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16 March 2011

Mr. Charles Fitzsimmons, FOSC
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U.S. Environmental Protection Agency Region 3
Environmental Science Center-3HS31
701 Mapes Road
Ft. Meade, Maryland 20755

Subject: Draft Trip Report for the Annandale PCE Site
EPA Contract No. EP-S3-10-05
Technical Direction Document No. WS01-10-10-005
Document Control Number W0036.1A.00118

Dear Mr. Fitzsimmons:

Weston Solutions, Inc. (WESTON) is submitting this Trip Report for the Annandale PCE Site summarizing the indoor and ambient air sampling activities conducted in January 2011. If you have any questions regarding this report, please contact me at (757) 214-6817.

Sincerely

Craig J. LaCrosse
Project Team Leader

**TRIP REPORT
FOR THE
ANNANDALE PCE SITE
ANNANDALE, FAIRFAX COUNTY, VIRGINIA**

Prepared for

U.S. Environmental Protection Agency Region III
Environmental Science Center-3HS31
701 Mapes Road
Ft. Meade, Maryland 20755

Submitted by

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501 Independence Parkway
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Approved by

Craig J. LaCrosse
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Annandale PCE Site
Annandale, Fairfax County, Virginia

TDD No. WS01-10-10-005
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1. INTRODUCTION

Under Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. EP-S3-10-05, Technical Direction Document (TDD) No. WS01-10-10-005, U.S. Environmental Protection Agency (EPA) Region III tasked Weston Solutions, Inc. (WESTON) to:

- Conduct indoor air, sub-slab soil gas, and ambient air sampling at residential properties located in close proximity to the Annandale PCE Site in Annandale, Fairfax County, Virginia.

The purpose of the sampling event was to collect sub-slab soil gas along with indoor and ambient air data so that EPA can evaluate potential risks to inhabitants. The contaminants of concern (COCs) are volatile organic compounds (VOCs) including tetrachloroethylene (PCE) and its degradation products trichloroethylene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) as well as other VOCs including benzene, xylenes, and chloroform.

This trip report provides site background in **Section 2.0**, describes site activities in **Section 3.0**, summarizes analytical results in **Section 4.0**; and provides conclusions and recommendations in **Section 5.0**. All references cited in this report are listed after the text.

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2. BACKGROUND

This section describes the site location, presents a description and history of the site, and summarizes previous site investigations.

2.1 SITE LOCATION

The Annandale PCE Site physical address is 6701 Little River Turnpike in Annandale, Fairfax County, Virginia (38.8249389 degrees north latitude, 77.1728206 degrees west longitude) as shown on **Figure 1**. This address is located at the intersection of Little River Turnpike and Randolph Drive and is not associated with a physical property as the limits of contamination are currently undefined. The site is located in a combination of residential and retail/commercial sites in the City of Annandale, Virginia.

A residence in the vicinity of the Annandale PCE Site located at 4605 Randolph Drive currently is not connected to a municipal water supply and utilize their respective private water supply well for water use. In contrast, a majority of the surrounding residential properties are connected to a municipal water supply and utilize their respective private water supply well on a limited basis for supplemental water use (e.g., irrigation). Surrounding properties are connected to a municipal sewer system.

2.2 SITE DESCRIPTION AND HISTORY

The Annandale PCE Site was discovered as a result of a complaint to the Virginia Department of Environmental Quality (DEQ) of bad tasting water from a private water supply well at a residential property located in Annandale, Virginia at 4605 Randolph Drive (residence located at 37.82416945 degrees north latitude and 77.173172 degrees west longitude). This residential property is adjacent to retail/commercial sites to the north and west and an undeveloped lot and residential property to the east and south. The residential property is not connected to a municipal water supply and utilizes a private water supply well for drinking water.

