O~~	12/9/99	12/9/99	MEK
V29082	↓	↓	↓	↓	↓	10ul	↓	10ppb	↓	↓	↓	↓
V29083	↓	↓	↓	↓	↓	20ul	↓	20ppb	↓	↓	↓	↓
V29084	↓	↓	↓	↓	↓	30ul	↓	30ppb	↓	↓	↓	↓
V29085	↓	↓	↓	↓	↓	40ul	↓	40ppb	↓	↓	↓	↓
V29086	↓	↓	↓	↓	↓	50ul	↓	50ppb	↓	↓	↓	↓
VL912094	LCS	↓	8260 MS	28966	↓	5ul	↓	50ppb	↓	↓	↓	↓
29087	STD	8260	8260 mix	28970	50ppm	5ul	25ml	50ppb	H_2O	12/9/99	12/9/99	CH
VL912095	LCS	↓	8260 MS	28966	↓	↓	↓	↓	↓	↓	↓	↓
VB912095	BLK	↓	N/A						↓	↓	↓	↓
29088	STD	8260	8260 mix	28970	50ppm	25ul	25ml	50ppb	H_2O	12.9.99	N/A	↓
VL912096	LCS	↓	8260 MS	28966	↓	↓	↓	↓	↓	↓	↓	↓
VB912096	BLK	↓	N/A						↓	↓	↓	↓
29089	STD	8260	8260 #2	ACCU# A9040221	5ml	—	—	various	MeOH	—	1/1/01	↓
29090	STD	8260	8260 mix | Ketones	28970/29068	50ppm	5ul	25ml	10ppb	H_2O	12/10/99	12/10/99	MEK
VB912101	BLK	8260	N/A	N/A					↓	↓	↓	↓
VL912101	LCS	8260	8260MS | Ketones	28966/29068	50ppm	5ul	25ml	10ppb	H_2O	12/10/99	12/10/99	MEK
29091	STD	8021	VOC	28946	200ppm	5ul	20ml	50ppb	H_2O	12/10/99	12/10/99	MEK
29092	STD	↓	VOC	28946	↓	↓	↓	↓	↓	↓	↓	↓
VL912102	LCS	↓	BTEX LCS	28947	200ppm	5ul	20ml	50ppb	↓	↓	↓	↓
VB912102	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H_2O	12/10/99	12/10/99	MEK

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem
29029	STD	8021	VOC	28946	200ppm	2.25ml	500ml	0.9ppb	H_2O	12/6/99	12/6/99	MEK
29030	↓	↓	↓	↓	↓	2.25ml	500ml	0.9ppb	↓	↓	↓	↓
29031						5ml	200ml	5.0ppb				
29032						5ml	20ml	50ppb				
29033						10ml	20ml	100ppb				
29034	STD		VOC	28946		20ml	20ml	200ppb				
VI912067	LCS/ICV	↓	BTEX LCC	28947	↓	5ml	20ml	50ppb	↓	↓	↓	↓
VL912067	LCS/ICV	8021	BTEX LCS	28947	200ppm	5ml	20ml	50ppb	H_2O	12/6/99	12/6/99	MEK
29035	STD	8021	VOC	28946	200ppm	2.25ml	500ml	0.9ppb	H_2O	12/6/99	12/6/99	MEK
29036	STD	8021	VOC	28946	200ppm	2.25ml	500ml	0.9ppb	H_2O	12/6/99	12/6/99	MEK
29037	STD	8260	8260 mix	28970	50ppm	5ml	5ml	50ppb	H_2O	12/6/99	12/6/99	CHS
VL912068	LCS	↓	8260 MS	28966	↓	↓	↓	↓	↓	↓	↓	↓
VB912068	BLK		N/A					→				
29038	STD	CLP LOW	8260 mix / Ketones	28970/28966	50ppm	2.5ml	25ml	5ppb	H_2O	12/7/99	12/7/99	NEH
VB912071	BLK	CLP LOW	N/A	N/A				→	↓	↓	↓	↓
VL912071	LCS	CLP LOW	8260 MS / Ketones	28966/28969	50ppm	2.5ml	25ml	5ppb	H_2O	12/7/99	12/7/99	NEH
29039	STD	8021	VOC	28946	200ppm	5ml	20ml	50ppb	H_2O	12/7/99	12/7/99	MEK
29040	STD	↓	VOC	28946	↓	↓	↓	↓	↓	↓	↓	↓
VL912072	LCS		BTEX LCS	28947	200ppm	5ml	20ml	50ppb				
VB912072	BLK	↓	N/A	N/A	N/A	N/A	N/A	N/A	↓	↓	↓	↓
29041	STD	8021	VOC	28946	200ppm	5ml	20ml	50ppb	H_2O	12/7/99	12/7/99	MEK
29042	STD	CLP LOW	8260 mix / Ketones	28966/28969	50ppm	2.5ml	25ml	5ppb	H_2O	12/7/99	12/7/99	NEH
29043	STD	8021	VOC ~~VOV~~ mix 13/17	28946	200ppm	2.25ml	500ml	0.9ppb	H_2O	12/7/99	12/7/99	MEK
29044	↓	↓	↓	↓	↓	2.25ml	500ml	0.9ppb	↓	↓	↓	↓
29045						5ml	200ml	5.0ppb				
29046						5ml	20ml	50ppb				
29047	↓	↓	↓	↓	↓	10ml	20ml	100ppb	↓	↓	↓	↓

STD/QC Sample ID Number	QC Type	Method	Description	Std ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem
29048	STD	↓	VOC	28146	↓	20 ul	20 ml	100 ppb	↓	↓	↓	↓
VI912073	ICV/LCS		BTEX LCS	28147		5 ul	20 ml	50 ppb				
VL912073	ICV/LCS	8021	BTEX LCS	28147	200 ppm	5 ul	20 ml	50 ppb	H2O	12/7/99	12/7/99	MTBE
29049	STD	8260	8260 mix	28164	50 ppm	5 ul	5 ml	5 ppb	MeOH	12/7/99	12/7/99	JKS
VL912074	LCS	↓	8260 mix	28164	↓	↓	↓	↓	↓	↓	↓	↓
VB912074	BLK	↓	N/A	—	—	—	—	—	↓	↓	↓	↓
29050	STD	8260	8260 mix	28170	50 ppm	4 ul	5 ml	4 ppb	MeOH	12/7/99	12/7/99	JKS
29051	↓	↓	↓	↓	↓	16 ul	↓	16 ppb	↓	↓	↓	↓
29052						20 ul		20 ppb				
29053						16 ul		16 ppb				
29054						20 ul		20 ppb				
~~29055~~	~~STD~~	~~8260~~	~~8260 mix / Ketones~~	~~28170/28169~~	~~50 ppm~~	~~5 ul~~	~~5 ml~~	~~5 ppb~~	~~MeOH~~	~~12/7/99~~	~~12/7/99~~	~~JKS~~
29056						2 ul		2 ppb				
29057						4 ul		4 ppb				
29058						16 ul		16 ppb				
29059						20 ul		20 ppb				
29060						40 ul		40 ppb				
VL912075	LCS	8260	8260 mix / Ketones	28169/28169	50 ppm	16 ul	5 ml	16 ppb	H2O	12/7/99	12/7/99	JKS

~~JKS 12/7/99~~

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol	Final Conc	Solv.	Prep Date	Exp. Date
VB11213	BLK	8260	N/A						N/A	12/1/99	12/1/99
28943	STD	8015	TPH GAS	28317	2000ppm	2.5ml	5ml	1000ppm	MeOH/H2O	12/01/99	12/01/99
28944	↓		↓	↓							
28945	STD		TPH GAS	28317	↓	↓	↓	1000ppm			
VL91.2014	LCS	↓	TPH LCS	28318	2000ppm	2.5ml	5ml	1000ppm			
VB912014	BLK	8015	N/A	N/A	N/A	N/A	N/A	N/A	H2O	12/01/99	12/01/99
28946	WCP.V. STD	8021	VLC	28651A	200 ppm	—	—		MeOH	12/01/99	1/01/00
28947	~~WCP.V.~~ STD	8021	BTCXLCS	26270E	200 ppm	—	—		MeOH	12/01/99	1/01/00
28948	~~WCP.V.~~ STD	~~8021~~	BFB	14592	NEAT	0.2ml	100 mL	200ppm	MeOH	12/01/99	12/01/00
28949	STD	CLP ~~8260~~	CLP ~~8260~~ mix Ketones	28906/28877	50PPM	2ml	200 ml	.5ppb	H2O	12/1/99	12/1/99
28950	STD	CLP	CLP mix Ketones	28906/28877	50PPM	10ml	250ml	2PPb	↓	↓	↓
28951	STD	CLP	CLP mix Ketones	28906/28877	50PPM	20ml	250ml	4PPb	H2O	12/1/99	12/1/99
28952	WCP.V. STD	8021	BFB	28948	2000ppm	1.25ml	10ml	250ppm	MeOH	12/01/99	5/01/00
28953	STD	CLP	CLP mix Ketones	28906/28877	50PPM	10ml	1000ml	.5PPb	H2O	12/1/99	12/1/99
28954	STD	CLP	CLP mix Ketones	28906/28877	50PPM	5ml	25ml	10PPb	H2O	12/1/99	12/1/99
VL91.2015	LCS	CLP	CLP MS/Ketones	28909/28877	50PPM	5ml	25ml	10PPb	H2O	12/1/99	12/1/99
VB91.2016	BLK	8260	8260 MS	28874	50ppm	5ml	5ml	50ppb	Na2SO4	12/1/99	12/1/99
VB91.2016	BLK	↓	N/A	—	—	—	—	—	↓	↓	↓
28955	STD	↓	8260 mix	28873	50ppm	5ml	25ml	50ppb	↓	↓	↓
28956	STD	8260	8260 mix	28873	50ppm	5ml	5ml	50ppb	H_2O	12.1.99	N/A
VL91.2017	LCS	↓	8260 MS	28874	↓	↓	↓	↓	↓	↓	↓
VB91.2017	BLK	↓	N/A						↓	↓	↓
28957	STD	8260	8260 mix Ketones	28873/28877	50ppm	5ml	25ml	10ppb	H2O	12/2/99	12/2/99
VB912021	BLK	8260	N/A	N/A					↓	↓	↓
VL912021	LCS	8260	8260 MS/Ketones	28874/28877	50PPM	5ml	25ml	10PPb	H2O	12/2/99	12/2/99
28958	STD	8260	8260 mix	28873	50ppm	5ml	5ml	50ppb	Na2SO4	12/2/99	12/2/00
VL912022	LCS	↓	8260 MS	28874	↓	↓	↓	↓	↓	↓	↓

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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
14565										
14566	GCS, BFB	13881, 14267	200/200ppm	6.25/0.5µL		200/100ppb	6/20/96	5/21/96	H_2O	
14567										
14568										
14569	5021, 601B, MTBE, BFB	14461, 14325, 14267, 14521	200ppm	1.25µL	5ml	50ppb				
14570										
14571	BFB, VOC, BFB	14457-8 14267							H_2O	
14572										
14573	GCS, BFB	13881, 14267	200/200ppm	6.25/1.25µL	5ml	200/100ppb	5/21/96	5/22/96	H_2O	
14574										
14575	BFB, VOC, 601A	14457-8, 14267	200ppm	1.25µL	5ml	50ppb	5/21/96	5/22/96	H_2O	
14576										
14577										
14578	601B	Acu STD 036-046	200ppm	—	—	—	5/21/96	5/22/96	MeOH	
14579	601A, B, C, 501, VOC, BFB	14457-60 14578 14267		1.25µL	5ml	50ppb		5/22/96	H_2O	
14580										
14581										
14582	601A, VOC, BFB	14557-8, 14267		0.4µL	200ml	0.4 ppb				
14583				5µL		5				
14584				1.25µL	5ml	50				
14585				2.5		100				
14586				12.5		500				
14587				1.25		50				
14588						50				
14589				2.5µL		100ppb	5/22/96	5/22/96	H_2O	
14590										
14591										
14592	BFB	Sigma 45H3634	Neat	—	—	—	—	—	—	
14593				0.200g	100ml	2000ppm	5/22/96	5/22/97	MeOH	
14594			2000ppm	10ml	100ml	200ppm				

STD 14592

43

080030

F. Technical Review Checklist and Other Analysis Documentation

DATA REVIEW CHECKLIST

All questions should be answered with a "Y" for yes, "N" for no or "N/A" for not applicable. *All "N" answers* **require a corrective action as specified in the project summary and an explanation in the narrative notes section.**

Report #: 991717 PS #: 90 Test: VOA Method: 8021 Analyst: MER
Comp. List: BTEX/NAPH Matrix: Water TICs: N/A Inst. ID: VB2 EA#s: 9913145-9913147 (3)

	Initial Analyst	Peer Review	Comments
Has the appropriate Project Summary been used?	Y	Y	
Have all associated memos/e-mail/NCRs been included?	N/A	Y	
Have the C-O-Cs been reviewed for errors?	Y	Y	
Were TCLP/DI WET extraction holding times met?	N/A	NA	
Were the samples properly preserved?	Y	Y	
Were the samples initially analyzed within holding time?	Y	Y	
Were dilutions/reanalyses completed within holding time?	Y	NA	
Did BFB meet tune criteria?	N/A	NA	
Did the IC/ICV/CCVs meet specified criteria?	Y	Y	
Did the method blank and LCS meet surrogate criteria?	Y	Y	
Did the method blank and LCS meet internal standard criteria?	N/A	NA	
Did the LCS/LCSD meet specified criteria?	Y	Y	
Have all samples been analyzed?	Y	Y	
Did all samples meet surrogate criteria?	Y	Y	
Did all samples meet internal standard criteria?	N/A	NA	
Were all samples analyzed within appropriate cal/tune time?	Y	Y	
Did the MS/MSD meet specified criteria?	Y	Y	
Were all target analytes within calibration range?	Y	Y	
Were the appropriate dilutions/reanalyses performed?	Y	Y	
Have the proper analytes/reporting limits been used?	Y	Y	
Has the report narrative been completed?	Y	Y	
Are the Client/LIMS C-O-Cs included?	Y	Y	
Are the TCLP/DIWET extraction sheets included?	N/A	NA	
Are the dry weight/sample weight logs included?	N/A	NA	
Is an example calculation included?	Y	Y	
Are the Injection and Standards logs included?	Y	Y	
Are the Forms Is (Sample Data) included?	Y	Y	
Are the Forms IIs (Surrogate recovery) included?	Y	Y	
Are the Forms IIIs (MS/MSD) included?	Y	Y	
Are the Forms IIIs (LCS/LCSD) included?	Y	Y	
Are the Forms IVs (Method Blank) included?	Y	Y	
Are the Forms Vs (Tune) included?	N/A	NA	
Are the Forms VIs (Initial Calibration) included?	Y	Y	
Are the Forms VIIs (Continuing Calibration) included?	Y	Y	
Are the Forms VIIIs (Internal Standard Areas) included?	N/A	NA	

Analyst: Megan Ruley Peer Reviewer: Gary Schmidt

Additional Comments:

Committed To *Your* Success

Severn Trent Laboratories
19 Loveton Circle
Sparks, MD 21152

Tel: (410) 771-4920
Fax: (410) 771-4407
www.stl-inc.com

January 17, 2000

Carl Reitenbach
EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152

Re:Willow Grove NAS (29600.74)

Dear Mr. Reitenbach:

Enclosed is our report on the analysis of three water samples collected for the Willow Grove NAS project on 30 December 1999. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 000001. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

GSP/mea
enclosure

Committed To *Your* Success

LABORATORY DATA REPORT

Prepared for:

Willow Grove NAS

Prepared by:

Severn Trent Laboratories - Baltimore
19 Loveton Circle
Sparks, MD 21152

Report 000001

January 2000

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Severn Trent Laboratories - Baltimore Report 000001

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1. NARRATIVE

Severn Trent Laboratories - Baltimore
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **Willow Grove NAS**
Project number:**29600.74**

STL Baltimore Report: **000001**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **17 January 2000**

This report contains the results of the analysis of three water samples collected on 30 December 1999 in support of the referenced project.

SAMPLE RECEIPT

The samples and one trip blank arrived intact by hand at Severn Trent Laboratories - Baltimore on 3 January 2000. Upon receipt, the samples and trip blank were inspected and compared with the chain-of-custody record. The samples and trip blank were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	ST Lab Number
INFLUENT	0000001
BETWEEN	0000002
EFFLUENT	0000003
TRIP BLANK	0000004

Following this narrative section are a glossary of data qualifiers (Table 1), codes associated with manual integration of chromatographic peaks (Table 2), and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval.

The narrative will then include a thorough discussion of the impact on data quality.

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (STL0000001 - STL0000004)

Sample Chronology: Four samples and associated quality control were analyzed on 04 and 05 January 2000 for the client specified list of analytes by USEPA SW-846, Methods 5030B/8021B. All holding times were met.

Sample INFLUENT was analyzed at a 2X dilution in order to bring the concentrations of target analytes within instrument calibration range.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exceptions;

- the batch LCS/LCSD, analyzed on 05 January 2000, had the recoveries of benzene (131%/131%) above the upper QC limit of 121%.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in Severn Trent Laboratories - Baltimore Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. Severn Trent Laboratories - Baltimore is not responsible for any assumptions of data quality if partial packages are used to interpret data Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper January 17, 2000
Mary E. Asper, Laboraotry Project Manager

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for detected concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

TABLE 2. CODES ASSOCIATED WITH MANUAL INTEGRATION OF CHROMATOGRAPHIC PEAKS

M1 .... Software failed to integrate peak or integrated peak improperly

M2 .... Multiple peaks within window, analyst's discretion used in peak identification.

M3 .... Close eluting or near-coelution of interferences.

M4 .... Adding or removing area due to peak tailing - subject to consistency within the sequence.

M5 .... Adding/removing area due to positive baseline deflection matrix effect.

M6 .... Adding/removing area due to negative baseline deflection matrix effect.

M7 .... Retention time shifts.

M8 .... Skimming vs. dropped baseline.

M9 .... Adding area due to peak splitting .

M10 ... Secondary ions or qualifier ions.

Note: Appropriate Qualifiers are used and specified in the data package; either on the individual quantitation reports or in the Technical Review Checklists.

F:\GROUP\FINALRPT\MASTER\MANINT.MAS

2. CHAIN-OF-CUSTODY

020000

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA Delaware

Project Manager or Contact: CARL REITENBACH
Phone: 302-325-2560

Project No. 29600.74

Project Name: WILLOW GROVE NAS

Dept.: 232 Task: 7200

Sample Storage Location: VOA1

ATO Number: –

Page 1 of 1

Report #: ~~994187~~ 000001

SAC 1/3/00

Report Deliverables: 1 2 3 4 D E

EDD: Yes/No

DUE TO CLIENT: 1/25/00

Parameter/Method Numbers for Analysis: 8021 BTEX/MTBE by 8260

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	8021 BTEX/MTBE by 8260										EA Labs Accession Number	Remarks
12/30/99	1420	X		INFLUENT	3	✓							0000001			~~9914374~~	LPM: MEA
	1410	X		BETWEEN	3	✓							0000002			~~9914375~~	SR-PS-090
↓	1400	X		EFFLUENT	3	✓							0000003			~~9914376~~	
—	—	-		TRIP BLANK	3	✓							0000004			~~9914377~~	L17383
																	Method Number Changed on COC per Conversation with Carl Reitenbach from EA Delaware on 1-3-00 MES
																	12 VOA'S
																	COC0016496

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	12/30/99 1430				

Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
[signature]	12/31/99	Cady Hershey	1/3/00 845		Fed Ex. Puro. UPS Hand Carried Other:

Cooler Temp. 4 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☐ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

C2000 1

Committed to *Your* Success

Severn Trent Laboratories
STL Baltimore

19 Loveton Circle
Sparks, Maryland 21152
(410) 771-4920

COOLER RECEIPT CHECKLIST

Report: 000001

Project: Willow Grove NAS
Received: 03-JAN-00 8:45
COC: COC0006496
Samples: 0000001-0000004

A. **COOLER INSPECTION:**

Date cooler was opened: 1/3/00 (Date) Cathy Hurley (Custodian Signature)

1. Did cooler come with a shipping slip, air bill, etc? YES (NO) N/A NCR# _____
1a. Circle courier: Federal Express UPS *Air bill Number from Chain-of-Custody* _____
1b. Circle, if applicable: Handcarried Other

2. Custody seals were present on outside of cooler? YES (NO) N/A NCR# _____
3. Custody seals were unbroken at the time of arrival? YES NO (N/A) NCR# _____
4. Chain-of-Custody (COC)records were present and legible? (YES) NO N/A NCR# _____
5. Were the COC records completed? (YES) NO N/A NCR# _____
6. Was cooler temperature 4C ± 2C? (YES) NO N/A NCR# _____

B. **SAMPLE INSPECTION**

9. All bottles arrived unbroken? (YES) NO N/A NCR# _____
10. All bottles labels were legible and complete? (YES) NO N/A NCR# _____
11. Containers were correct for the analysis listed on the COC? (YES) NO N/A NCR# _____
12. Were preservatives checked (except VOA vials)? YES (NO) N/A NCR# _____
13. Were bubbles absent in Volatiles samples? YES (NO) N/A NCR# 6-0737

Special Notes:
Bubbles present in 3 trip blanks

Sonita Corum
Sample Management Officer

Date

M:\GROUP\QA\FORMS\COOLER.WPD

September 29, 1999/mmu

D20002

3. BTEX DATA

A. QC Summary

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No REFERENCE

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Benzene	50	2.9	60	114	87 - 121
Toluene	50	5.7	61	110	81 - 125

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Benzene	50	54	102	11	21	87 - 121
Toluene	50	57	102.	8	27	81 - 125

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 2 outside limits

Spike Recovery: 0 out of 4 outside limits

COMMENTS: _____

_____

030003

LCS Recovery Report

Lab Name : STL Baltimore File ID : VB29062.D Instrument: VB2

Sample : VI001042 Date Analyzed: 4 Jan 200

Matrix : WATER Method : AB200104.M

Client : 000001 Project : WILLOW GROVE

Spike Compound	Spike Added	Spike Res	Spike %Rec	QC Limits % Rec
Benzene	50	52.3	105	87-121
Toluene	50	54.8	110	81-125
Ethylbenzene	50	54.0	108	50-150

* - Indicates values outside of QC limits

LCS Recovery Report

Lab Name : STL Baltimore File ID : VB29079.D Instrument: VB2

Sample : VL001052 Date Analyzed: 5 Jan 200

Matrix : WATER Method : AB200104.M

Client : 000001 Project : WILLOW GROVE

Spike Compound	Spike Added	Spike Res	Spike %Rec	QC Limits % Rec
Benzene	50	65.7	131*	87-121
Toluene	50	53.8	108	81-125
Ethylbenzene	50	55.6	111	50-150

* - Indicates values outside of QC limits

LCS Recovery Report

Lab Name : STL Baltimore File ID : VB29086.D Instrument: VB2

Sample : VD001054 Date Analyzed: 5 Jan 200

Matrix : WATER Method : AB200104.M

Client : 000001 Project : WILLOW GROVE

Spike Compound	Spike Added	Spike Res	Spike %Rec	QC Limits % Rec
Benzene	50	65.3	131*	87-121
Toluene	50	57.4	115	81-125
Ethylbenzene	50	58.5	117	50-150

* - Indicates values outside of QC limits

4A

EPA SAMPLE NO.

VOLATILE METHOD BLANK SUMMARY

VBLK01

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Lab File ID: VB29065.D Lab Sample ID: VB001044

Date Analyzed: 1/4/00 Time Analyzed: 15:28

GC Column: DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID: VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS01	VI001042	VB29062.D	14:01
02	TRIP BLANK	0000004	VB29066.D	15:58
03	EFFLUENT	0000003	VB29067.D	16:27
04	BETWEEN	0000002	VB29068.D	16:56
05	REFERENCE	9914369	VB29071.D	18:23
06	REFERENCEMS	9914369MS	VB29072.D	18:53
07	REFERENCEMSD	9914369MSD	VB29073.D	19:22

COMMENTS

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK02

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Lab File ID: VB29081.D Lab Sample ID: VB001052

Date Analyzed: 1/5/00 Time Analyzed: 11:25

GC Column: DB-VRX ID: 0.45 (mm) Heated Purge: (Y/N) Y

Instrument ID: VB2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS02	VL001052	VB29079.D	10:27
02	INFLUENT	0000001	VB29082.D	11:54
03	VLCS02DUP	VD001054	VB29086.D	13:51

COMMENTS

B. Sample Results

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

INFLUENT

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 0000001

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29082.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/5/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 2.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

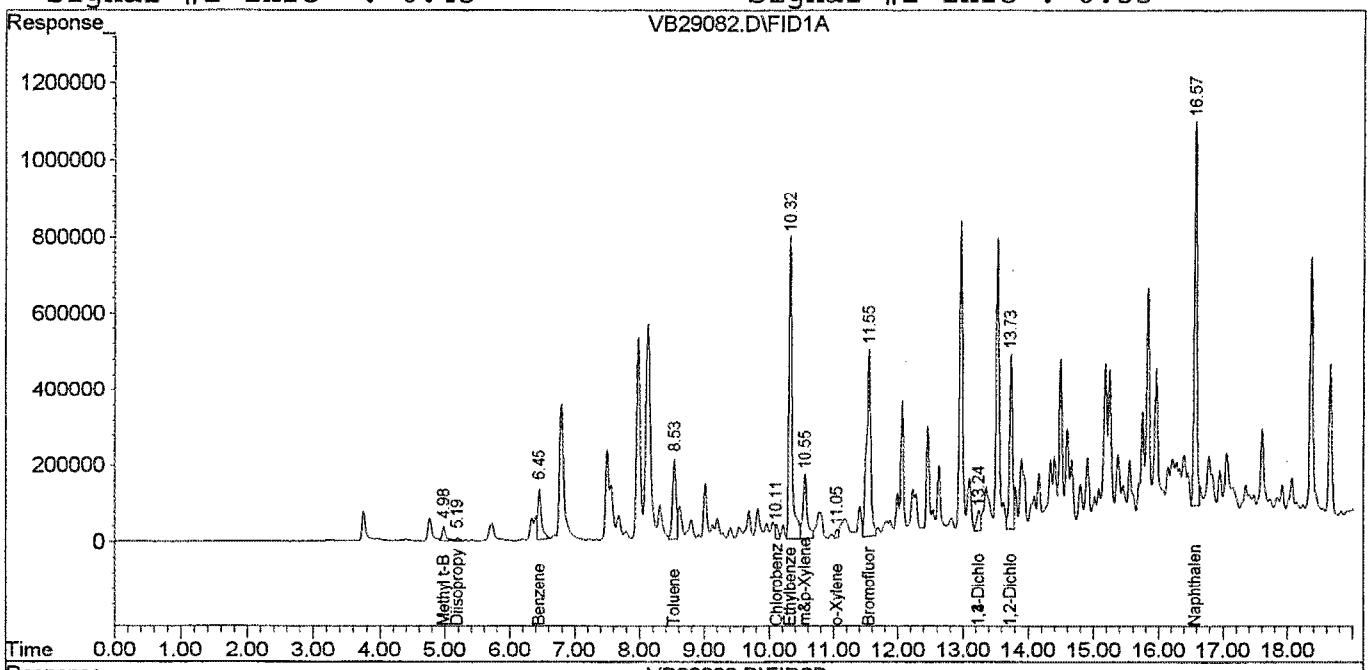
CAS NO.	COMPOUND (ug/L or ug/Kg) UG/L		Q
71-43-2	Benzene	120	D
108-88-3	Toluene	83	D
100-41-4	Ethylbenzene	290	D
91-20-3	Naphthalene	220	D
	m&p-Xylenes	70	D
95-47-6	o-Xylene	6	D

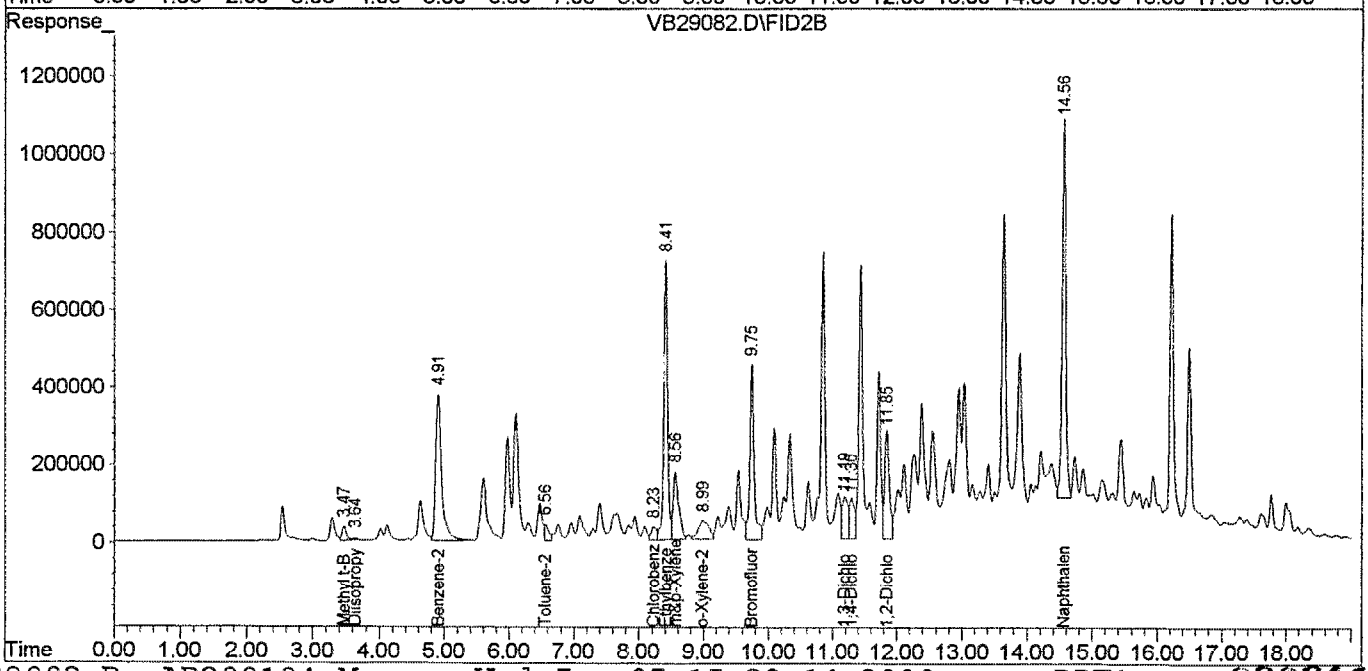
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29082.D\FID1A.CH Vial: 30
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29082.D\FID2B.CH
Acq On : 5 Jan 2000 11:54 am Operator: MER
Sample : 0000001DL Inst : VB2
Misc : RPT#000001 INFLUENTDL,2X Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:29 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29082.D\FID1A.CH Vial: 30
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29082.D\FID2B.CH
Acq On : 5 Jan 2000 11:54 am Operator: MER
Sample : 0000001DL Inst : VB2
Misc : RPT#000001 INFLUENTDL,2X Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:29 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9)	S Bromofluorobenze	11.55	9.75	22013946	20749781	103.623	75.666	#
	Spiked Amount 50.000			Recovery	=	207.25%	151.33%	
	Target Compounds							
1)	Methyl t-Butyl E	4.98	3.47	1474778	1590494	28.649	25.151	
2)	Diisopropyl Ethe	5.19	3.64	267561	284480	5.870	4.517	
3)	Benzene	6.45	4.91	5270041	24604103	58.689m	212.333	#
4)	Toluene	8.53	6.56	8285960	1848513	41.564	6.848	#
5)	Chlorobenzene	10.11	8.23	1209055	1896321	5.075	6.132	
6)	Ethylbenzene	10.32	8.41	27103780	29365199	144.553	118.398	
7)	m&p-Xylenes	10.55	8.56	7764579	10566390	35.096	35.832	
8)	o-Xylene	11.05	8.99	609075	5553235	2.919	20.892	#
10)	1,3-Dichlorobenz	13.25	11.19	2304575	6847195	10.266	22.972	#
11)	1,4-Dichlorobenz	13.25	11.30	2304575	5815449	8.790	17.146	#
12)	1,2-Dichlorobenz	13.74	11.85	14733390	14516620	73.868	56.462	
13)	Naphthalene	16.57	14.56	29159339	37600409	110.063m	115.255m	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BETWEEN

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 0000002

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29068.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

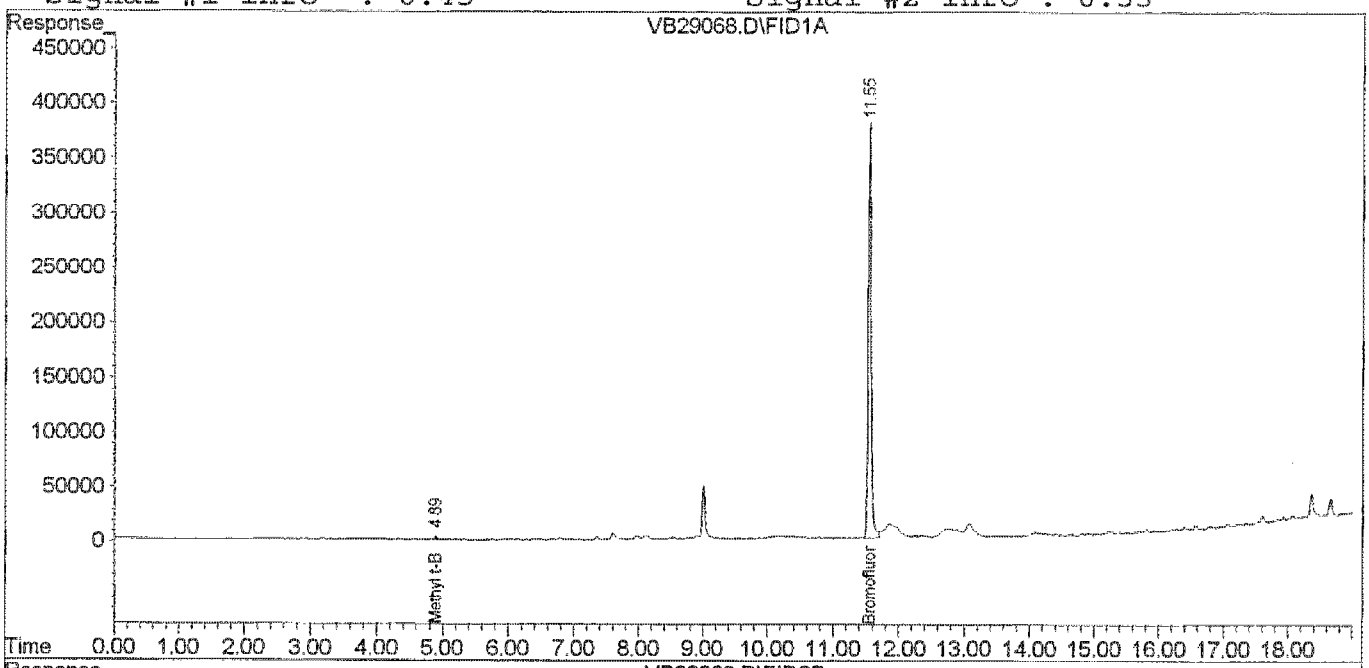
CAS NO.	COMPOUND		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

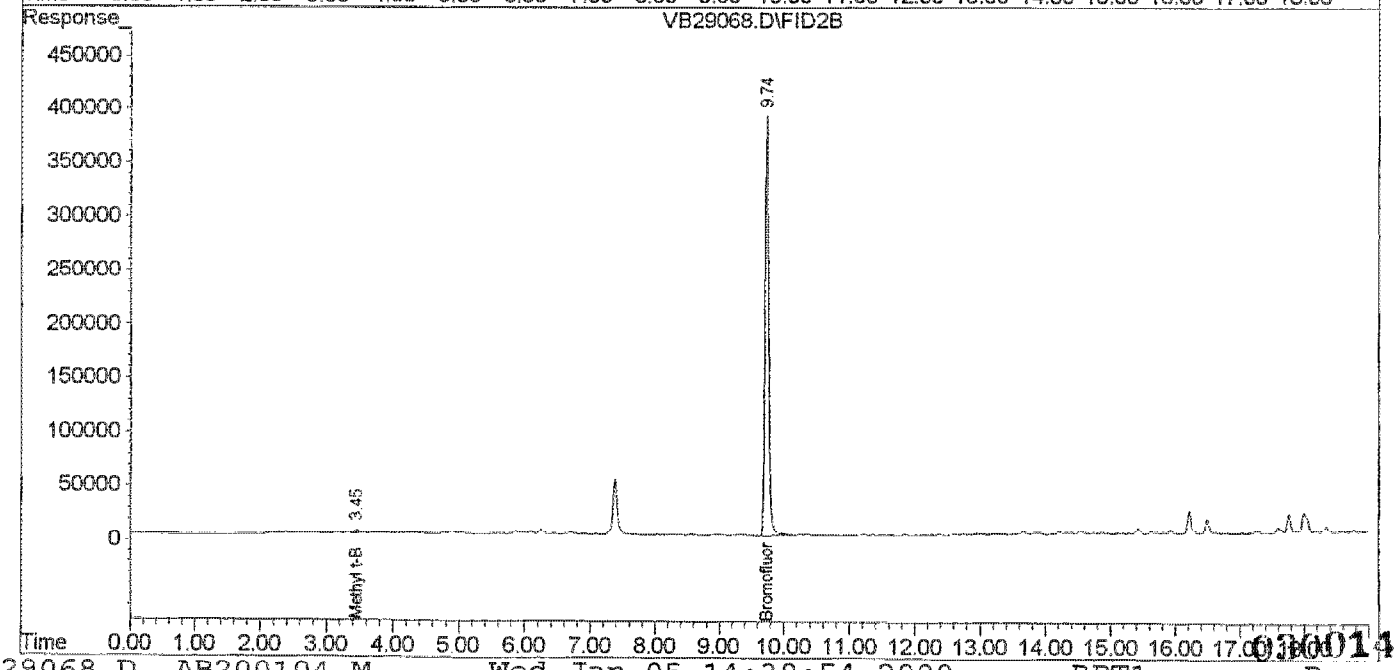
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29068.D\FID1A.CH Vial: 16
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29068.D\FID2B.CH
Acq On : 4 Jan 2000 4:56 pm Operator: MER
Sample : 0000002 Inst : VB2
Misc : RPT#000001 BETWEEN Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 14:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29068.D\FID1A.CH Vial: 16
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29068.D\FID2B.CH
Acq On : 4 Jan 2000 4:56 pm Operator: MER
Sample : 0000002 Inst : VB2
Misc : RPT#000001 BETWEEN Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 14:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	11.55	9.74	11478355	14693838	54.030	53.582
Spiked Amount 50.000			Recovery	=	108.06%	107.16%
Target Compounds						
1) Methyl t-Butyl E	4.89	3.45	84062	113613	1.633m	1.797m

030015

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EFFLUENT

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 0000003

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29067.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg) UG/L		Q
71-43-2	Benzene	2	
108-88-3	Toluene	4	
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	13	
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

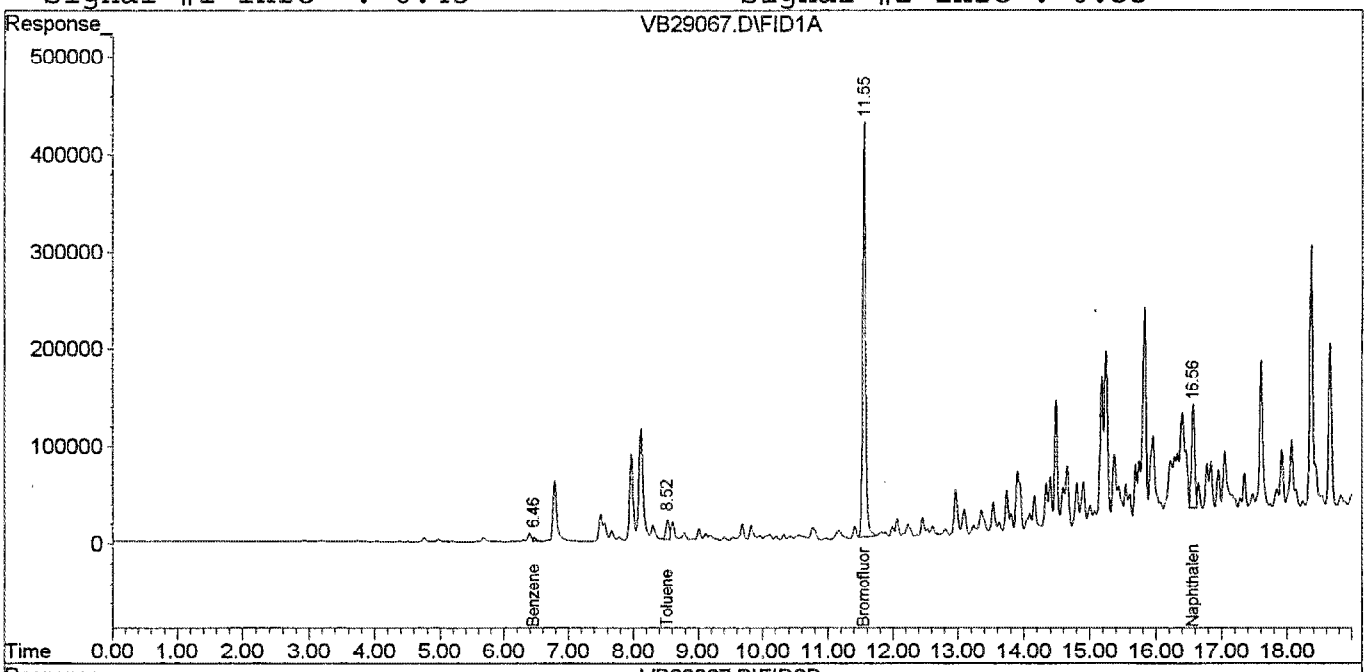
030016

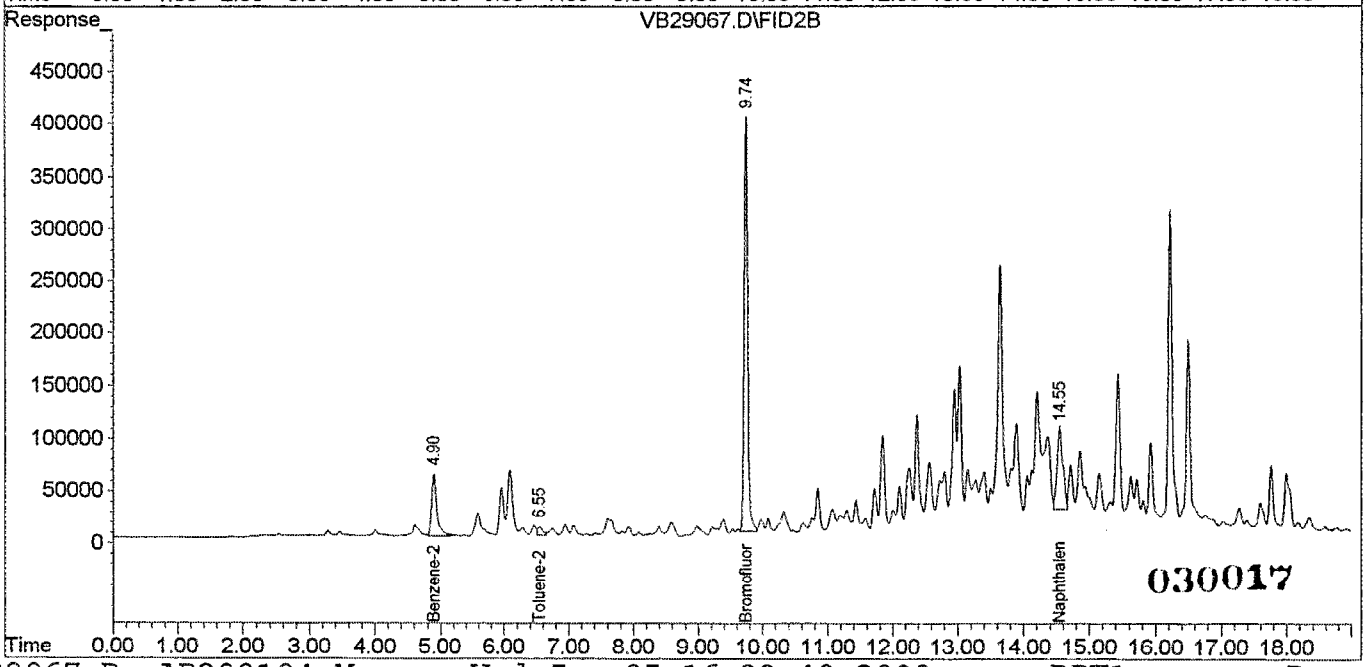
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29067.D\FID1A.CH Vial: 15
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29067.D\FID2B.CH
Acq On : 4 Jan 2000 4:27 pm Operator: MER
Sample : 0000003 Inst : VB2
Misc : RPT#000001 EFFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 16:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030017

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29067.D\FID1A.CH Vial: 15
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29067.D\FID2B.CH
Acq On : 4 Jan 2000 4:27 pm Operator: MER
Sample : 0000003 Inst : VB2
Misc : RPT#000001 EFFLUENT Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 16:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9)	S Bromofluorobenze	11.55	9.74	12686489	14456241	59.717m	52.716m
	Spiked Amount 50.000			Recovery	=	119.43%	105.43%
	Target Compounds						
3)	Benzene	6.46	4.90	146636	3422401	1.633m	29.535m#
4)	Toluene	8.52	6.55	723853	430678	3.631m	1.596m#
13)	Naphthalene	16.56	14.55	3477834	4931318	13.127m	15.116m

030018

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP BLANK

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 0000004

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29066.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

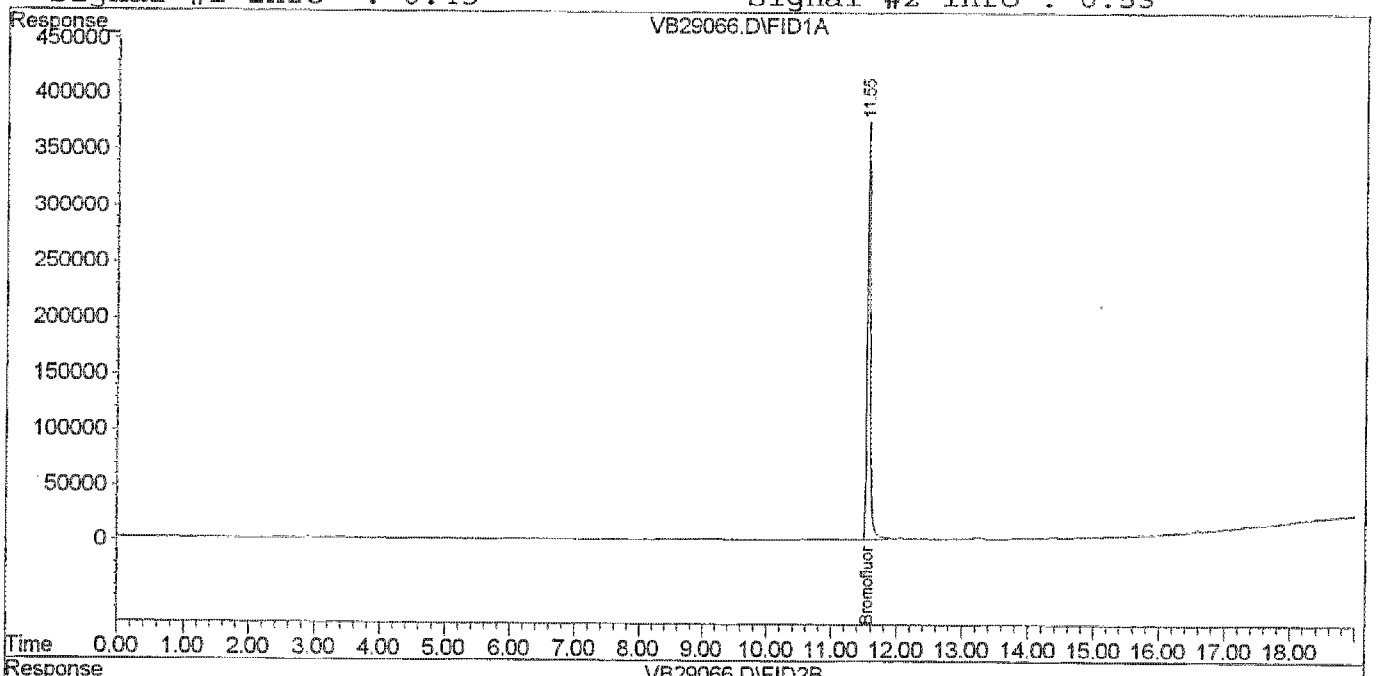
CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

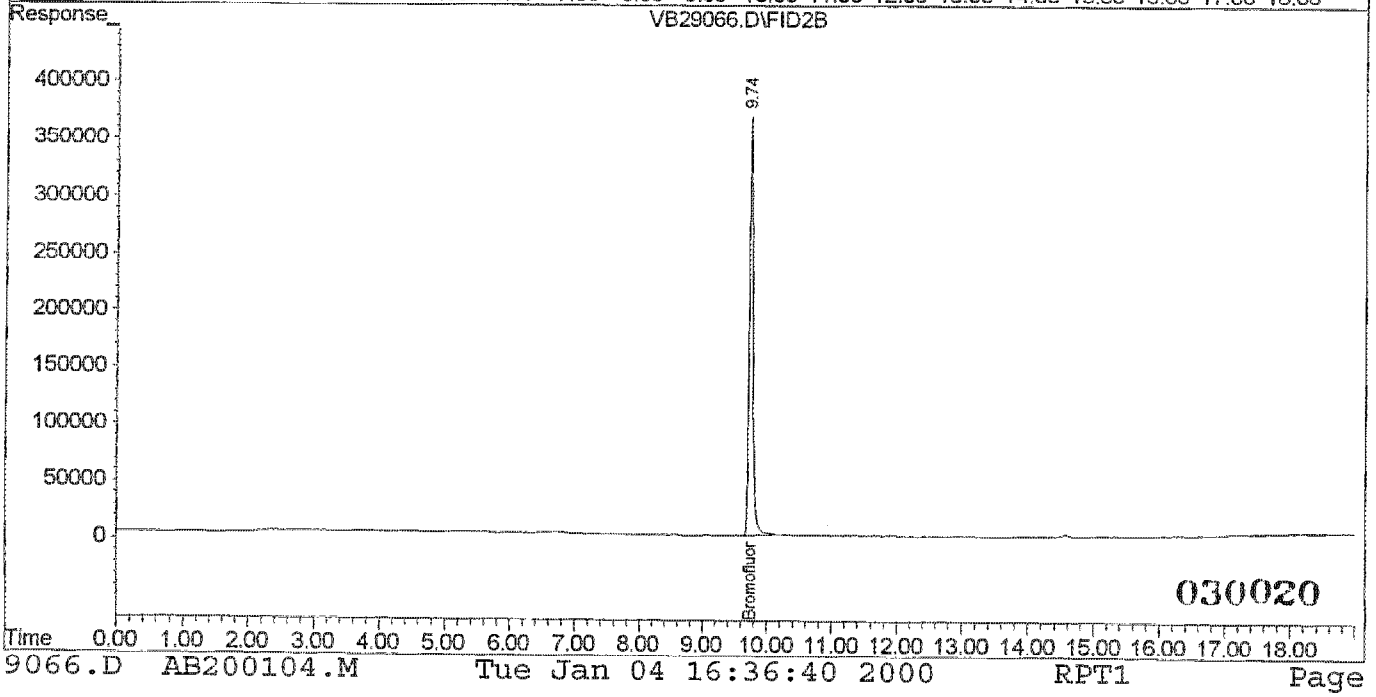
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29066.D\FID1A.CH Vial: 14
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29066.D\FID2B.CH
Acq On : 4 Jan 2000 3:58 pm Operator: MER
Sample : 0000004 Inst : VB2
Misc : RPT#000001 TRIP BLANK Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 16:36 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030020

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29066.D\FID1A.CH Vial: 14
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29066.D\FID2B.CH
Acq On : 4 Jan 2000 3:58 pm Operator: MER
Sample : 0000004 Inst : VB2
Misc : RPT#000001 TRIP BLANK Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 16:36 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	11.55	9.74	11934528	14595683	56.177m	53.224
Spiked Amount 50.000			Recovery	=	112.35%	106.45%
Target Compounds						

030021

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

C. Standards Data

Response Factor Report VB2

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Jan 04 14:16:50 2000

Calibration Files
5 =VB29058.D 50 =VB29056.D 100 =VB29055.D
200 =VB29054.D 0.9 =VB29060.D

		Compound	5	50	100	200	0.9	Avg		%RSD
1)		Methyl t-Butyl Ether	4.720	5.168	5.177	5.836	4.839	5.148	E4	8.43
2)		Diisopropyl Ether	4.160	4.761	4.742	4.598	4.528	4.558	E4	5.33
3)	m	Benzene	7.968	9.842	9.982	9.556	7.550	8.980	E4	12.63
4)	m	Toluene	1.811	2.107	2.123	2.087	1.840	1.994	E5	7.74
5)		Chlorobenzene	2.196	2.513	2.452	2.438	2.312	2.382	E5	5.34
6)	m	Ethylbenzene	1.708	1.979	2.009	1.958	1.721	1.875	E5	7.87
7)		m&p-Xylenes	2.083	2.366	2.312	2.161	2.141	2.212	E5	5.45
8)		o-Xylene	1.880	2.314	2.240	2.090	1.910	2.087	E5	9.25
9)	s	Bromofluorobenzene	1.913	2.373	2.309	2.071	1.956	2.124	E5	9.76
10)		1,3-Dichlorobenzene	2.115	2.488	2.313	2.053	2.255	2.245	E5	7.63
11)		1,4-Dichlorobenzene	2.449	2.880	2.683	2.410	2.687	2.622	E5	7.38
12)		1,2-Dichlorobenzene	1.877	2.257	2.077	1.830	1.932	1.995	E5	8.70
13)		Naphthalene	2.534	2.773	2.589	2.360	2.990	2.649	E5	9.09

AVG 8.05

Signal #2 Calibration Files
5 =VB29058.D 50 =VB29056.D 100 =VB29055.D
200 =VB29054.D 0.9 =VB29060.D

		Compound	5	50	100	200	0.9	Avg		%RSD
1)		Methyl t-Butyl Ether-	6.085	6.755	6.517	6.571	5.691	6.324	E4	6.81
2)		Diisopropyl Ether-2	5.563	6.897	6.816	6.943	5.267	6.297	E4	12.92
3)		Benzene-2	1.243	1.157	1.206	1.227	0.960	1.159	E5	9.99
4)		Toluene-2	2.477	2.753	2.783	2.637	2.846	2.699	E5	5.39
5)		Chlorobenzene-2	3.015	3.158	3.115	3.031	3.143	3.092	E5	2.12
6)		Ethylbenzene-2	2.420	2.511	2.558	2.506	2.407	2.480	E5	2.61
7)		m&p-Xylenes-2	2.911	2.991	3.007	2.903	2.933	2.949	E5	1.61
8)		o-Xylene-2	2.548	2.733	2.717	2.652	2.641	2.658	E5	2.76
9)	S	Bromofluorobenzene-2	2.596	2.798	2.849	2.710	2.758	2.742	E5	3.52
10)		1,3-Dichlorobenzene-2	2.847	3.033	3.006	2.895	3.123	2.981	E5	3.71
11)		1,4-Dichlorobenzene-2	3.278	3.464	3.394	3.250	3.573	3.392	E5	3.93
12)		1,2-Dichlorobenzene-2	2.440	2.659	2.606	2.505	2.646	2.571	E5	3.70
13)		Naphthalene-2	3.111	3.279	3.173	3.055	3.694	3.262	E5	7.83