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In addition to the house at 4605 Randolph Drive, two sheds are located on either side of a drainage area located behind the residence. An inactive heating oil underground storage tank (UST) is located along the front side of the house and an active above ground storage tank (AST) is located on the back side of the house (**Figure 2**). The property was built prior to 1966 and has been a residential property since construction as evident from an aerial photograph review by Marshall Miller & Associates, Inc. [MM&A (MM&A, 2010)]

The soil descriptions from a Site Inspection (SI) conducted by MM&A in the vicinity of the residence at 4605 Randolph Drive indicate primarily sand and silt textures. The bedrock in the vicinity of the site is metasedimentary and metaigneous rocks and depth-to-bedrock based on the geologic well logs review by MM&A indicates a range from 53 to 98 feet bgs. Soil borings as described in the MM&A report indicate saprolite, a type of chemically weathered bedrock encountered below the depth of soil, as shallow as 8 feet bgs at monitoring well location MW-2 [behind residence (**Figure 2**)]. The saprolite was also encountered at monitoring well locations MW-3 and MW-4 and may be considered a stratigraphic layer retarding the downward migration of groundwater and dissolved contaminants. The only information available for the onsite water supply well at 4605 Randolph Drive is that it has a 6-inch diameter well casing and the well is assumed to be bored into the bedrock (MM&A, 2010).

2.3 PREVIOUS SITE INVESTIGATION ACTIVITIES

As a result of a complaint of bad tasting water at 4605 Randolph Drive in Annandale, Virginia, the DEQ contracted Culligan of Hagerstown, Maryland to collect a sample from the well at the residence. On May 10, 2010, a sample was collected from the water supply well at 4605 Randolph Drive and analyzed by Maryland Spectral Services, Inc. of Baltimore, Maryland. Analytical results of the water well sample indicated the detection of several VOCs.

Based on the detection of several VOCs from the private water supply well at 4605 Randolph Drive, the DEQ, under the State Lead Program, issued Pollution Complaint number 2010-3275 and arranged for Culligan to install a carbon filtration unit (CFU) to treat the water pumped from

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the well to the house. Subsequently, the DEQ identified nearby private water well users (who use their existing private wells as an auxiliary source of water) from records obtained through the Fairfax County Water Authority (FCWA) and arranged for testing of the wells in June 2010. VOCs were not detected in any of the adjacent or off-site water supply wells.

The water supply well at 4605 Randolph Drive (pre- and post- CFU water) was later sampled by Culligan on July 9, 2010, and analyzed for VOCs by EPA method SW-846 8260B. Analytical results of the July sampling event confirmed the presence of VOCs detected in the May 2010 sampling event in the untreated water. No detectable VOCs were identified in the post-CFU filtered water.

The DEQ hired subcontractor MM&A to perform a limited soil and groundwater investigation at and in the vicinity of the residence at 4605 Randolph Drive. MM&A installed seven soil borings using direct-push technology (DPT) and hand auger techniques. A total of seven monitoring wells were installed within the soil borings indicated above. Field screening of the soils with a photoionization detector (PID) was completed in an effort to identify soils potentially impacted by contaminants.

One soil sample was collected from boring MW-6 at 8 to 12 feet below ground surface (bgs) based on the elevated PID results and analyzed for Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) by EPA Method SW-846 8015B. The analytical results indicated a concentration of 194 mg/kg in the soil at MW-6 indicating petroleum impact in the soil horizon at this location identified as a former location of an UST.

All seven monitoring wells were sampled for VOCs and semi-volatile organic compounds (SVOCs) per EPA Methods SW-846 8260 and SW-846 8270, respectively. Several VOCs were detected including benzene, xylenes, methyl tert-butyl ether (MTBE) and diisopropyl ether (DIPE) at MW-6 and PCE, TCE, and cis-1,2-DCE at monitoring wells MW-2 and MW-3. Benzene, MTBE, PCE, and TCE exceeded drinking water Maximum Contaminant Levels (MCLs) or risk standards in groundwater. No SVOCs were detected.

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The depth-to-water observed in the monitoring wells ranged from 5 to 10 feet bgs. As a result of the shallow depth-to-water, and the sandy soils, the potential exists for vapors from the contaminants to migrate via vapor intrusion into the basements of nearby residential properties and affect air quality. Due to these findings, indoor air and ambient air samples from in and around three residential properties were collected on November 17, 2010, by USEPA START contractor WESTON for evidence of vapor intrusion.

The November 2010 indoor and ambient air sampling event conducted by WESTON on November 17 and 18, 2010, indicated indoor air detections of organic compounds tetrachloroethylene, trichloroethylene, chloroform, benzene, and xylenes. Ambient air (background) samples had detections for trichloroethylene, benzene, and xylenes and the trip blank (quality control) sample had detections for tetrachloroethylene and xylenes. The trip blank detections resulted in qualification of laboratory analytical results (from detection of contaminant to “not detected”) for those compounds at multiple locations.

The highest tetrachloroethylene and trichloroethylene concentrations detected were at a sample location in the lower level of the residence at 4613 Randolph Drive. Benzene was detected in all samples (including background ambient air) with the exception of the trip blank sample. The highest benzene concentrations were detected in samples collected at 4609 Randolph Drive. The highest chloroform detection was at sample location in the lower living area (bedroom) of the residence located at 4609 Randolph Drive. Xylenes were detected at all sample locations but due to the detection of xylenes in the trip blank, several of the results were later qualified to “non detect”.

With the exception of chloroform, the COCs were anticipated to have originated from an offsite source (chloroform was detected in several indoor air samples, not detected in ambient or background air samples). The occurrence of chloroform at residential sample locations is or maybe related to the use of municipal water and cleaning supplies. With the exception of the 4613 Randolph Drive residence, residents were notified and removed any dry-cleaned clothing

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and household cleaners from the vicinity of the sampling locations in advance of the sampling event.

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3. SITE ACTIVITIES

This section describes the sample collection and sample handling activities associated with the January 2011 sub-slab soil gas and indoor air sampling event at the Annandale PCE Site.

3.1 SAMPLE COLLECTION

On January 25, 2011, a total of 12 air samples [including a co-located (or “duplicate”) sample and trip blank] from 10 locations were collected by WESTON for evidence of vapor intrusion. Samples were collected in accordance with the EPA-approved sampling plan using 6-L summa canisters for the evaluation of select VOCs of interest including PCE and its degradation products (TCE, VC, and other constituents) along with benzene, chloroform, and xylenes. The samples were collected over a 24-hour period and submitted to CLP laboratory Pace Analytical Services, Inc. for analysis via EPA Method TO-15.

Three (3) 24-hour SUMMA[®] Canisters [including one (1) sub-slab soil gas sample] were collected from within the residential property located at 4605 Randolph Drive at three (3) locations in the residence as follows: Two (2) locations in basement [including one (1) sub-slab soil gas sample]; and one (1) location on the 1st floor of residence.

Two (2) 24-hour SUMMA[®] Canisters were collected from two (2) locations at the residence residential property located at 4609 Randolph Drive as follows: one (1) in basement; and one (1) on 1st floor of the residence.

Four (4) 24-hour SUMMA[®] Canisters [including one (1) sub-slab soil gas and one (1) duplicate sample] were collected from three (3) locations at the residence located at 4613 Randolph Drive as follows: Three (3) in basement from two (2) locations [including (1) sub-slab soil gas and (1) duplicate indoor air sample]; and one (1) on 1st floor.

Two (2) 24-hour SUMMA[®] Canisters were positioned outside of the residence at 4605 Randolph Road to collect ambient air during the sampling period in order to evaluate the concentration of background contaminants of interest from areas surrounding the site. An equipment lot (“Trip”)

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blank was submitted to the laboratory for QC purposes. A summary of the field sampling location data is provided in **Table 1** and shown on **Figure 2**.