AVG = 5.01

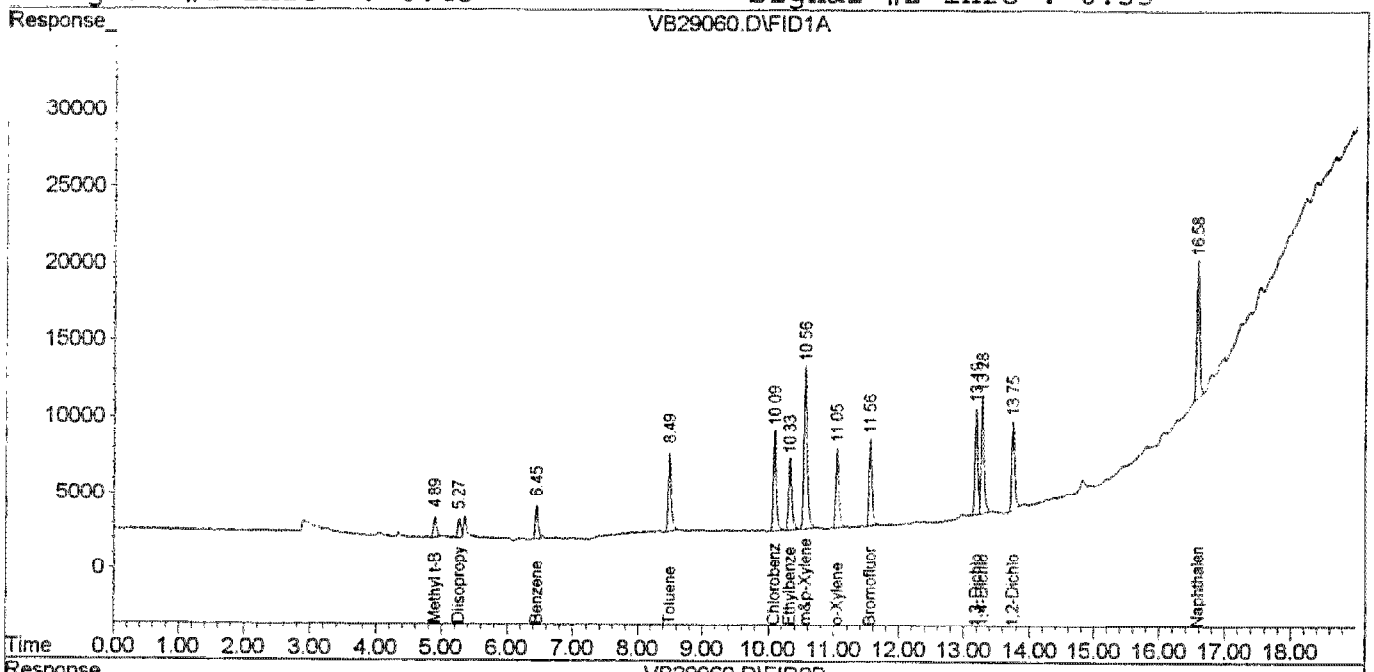
030023

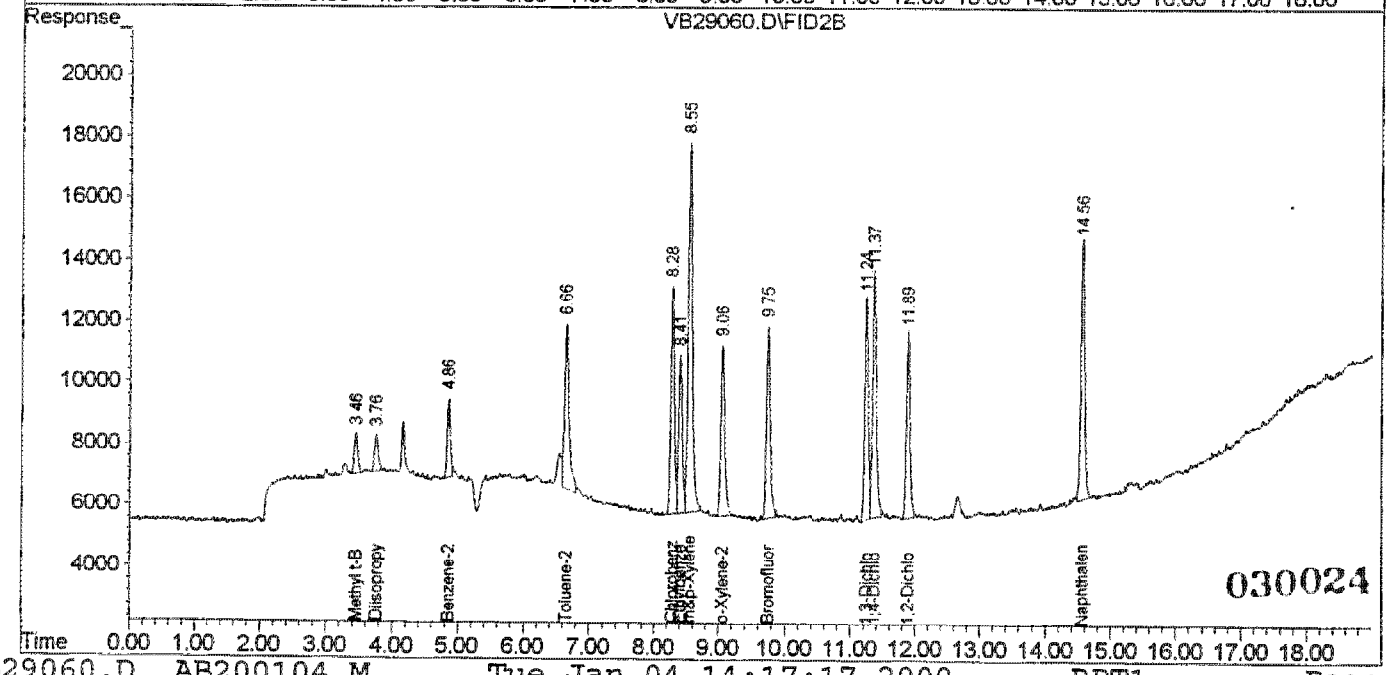
(#) = Out of Range

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29060.D\FID1A.CH Vial: 8
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29060.D\FID2B.CH
Acq On : 4 Jan 2000 1:03 pm Operator: MER
Sample : STD#29440 Inst : VB2
Misc : INITIAL CALIBRATION VSTD0.9,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:16 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Jan 04 13:07:48 2000
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030024

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29060.D\FID1A.CH Vial: 8
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29060.D\FID2B.CH
Acq On : 4 Jan 2000 1:03 pm Operator: MER
Sample : STD#29440 Inst : VB2
Misc : INITIAL CALIBRATION VSTD0.9,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:16 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Jan 04 13:07:48 2000
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	11.56	9.75	176072	248264	0.821m	0.894m
Spiked Amount	50.000			Recovery	=	1.64%	1.79%
	Target Compounds						
1)	Methyl t-Butyl E	4.89	3.46	43551	51219	0.845m	0.810m
2)	Diisopropyl Ethe	5.27	3.76	40753	47406	0.912m	0.744m
3)	Benzene	6.45	4.86	67947	86377	0.741m	0.734m
4)	Toluene	8.49	6.66	165579	256126	0.823m	0.950m
5)	Chlorobenzene	10.09	8.28	208100	282902	0.867m	0.904m
6)	Ethylbenzene	10.33	8.41	154893	216591	0.817m	0.856
7)	m&p-Xylenes	10.56	8.55	385311	527874	1.725m	1.760m
8)	o-Xylene	11.05	9.06	171917	237645	0.812	0.877m
10)	1,3-Dichlorobenz	13.19	11.24	202917	281094	0.892m	0.931m
11)	1,4-Dichlorobenz	13.28	11.37	241859	321539	0.918m	0.933m
12)	1,2-Dichlorobenz	13.75	11.89	173843	238118	0.859m	0.909m
13)	Naphthalene	16.58	14.56	269107	332487	0.973m	0.966m

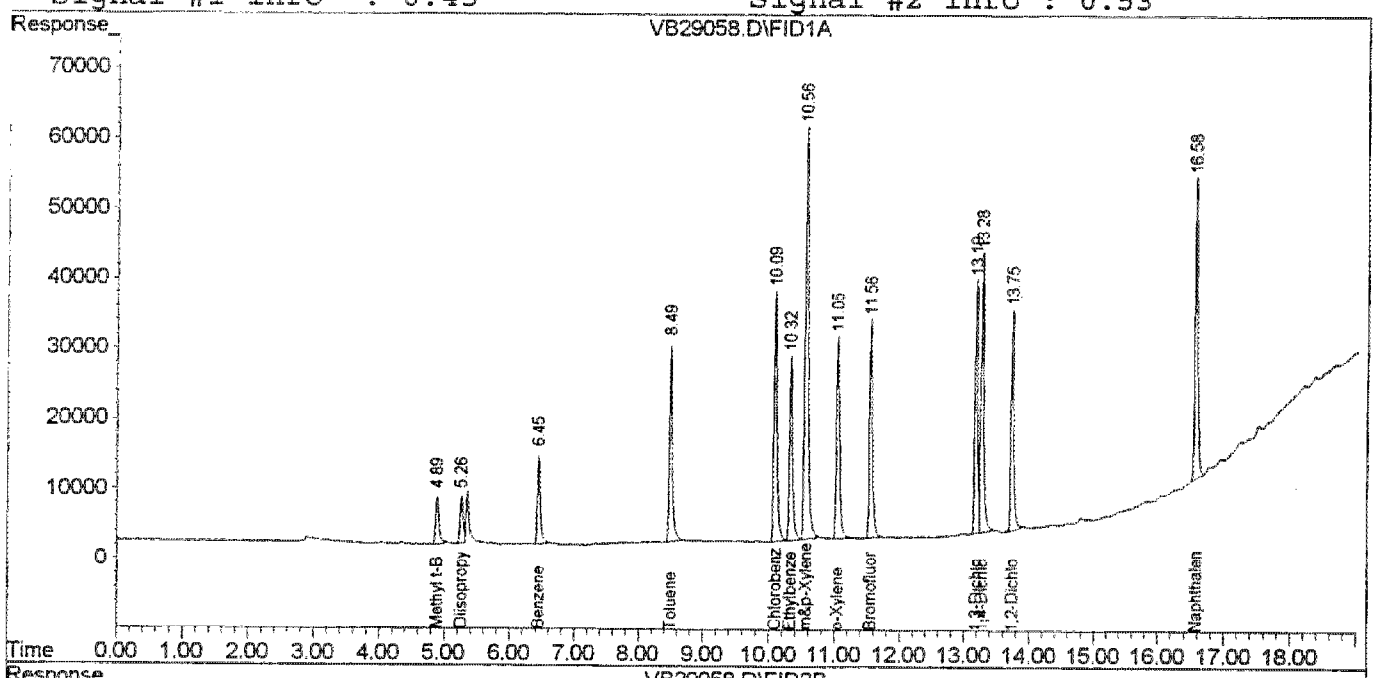
030025

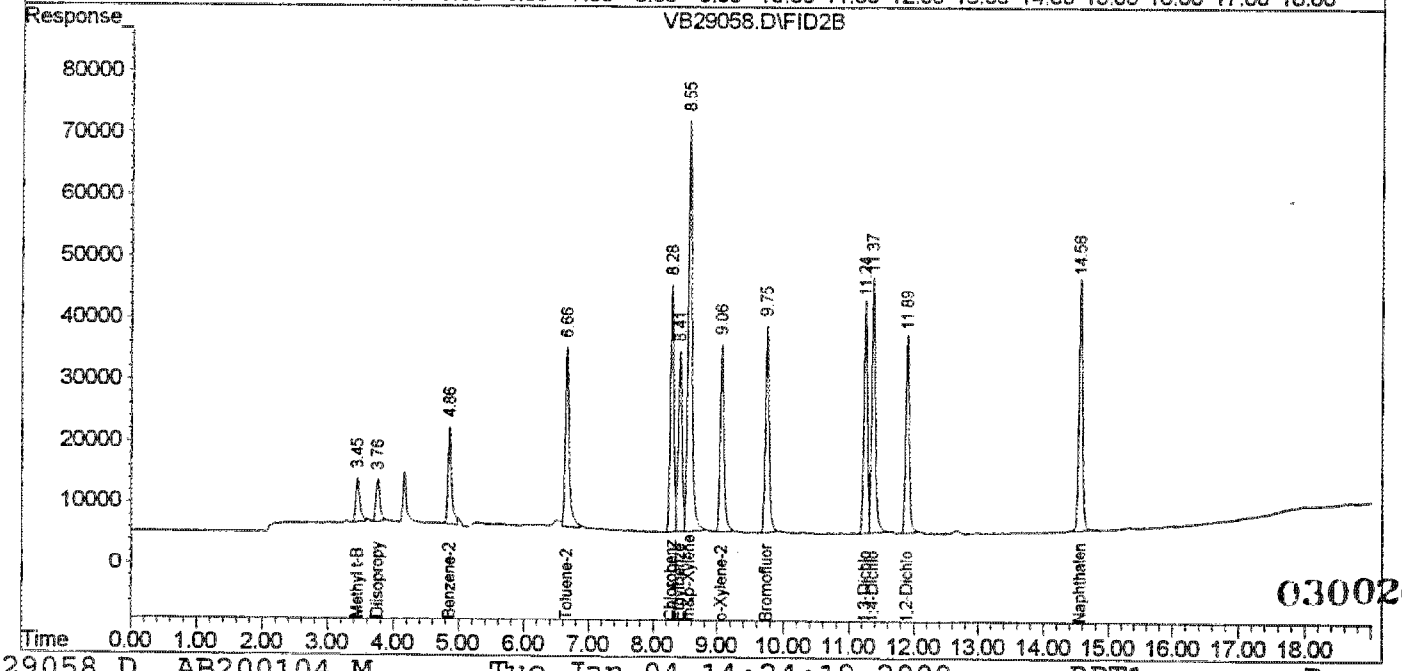
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29058.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29058.D\FID2B.CH
Acq On : 4 Jan 2000 12:04 pm Operator: MER
Sample : STD#29438 Inst : VB2
Misc : INITIAL CALIBRATION VSTD5.0,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:53 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Jan 04 12:07:58 2000
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030026

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29058.D\FID1A.CH Vial: 6
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29058.D\FID2B.CH
Acq On : 4 Jan 2000 12:04 pm Operator: MER
Sample : STD#29438 Inst : VB2
Misc : INITIAL CALIBRATION VSTD5.0,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:53 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Jan 04 12:07:58 2000
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	11.56	9.75	956320	1298035	3.479m	3.121m
Spiked Amount	50.000			Recovery	=	6.96%	6.24%
	Target Compounds						
1)	Methyl t-Butyl E	4.89	3.45	235981	304245	3.942m	3.792m
2)	Diisopropyl Ethe	5.26	3.76	208004	278159	3.823m	3.448m
3)	Benzene	6.45	4.86	398410	621459	2.680m	4.325m#
4)	Toluene	8.49	6.66	905600	1238495	3.544m	3.137m
5)	Chlorobenzene	10.09	8.28	1097814	1507382	3.262m	3.394m
6)	Ethylbenzene	10.33	8.41	854073	1209899	3.197	3.231
7)	m&p-Xylenes	10.56	8.55	2082646	2910832	7.036m	6.573m
8)	o-Xylene	11.05	9.06	940036	1274038	3.261m	3.206m
10)	1,3-Dichlorobenz	13.19	11.24	1057543	1423629	3.633m	3.156m
11)	1,4-Dichlorobenz	13.28	11.37	1224436	1639009	3.249m	3.126
12)	1,2-Dichlorobenz	13.75	11.89	938633	1219829	3.666m	2.973m
13)	Naphthalene	16.58	14.56	1267003	1555371	2.933m	2.733m

030027

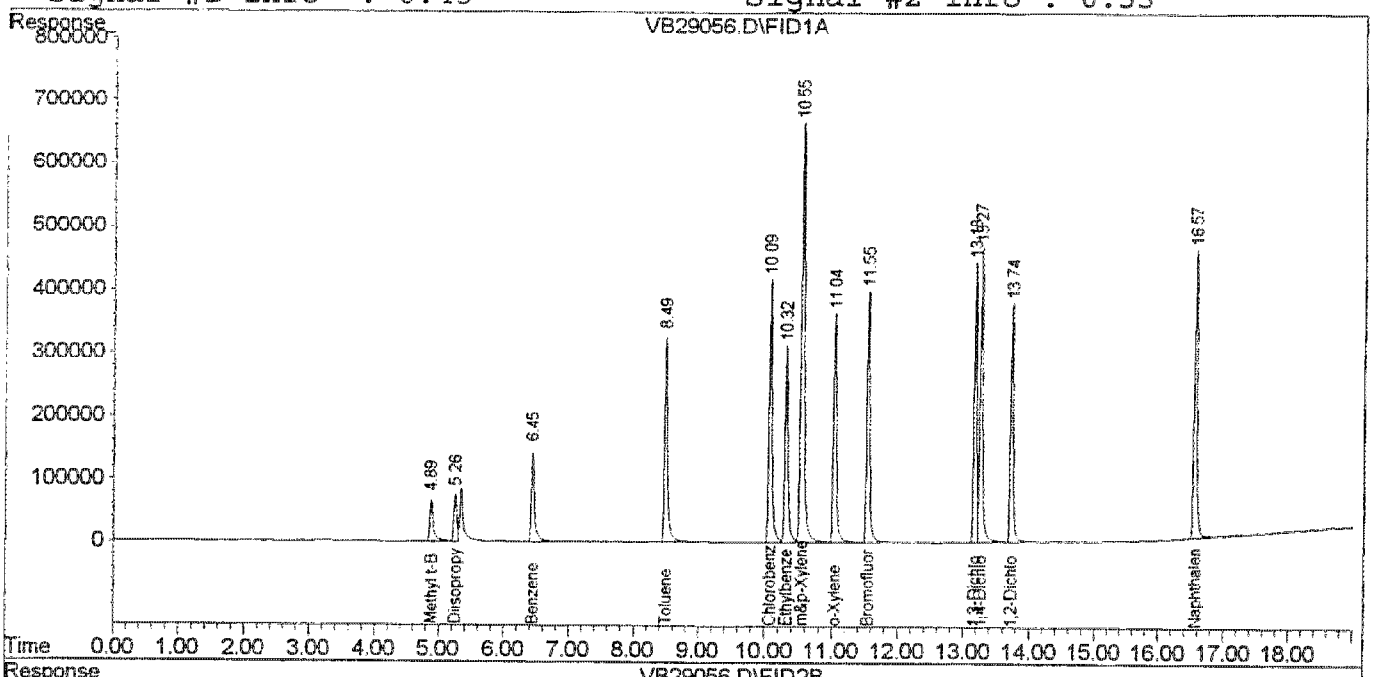
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

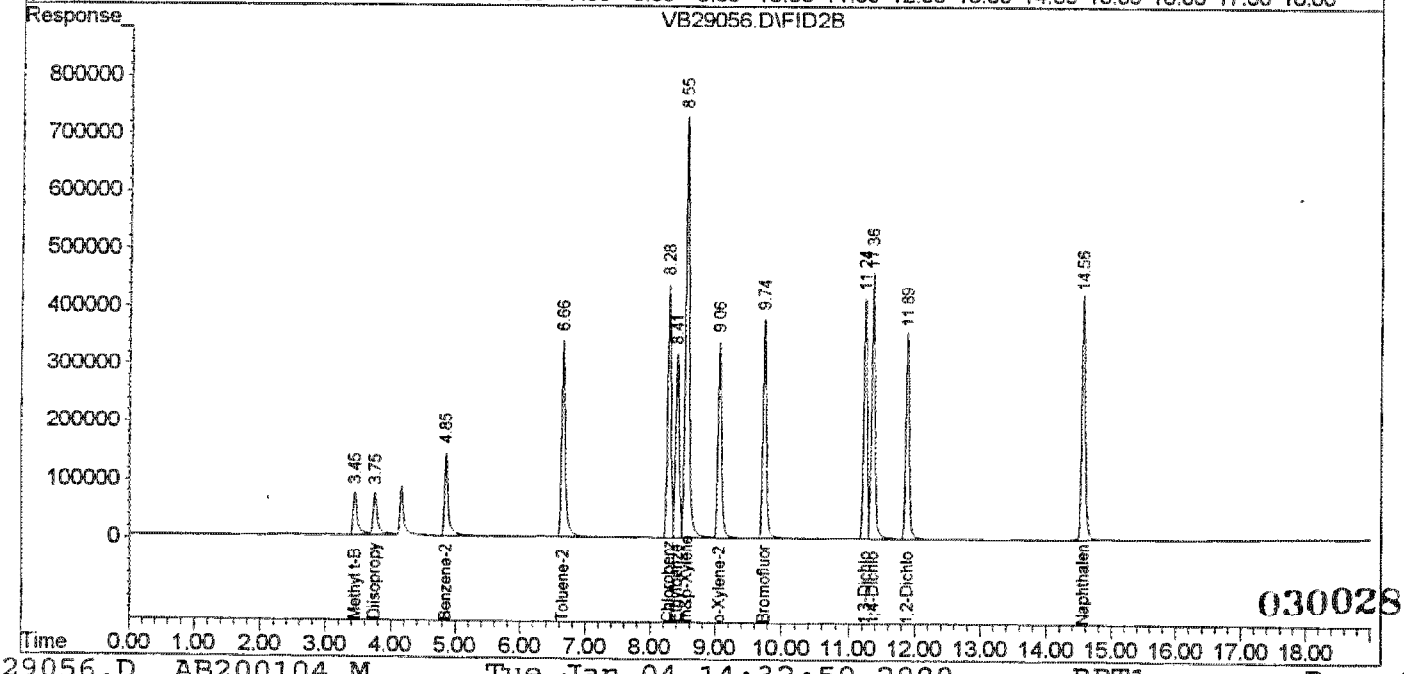
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29056.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29056.D\FID2B.CH
Acq On : 4 Jan 2000 11:06 am Operator: MER
Sample : STD#29436 Inst : VB2
Misc : INITIAL CALIBRATION VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:05 2000 Quant Results File: AB291222.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291222.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Wed Dec 22 14:23:23 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030028

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29056.D\FID1A.CH Vial: 4
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29056.D\FID2B.CH
Acq On : 4 Jan 2000 11:06 am Operator: MER
Sample : STD#29436 Inst : VB2
Misc : INITIAL CALIBRATION VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:05 2000 Quant Results File: AB291222.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291222.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Wed Dec 22 14:23:23 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.55	9.75	11863460	13989792	24.511	16.066	#
Spiked Amount	50.000			Recovery	=	49.02%	32.13%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2583877	3377515	22.245	20.058	
2)	Diisopropyl Ethe	5.26	3.76	2380647	3448543	22.994	19.313	
3)	Benzene	6.45	4.86	4921187	5787242	11.982	19.703	#
4)	Toluene	8.49	6.66	10534582	13766966	21.222	16.143	
5)	Chlorobenzene	10.09	8.28	12564443	15788856	20.887	17.206	
6)	Ethylbenzene	10.32	8.41	9897298	12554300	20.038	15.457	
7)	m&p-Xylenes	10.55	8.55	23660856	29909016	45.617	32.879	#
8)	o-Xylene	11.05	9.06	11568413	13665385	23.341	16.103	#
10)	1,3-Dichlorobenz	13.18	11.24	12440292	15163911	25.552	16.859	#
11)	1,4-Dichlorobenz	13.28	11.36	14401323	17318729	22.040	16.075	#
12)	1,2-Dichlorobenz	13.74	11.89	11284480	13296700	24.767	16.167	#
13)	Naphthalene	16.57	14.56	13865835	16395194	20.553	14.961	#

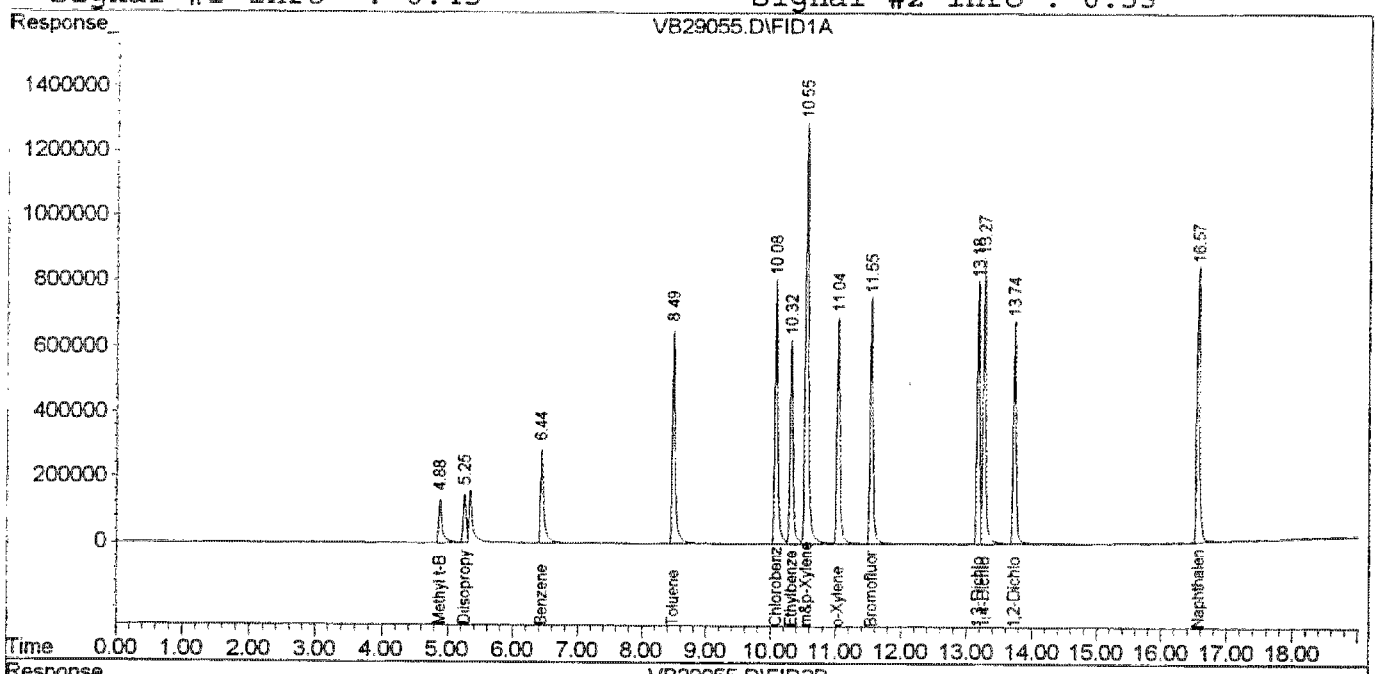
030029

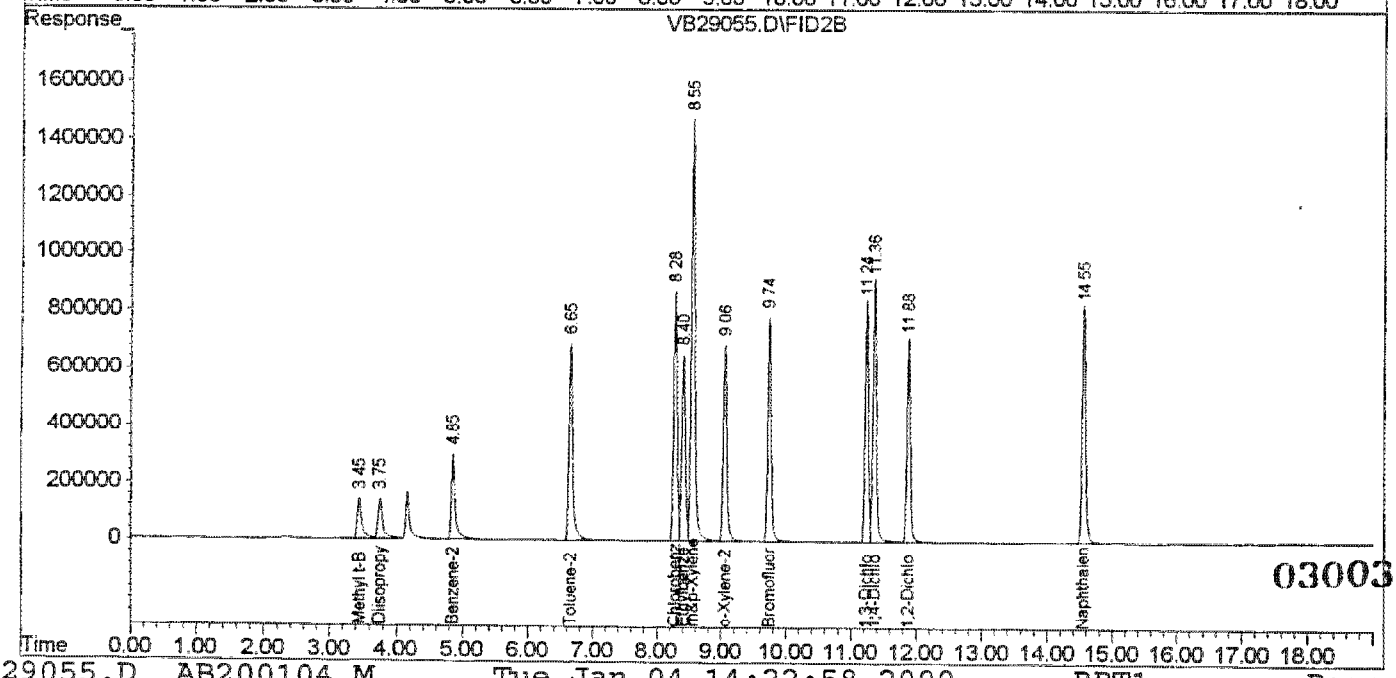
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29055.D\FID1A.CH Vial: 3
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29055.D\FID2B.CH
Acq On : 4 Jan 2000 10:37 am Operator: MER
Sample : STD#29435 Inst : VB2
Misc : INITIAL CALIBRATION VSTD100,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:04 2000 Quant Results File: AB291222.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291222.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Wed Dec 22 14:23:23 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030030

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29055.D\FID1A.CH Vial: 3
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29055.D\FID2B.CH
Acq On : 4 Jan 2000 10:37 am Operator: MER
Sample : STD#29435 Inst : VB2
Misc : INITIAL CALIBRATION VSTD100,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 12:04 2000 Quant Results File: AB291222.RES

Quant Method : C:\HPCHEM\1\METHODS\AB291222.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Wed Dec 22 14:23:23 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.55	9.74	23094751	28491100	47.715	32.719	#
Spiked Amount	50.000			Recovery	=	95.43%	65.44%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	5176678	6517082	44.566	38.703	
2)	Diisopropyl Ethe	5.26	3.75	4741906	6816118	45.801	38.173	
3)	Benzene	6.44	4.85	9981842	12064493	24.305	41.074	#
4)	Toluene	8.49	6.66	21225863	27827417	42.760	32.630	
5)	Chlorobenzene	10.09	8.28	24522803	31148228	40.766	33.944	
6)	Ethylbenzene	10.32	8.40	20086968	25582304	40.668	31.497	
7)	m&p-Xylenes	10.55	8.55	46230194	60148213	89.130	66.121	#
8)	o-Xylene	11.04	9.06	22403727	27168280	45.203	32.015	#
10)	1,3-Dichlorobenz	13.18	11.24	23134107	30056054	47.517	33.415	#
11)	1,4-Dichlorobenz	13.27	11.36	26831759	33943651	41.063	31.506	
12)	1,2-Dichlorobenz	13.74	11.88	20772414	26057127	45.591	31.682	#
13)	Naphthalene	16.57	14.56	25889575	31727992	38.375	28.952	

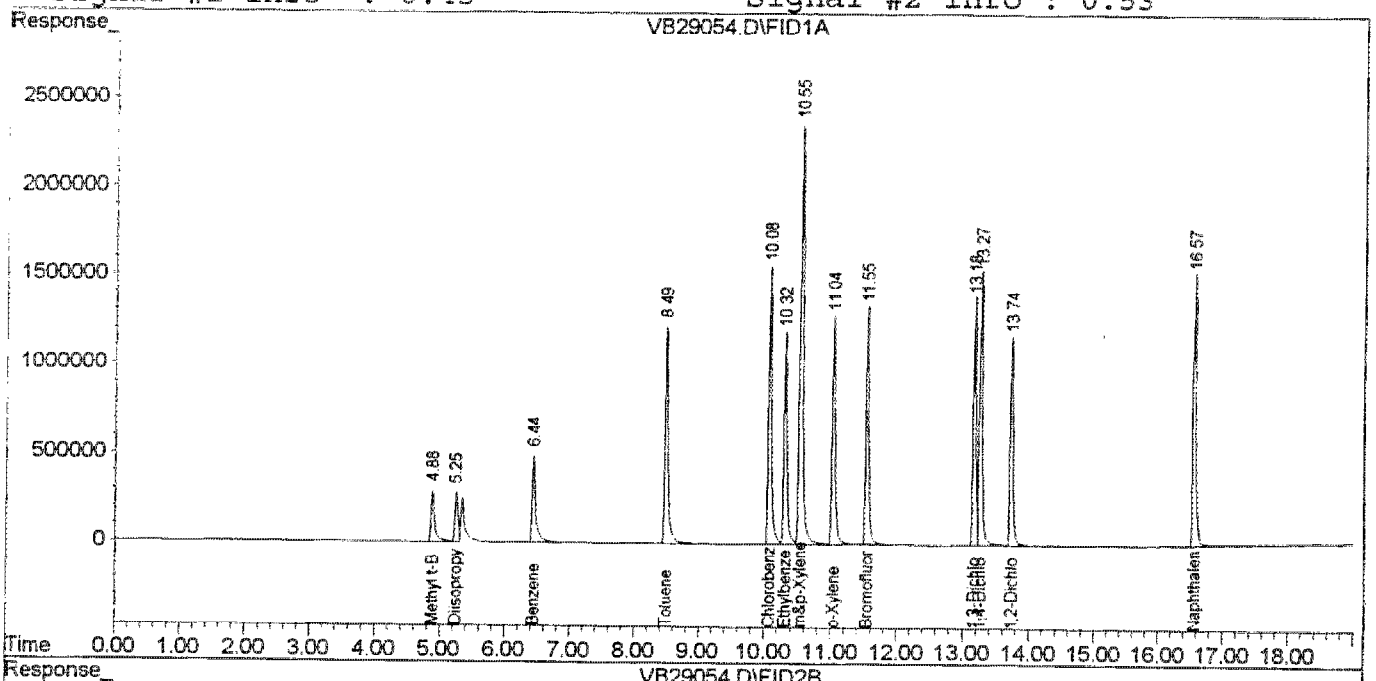
030031

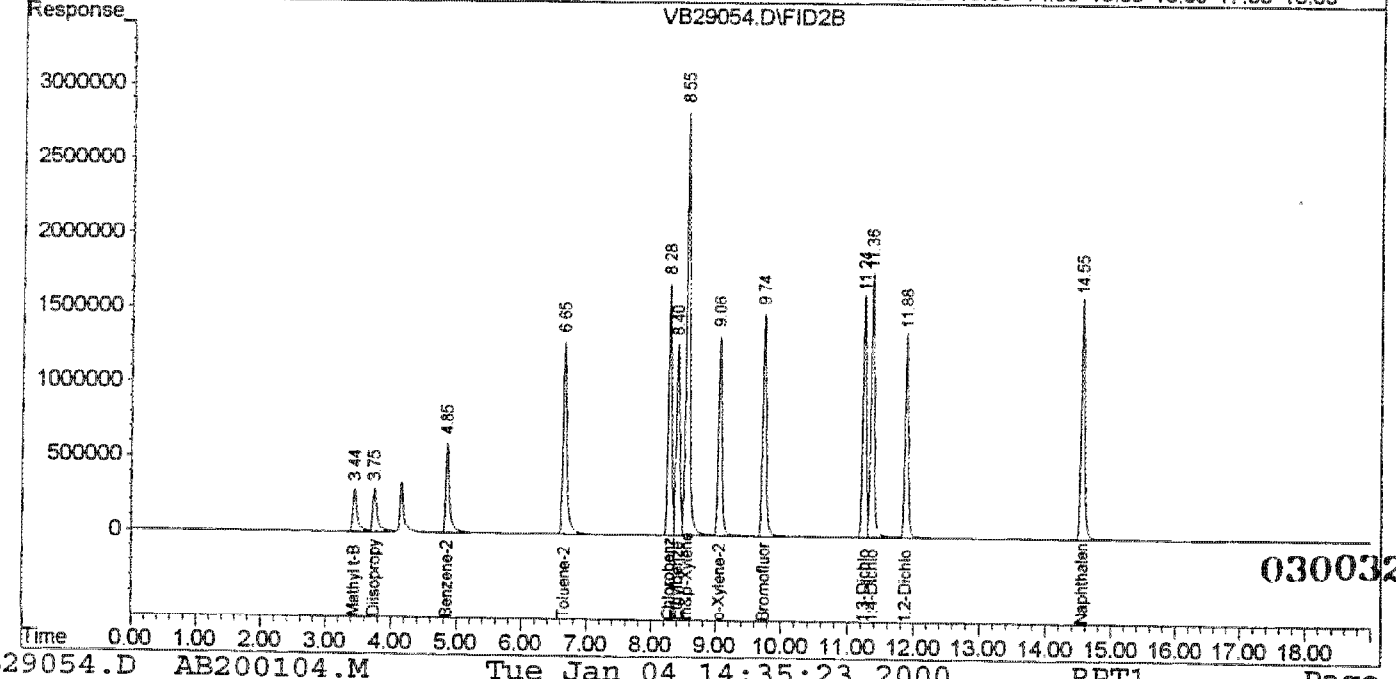
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29054.D\FID1A.CH Vial: 2
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29054.D\FID2B.CH
Acq On : 4 Jan 2000 10:08 am Operator: MER
Sample : STD#29434 Inst : VB2
Misc : INITIAL CALIBRATION VSTD200,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:35 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030032

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29054.D\FID1A.CH Vial: 2
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29054.D\FID2B.CH
Acq On : 4 Jan 2000 10:08 am Operator: MER
Sample : STD#29434 Inst : VB2
Misc : INITIAL CALIBRATION VSTD200,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:35 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	11.55	9.74	41420227	54197265	194.970	197.635
Spiked Amount	50.000			Recovery	=	389.94%	395.27%
	Target Compounds						
1)	Methyl t-Butyl E	4.89	3.45	11671822	13142561	226.735	207.825
2)	Diisopropyl Ethe	5.25	3.75	9196387	13886449	201.767	220.512
3)	Benzene	6.44	4.85	19111461	24543831	212.833	211.813
4)	Toluene	8.49	6.66	41744223	52745345	209.398	195.408
5)	Chlorobenzene	10.09	8.28	48756194	60628777	204.672	196.055
6)	Ethylbenzene	10.32	8.40	39154151	50112051	208.821	202.047
7)	m&p-Xylenes	10.55	8.55	86440518	116.1E6	390.714	393.723
8)	o-Xylene	11.04	9.06	41790581	53036062	200.265	199.529
10)	1,3-Dichlorobenz	13.18	11.24	41068949	57893496	182.941	194.227
11)	1,4-Dichlorobenz	13.27	11.36	48197463	64992057	183.826	191.622
12)	1,2-Dichlorobenz	13.74	11.88	36596712	50094105	183.482	194.840
13)	Naphthalene	16.57	14.56	47209741	61099396	178.194	187.285

030033

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	51.478	57.075	E3	R	-10.9	110	0.00
2		Diisopropyl Ether	45.579	65.223	E3	R	-43.1#	137	0.00
3	m	Benzene	89.796	93.994	E3	R	-4.7	95	0.00
4	m	Toluene	199.354	218.563	E3	R	-9.6	104	0.00
5		Chlorobenzene	238.217	263.004	E3	R	-10.4	105	0.00
6	m	Ethylbenzene	187.501	202.652	E3	R	-8.1	102	0.00
7		m&p-Xylenes	221.237	234.087	E3	R	-5.8	99	0.00
8		o-Xylene	208.677	227.862	E3	R	-9.2	98	0.00
9	s	Bromofluorobenzene	212.444	229.243	E3	R	-7.9	97	0.00
10		1,3-Dichlorobenzene	224.493	240.131	E3	R	-7.0	97	0.00
11		1,4-Dichlorobenzene	262.190	270.731	E3	R	-3.3	94	0.00
12		1,2-Dichlorobenzene	199.456	215.856	E3	R	-8.2	96	0.00
13		Naphthalene	264.934	216.318	E3	R	18.4#	78	0.00

AVG= 11.28

Signal #2

1		Methyl t-Butyl Ether-2	63.238	61.138	E3	R	3.3	91	0.00
2		Diisopropyl Ether-2	62.974	66.945	E3	R	-6.3	97	0.00
3		Benzene-2	115.875	118.034	E3	R	-1.9	102	0.00
4		Toluene-2	269.925	253.727	E3	R	6.0	92	0.00
5		Chlorobenzene-2	309.243	300.528	E3	R	2.8	95	0.00
6		Ethylbenzene-2	248.021	236.994	E3	R	4.4	94	0.00
7		m&p-Xylenes-2	294.888	283.252	E3	R	3.9	95	0.00
8		o-Xylene-2	265.806	261.098	E3	R	1.8	96	0.00
9	S	Bromofluorobenzene-2	274.230	263.347	E3	R	4.0	94	0.00
10		1,3-Dichlorobenzene-2	298.072	287.266	E3	R	3.6	95	0.00
11		1,4-Dichlorobenzene-2	339.168	323.076	E3	R	4.7	93	0.00
12		1,2-Dichlorobenzene-2	257.103	253.656	E3	R	1.3	95	0.00
13		Naphthalene-2	326.237	272.039	E3	R	16.6#	83	0.00

AVG=4.66

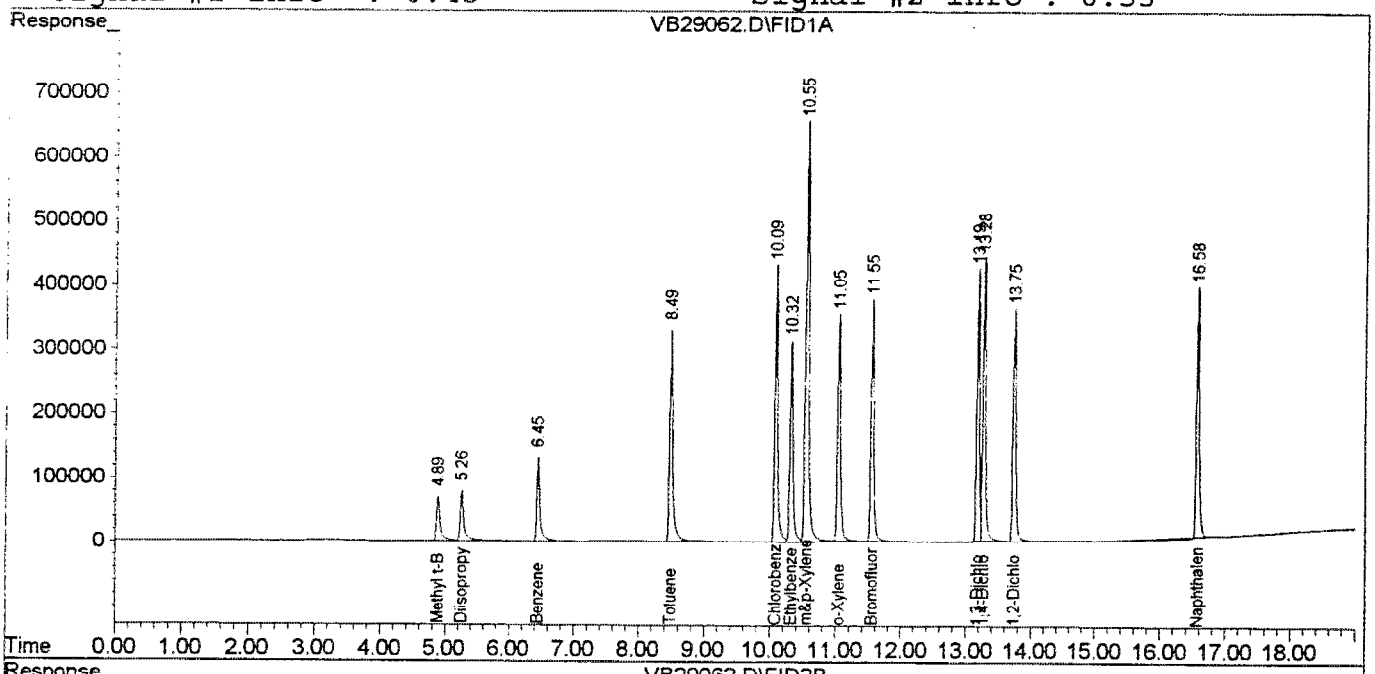
030034

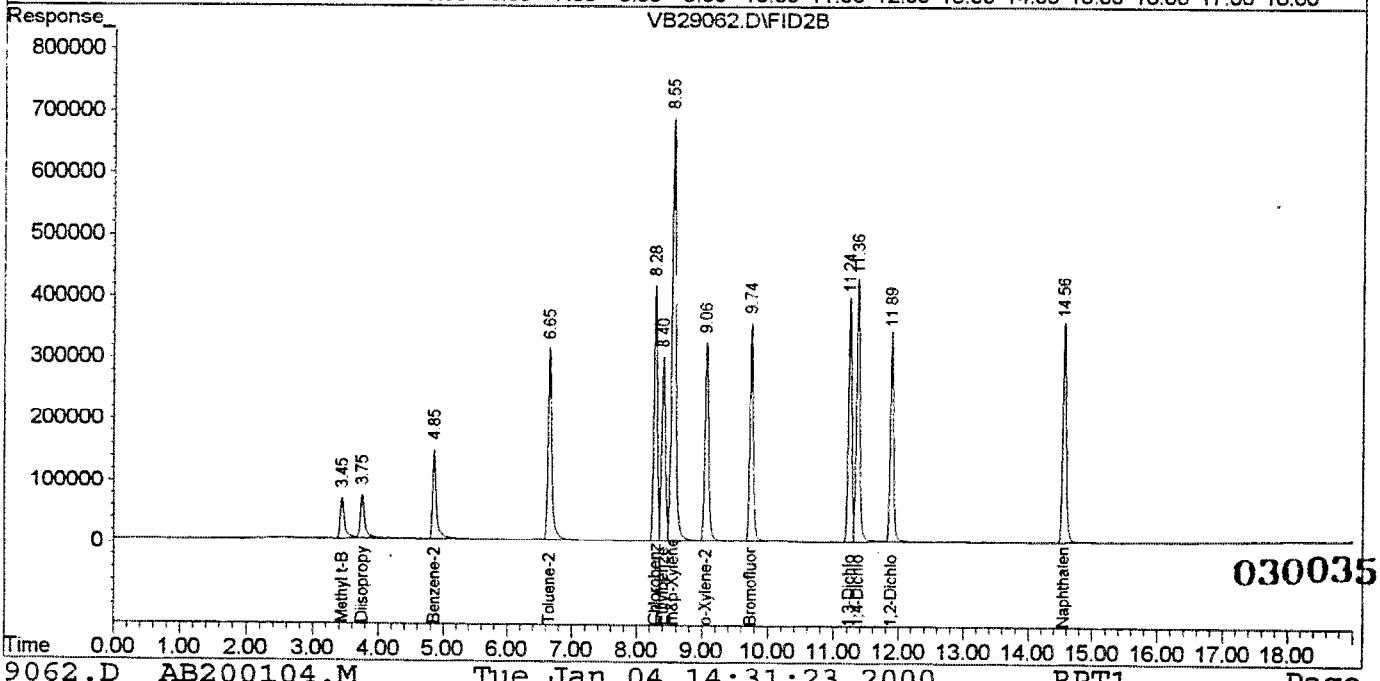
(#) = Out of Range SPCC's out = 0 CCC's out = 0

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030035

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9)	S Bromofluorobenze	11.56	9.74	11462159	13167367	53.954	48.016	
	Spiked Amount 50.000			Recovery	=	107.91%	96.03%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2853752	3056920	55.436	48.340	
2)	Diisopropyl Ethe	5.26	3.75	3261155	3347270	71.549	53.153	#
3)	Benzene	6.45	4.86	4699690	5901707	52.338	50.932	
4)	Toluene	8.49	6.66	10928151	12686374	54.818	47.000	
5)	Chlorobenzene	10.09	8.28	13150203	15026408	55.203	48.591	
6)	Ethylbenzene	10.32	8.41	10132590	11849706	54.040	47.777	
7)	m&p-Xylenes	10.56	8.55	23408733	28325170	105.808	96.054	
8)	o-Xylene	11.05	9.06	11393103	13054896	54.597	49.114	
10)	1,3-Dichlorobenz	13.19	11.24	12006536	14363305	53.483	48.187	
11)	1,4-Dichlorobenz	13.28	11.36	13536571	16153780	51.629	47.628	
12)	1,2-Dichlorobenz	13.75	11.89	10792800	12682807	54.111	49.330	
13)	Naphthalene	16.58	14.56	10815924	13601933	40.825	41.693	

030036

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Evaluate Continuing Calibration Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	51.478	57.075	E3	R	-10.9	110	0.00
2		Diisopropyl Ether	45.579	65.223	E3	R	-43.1#	137	0.00
3	m	Benzene	89.796	93.994	E3	R	-4.7	95	0.00
4	m	Toluene	199.354	218.563	E3	R	-9.6	104	0.00
5		Chlorobenzene	238.217	263.004	E3	R	-10.4	105	0.00
6	m	Ethylbenzene	187.501	202.652	E3	R	-8.1	102	0.00
7		m&p-Xylenes	221.237	234.087	E3	R	-5.8	99	0.00
8		o-Xylene	208.677	227.862	E3	R	-9.2	98	0.00
9	s	Bromofluorobenzene	212.444	229.243	E3	R	-7.9	97	0.00
10		1,3-Dichlorobenzene	224.493	240.131	E3	R	-7.0	97	0.00
11		1,4-Dichlorobenzene	262.190	270.731	E3	R	-3.3	94	0.00
12		1,2-Dichlorobenzene	199.456	215.856	E3	R	-8.2	96	0.00
13		Naphthalene	264.934	216.318	E3	R	18.4#	78	0.00

AVG = 11.28

Signal #2

1		Methyl t-Butyl Ether-2	63.238	61.138	E3	R	3.3	91	0.00
2		Diisopropyl Ether-2	62.974	66.945	E3	R	-6.3	97	0.00
3		Benzene-2	115.875	118.034	E3	R	-1.9	102	0.00
4		Toluene-2	269.925	253.727	E3	R	6.0	92	0.00
5		Chlorobenzene-2	309.243	300.528	E3	R	2.8	95	0.00
6		Ethylbenzene-2	248.021	236.994	E3	R	4.4	94	0.00
7		m&p-Xylenes-2	294.888	283.252	E3	R	3.9	95	0.00
8		o-Xylene-2	265.806	261.098	E3	R	1.8	96	0.00
9	S	Bromofluorobenzene-2	274.230	263.347	E3	R	4.0	94	0.00
10		1,3-Dichlorobenzene-2	298.072	287.266	E3	R	3.6	95	0.00
11		1,4-Dichlorobenzene-2	339.168	323.076	E3	R	4.7	93	0.00
12		1,2-Dichlorobenzene-2	257.103	253.656	E3	R	1.3	95	0.00
13		Naphthalene-2	326.237	272.039	E3	R	16.6#	83	0.00

AVG = 4.66

030037

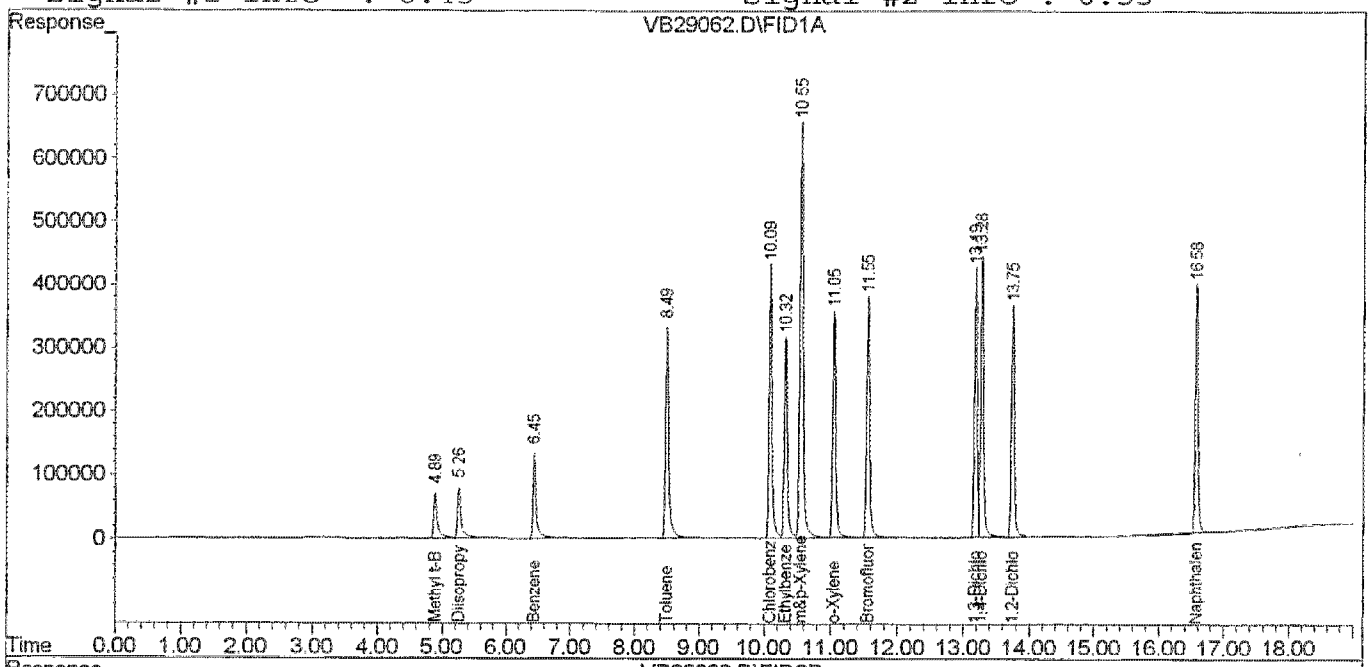
(#) = Out of Range SPCC's out = 0 CCC's out = 0

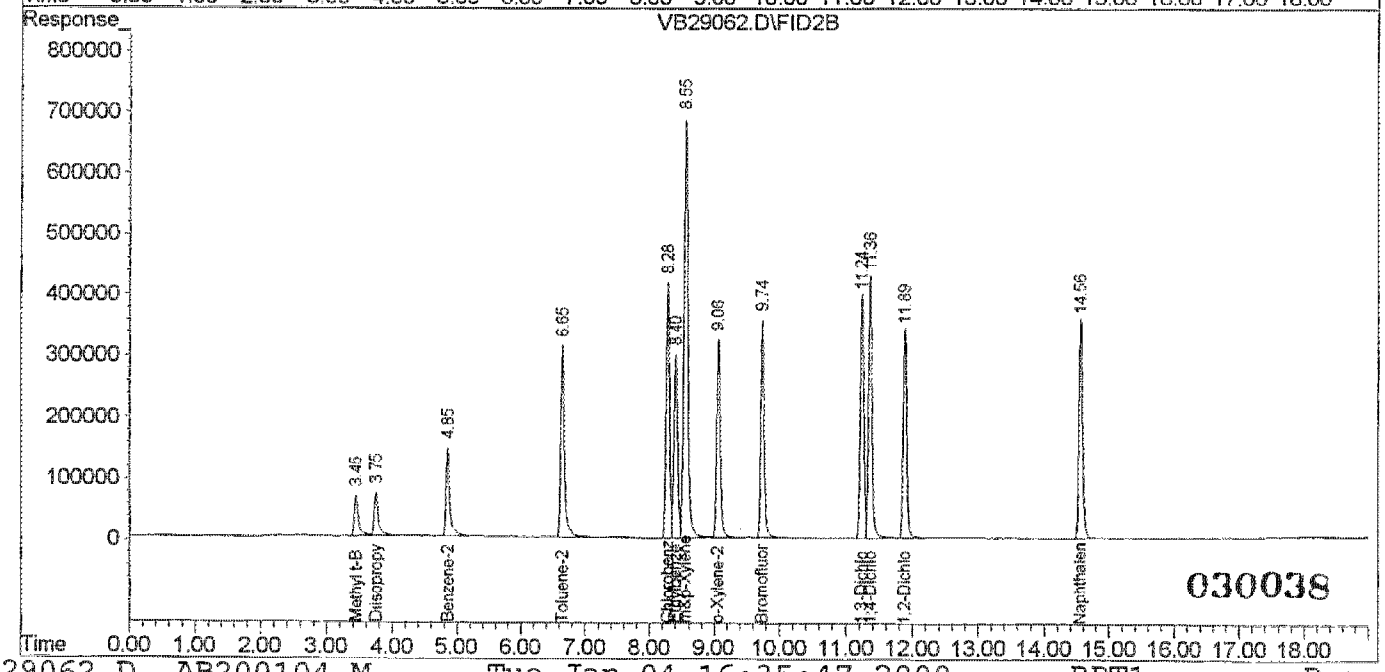
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030038

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.56	9.74	11462159	13167367	53.954	48.016	
Spiked Amount	50.000			Recovery	=	107.91%	96.03%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2853752	3056920	55.436	48.340	
2)	Diisopropyl Ethe	5.26	3.75	3261155	3347270	71.549	53.153	#
3)	Benzene	6.45	4.86	4699690	5901707	52.338	50.932	
4)	Toluene	8.49	6.66	10928151	12686374	54.818	47.000	
5)	Chlorobenzene	10.09	8.28	13150203	15026408	55.203	48.591	
6)	Ethylbenzene	10.32	8.41	10132590	11849706	54.040	47.777	
7)	m&p-Xylenes	10.56	8.55	23408733	28325170	105.808	96.054	
8)	o-Xylene	11.05	9.06	11393103	13054896	54.597	49.114	
10)	1,3-Dichlorobenz	13.19	11.24	12006536	14363305	53.483	48.187	
11)	1,4-Dichlorobenz	13.28	11.36	13536571	16153780	51.629	47.628	
12)	1,2-Dichlorobenz	13.75	11.89	10792800	12682807	54.111	49.330	
13)	Naphthalene	16.58	14.56	10815924	13601933	40.825	41.693	

030039

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Evaluate Continuing Calibration Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID1A.CH Vial: 23
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID2B.CH
Acq On : 4 Jan 2000 8:20 pm Operator: MER
Sample : STD#29450 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	51.478	55.439	E3	R	-7.7	107	0.00
2		Diisopropyl Ether	45.579	47.817	E3	R	-4.9	100	0.00
3	m	Benzene	89.796	101.108	E3	R	-12.6	103	0.00
4	m	Toluene	199.354	215.885	E3	R	-8.3	102	0.00
5		Chlorobenzene	238.217	264.021	E3	R	-10.8	105	0.00
6	m	Ethylbenzene	187.501	205.030	E3	R	-9.3	104	0.00
7		m&p-Xylenes	221.237	235.611	E3	R	-6.5	100	0.00
8		o-Xylene	208.677	227.356	E3	R	-9.0	98	0.00
9	s	Bromofluorobenzene	212.444	236.107	E3	R	-11.1	100	0.00
10		1,3-Dichlorobenzene	224.493	246.097	E3	R	-9.6	99	0.00
11		1,4-Dichlorobenzene	262.190	274.889	E3	R	-4.8	95	0.00
12		1,2-Dichlorobenzene	199.456	218.747	E3	R	-9.7	97	0.00
13		Naphthalene	264.934	275.003	E3	R	-3.8	99	0.00

AVG=8.32

Signal #2

1		Methyl t-Butyl Ether-2	63.238	63.642	E3	R	-0.6	94	0.00
2		Diisopropyl Ether-2	62.974	66.874	E3	R	-6.2	97	0.00
3		Benzene-2	115.875	112.335	E3	R	3.1	97	0.00
4		Toluene-2	269.925	264.424	E3	R	2.0	96	0.00
5		Chlorobenzene-2	309.243	302.998	E3	R	2.0	96	0.00
6		Ethylbenzene-2	248.021	238.742	E3	R	3.7	95	0.00
7		m&p-Xylenes-2	294.888	282.202	E3	R	4.3	94	0.00
8		o-Xylene-2	265.806	261.629	E3	R	1.6	96	0.00
9	S	Bromofluorobenzene-2	274.230	272.913	E3	R	0.5	98	0.00
10		1,3-Dichlorobenzene-2	298.072	286.102	E3	R	4.0	94	0.00
11		1,4-Dichlorobenzene-2	339.168	320.970	E3	R	5.4	93	0.00
12		1,2-Dichlorobenzene-2	257.103	251.887	E3	R	2.0	95	0.00
13		Naphthalene-2	326.237	317.047	E3	R	2.8	97	0.00