WESTON designated indoor air sample identifiers according to three components and the following format:

The sample ID will be composed of four components:

[_] [_] [_] [_]
1 2 3 4

Component 1 – Defines the site location using a number:

RES1 = Residential property at 4605 Randolph Drive

RES2 = Residential property at 4609 Randolph Drive

RES3 = Residential property at 4613 Randolph Drive

Component 2 – Is the individual sample type and location identifier where:

IA## = indoor air sample

SS## = sub-slab soil gas sample

AA## = ambient air sample

Component 3 – Defines QA sample type:

00 = Environmental sample

01 = Duplicate sample

02 = Equipment Lot (“Trip”) blank

Component 4 – Defines site air sampling event

02 = Second Air Sampling Event

Examples of the sample identifications for the site are as follows:

A typical sample may be identified as RES1-IA01-00-02. The “RES1” indicates the sample was collected from the residential property at 4605 Randolph Drive, and the “IA” indicates the sample is an indoor air sample at location 01. The “00” indicates that the sample is an environmental sample. The “02” indicates this sample was collected from the second air sampling event.

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TABLE 1 INDOOR AND AMBIENT AIR SAMPLING SUMMARY

Sample Identifier	Sample Date Start	Start Time	Stop Time*	Canister Vacuum in Field Start (Hg)	Canister Vacuum in Field End (Hg)	Sample Location Description
RES1-AA01-00-02	1/25/2011	09:26	08:48	-29.0	0.0	North property line at northeast corner of fence line east of drainage in rear of house approximately 3feet from ground at 4605 Randolph Drive (upwind location).
RES1-AA02-00-02	1/25/2011	09:31	08:49	-30.0	-4.0	South property line at southeast corner of fence line east of drainage in rear of house approximately 3 feet from ground at 4605 Randolph Drive (downwind location).
RES1-SS01-00-02	1/25/2011	10:51	10:46	-30.0	-5.0	Sub-slab sample in northeast corner (storage area) of basement at 4605 Randolph Drive
RES1-IA01-00-02	1/25/2011	10:57	10:50	-30.0	-2.0	Northwest corner of basement (bedroom) at 4605 Randolph Drive
RES1-IA02-00-02	1/25/2011	11:04	10:52	-30.0	-4.0	Northwest location of main level near television (family room area) at 4605 Randolph Drive
RES2-IA01-00-02	1/25/2011	11:25	11:01	-28.0	-4.0	Northeast corner (bedroom) of basement at 4609 Randolph Drive
RES2-IA02-00-02	1/25/2011	11:35	11:05	-30.0	-2.0	Southwest location of main level near fireplace (family room area) at 4609 Randolph Drive.
RES3-IA01-00-02	1/25/2011	12:30	12:00	-30.0	-11.0	Northeast section of basement at 4613 Randolph Drive near staircase.
RES3-IA01-01-02	1/25/2011	12:30	12:02	-29.0	-5.0	Duplicate sample of RES3-IA01-00-02.
RES3-IA02-00-02	1/25/2011	12:36	12:07	-26.5	-6.0	East location (dining room area) of main level at 4613 Randolph Drive
RES3-SS01-00-02	1/25/2011	12:58	12:02	-30.0	-3.0	Sub-slab sample in southeast section of basement near staircase at 4613 Randolph Drive.
RES1-IA01-02-02	1/25/2011	09:00	12:07	--	--	Trip Blank

Note:

* = Stop Time was collected on 1/26/2011 (24 hour regulator)

-- = Not tested for canister pressure as this trip blank was not opened to atmospheric conditions.

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Meteorological data was recorded from the local meteorological data (wind speed and direction, temperature, relative humidity, rainfall, barometric pressure, etc.) prior to (7 days) and concurrent with the SUMMA® canister sampling as shown in Table 2.