AVG=2.94

030040

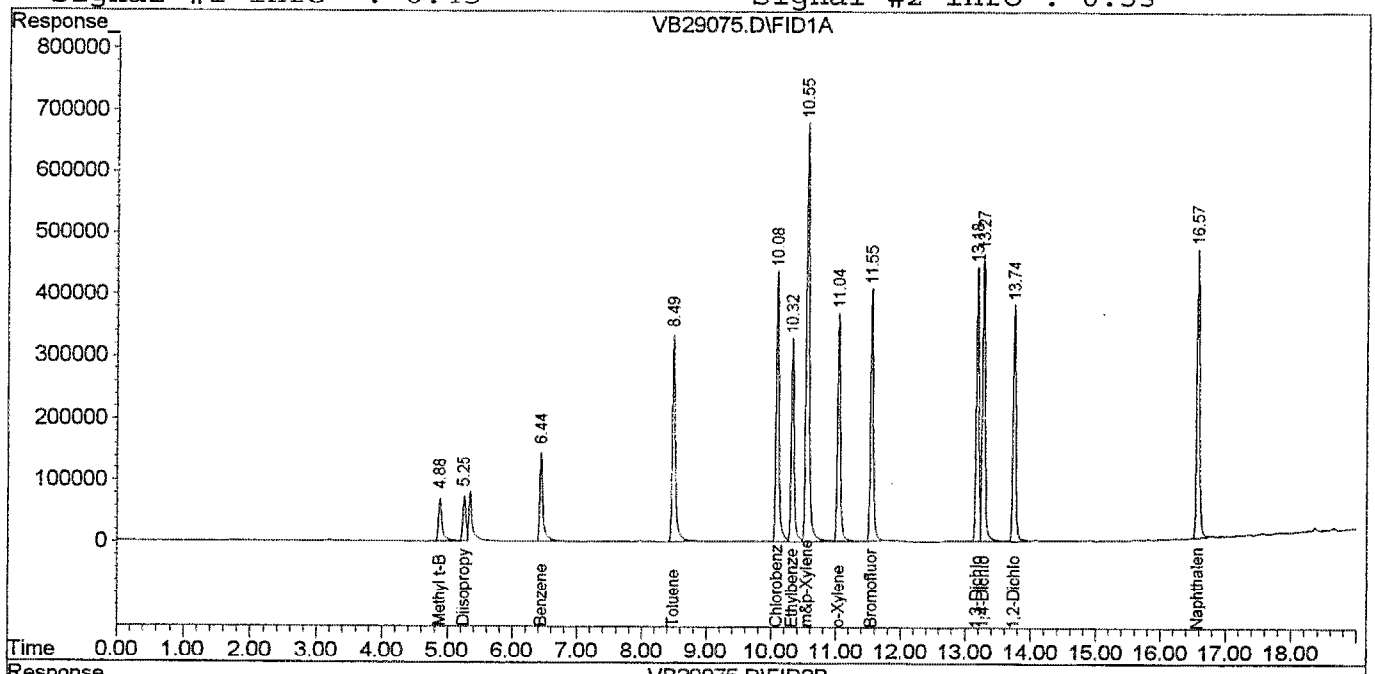
(#) = Out of Range SPCC's out = 0 CCC's out = 0

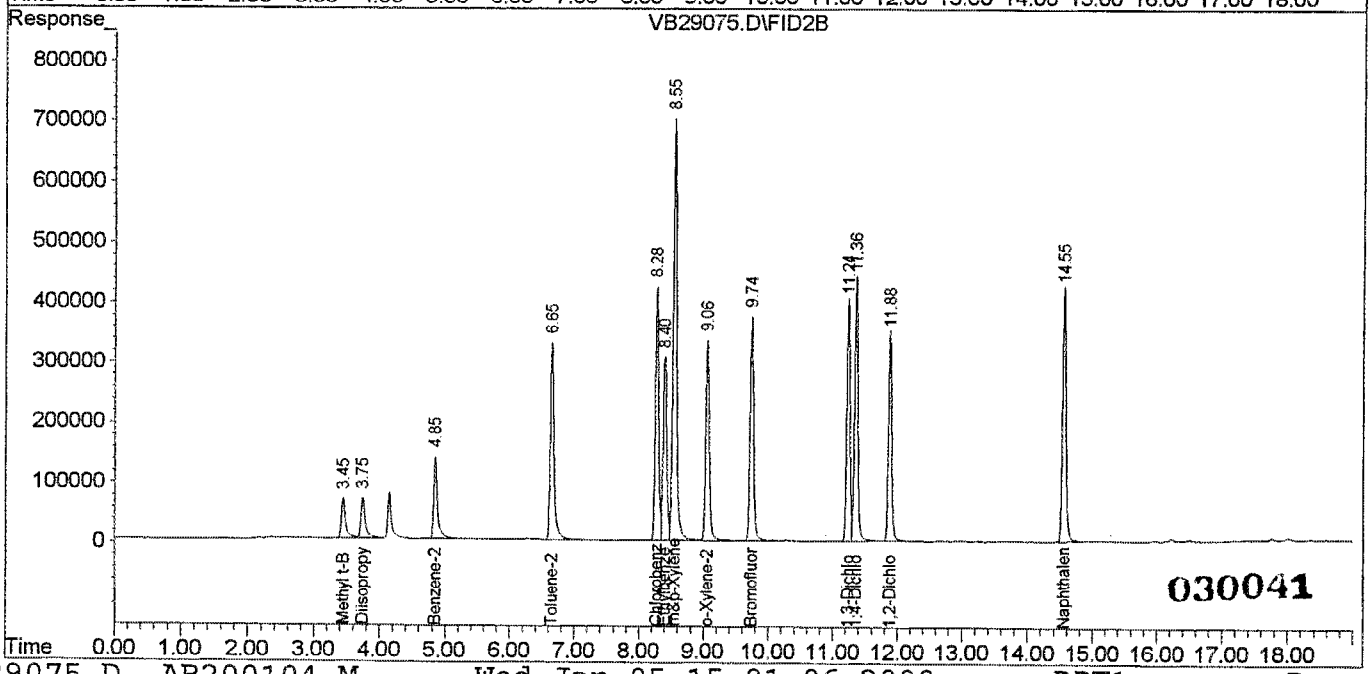
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID1A.CH Vial: 23
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID2B.CH
Acq On : 4 Jan 2000 8:20 pm Operator: MER
Sample : STD#29450 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 20:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030041

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID1A.CH Vial: 23
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29075.D\FID2B.CH
Acq On : 4 Jan 2000 8:20 pm Operator: MER
Sample : STD#29450 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 20:39 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9)	S Bromofluorobenze	11.55	9.74	11805353	13645673	55.569	49.760
	Spiked Amount 50.000			Recovery	=	111.14%	99.52%
	Target Compounds						
1)	Methyl t-Butyl E	4.88	3.45	2771960	3182105	53.848	50.319
2)	Diisopropyl Ethe	5.25	3.75	2390825	3343719	52.454	53.097
3)	Benzene	6.44	4.85	5055420	5616737	56.299	48.472
4)	Toluene	8.49	6.65	10794265	13221197	54.146	48.981
5)	Chlorobenzene	10.09	8.28	13201032	15149899	55.416	48.990
6)	Ethylbenzene	10.32	8.40	10251489	11937077	54.674	48.129
7)	m&p-Xylenes	10.55	8.55	23561101	28220196	106.497	95.698
8)	o-Xylene	11.04	9.06	11367792	13081441	54.476	49.214
10)	1,3-Dichlorobenz	13.18	11.24	12304841	14305086	54.812	47.992
11)	1,4-Dichlorobenz	13.27	11.36	13744447	16048502	52.422	47.317
12)	1,2-Dichlorobenz	13.74	11.88	10937348	12594331	54.836	48.985
13)	Naphthalene	16.57	14.56	13750132	15852370	51.900	48.592

030042

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Evaluate Continuing Calibration Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID1A.CH Vial: 26
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID2B.CH
Acq On : 5 Jan 2000 9:58 am Operator: MER
Sample : STD#29455 Inst : VB2
Misc : DAILY STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	51.478	54.400	E3	R	-5.7	105	0.00
2		Diisopropyl Ether	45.579	49.880	E3	R	-9.4	105	0.00
3	m	Benzene	89.796	114.756	E3	R	-27.8#	117	0.00
4	m	Toluene	199.354	215.258	E3	R	-8.0	102	0.00
5		Chlorobenzene	238.217	256.804	E3	R	-7.8	102	0.00
6	m	Ethylbenzene	187.501	203.801	E3	R	-8.7	103	0.00
7		m&p-Xylenes	221.237	247.037	E3	R	-11.7	104	0.00
8		o-Xylene	208.677	234.937	E3	R	-12.6	102	0.00
9	s	Bromofluorobenzene	212.444	241.546	E3	R	-13.7	102	0.00
10		1,3-Dichlorobenzene	224.493	253.859	E3	R	-13.1	102	0.00
11		1,4-Dichlorobenzene	262.190	292.871	E3	R	-11.7	102	0.00
12		1,2-Dichlorobenzene	199.456	227.883	E3	R	-14.3	101	0.00
13		Naphthalene	264.934	306.332	E3	R	-15.6#	110	0.00

AVG = 11.31

Signal #2

1		Methyl t-Butyl Ether-2	63.238	69.293	E3	R	-9.6	103	0.00
2		Diisopropyl Ether-2	62.974	73.438	E3	R	-16.6#	106	0.00
3		Benzene-2	115.875	128.665	E3	R	-11.0	111	0.00
4		Toluene-2	269.925	124.462	E3	R	53.9#	45#	0.00
5		Chlorobenzene-2	309.243	295.360	E3	R	4.5	94	0.00
6		Ethylbenzene-2	248.021	239.250	E3	R	3.5	95	0.00
7		m&p-Xylenes-2	294.888	283.366	E3	R	3.9	95	0.00
8		o-Xylene-2	265.806	257.701	E3	R	3.0	94	0.00
9	S	Bromofluorobenzene-2	274.230	263.333	E3	R	4.0	94	0.00
10		1,3-Dichlorobenzene-2	298.072	281.449	E3	R	5.6	93	0.00
11		1,4-Dichlorobenzene-2	339.168	318.280	E3	R	6.2	92	0.00
12		1,2-Dichlorobenzene-2	257.103	244.880	E3	R	4.8	92	0.00
13		Naphthalene-2	326.237	321.395	E3	R	1.5	98	0.00

AVG = 9.05

030043

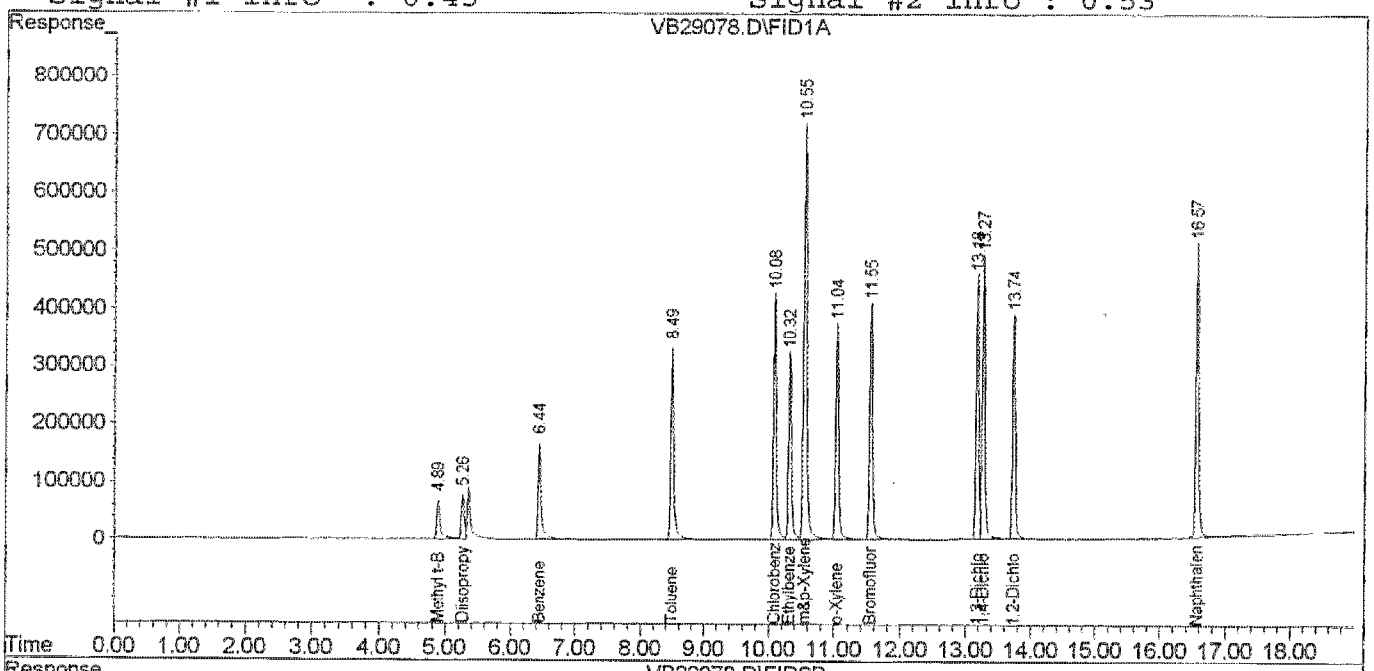
(#) = Out of Range SPCC's out = 0 CCC's out = 0

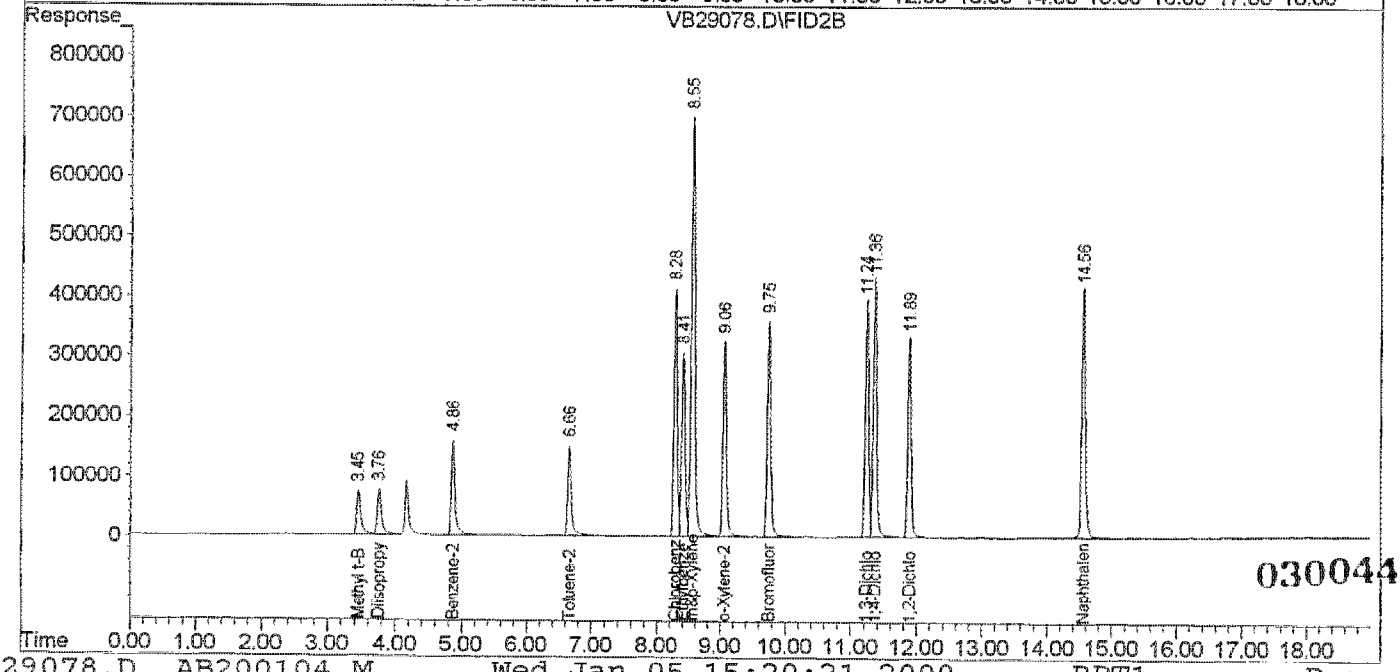
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID1A.CH Vial: 26
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID2B.CH
Acq On : 5 Jan 2000 9:58 am Operator: MER
Sample : STD#29455 Inst : VB2
Misc : DAILY STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:19 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030044

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID1A.CH Vial: 26
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29078.D\FID2B.CH
Acq On : 5 Jan 2000 9:58 am Operator: MER
Sample : STD#29455 Inst : VB2
Misc : DAILY STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:19 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.55	9.75	12077324	13166652	56.850	48.013	
Spiked Amount	50.000			Recovery	=	113.70%	96.03%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2719985	3464636	52.838	54.787	
2)	Diisopropyl Ethe	5.26	3.76	2493976	3671875	54.717	58.308	
3)	Benzene	6.44	4.86	5737818	6433269	63.899m	55.519	
4)	Toluene	8.49	6.66	10762885	6223113	53.989	23.055	#
[illegible]	Chlorobenzene	10.08	8.28	12840220	14768021	53.901	47.755	
[illegible]	Ethylbenzene	10.32	8.41	10190070	11962512	54.347	48.232	
7)	m&p-Xylenes	10.55	8.56	24703692	28336636	111.661	96.093	
8)	o-Xylene	11.04	9.06	11746864	12885049	56.292	48.475	
10)	1,3-Dichlorobenz	13.18	11.24	12692942	14072435	56.541	47.212	
11)	1,4-Dichlorobenz	13.27	11.36	14643538	15913975	55.851	46.921	
12)	1,2-Dichlorobenz	13.74	11.89	11394163	12243982	57.126	47.623	
13)	Naphthalene	16.57	14.56	15316586	16069770	57.813	49.258	

030045

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Evaluate Continuing Calibration Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID1A.CH Vial: 36
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID2B.CH
Acq On : 5 Jan 2000 2:50 pm Operator: MER
Sample : STD#29457 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E

Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

		Compound	AvgRF	CCRF		CAL	%Dev	Area%	Dev(Min)
1		Methyl t-Butyl Ether	51.478	57.149	E3	R	-11.0	111	0.01
2		Diisopropyl Ether	45.579	49.833	E3	R	-9.3	105	0.01
3	m	Benzene	89.796	104.302	E3	R	-16.2#	106	0.01
4	m	Toluene	199.354	222.591	E3	R	-11.7	106	0.01
5		Chlorobenzene	238.217	270.249	E3	R	-13.4	108	0.01
6	m	Ethylbenzene	187.501	214.983	E3	R	-14.7	109	0.01
7		m&p-Xylenes	221.237	250.380	E3	R	-13.2	106	0.01
8		o-Xylene	208.677	238.050	E3	R	-14.1	103	0.01
9	s	Bromofluorobenzene	212.444	254.260	E3	R	-19.7#	107	0.01
10		1,3-Dichlorobenzene	224.493	255.438	E3	R	-13.8	103	0.02
11		1,4-Dichlorobenzene	262.190	290.529	E3	R	-10.8	101	0.01
12		1,2-Dichlorobenzene	199.456	228.250	E3	R	-14.4	101	0.02
13		Naphthalene	264.934	283.946	E3	R	-7.2	102	0.01

AVG = 13.04

Signal #2

1		Methyl t-Butyl Ether-2	63.238	60.074	E3	R	5.0	89	0.01
2		Diisopropyl Ether-2	62.974	66.341	E3	R	-5.3	96	0.01
3		Benzene-2	115.875	106.843	E3	R	7.8	92	0.01
4		Toluene-2	269.925	259.426	E3	R	3.9	94	0.01
5		Chlorobenzene-2	309.243	293.566	E3	R	5.1	93	0.01
6		Ethylbenzene-2	248.021	234.630	E3	R	5.4	93	0.01
7		m&p-Xylenes-2	294.888	277.198	E3	R	6.0	93	0.01
8		o-Xylene-2	265.806	254.499	E3	R	4.3	93	0.01
9	S	Bromofluorobenzene-2	274.230	269.458	E3	R	1.7	96	0.01
10		1,3-Dichlorobenzene-2	298.072	276.448	E3	R	7.3	91	0.01
11		1,4-Dichlorobenzene-2	339.168	311.667	E3	R	8.1	90	0.01
12		1,2-Dichlorobenzene-2	257.103	243.070	E3	R	5.5	91	0.01
13		Naphthalene-2	326.237	301.256	E3	R	7.7	92	0.01

AVG = 5.06

030046

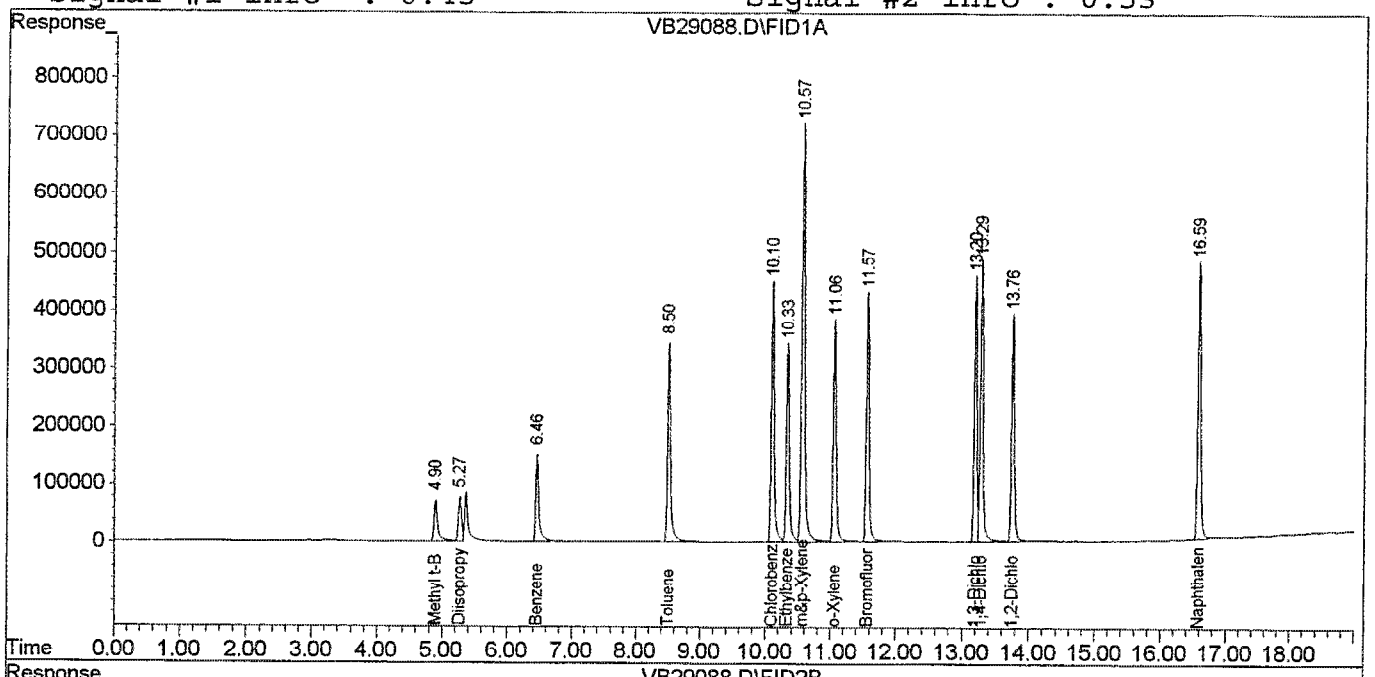
(#) = Out of Range SPCC's out = 0 CCC's out = 0

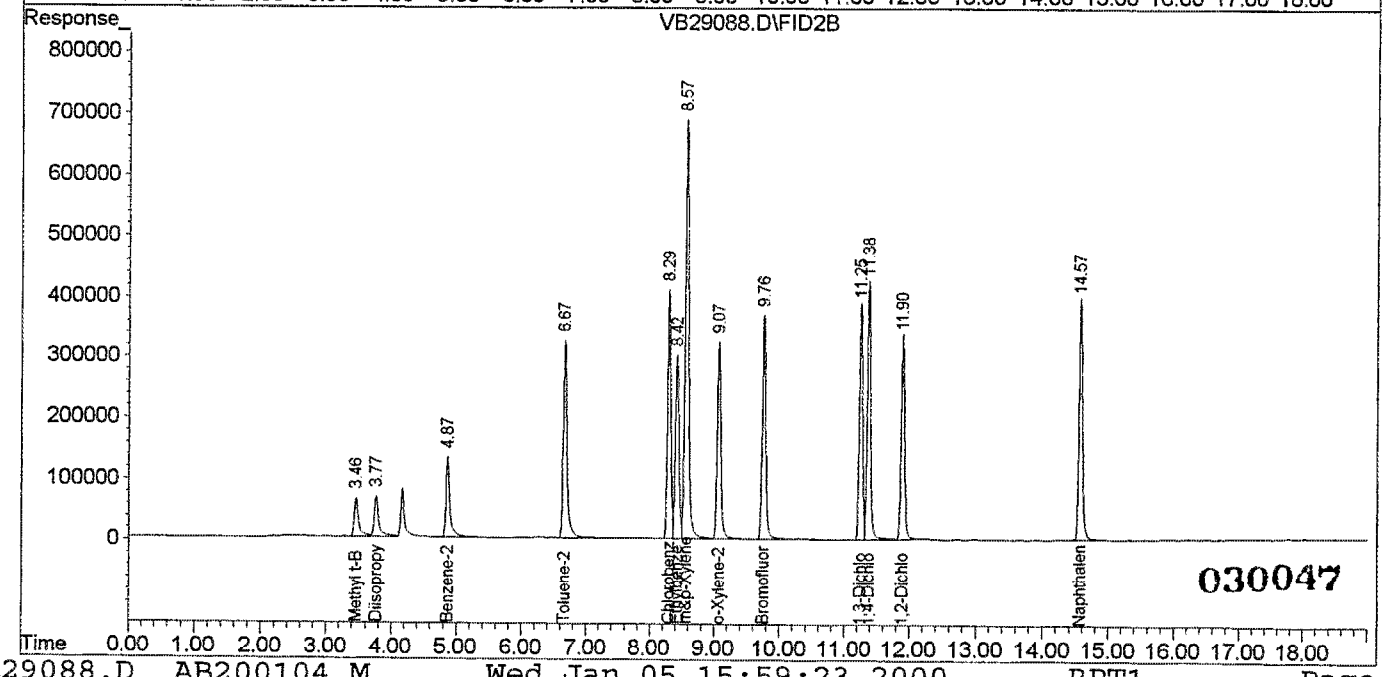
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID1A.CH Vial: 36
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID2B.CH
Acq On : 5 Jan 2000 2:50 pm Operator: MER
Sample : STD#29457 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:44 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030047

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID1A.CH Vial: 36
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29088.D\FID2B.CH
Acq On : 5 Jan 2000 2:50 pm Operator: MER
Sample : STD#29457 Inst : VB2
Misc : ENDING STANDARD VSTD50,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:44 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9) S	Bromofluorobenze	11.57	9.76	12713019	13472911	59.842m	49.130
	Spiked Amount 50.000			Recovery	=	119.68%	98.26%
	Target Compounds						
1)	Methyl t-Butyl E	4.90	3.46	2857457	3003712	55.508	47.498
2)	Diisopropyl Ethe	5.27	3.77	2491646	3317072	54.666	52.674
3)	Benzene	6.46	4.87	5215123	5342149	58.078	46.103
4)	Toluene	8.51	6.67	11129547	12971290	55.828	48.055
5)	Chlorobenzene	10.10	8.30	13512446	14678307	56.723	47.465
6)	Ethylbenzene	10.34	8.42	10749148	11731496	57.329	47.300
7)	m&p-Xylenes	10.57	8.57	25038011	27719824	113.173	94.001
8)	o-Xylene	11.06	9.08	11902523	12724935	57.038m	47.873
10)	1,3-Dichlorobenz	13.20	11.26	12771916	13822413	56.892	46.373
11)	1,4-Dichlorobenz	13.29	11.38	14526431	15583350	55.404	45.946
12)	1,2-Dichlorobenz	13.76	11.90	11412476	12153480	57.218	47.271
13)	Naphthalene	16.59	14.57	14197322	15062788	53.588m	46.171

030048

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

D. Raw QC Data

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB001044

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29065.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg) UG/L		Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

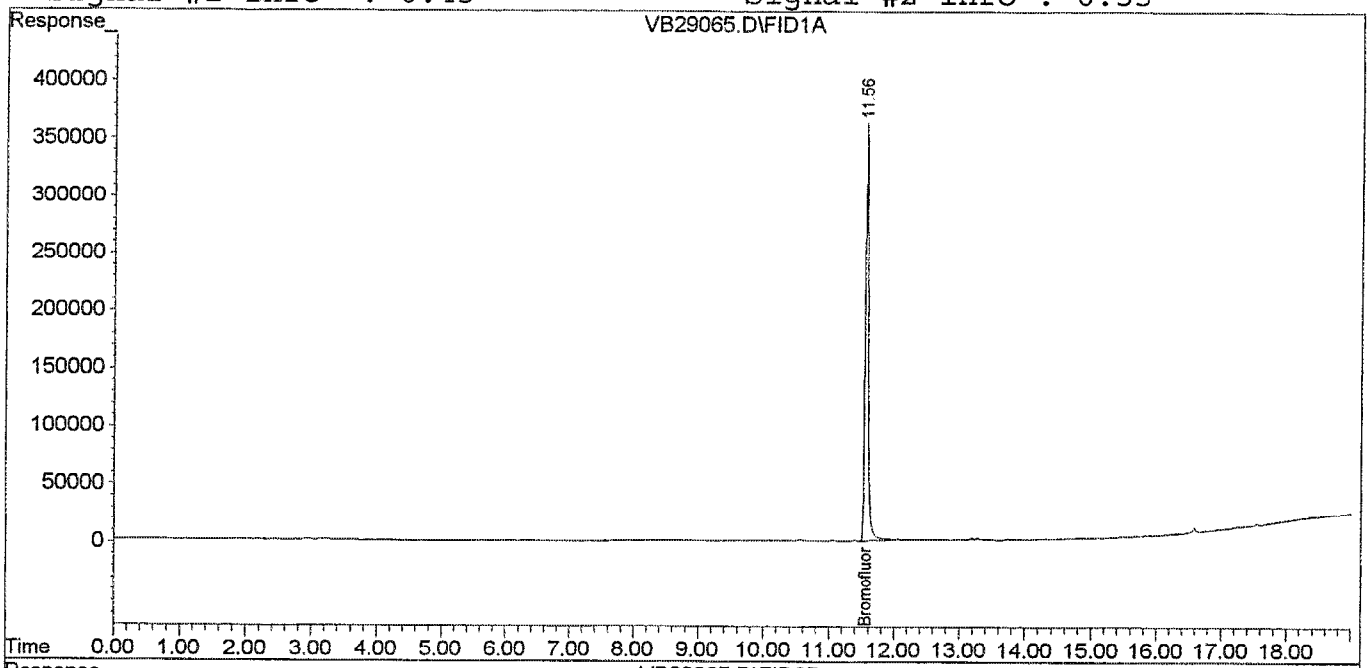
030050

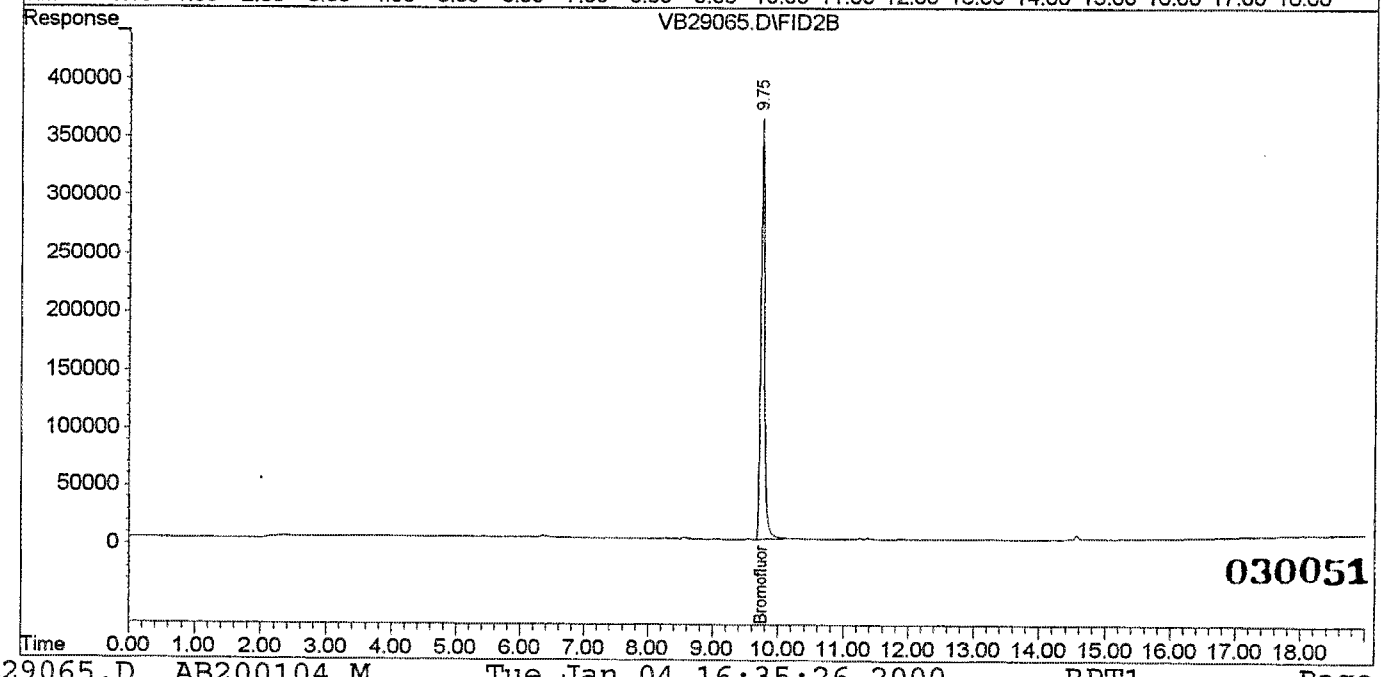
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29065.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29065.D\FID2B.CH
Acq On : 4 Jan 2000 3:28 pm Operator: MER
Sample : VB001044 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 16:35 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030051

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29065.D\FID1A.CH Vial: 13
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29065.D\FID2B.CH
Acq On : 4 Jan 2000 3:28 pm Operator: MER
Sample : VB001044 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 16:35 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	11.56	9.75	11666429	14444914	54.915m	52.675
Spiked Amount 50.000			Recovery	=	109.83%	105.35%

Target Compounds

030052

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB001052

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29081.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/5/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	5	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

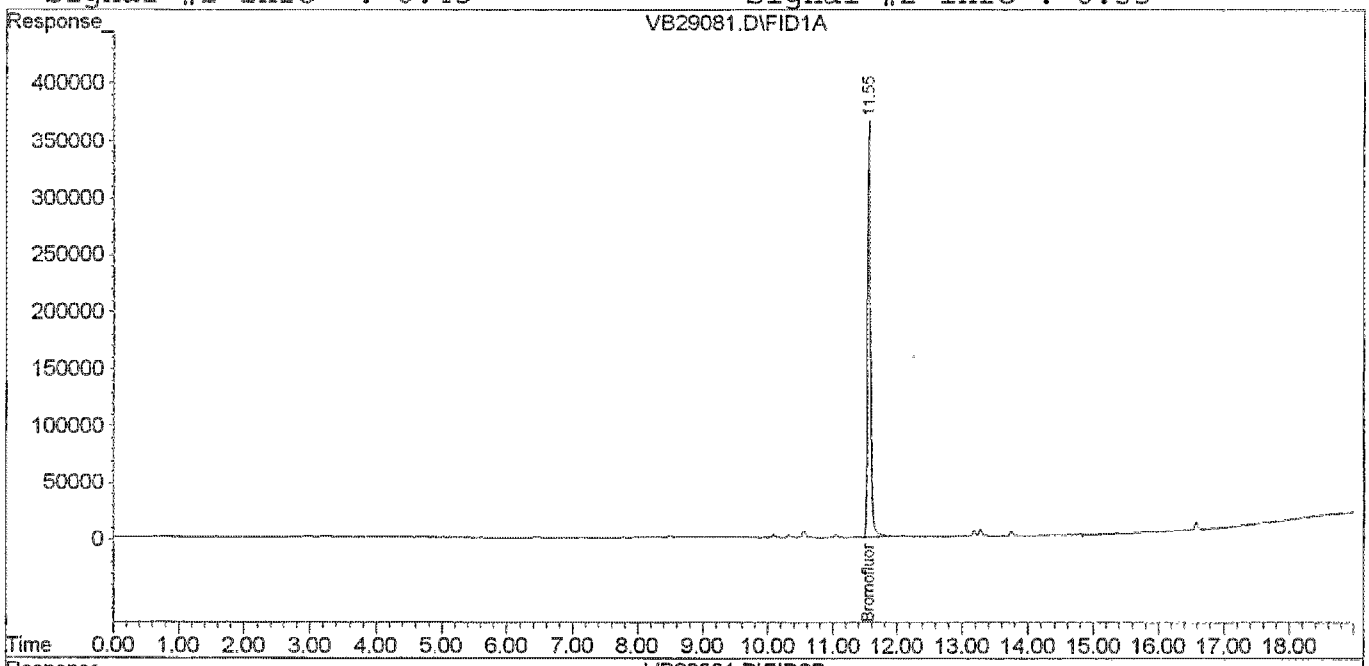
030053

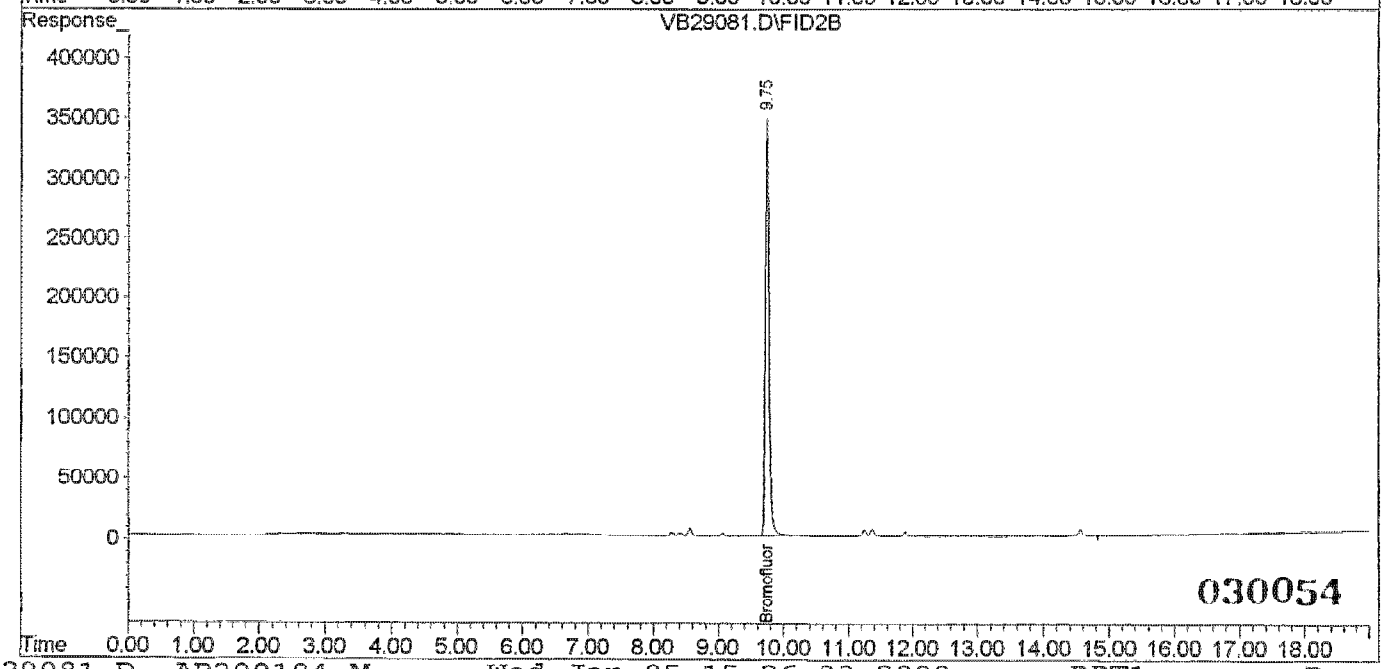
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29081.D\FID1A.CH Vial: 29
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29081.D\FID2B.CH
Acq On : 5 Jan 2000 11:25 am Operator: MER
Sample : VB001052 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:26 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030054

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29081.D\FID1A.CH Vial: 29
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29081.D\FID2B.CH
Acq On : 5 Jan 2000 11:25 am Operator: MER
Sample : VB001052 Inst : VB2
Misc : VBLK,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:26 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	11.55	9.75	11249636	13291829	52.954	48.470
Spiked Amount 50.000			Recovery	=	105.91%	96.94%
Target Compounds						

030055

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

REFERENCE

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9914369

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29071.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	3	
108-88-3	Toluene	6	
100-41-4	Ethylbenzene	1	U
91-20-3	Naphthalene	32	
	m&p-Xylenes	6	
95-47-6	o-Xylene	4	

030056

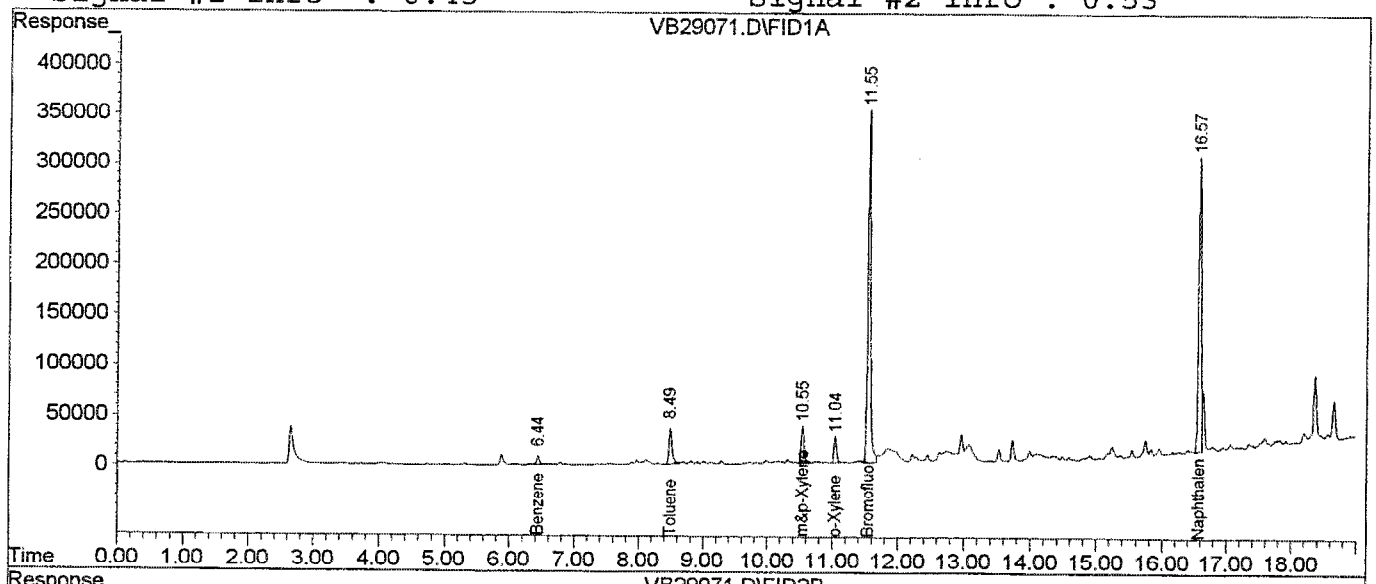
Quantitation Report

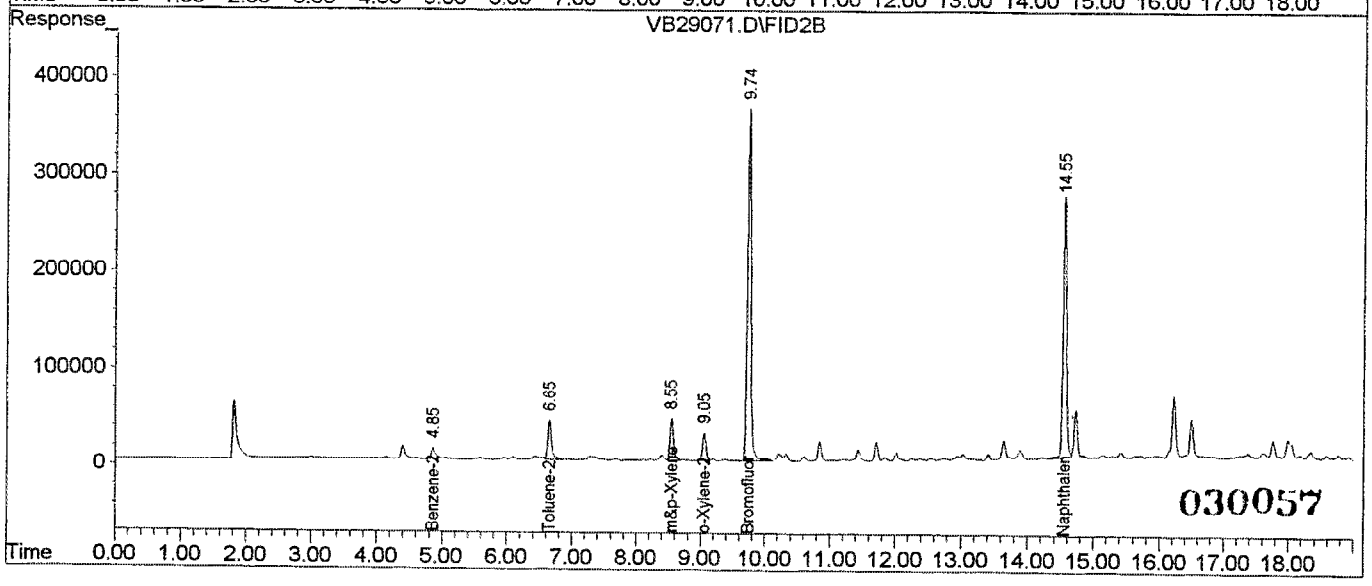
Data File : O:\ORG\VOA\VB2\04JAN00\VB29071.D\FID1A.CH Vial: 19
Acq On : 4 Jan 2000 6:23 pm Operator: MER
Sample : 9914370 Inst : VB2
Misc : RPT#991858 RW3-EFF Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29071.D\FID2B.CH Vial: 19
Acq On : 4 Jan 2000 6:23 pm Operator: MER
Sample : 9914369 Inst : VB2
Misc : RPT#991858 RW3-EFF Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:46 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030057

Quantitation Report (QT Reviewed)

Data File : O:\ORG\VOA\VB2\04JAN00\VB29071.D\FID1A.CH Vial: 19
Acq On : 4 Jan 2000 6:23 pm Operator: MER
Sample : 9914370 Inst : VB2
Misc : RPT#991858 RW3-EFF Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29071.D\FID2B.CH Vial: 19
Acq On : 4 Jan 2000 6:23 pm Operator: MER
Sample : 9914369 Inst : VB2
Misc : RPT#991858 RW3-EFF Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:46 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
	System Monitoring Compounds						
9)	S Bromofluorobenze	11.55	9.74	10357505	13400872	48.754	48.867
	Spiked Amount 50.000			Recovery	=	97.51%	97.73%
	Target Compounds						
3)	Benzene	6.44	4.85	262743	483404	2.926m	4.172m#
4)	Toluene	8.49	6.65	1129420	1630120	5.665m	6.039m
7)	m&p-Xylenes	10.55	8.55	1231753	1666612	5.568m	5.652m
8)	o-Xylene	11.04	9.05	749053	1075242	3.590m	4.045m
13)	Naphthalene	16.57	14.55	8394799	9766826	31.686	29.938

030058

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

REFERENCEMS

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9914369MS

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29072.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	60	
108-88-3	Toluene	61	
100-41-4	Ethylbenzene	57	
91-20-3	Naphthalene	88	
	m&p-Xylenes	110	
95-47-6	o-Xylene	60	

030059

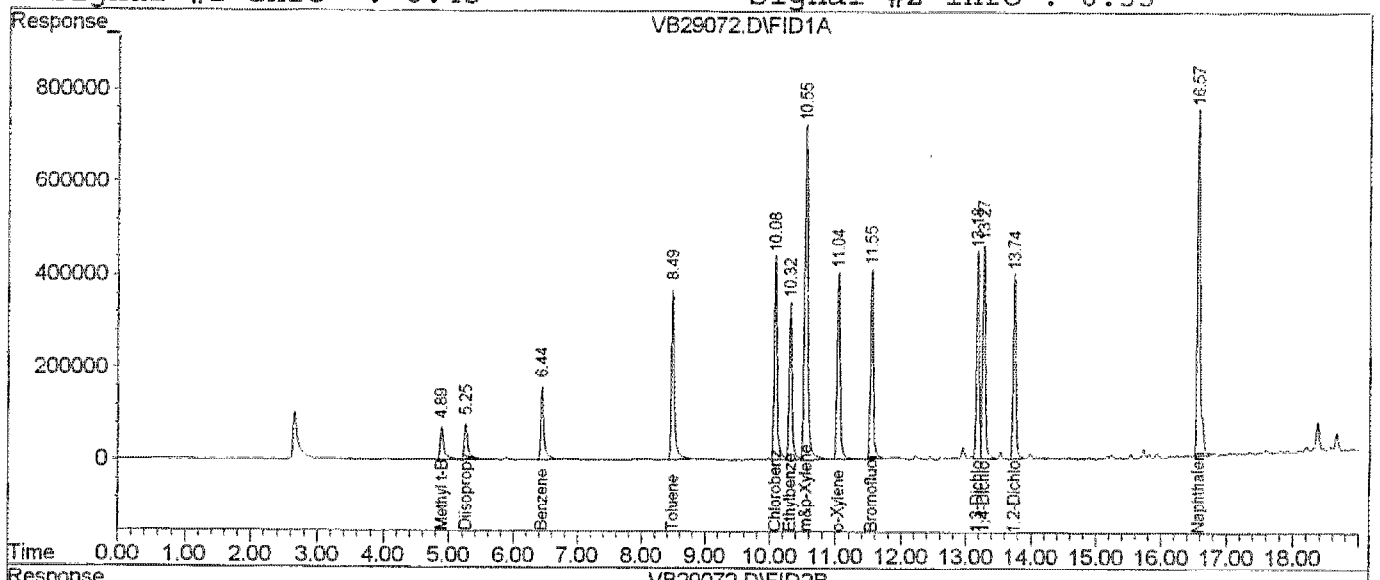
Quantitation Report

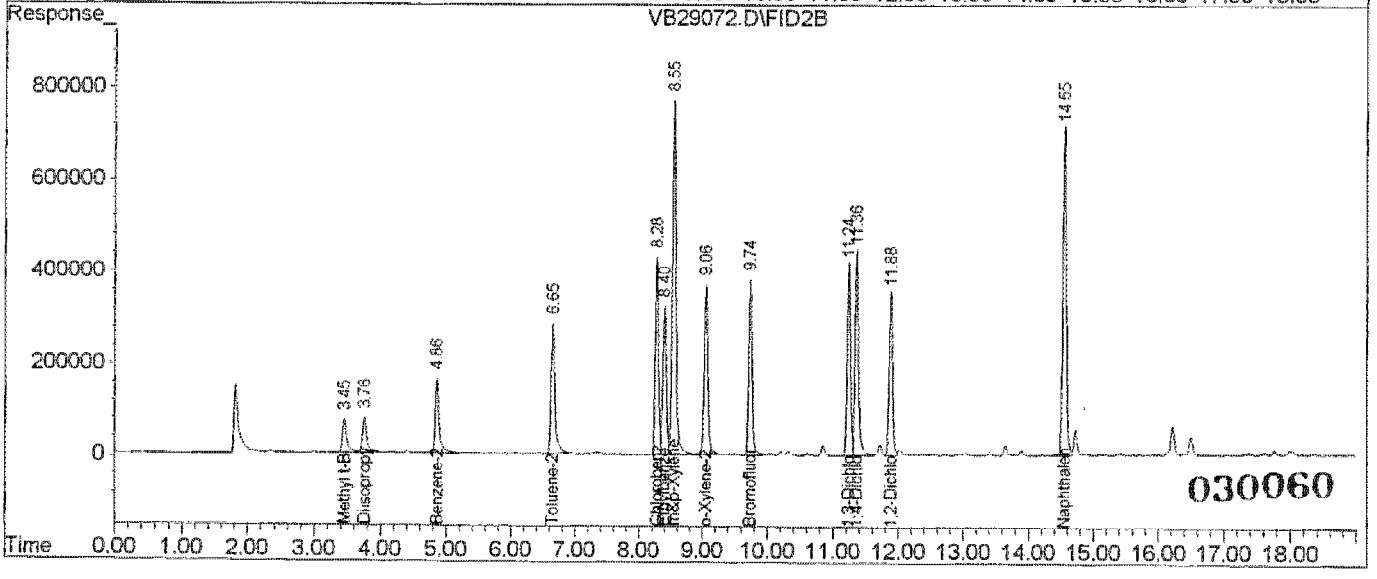
Data File : O:\ORG\VOA\VB2\04JAN00\VB29072.D\FID1A.CH Vial: 20
Acq On : 4 Jan 2000 6:53 pm Operator: MER
Sample : 9914370MS Inst : VB2
Misc : RPT#991858 RW3-EFFMS Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29072.D\FID2B.CH Vial: 20
Acq On : 4 Jan 2000 6:53 pm Operator: MER
Sample : 9914369MS Inst : VB2
Misc : RPT#991858 RW3-EFFMS Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:58 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030060

Quantitation Report (QT Reviewed)

Data File : O:\ORG\VOA\VB2\04JAN00\VB29072.D\FID1A.CH Vial: 20
Acq On : 4 Jan 2000 6:53 pm Operator: MER
Sample : 9914370MS Inst : VB2
Misc : RPT#991858 RW3-EFFMS Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29072.D\FID2B.CH Vial: 20
Acq On : 4 Jan 2000 6:53 pm Operator: MER
Sample : 9914369MS Inst : VB2
Misc : RPT#991858 RW3-EFFMS Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:58 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.55	9.74	11946114	13730941	56.232	50.071	
Spiked Amount	50.000			Recovery	=	112.46%	100.14%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2786381	3327963	54.128	52.626	
2)	Diisopropyl Ethe	5.26	3.76	3135123	3461400	68.784	54.966	
3)	Benzene	6.44	4.86	5413052	6796315	60.282	58.652	
4)	Toluene	8.49	6.66	12082379	11363774	60.608	42.100	#
5)	Chlorobenzene	10.08	8.28	13257788	15367104	55.654	49.693	
6)	Ethylbenzene	10.32	8.40	10646094	12531817	56.779	50.527	
7)	m&p-Xylenes	10.55	8.55	25329647	30588175	114.491	103.728	
8)	o-Xylene	11.04	9.06	12430518	14251919	59.568	53.618	
10)	1,3-Dichlorobenz	13.18	11.24	12443296	14702360	55.428	49.325	
11)	1,4-Dichlorobenz	13.27	11.36	13467625	16579788	51.366	48.884	
12)	1,2-Dichlorobenz	13.74	11.88	11447799	12739567	57.395m	49.550	
13)	Naphthalene	16.57	14.55	23355758	25961172	88.157	79.578	

030061

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

REFERENCEMSD

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9914369MSD

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29073.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg)	UG/L	Q
71-43-2	Benzene	54	
108-88-3	Toluene	57	
100-41-4	Ethylbenzene	53	
91-20-3	Naphthalene	86	
	m&p-Xylenes	110	
95-47-6	o-Xylene	56	

030062

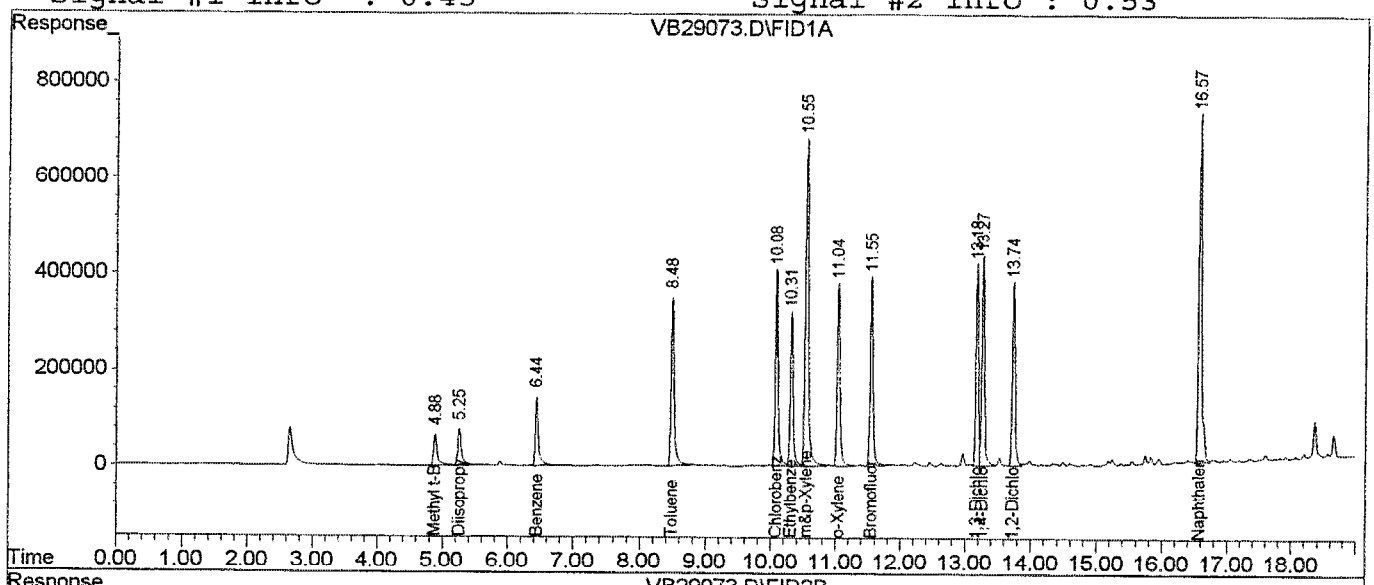
Quantitation Report

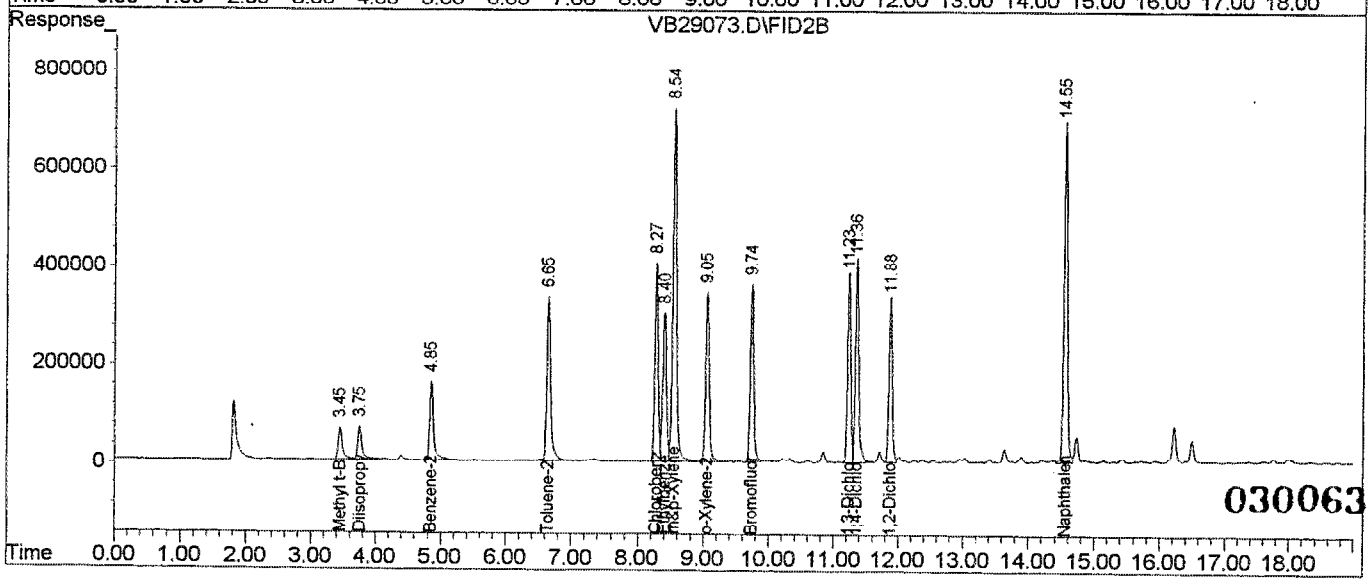
Data File : O:\ORG\VOA\VB2\04JAN00\VB29073.D\FID1A.CH Vial: 21
Acq On : 4 Jan 2000 7:22 pm Operator: MER
Sample : 9914370MSD Inst : VB2
Misc : RPT#991858 RW3-EFFMSD Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29073.D\FID2B.CH Vial: 21
Acq On : 4 Jan 2000 7:22 pm Operator: MER
Sample : 9914369MSD Inst : VB2
Misc : RPT#991858 RW3-EFFMSD Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:59 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030063