TABLE 2 METEOROLOGICAL DATA SUMMARY

Date	Temperature High (Degrees F)	Temperature Low (Degrees F)	Humidity Average (Percent)	Pressure Maximum (Inches)	Pressure Minimum (Inches)	Wind Speed Average (MPH)	Wind Direction	Precipitation (Inches)
1/18/2011	33	28	97	30.10	29.70	0.4	N	0.31
1/19/2011	49	33	85	29.90	29.68	0.9	NNW	0.00
1/20/2011	42	32	59	30.11	29.65	1.0	NW	0.00
1/21/2011	36	18	52	29.99	29.59	2.4	WNW	0.03
1/22/2011	24	14	49	30.02	29.88	0.4	NNW	0.00
1/23/2011	28	14	51	30.32	29.89	0.7	NW	0.00
1/24/2011	30	11	58	30.44	30.25	0.0	SE	0.00
1/25/2011	45	27	65	30.25	30.00	0.0	S	0.00
1/26/2011	36	32	93	30.01	29.50	2.7	NNE	0.50

Average wind speed for the first day of sampling was 0.0 miles per hour (mph), with gust up to 6 mph; direction was predominantly from the south. Average wind speed for the second day of sampling was 2.7 mph, with gust up to 20 mph; direction was predominantly from the north northeast. Precipitation in the amount of 0.50 inches was recorded on the second day of sampling. The precipitation event occurred during the sampling and due to the low barometric pressures of the storm some aspects of vapor migration may have been influenced.

3.2 SAMPLE HANDLING PROCEDURES

Samples were handled and packaged in accordance with the START-4 *Program-Wide Uniform Federal Policy Act Quality Assurance Project Plan (QAPP)*, (WESTON, 2010). All shipping canisters and packages were properly labeled with chain-of-custody seals and shipped via FedEx on January 26, 2011, to an EPA CLP laboratory, Pace Analytical Services, Inc. of Minneapolis, Minnesota, with signed chain-of-custody forms (**Attachment A**). The samples were received and logged with a receipt date of January 28, 2011; and arrived in good condition. WESTON personnel conducted photographic and written documentation of sampling activities. Field

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logbook documentation was conducted in accordance with WESTON's QAPP for START (WESTON, 2010). A photographic documentation log is included in **Appendix B**.

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4. ANALYTICAL RESULTS

This section discusses the analytical results of the indoor and ambient air samples collected at the Annandale PCE Site in January 2011. The samples were analyzed for Volatile Organic Compounds in accordance with EPA Method TO-15. Analytical results were validated by the USEPA Region III Environmental Services Assistance Team (ESAT) contractor and received from ESAT on February 14, 2011, within the allotted turn-around-time. A copy of the laboratory analytical data package(s) from Pace Analytical Services, Inc. and the ESAT-validated report are included as **Attachment B** to this report.

Tables 3 and 4 summarize analytical results in both ug/m^3 and parts per billion by volume [(ppbv) volumes of gaseous pollutant per billion volumes of air] for indoor and ambient air samples collected during the sampling event, respectively. **Figure 2** shows analytical detections in (ug/m^3) of constituents at indoor and ambient air sampling locations. The difference between the measurements is a unit conversion based on the molecular weight of the contaminant. The pollution laws and regulations in the United States typically reference their pollutant limits in ug/m^3 .

The sub-slab soil gas samples collected at 4605 and 4613 Randolph Drive did not indicate elevated constituents or detections as those samples collected within the residence (indoor air samples) at the residential locations. This indicates volatile organic compounds are likely not influenced by the 6-inch concrete slab at those locations.

It should be noted that a cleaning solution odor was perceived in the lower portion of the residence at 4609 Randolph Drive. In addition, several cleaners were identified in the lower and main floor living areas at the 4613 Randolph Drive residence. The presence of cleaners may have an impact on chloroform and other compounds detected during the sampling event.