Quantitation Report (QT Reviewed)

Data File : O:\ORG\VOA\VB2\04JAN00\VB29073.D\FID1A.CH Vial: 21
Acq On : 4 Jan 2000 7:22 pm Operator: MER
Sample : 9914370MSD Inst : VB2
Misc : RPT#991858 RW3-EFFMSD Multiplr: 1.00
IntFile : EVENTS3.E

Data File : O:\ORG\VOA\VB2\04JAN00\VB29073.D\FID2B.CH Vial: 21
Acq On : 4 Jan 2000 7:22 pm Operator: MER
Sample : 9914369MSD Inst : VB2
Misc : RPT#991858 RW3-EFFMSD Multiplr: 1.00
IntFile : EVENTS4.E
Quant Time: Jan 5 14:59 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L
System Monitoring Compounds						
9) S Bromofluorobenze	11.55	9.74	11742148	12962341	55.272	47.268
Spiked Amount 50.000			Recovery	=	110.54%	94.54%
Target Compounds						
1) Methyl t-Butyl E	4.89	3.45	2557715	3032469	49.686	47.953
2) Diisopropyl Ethe	5.26	3.75	3012018	3257462	66.083	51.727
3) Benzene	6.44	4.86	4813175	6642599	53.601	57.326
4) Toluene	8.49	6.65	11302353	13390047	56.695	49.607
5) Chlorobenzene	10.08	8.27	12258676	14541434	51.460	47.023
6) Ethylbenzene	10.31	8.40	9910958	11854945	52.858	47.798
7) m&p-Xylenes	10.55	8.55	23830707	28945053	107.716	98.156
8) o-Xylene	11.04	9.05	11749831	13569921	56.306	51.052
10) 1,3-Dichlorobenz	13.18	11.23	11561949	13617247	51.503	45.684m
11) 1,4-Dichlorobenz	13.27	11.36	12727170	15505015	48.542	45.715
12) 1,2-Dichlorobenz	13.74	11.88	10951046	12013283	54.904	46.725
13) Naphthalene	16.57	14.55	22694375	25456353	85.661	78.030

030064

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VLCS01

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VI001042

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29062.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/4/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
71-43-2	Benzene	52	
108-88-3	Toluene	55	
100-41-4	Ethylbenzene	54	
91-20-3	Naphthalene	41	
	m&p-Xylenes	110	
95-47-6	o-Xylene	55	

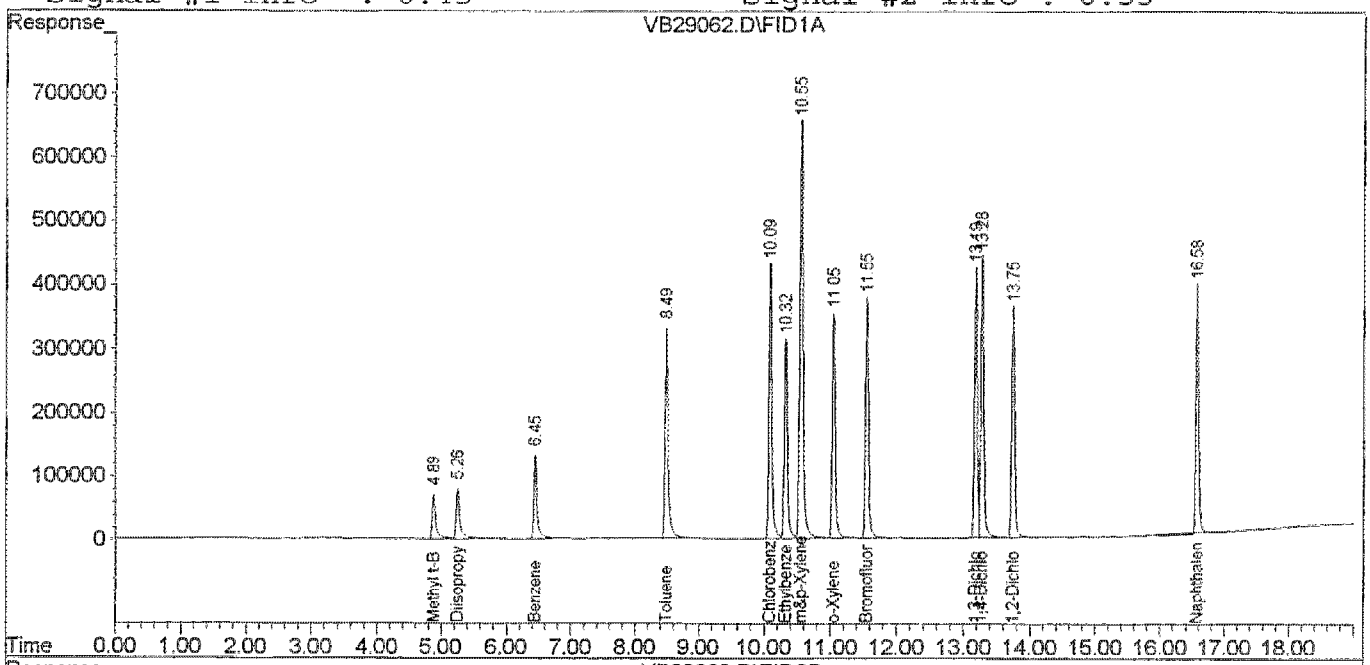
030065

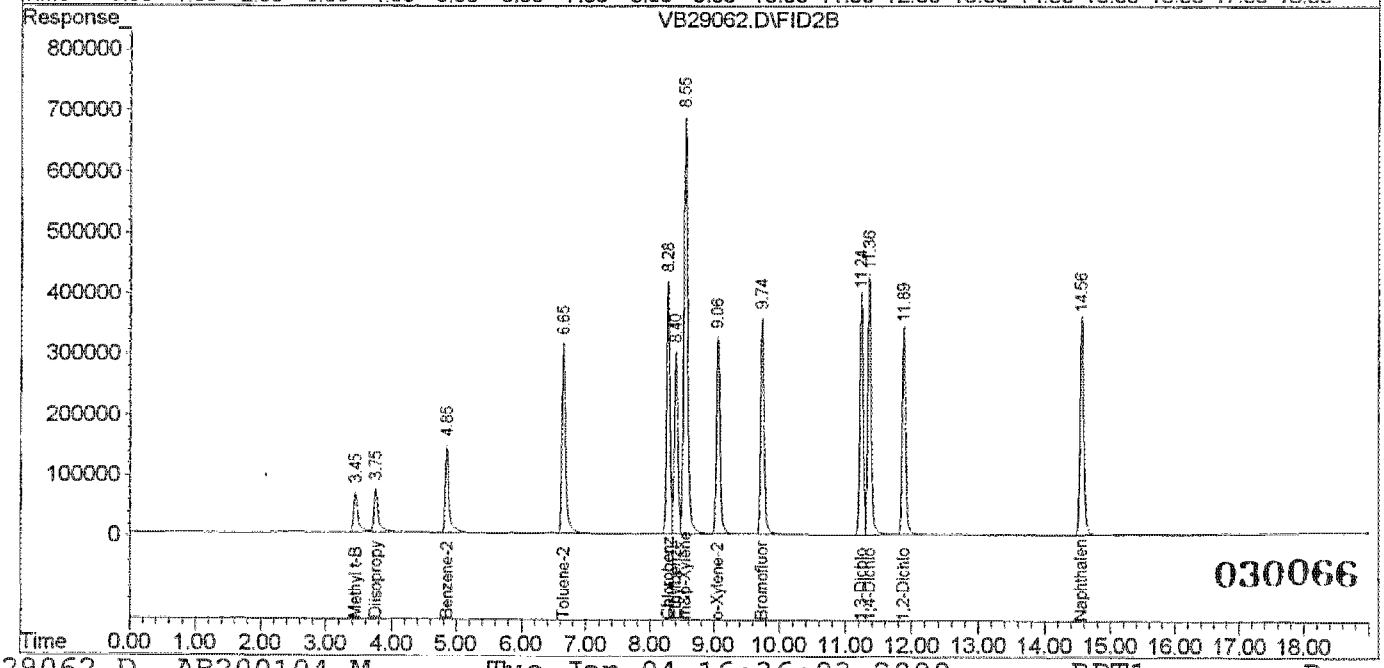
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030066

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID1A.CH Vial: 10
Signal #2 : O:\ORG\VOA\VB2\04JAN00\VB29062.D\FID2B.CH
Acq On : 4 Jan 2000 2:01 pm Operator: MER
Sample : VI001042 Inst : VB2
Misc : ICV/LCS Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 4 14:30 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB291222.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.56	9.74	11462159	13167367	53.954	48.016	
Spiked Amount	50.000			Recovery	=	107.91%	96.03%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.45	2853752	3056920	55.436	48.340	
2)	Diisopropyl Ethe	5.26	3.75	3261155	3347270	71.549	53.153	#
3)	Benzene	6.45	4.86	4699690	5901707	52.338	50.932	
4)	Toluene	8.49	6.66	10928151	12686374	54.818	47.000	
5)	Chlorobenzene	10.09	8.28	13150203	15026408	55.203	48.591	
6)	Ethylbenzene	10.32	8.41	10132590	11849706	54.040	47.777	
7)	m&p-Xylenes	10.56	8.55	23408733	28325170	105.808	96.054	
8)	o-Xylene	11.05	9.06	11393103	13054896	54.597	49.114	
10)	1,3-Dichlorobenz	13.19	11.24	12006536	14363305	53.483	48.187	
11)	1,4-Dichlorobenz	13.28	11.36	13536571	16153780	51.629	47.628	
12)	1,2-Dichlorobenz	13.75	11.89	10792800	12682807	54.111	49.330	
13)	Naphthalene	16.58	14.56	10815924	13601933	40.825	41.693	

030067

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VLCS02

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VL001052

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29079.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. Date Analyzed: 1/5/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
71-43-2	Benzene	66	
108-88-3	Toluene	54	
100-41-4	Ethylbenzene	56	
91-20-3	Naphthalene	52	
	m&p-Xylenes	110	
95-47-6	o-Xylene	57	

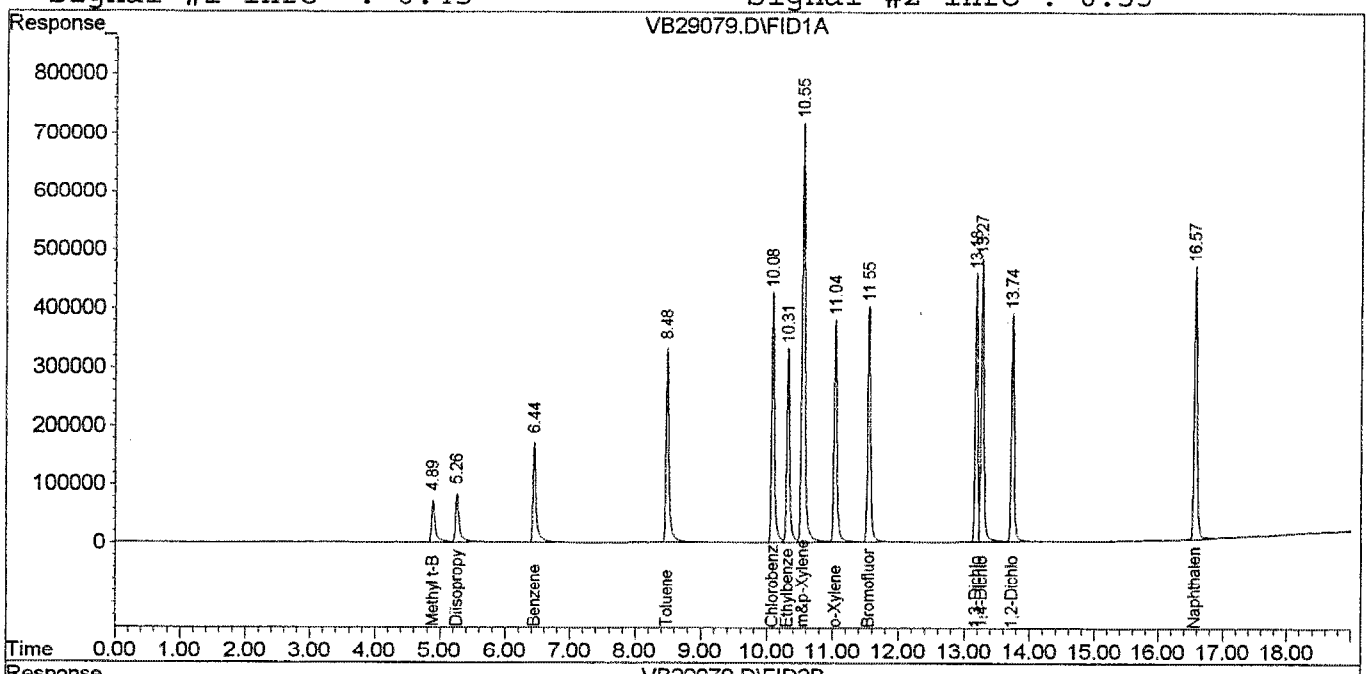
030068

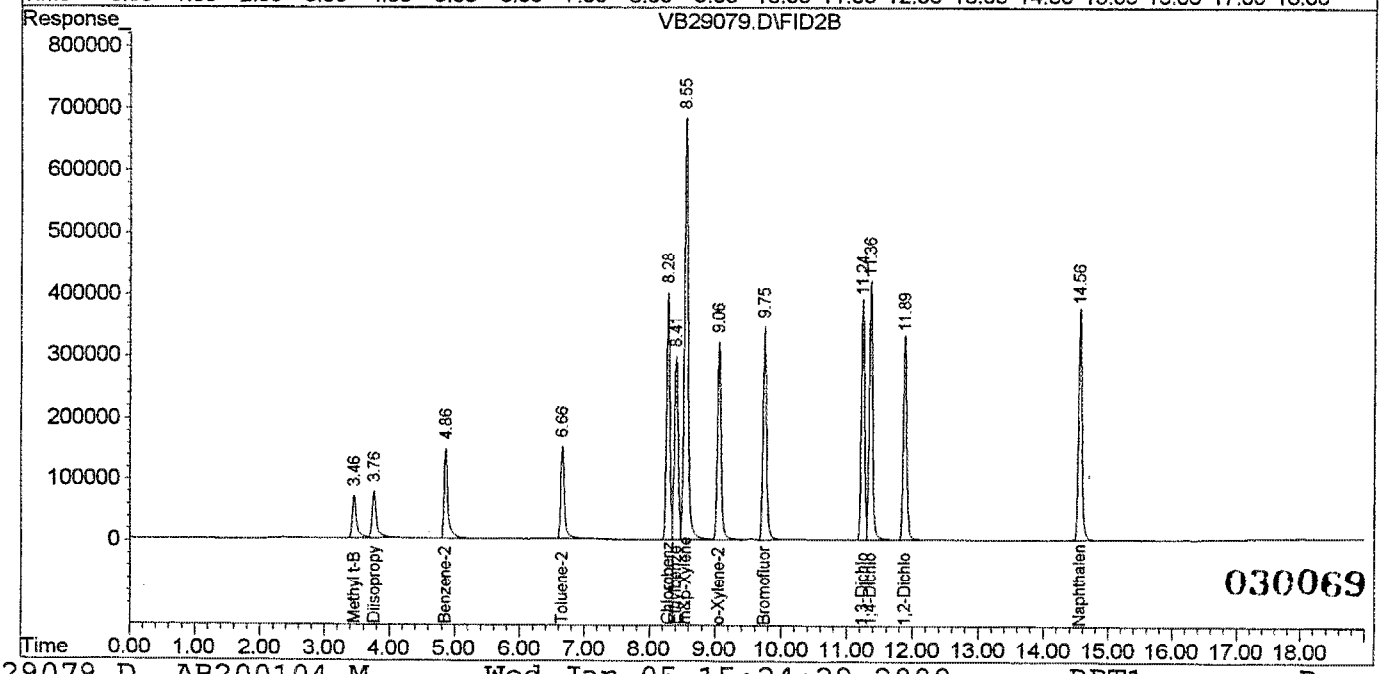
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29079.D\FID1A.CH Vial: 27
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29079.D\FID2B.CH
Acq On : 5 Jan 2000 10:27 am Operator: MER
Sample : VL001052 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:24 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030069

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29079.D\FID1A.CH Vial: 27
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29079.D\FID2B.CH
Acq On : 5 Jan 2000 10:27 am Operator: MER
Sample : VL001052 Inst : VB2
Misc : VLCS,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:24 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

	Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
	System Monitoring Compounds							
9) S	Bromofluorobenze	11.55	9.75	11962380	12681680	56.309	46.245	
Spiked Amount	50.000			Recovery	=	112.62%	92.49%	
	Target Compounds							
1)	Methyl t-Butyl E	4.89	3.46	2903465	3228828	56.402	51.058	
2)	Diisopropyl Ethe	5.26	3.76	3293273	3580481	72.254	56.857	
3)	Benzene	6.44	4.87	5896633	6012168	65.667m	51.885	
4)	Toluene	8.49	6.66	10721173	6214939	53.780	23.025	#
5)	Chlorobenzene	10.08	8.28	12891346	14427838	54.116	46.655	
6)	Ethylbenzene	10.32	8.41	10422860	11667407	55.588	47.042	
7)	m&p-Xylenes	10.55	8.55	24859323	27823783	112.365	94.354	
8)	o-Xylene	11.04	9.06	11873418	12765295	56.899	48.025	
10)	1,3-Dichlorobenz	13.18	11.24	12775265	13885273	56.907	46.584	
11)	1,4-Dichlorobenz	13.27	11.37	14400379	15471009	54.923	45.615	
12)	1,2-Dichlorobenz	13.74	11.89	11341688	12074799	56.863	46.965	
13)	Naphthalene	16.57	14.56	13774623	14299332	51.993m	43.831	

030070

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VLCS02DUP

Lab Name: STL BALTIMORE Contract: 000001

Lab Code: ST LABS Case No.: WILLOW SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VD001054

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: VB29086.D

Level: (low/med) LOW Date Received: 1/3/00

% Moisture: not dec. _____ Date Analyzed: 1/5/00

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	65	
108-88-3	Toluene	57	
100-41-4	Ethylbenzene	59	
91-20-3	Naphthalene	51	
	m&p-Xylenes	110	
95-47-6	o-Xylene	58	

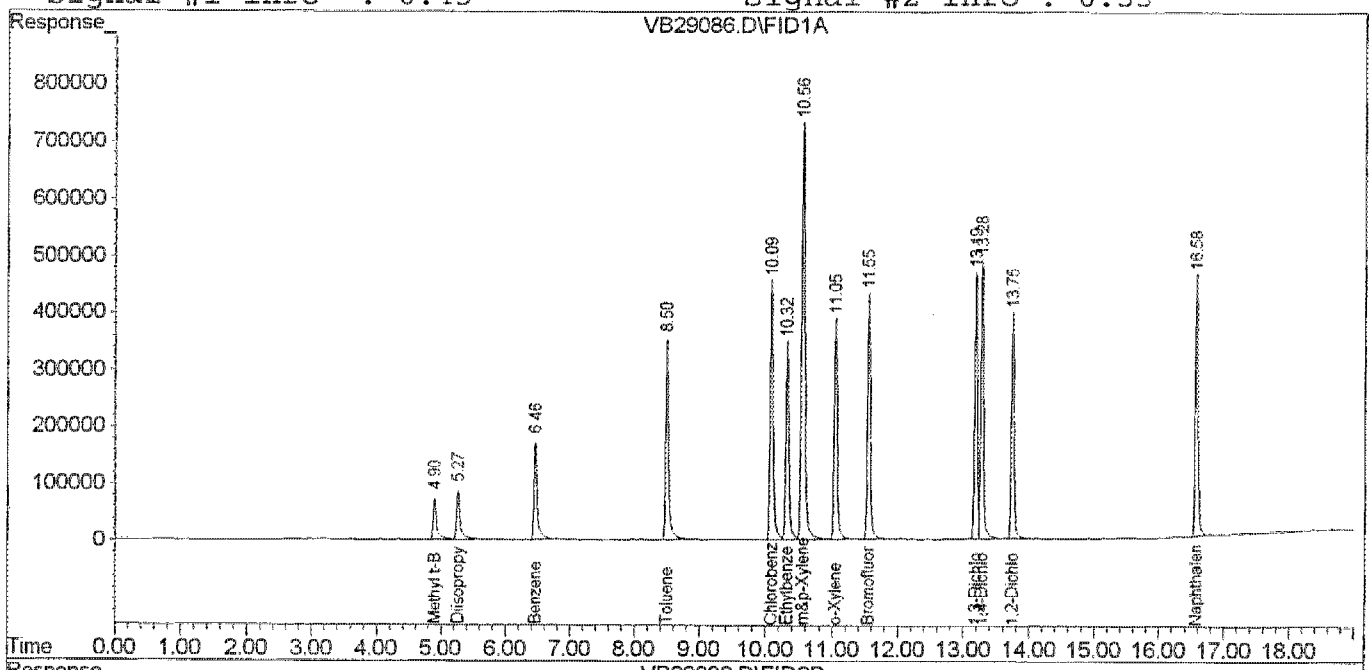
030071

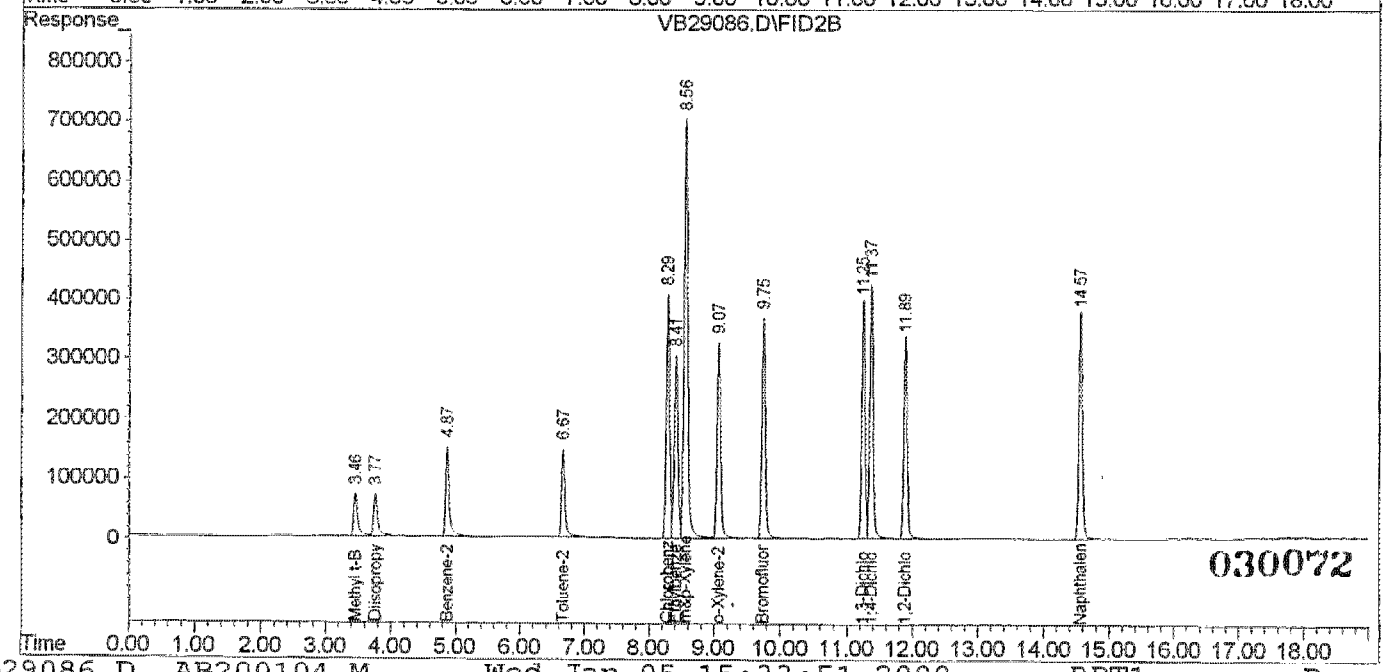
Quantitation Report

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29086.D\FID1A.CH Vial: 34
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29086.D\FID2B.CH
Acq On : 5 Jan 2000 1:51 pm Operator: MER
Sample : VD001054 Inst : VB2
Misc : VLCSDUP,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:33 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Multiple Level Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53





030072

Quantitation Report (QT Reviewed)

Signal #1 : O:\ORG\VOA\VB2\05JAN00\VB29086.D\FID1A.CH Vial: 34
Signal #2 : O:\ORG\VOA\VB2\05JAN00\VB29086.D\FID2B.CH
Acq On : 5 Jan 2000 1:51 pm Operator: MER
Sample : VD001054 Inst : VB2
Misc : VLCSDUP,W Multiplr: 1.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS4.E
Quant Time: Jan 5 15:33 2000 Quant Results File: AB200104.RES

Quant Method : C:\HPCHEM\1\METHODS\AB200104.M (Chemstation Integrator)
Title : GC Volatiles\PID\Ambient Purge SOP# STL-M-8021A-1
Last Update : Tue Dec 07 17:18:03 1999
Response via : Initial Calibration
DataAcq Meth : AB200104.M

Volume Inj. : 5mL
Signal #1 Phase : DB-VRX Signal #2 Phase: DB-624
Signal #1 Info : 0.45 Signal #2 Info : 0.53

Compound	RT#1	RT#2	Resp#1	Resp#2	ug/L	ug/L	
System Monitoring Compounds							
9) S Bromofluorobenze	11.56	9.75	12698851	13436980	59.775	48.999	
Spiked Amount 50.000			Recovery	=	119.55%	98.00%	
Target Compounds							
1) Methyl t-Butyl E	4.90	3.46	2879019	3268543	55.927	51.686	
2) Diisopropyl Ethe	5.27	3.77	3442192	3264518	75.521	51.839	#
3) Benzene	6.46	4.87	5861077	6239077	65.271	53.843	
4) Toluene	8.50	6.67	11440868	6081723	57.390	22.531	#
5) Chlorobenzene	10.09	8.29	13816833	14613969	58.001	47.257	
6) Ethylbenzene	10.33	8.41	10969865	11832930	58.506	47.709	
7) m&p-Xylenes	10.56	8.56	25432824	28197849	114.957	95.622	
8) o-Xylene	11.05	9.07	12095182	12917256	57.961	48.597	
10) 1,3-Dichlorobenz	13.19	11.25	13146876	14090226	58.563	47.271	
11) 1,4-Dichlorobenz	13.28	11.37	14548306	15590833	55.488	45.968	
12) 1,2-Dichlorobenz	13.75	11.89	11484190	12193922	57.577	47.428	
13) Naphthalene	16.58	14.57	13404120	14114769	50.594m	43.265	

030073

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

E. Laboratory Logs

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 29427 Start Date: 4 Jan 2000 Page No.: 1

Directory : 04JAN00 IS\SS Vol: 4ul MS Vol: 5ul Method: AB200104.M Book No.: 26

File ID	ALS	Sample Information		Inj.Time	Comments	pH
VB29053.	1	PRIME	PRIME	9:39 am	—	—
VB29054.	2	STD#29434	INITIAL CALIBRATION VSTD200,W	10:08 am	OK	—
VB29055.	3	STD#29435	INITIAL CALIBRATION VSTD100,W	10:37 am	OK	—
VB29056.	4	STD#29436	INITIAL CALIBRATION VSTD50,W	11:06 am	OK	—
VB29057.	5	STD#29437	INITIAL CALIBRATION VSTD5.0,W	11:35 am	NG	—
VB29058.	6	STD#29438	INITIAL CALIBRATION VSTD5.0,W	12:04 pm	OK	—
VB29059.	7	STD#29439	INITIAL CALIBRATION VSTD0.9,W	12:34 pm	NG	—
VB29060.	8	STD#29440	INITIAL CALIBRATION VSTD0.9,W	1:03 pm	OK	—
VB29061.	9	STD#29441	INITIAL CALIBRATION VSTD0.9,W	1:32 pm	NN	—
VB29062.	10	VI001042	ICV/LCS	2:01 pm	OK	—
VB29063.	11	VL001042	ICV/LCS	2:30 pm	NN	—
VB29064.	12	I BLANK	I BLANK	2:59 pm	—	—
VB29065.	13	VB001044	VBLK,W	3:28 pm	OK	~~2.0~~ MEG 1/5/
VB29066.	14	0000004	RPT#000001 TRIP BLANK	3:58 pm	OK	2.0
VB29067.	15	0000003	RPT#000001 EFFLUENT	4:27 pm	OK	2.0
VB29068.	16	0000002	RPT#000001 BETWEEN	4:56 pm	OK	2.0
VB29069.	17	0000001	RPT#000001 INFLUENT	5:25 pm	RR @ 2X	2.0
VB29070.	18	I BLANK	I BLANK	5:54 pm	—	—
VB29071.	19	9914370	RPT#991858 RW3-EFF	6:23 pm	OK	2.0
VB29072.	20	9914370MS	RPT#991858 RW3-EFFMS	6:53 pm	OK	2.0
VB29073.	21	9914370MSD	RPT#991858 RW3-EFFMSD	7:22 pm	OK	2.0
VB29074.	22	9914369	RPT#991858 RW3-INF,50X	7:51 pm	RR @ 10X	2.0
VB29075.	23	STD#29450	ENDING STANDARD VSTD50,W	8:20 pm	OK	—
VB29076.	24	STD#29451	ENDING STANDARD VSTD50,W	8:49 pm	NN	—

030075

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments: CALIBRATION NAMED AB200104.M

Analyst: Megan Bailey Date: 1/5/00

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 29427 Start Date: 4 Jan 2000 Page No.: 1

Directory : 04JAN00 IS\SS Vol: 4ul MS Vol: 5ul Method: AB200104.M Book No.: 26

File ID	ALS	Sample Information		Inj.Time	Comments	pH
VB29053.	1	PRIME	PRIME	9:39 am	—	—
VB29054.	2	STD#29434	INITIAL CALIBRATION VSTD200,W	10:08 am	OK	—
VB29055.	3	STD#29435	INITIAL CALIBRATION VSTD100,W	10:37 am	OK	—
VB29056.	4	STD#29436	INITIAL CALIBRATION VSTD50,W	11:06 am	OK	—
VB29057.	5	STD#29437	INITIAL CALIBRATION VSTD5.0,W	11:35 am	NG	—
VB29058.	6	STD#29438	INITIAL CALIBRATION VSTD5.0,W	12:04 pm	OK	—
VB29059.	7	STD#29439	INITIAL CALIBRATION VSTD0.9,W	12:34 pm	NG	—
VB29060.	8	STD#29440	INITIAL CALIBRATION VSTD0.9,W	1:03 pm	OK	—
VB29061.	9	STD#29441	INITIAL CALIBRATION VSTD0.9,W	1:32 pm	NN	—
VB29062.	10	VI001042	ICV/LCS	2:01 pm	OK	—
VB29063.	11	VL001042	ICV/LCS	2:30 pm	NN	—
VB29064.	12	I BLANK	I BLANK	2:59 pm	—	—
VB29065.	13	VB001044	VBLK,W	3:28 pm	OK	~~2.0~~ MEO 1/5/01
VB29066.	14	0000004	RPT#000001 TRIP BLANK	3:58 pm	OK	2.0
VB29067.	15	0000003	RPT#000001 EFFLUENT	4:27 pm	OK	2.0
VB29068.	16	0000002	RPT#000001 BETWEEN	4:56 pm	OK	2.0
VB29069.	17	0000001	RPT#000001 INFLUENT	5:25 pm	RR @ 2X	2.0
VB29070.	18	I BLANK	I BLANK	5:54 pm	—	—
VB29071.	19	9914370	RPT#991858 RW3-EFF	6:23 pm	OK	2.0
VB29072.	20	9914370MS	RPT#991858 RW3-EFFMS	6:53 pm	OK	2.0
VB29073.	21	9914370MSD	RPT#991858 RW3-EFFMSD	7:22 pm	OK	2.0
VB29074.	22	9914369	RPT#991858 RW3-INF,50X	7:51 pm	RR @ 10X	2.0
VB29075.	23	STD#29450	ENDING STANDARD VSTD50,W	8:20 pm	OK	—
VB29076.	24	STD#29451	ENDING STANDARD VSTD50,W	8:49 pm	NN	—

030076

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments: CALIBRATION NAMED AB200104.M

Analyst: Megan Ruby Date: 1/5/00

STL Baltimore, VOA Injection Log

Instrument: VB2 IS\SS No.: 28952 MS No.: 29427 Start Date: 5 Jan 2000 Page No.: 2

Directory : 05JAN00 IS\SS Vol: 4ul MS Vol: 5ul Method: AB200104.M Book No.: 26

File ID	ALS	Sample Information		Inj.Time	Comments	pH
VB29077.	25	PRIME	PRIME	9:29 am	—	—
VB29078.	26	STD#29455	DAILY STANDARD VSTD50,W	9:58 am	OK	—
VB29079.	27	VL001052	VLCS,W	10:27 am	OK	—
VB29080.	28	I BLANK	I BLANK	10:56 am	—	—
VB29081.	29	VB001052	VBLK,W	11:25 am	OK	—
VB29082.	30	0000001DL	RPT#000001 INFLUENTDL,2X	11:54 am	OK	2.0
VB29083.	31	I BLANK	I BLANK	12:23 pm	—	—
VB29084.	32	9914369RE	RPT#991858 RW3-INFRE,10X	12:52 pm	OK	2.0
VB29085.	33	I BLANK	I BLANK	1:21 pm	—	—
VB29086.	34	VD001054	VLCSDUP,W	1:51 pm	OK	—
VB29087.	35	STD#29456	ENDING STANDARD VSTD50,W	2:20 pm	NG	—
VB29088.	36	STD#29457	ENDING STANDARD VSTD50,W	2:50 pm	OK	—

030077

Method SOP: STL-M-8021A-1 DIWater Purged: N/A Comments:

Analyst: Megan Ruby Date: 1/5/00

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem.
VL001045	LCS	8260	8260 MS	29443	50ppm	5ul	5ml	50ppb	H2O	1/4/00	1/4/00	CHS
VB001045	BLK	↓	N/A					→	↓	↓	↓	↓
29453	STD	8260	8260MIX	29442	50ppm	25ul	25ml	50ppb	H2O	1-4-00	N/A	CH
VL001046	LCS	↓	8260MS	29443	↓	↓	↓	↓	↓	↓	↓	↓
VB001046	BLK	↓	N/A					→	↓	↓	↓	↓
29454	STD	8260	8260 mix | Ketones	29442/29446	50PPM	5ul	25ml	10PPb	H2O	1/5/00	1/5/00	NEH
VL001051	LCS	8260	8260ms | Ketones	29443/29446	50PPM	5ul	25ml	10PPb	H2O	1/5/00	1/5/00	NEH
VB001051	BLK	8260	N/A	N/A				→	H2O	1/5/00	1/5/00	NEH
29455	STD	8021	VOC	29426	200ppm	5ul	20ml	50ppb	H2O	1/5/00	1/5/00	MER
29456	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
29457	STD	↓	VOC	29426	↓	↓	↓	↓	↓	↓	↓	↓
VL001052	LCS	↓	BTEX LCS	29427	200ppm	5ul	20ml	50ppb	↓	↓	↓	↓
VB001052	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H2O	1/5/00	1/5/00	MER
VL001053	LCS	8260	8260ms | Ketones	29443/29446	50 ppm	5ul	25ml	10ppb	H2O	1/5/00	1/5/00	NEH
VL001054	LCS	8021	BTEX LCS	29427	200ppm	5ul	20ml	50ppb	H2O	1/5/00	1/5/00	MER
29458(A-I)	STD	8260	8260 mix | Ketones (MOL's)	29442/29446	50PPM	20ul	1000ml	1ppb	H2O	1/5/00	1/5/00	NEH
29459	STD	8015 MEH 1/5/00	TPH GAS	Lot # A908C053	—	—	—	—	MeOH	1/5/00	2/1/01	MER
29460	STD	8260	M-8260 ADD(AD)	Lot # A912C268	200ppm	—	—	—	MeOH	1/5/00	2/1/00	SRS

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Chem
29438						5ul	200ml	5.0 ppb				
29439						2.25 ul	500 ml	0.9 ppb				
29440						2.25 ul	500ml	0.9 ppb				
29441	STD		VOC	29426		2.25 ul	500 ml	0.9 ppb				
VI001042	ICV/LCS		BTEX LCS	29427		5ul	20ml	50 ppb				
VL001042	ICV/LCS	8021	BTEX LCS	29427	200ppm	5ul	20ml	50 ppb	H2O	1/4/00	1/4/00	MER
29442	Work STD	8260	8260 #1	STL# 29293	2000ppm	250ul	10ml's	50ppm	BW756 MeOH	1/4/00	1/11/00	JRS
			8260 #2	STL# 29089	VAR	250ul		50ppm				
			8260 #3	LOT# A8100125	VAR	250ul		50/50/100ppm				
			8260 #4	STL# 28878 B	10000ppm	500ul		50/100/250ppm				
			ADD	STL# 29292	2000ppm	250ul		500ppm				
			Gases	STL# 29291	2000ppm	250ul		50ppm				
29443			8260 MS	STL# 28624 Q	200ppm	1ml	4ml's					
			ADD MS	STL# 28375	200ppm							
29444			8260 IS	STL# 29289	200ppm							
29445			8260 SS	STL# 29290	200ppm							
29446			ResTek Mix Ketones	STL# 28660A	VAR	100ul	10ml's	50ppm				
29447	8260 STD	8260	8260 mix/Ketones	29442/29446	50ppm	5ul	25ml	10ppb	H2O	1/4/00	1/4/00	MEH
29448	STD	8260	8260 mix Ketones	29442/29446	50ppm	5ul	25ml	10ppb	H2O	1/4/00	1/4/00	MEH
29449	STD	8260	8260 mix	29442	50ppm	5ul	5ml's	50ppb	H2O	1/4/00	1/4/00	JRS
~~VL001043~~ VL001043	LCS		8260 MS	29443								
VB001043	BLK		N/A									
VD001043	LCSD	8260	8260 MS	29443	50ppm	5ul	5ml's	50ppb	H2O	1/4/00	1/4/00	JRS
VB001044	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H2O	1/4/00	1/4/00	MER
29450	STD	8021	VOC	29426	200ppm	5ul	20ml	50ppb	H2O	1/4/00	1/4/00	MER
29451	STD	8021	VOC	29426	200ppm	5ul	20ml	50ppb	H2O	1/4/00	1/4/00	MER
29452	STD	8260	8260 mix	29442	50ppm	5ul	5ml	50ppb	H2O	1/4/00	1/4/00	CHS

8260 mix

030029

Volatiles Lab Standards/QC Sample Logbook

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Prep Date	Exp. Date	Che
29438						5ul	200ml	5.0 ppb				
29439						2.25 ul	500 ml	0.9 ppb				
29440						2.25 ul	500ml	0.9 ppb				
29441	STD		VOC	29426		2.25 ul	500 ml	0.9 ppb				
VL001042	ICV/LCS		BTEX LCS	29427		5ul	20ml	50 ppb				
VL001042	ICV/LCS	8021	BTEX LCS	29427	200ppm	5ul	20ml	50 ppb	H2O	1/4/00	1/4/00	MEH
29442	Work STD	8260	8260 #1	STL# 29293	2000ppm	250ul	10mls	50ppm	80/20 MeOH	1/4/00	1/11/00	JR
			8260 #2	STL# 29089	VAR	250ul		50ppm				
			8260 #3	LOT# A9100125	VAR	250ul		50/50/100ppm				
			8260 #4	STL# 28878 B	10000ppm	500ul		50/100/200ppm				
			ADD	STL# 29292	2000ppm	250ul		500ppm				
			Gases	STL# 29291	2000ppm	250ul		50ppm				
29443			8260 MS	STL# 28624 Q	200ppm	1ml	4mls					
			ADD MS	STL# 28375	200ppm							
29444			8260 IS	STL# 29289	200ppm							
29445			8260 SS	STL# 29290	200ppm							
29446			Restek Mix Ketones	STL# 28660A	VAR	100ul	10mls	50ppm				
29447	8260 STD	8260	8260 mix/Ketones	29442/29446	50ppm	5ul	25ml	10ppb	H2O	1/4/00	1/4/00	MEH
29448	STD	8260	8260 mix Ketones	29442/29446	50ppm	5ul	25ml	10 ppb	H2O	1/4/00	1/4/00	MEH
29449	STD	8260	8260 mix	29442	50ppm	5ul	5ml	50ppb	H2O	1/4/00	1/4/00	JRS
VL001043 ~~VL001044~~	LCS		8260 MC	29443								
VB001043	BLK		N/A									
VD001043	LCSD	8260	8260 MS	29445	50ppm	5ul	5ml	50ppb	H2O	1/4/00	1/4/00	JRS
VB001044	BLK	8021	N/A	N/A	N/A	N/A	N/A	N/A	H2O	1/4/00	1/4/00	MEH
29450	STD	8021	VOC	29426	200ppm	5ul	20ml	50ppb	H2O	1/4/00	1/4/00	MEH
29451	STD	8021	VOC	29426	200ppm	5ul	20ml	50ppb	H2O	1/4/00	1/4/00	MEH
29452	STD	8260	8260 MIX	29442	50ppm	5ul	5ml	50ppb	H2O	1/4/00	1/4/00	JRS

Reviewed by: [illegible] Date: 1/4/00

STD/Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol.	Final Conc.	Solv.	Exp. Date	Exp. Date	Ch
29422	STD	8260	8260 mix	29337	50ppm	5ul	5ml	50ppb	H_2O	1/2/00	1/2/00	C
VL001021	LCS	↓	8260 ms	29338	↓	↓	↓	↓	↓	↓	↓	↓
VB001021	BLK	↓	N/A						↓	↓	↓	↓
29423	Std	8260	8260 mix / Ketones	29337/29330	50ppm	5ul	25ml	10ppb	H2O	1/3/00	1/3/00	NE
VB001031	BLK	8260	N/A	N/A					↓	↓	↓	↓
VL001031	LCS	8260	8260 ms / Ketones	29338/29330	50ppm	5ul	25ml	10ppb	H2O	1/3/00	1/3/00	NE
29424	Std	8260	8260 mix	29337	50ppm	5ul	5ml	50ppb	H2O	1/3/00	1/3/00	NE
VB001032	BLK	8260	N/A	N/A					↓	↓	↓	↓
VL001032	LCS	8260	8260 ms / Ketones	29338	50 ppm	5ul	~~25ml~~ 5ml	50ppb	H2O	1/3/00	1/3/00	N
29425	Std	8260	8260 mix / Ketones	29337/29330	50ppm	5ul	25ml	10ppb	H2O	1/3/00	1/3/00	NE
29426	WORK STD	8021	VOC	28651B	200ppm	—	—	—	MeOH	1/3/00	2/3/00	M
29427	WORK STD	8021	BTEX LCS	28652A	200ppm	—	—	—	MeOH	1/3/00	2/3/00	M
29428	WORK STD	8015	TPH SURR (1,2,3-TCB)	Lot # 2910	NEAT	5mg	10ml	~~MeOH~~ 500ppm	MeOH	1/3/00	7/3/00	M
29429	WORK STD	8015	TPH GAS	27556B	~~5000~~ 6000 ppm	800ul	2mL	2000ppm	MeOH	1/3/00	2/3/00	M
29430	WORK STD	8015	TPH LCS	~~29~~ Lot # M-1832	5000 ppm	—	—	—	MeOH	10/8/99	~~2/3/00~~	M
29431	WORK STD	8015	TPH LCS	29430A	5000ppm	800ul	2mL	2000ppm	MeOH	1/3/00	2/3/00	M
VD001031	LCSDup	8260	8260ms/Ketones	29337/29330	50ppm	5ul	25ml	10ppb	H2O	1/3/00	1/3/00	NE
29432	STD	8260	8260MIX	29337	50ppm	25ul	25mL	50ppb	H_2O	1-3-00	N/A	(
VL001033	LCS	↓	8260MS	29338	↓	↓	↓	↓	↓	↓	↓	(
VB001033	BLK	↓	N/A						↓	↓	↓	↓
29433	Std	8260	8260mix / Ketones	29337/29330	50ppm	5ul	25ml	10ppb	H2O	1/4/00	1/4/00	NE
VB001041	BLK	8260	N/A	N/A					↓	↓	↓	↓
VL001041	LCS	8260	8260 ms / Ketones	29338/29330	50ppm	5ul	25ml	10ppb	H2O	1/4/00	1/4/00	NE
29434	STD	8021	VOC	29426	200ppm	20ul	20ml	200ppb	H_2O	1/4/00	1/4/00	N
29435	↓	↓	↓	↓	↓	10ul	20ml	100ppb	↓	↓	↓	
29436						5ul	20ml	50ppb				
29437	↓	↓	↓	↓	↓	5ul	200ml	5.0ppb	↓	↓	↓	↓

STD/QC Sample ID Number	QC Type	Method	Description	Stock ID	Stock Conc.	Initial wt/vol	Final vol	Final Conc	Solv.	Prep Date	Exp Date
VB112013	BLK	8260	N/A								
28943	STD	8015	TPH GAS	28317	2000 ppm	25.0	5 ml	[illegible]	H_2O	12/01/99	12/01
28944	↓	↓	↓	↓	↓	↓	↓	1000 ppm	↓	↓	↓
28945	STD	↓	TPH GAS	28317	↓	↓	↓	↓	↓	↓	↓
VL91 2014	LCS	↓	TPH LCS	28318	2000 ppm	2.5 ml	5 ml	1000 ppm	↓	↓	↓
VB91 2014	BLK	8015	N/A	N/A	N/A	N/A	N/A	N/A	H_2O	12/01/99	12/01
28946	WC P.V. STD	8021	VOC	28651A	200 ppm	—	—		MeOH	12/01/99	1/01
28947	STD	8021	BTEX LCS	26270E	200 ppm	—	—		MeOH	12/01/99	1/01
28948	STD	~~8021~~	BFB	14592	NEAT	0.200 g	100 ml	2000 ppm	MeOH	12/01/99	12/01
28949	STD	CLP 8260	CLP mix / Ketones	28873/28877	50 ppm	2 ml	200 ml	.5 ppb	H_2O	12/1/99	12/
28950	STD	CLP	CLP mix / Ketones	28906/28877	50 ppm	10 ml	25 ml	2 ppb	↓	↓	↓
28951	STD	CLP	CLP mix / Ketones	28906/28877	50 ppm	20 ml	25 ml	4 ppb	H_2O	12/1/99	12/1
28952	WC P.V. STD	8021	BFB	28948	2000 ppm	1.25 ml	10 ml	250 ppm	MeOH	12/01/99	5/01
28953	STD	CLP	CLP mix / Ketones	28906/28877	50 ppm	10 ml	1000 ml	.5 ppb	H_2O	12/1/99	12/1
28954	STD	CLP	CLP mix / Ketones	28906/28877	50 ppm	5 ml	25 ml	10 ppb	H_2O	12/1/99	12/1
VL91 2015	LCS	CLP	CLP MS / Ketones	28909/28877	50 ppm	5 ml	25 ml	10 ppb	H_2O	12/1/99	12/
VL91 2016	LCS	8260	8260 MS	28874	50 ppm	5 ml	5 ml	50 ppb	$Na_2S_2O_3$	12/1/99	12/
VB91 2016	BLK	↓	N/A	—	—	—	—	—	↓	↓	↓
28955	STD	↓	8260 mix	28873	50 ppm	5 ml	5 ml	50 ppb	↓	↓	↓
28956	STD	8260	8260 mix	28873	50 ppm	5 ml	5 ml	50 ppb	H_2O	12/1/99	N/
VL9 2017	LCS	↓	8260 MS	28874	↓	↓	↓	↓	↓	↓	↓
VB9 2017	BLK	↓	N/A						↓	↓	↓
28957	STD	8260	8260 mix / Ketones	28873/28877	50 ppm	5 ml	25 ml	10 ppb	H_2O	12/2/99	12/
VB91 2021	BLK	8260	N/A	N/A	—	—	—	—	↓	↓	↓
VL91 2021	LCS	8260	8260 MS / Ketones	28874/28877	50 ppm	5 ml	25 ml	10 ppb	H_2O	12/2/99	12/
28958	STD	8260	8260 mix	28873	50 ppm	5 ml	5 ml	50 ppb	$Na_2S_2O_3$	12/2/99	12/
VL91 2022	LCS	↓	8260 MS	28874	↓	↓	↓	↓	↓	↓	↓

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030082

14563	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
14564	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
14565	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
14566	GCS, BFB	13881, 14267	200/200ppm	0.25/0.5µL	↓	50/100ppb	6/20/96	5/21/96	H2O
14567	↓	↓	↓	↓	↓	↓	↓	↓	↓
14568	↓	↓	↓	↓	↓	↓	↓	↓	↓
14569	SD201, 601C, MIBE, BFB	14461, 14325, 14267, 14457	200ppm	1.25µL	5ml	50ppb	↓	↓	↓
14570	↓	↓	↓	↓	↓	↓	↓	↓	↓
14571	BFB, VOC, BFB	14457-8 14267	↓	↓	↓	↓	↓	↓	H2O
14572	↓	↓	↓	↓	↓	↓	↓	↓	↓
14573	GCS, BFB	13881, 14267	200/200ppm	0.25/0.25µL	5ml	50/100ppb	5/21/96	5/22/96	H2O
14574	↓	↓	↓	↓	↓	↓	↓	↓	↓
14575	BFB, VOC, 601A	14457-8, 14267	200ppm	1.25µL	5ml	50ppb	5/21/96	5/22/96	H2
14576	↓	↓	↓	↓	↓	↓	↓	↓	↓
14577	↓	↓	↓	↓	↓	↓	↓	↓	↓
14578	601B	Acu std 036-016	200ppm	—	—	—	5/21/96	5/22/96	H2O
14579	601A, B, C, SD1, VOC, BFB	14457-60 14578 14267	↓	1.25µL	5ml	50ppb	↓	5/22/96	H2
14580	↓	↓	↓	↓	↓	↓	↓	↓	↓
14581	↓	↓	↓	↓	↓	↓	↓	↓	↓
14582	601A, VOC, BFB	14457-8, 14267	↓	0.4µL	200ml	0.4 ppb	↓	↓	↓
14583	↓	↓	↓	5µL	↓	5	↓	↓	↓
14584	↓	↓	↓	1.25µL	5ml	50	↓	↓	↓
14585	↓	↓	↓	2.5	↓	100	↓	↓	↓
14586	↓	↓	↓	12.5	↓	500	↓	↓	↓
14587	↓	↓	↓	1.25	↓	50	↓	↓	↓
14588	↓	↓	↓	↓	↓	50	↓	↓	↓
14589	↓	↓	↓	2.5µL	↓	100ppb	5/22/96	5/22/96	H2
14590	↓	↓	↓	↓	↓	↓	↓	↓	↓
14591	↓	↓	↓	↓	↓	↓	↓	↓	↓
14592	BFB	Std mix 45H2634	Neat	—	—	—	—	—	
14593	↓	↓	↓	0.200g	100ml	200ppm	5/22/96	5/22/97	N
14594	↓	↓	2000ppm	10ml	100ml	200ppm	↓	↓	

STD 14592 43

030083

F. Technical Review Checklist and Other Analysis Documentation

DATA REVIEW CHECKLIST

All questions should be answered with a "Y" for yes, "N" for no or "N/A" for not applicable. All "N" answers require a corrective action as specified in the project summary and an explanation in the narrative notes section.

Report #: 000001 PS #: 90 Test: VOA Method: 8021 Analyst: MER
Comp. List: BTEX+NAPH Matrix: Water TICs: NA Inst. ID: VB2 EA#s: 1-4 (4)

	Initial Analyst	Peer Review	Comments
Has the appropriate Project Summary been used?	Y	Y	
Have all associated memos/e-mail/NCRs been included?	N/A	Y	
Have the C-O-Cs been reviewed for errors?	Y	Y	
Were TCLP DI WET extraction holding times met?	N/A	NA	
Were the samples properly preserved?	Y	Y	
Were the samples initially analyzed within holding time?	Y	Y	
Were dilutions/reanalyses completed within holding time?	Y	Y	
Did BFB meet tune criteria?	Y	Y	
Did the IC/ICV/CCVs meet specified criteria?	Y	Y	
Did the method blank and LCS meet surrogate criteria?	Y	Y	
Did the method blank and LCS meet internal standard criteria?	N/A	NA	
Did the LCS/LCSD meet specified criteria?	N	NO	
Have all samples been analyzed?	Y	Y	
Did all samples meet surrogate criteria?	Y	Y	
Did all samples meet internal standard criteria?	N/A	NA	
Were all samples analyzed within appropriate cal/tune time?	Y	Y	
Did the MS/MSD meet specified criteria?	Y	Y	
Were all target analytes within calibration range?	Y	Y	
Were the appropriate dilutions/reanalyses performed?	Y	Y	
Have the proper analytes/reporting limits been used?	Y	Y	
Has the report narrative been completed?	Y	Y	
Are the Client/LIMS C-O-Cs included?	Y	Y	
Are the TCLP/DIWET extraction sheets included?	N/A	NA	
Are the dry weight/sample weight logs included?	N/A	NA	
Is an example calculation included?	Y	Y	
Are the Injection and Standards logs included?	Y	Y	
Are the Forms Is (Sample Data) included?	Y	Y	
Are the Forms IIs (Surrogate recovery) included?	Y	Y	
Are the Forms IIIs (MS/MSD) included?	Y	Y	
Are the Forms IIIs (LCS/LCSD) included?	Y	Y	
Are the Forms IVs (Method Blank) included?	Y	Y	
Are the Forms Vs (Tune) included?	N/A	NA	
Are the Forms VIs (Initial Calibration) included?	Y	Y	
Are the Forms VIIs (Continuing Calibration) included?	Y	Y	
Are the Forms VIIIs (Internal Standard Areas) included?	N/A	NA	

Analyst: Megan Ruby Peer Reviewer: Cheryl Schenck

Additional Comments:

Example Calculation Worksheet
GC Volatiles(External Calibration)

Compound: Toluene **EA ID#:** VI001042
Curve Date: 1/4/00 **Matrix:** WATER

Linear Regression Stats

	Level(ppb)	Area	RF	Avg. RF	%RSD	Slope(m)	y-Inter.(b)	r2
	0.9	165579	183977	199354	7.74	209413	9172	1.000
C	5	905600	181120					
U	50	10534582	210692			passes y-inter. criteria		
R	100	21225863	212259					
V	200	4.17E+07	208721					
E								
S								
M	**Conc.(ppb)**	**Area**	**Quant(A/L)***					
P	54.818	10928151	A					

Calculations: conc.= Area/AvgRF (for average RF)
conc.= Area-b/m (for linear regression)

* A = average RF used for quantitation, L = linear regression used for quantitation

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Example Calculation Worksheet
GC Volatiles(External Calibration)

Compound: Toluene **EA ID#:** VL001052
Curve Date: 1/4/00 **Matrix:** WATER

Linear Regression Stats

	Level(ppb)	Area	RF	Avg. RF	%RSD	Slope(m)	y-Inter.(b)	r2
	0.9	165579	183977	199354	7.74	209413	9172	1.000
C	5	905600	181120					
U	50	10534582	210692			passes y-inter. criteria		
R	100	21225863	212259					
V	200	4.17E+07	208721					
E								
S								
M	**Conc.(ppb)**	**Area**	**Quant(A/L)***					
P	53.780	10721173	A					

Calculations: conc.= Area/AvgRF (for average RF)
conc.= Area-b/m (for linear regression)

* A = average RF used for quantitation, L = linear regression used for quantitation

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Example Calculation Worksheet
GC Volatiles(External Calibration)

Compound: Toluene **EA ID#:** VD001054
Curve Date: 1/4/00 **Matrix:** WATER

Linear Regression Stats

	Level(ppb)	Area	RF	Avg. RF	%RSD	Slope(m)	y-Inter.(b)	r2
	0.9	165579	183977	199354	7.74	209413	9172	1.000
C	5	905600	181120					
U	50	10534582	210692			passes y-inter. criteria		
R	100	21225863	212259					
V	200	4.17E+07	208721					
E								
S								
M	**Conc.(ppb)**	**Area**	**Quant(A/L)***					
P	57.390	11440868	A					

Calculations: conc.= Area/AvgRF (for average RF)
conc.= Area-b/m (for linear regression)

* A = average RF used for quantitation, L = linear regression used for quantitation

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