The laboratory report indicated the laboratory surrogate 1,4-dichlorobenzene was outside of the lower control limit (<70%) in the analysis of the trip blank sample. As no positive detections were reported in this sample, the quantitation limits were qualified as “UJ” on by the data

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reviewer. The “UJ” designation indicates that there was no positive detection but the quantitation limit may be inaccurate or imprecise for this sample.

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TABLE 3 INDOOR AND AMBIENT AIR SAMPLE ANALYTICAL RESULTS ($\mu\text{g}/\text{m}^3$)

Sample Location	Reporting Limit ($\mu\text{g}/\text{m}^3$)	Screening Level ($\mu\text{g}/\text{m}^3$)	RES1-AA01-00-02	RES1-AA02-00-02	RES1-IA01-00-02	RES1-IA01-02-02	RES1-IA02-00-02	RES1-SS01-00-02	RES2-IA01-00-02	RES2-IA02-00-02	RES3-IA01-00-02	RES3-IA01-01-02	RES3-IA02-00-02	RES3-SS01-00-02
Tetrachlorethylene (PCE)	0.70	41	U	U	U	UJ	U	2.5	4.3	12.7	3.8	3.4	4.4	2.4
Trichloroethylene (TCE)	0.55	120	U	U	U	UJ	U	U	U	U	U	U	U	1.4
Trans-1,2-Dichloroethene	0.40	NA	U	U	U	UJ	U	U	U	U	U	U	U	U
Cis-1,2-dichloroethene	0.40	NA	U	U	U	UJ	U	U	U	U	U	U	U	U
1,1-dichloroethene	0.40	21,000	U	U	U	UJ	U	U	U	U	U	U	U	U
Vinyl Chloride (VC)	0.26	16	U	U	U	UJ	U	U	U	U	U	U	U	U
Chloroform	0.50	11	U	U	U	UJ	2.5	U	4.0	6.5	U	U	U	8.2
Benzene	0.32	31	1.0	1.1	0.92	UJ	5.2	5.5	2.6	4.2	1.2	1.1	1.7	0.97
m,p-Xylene	0.88	73,000	1.1	U	U	UJ	3.4	3.7	5.7	6.5	13.2	11.9	11.3	U
Xylene, o-	0.44	73,00	U	U	U	UJ	U	U	2.3	2.4	4.1	3.7	3.6	U

Notes:
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
 NA = Not Available
 U = Not detected above method detection limit.
 UJ = Not detected, quantitation limit may be inaccurate or imprecise.

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TABLE 4 INDOOR AND AMBIENT AIR SAMPLE ANALYTICAL RESULTS (ppbv)

Sample Number	Limit Reporting (ppbv)	RES1-AA01-00-02	RES1-AA02-00-02	RES1-IA01-00-02	RES1-IA01-02-02	RES1-IA02-00-02	RES1-SS01-00-02	RES2-IA01-00-02	RES2-IA02-00-02	RES3-IA01-00-02	RES3-IA01-01-02	RES3-IA02-00-02	RES3-SS01-00-02
Tetrachlorethylene (PCE)	0.1	U	U	U	UJ	U	0.36	0.62	1.84	0.55	0.49	0.64	0.35
Trichloroethylene (TCE)	0.1	U	U	U	UJ	U	U	U	U	U	U	U	0.26
Trans-1,2-Dichloroethene	0.1	U	U	U	UJ	U	U	U	U	U	U	U	U
Cis-1,2-dichloroethene	0.1	U	U	U	UJ	U	U	U	U	U	U	U	U
1,1-dichloroethene	0.1	U	U	U	UJ	U	U	U	U	U	U	U	U
Vinyl Chloride (VC)	0.1	U	U	U	UJ	U	U	U	U	U	U	U	U
Chloroform	0.1	U	U	U	UJ	0.50	U	0.81	1.31	U	U	U	1.65
Benzene	0.1	0.31	0.34	0.28	UJ	1.6	1.69	0.80	1.29	0.37	0.34	0.52	0.30
m,p-Xylene	0.2	0.25	U	U	UJ	0.77	0.84	1.29	1.47	2.99	2.7	2.56	U
Xylene, o-	0.1	U	U	U	UJ	U	U	0.52	0.54	0.93	0.84	0.82	U

Notes:

- ppbv = parts per billion by volume
- U = Not detected above method detection limit.
- UJ = Not detected, quantitation limit may be inaccurate or imprecise.

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Contract No. EP-S3-10-05

The compounds detected include tetrachloroethylene, trichloroethylene, chloroform, benzene, and xylenes. Tetrachloroethylene detections appear to have increased in number from the previous sampling event conducted in November 2010, although this is likely a result of several tetrachloroethylene detections later qualified to “non-detect” due the presence of tetrachloroethylene in the trip blank sample from the November 2010 sampling event. The highest tetrachloroethylene concentrations detected were at sample location RES2-IA02-00-02 located in the upper level of the residence at 4609 Randolph Drive. The resident at this location was informed to remove any dry cleaner clothing or solvents/degreasers from the proposed area of sampling prior to the sampling event. The residence did indicate an odor similar to that of a cleaning solution in the lower level at the time of the sampling event.

Benzene was detected in all samples with the exception of the trip blank (sample RES-IA01-02-02). Benzene concentrations were slightly elevated at two of the three sampling locations at the 4605 Randolph Drive residence during this sampling event as compared to the benzene concentrations observed at other residential sampling locations where the benzene concentrations did not vary significantly. The highest benzene concentrations were detected in samples collected at 4609 Randolph Drive. The presence of benzene at the sample locations is may be derived from an offsite source, as the compound was detected in background (ambient air) samples locations as well. This is a similar pattern as the previous indoor air sampling event conducted in November 2010.

It should be noted that background ambient air samples (RES1-AA01-00 and RES1-AA02-00) had detections for benzene and xylenes, two of the three same compounds detected in the background ambient air samples from the November 2010 air sampling event. The presence of these same compounds in background ambient air samples collected at different locations in subsequent sampling events strengthen the assumption these compounds are present in background air quality in the vicinity of the residence at 4605 Randolph Drive.

T R I P R E P O R T

Annandale PCE Site
Annandale, Fairfax County, Virginia

TDD No. WS01-10-10-005
Contract No. EP-S3-10-05

5. CONCLUSIONS AND RECOMMENDATIONS

Based on previous investigations and analytical sampling results, the constituents detected in groundwater and multiple indoor air sampling events at the Annandale PCE Site continue to include benzene, tetrachloroethylene, trichloroethylene, and xylenes. Similar to the November 2010 sampling event, the COCs detected at the Annandale PCE Site include tetrachloroethylene, trichloroethylene, chloroform, benzene, and xylenes. With the exception of chloroform, the COCs are anticipated to have originated from an offsite source as chloroform was detected in several indoor air samples and not detected in ambient or background air samples from the November 2010 or January 2011 events.

The sub-slab soil gas sampling locations and analytical results did not indicate significant concentration variance as compared to indoor air samples collected from residential locations. This indicates the basement slab may not be a limiting factor in the migration of detected compounds. It should also be noted that the background or ambient air samples collected from locations outside the residence included detections of compounds benzene and xylenes from both the November 2010 and January 2001 sampling events. This suggests the background air quality sample locations were impacted by some of the same constituents detected in the indoor air samples.

Based on the known information about the site and the sampling results from the January 2011 sampling event, WESTON recommends the following:

1. Compare validated analytical data to Region III Regional Screening Levels (RSLs) for indoor air and Virginia DEQ Voluntary Remediation Program Tier III Sub-Slab Soil Gas Screening Levels (Table 2.12).
2. Future actions will be contingent on the associated results and the OSC's direction.

T R I P R E P O R T

Annandale PCE Site
Annandale, Fairfax County, Virginia

TDD No. WS01-10-10-005
Contract No. EP-S3-10-05

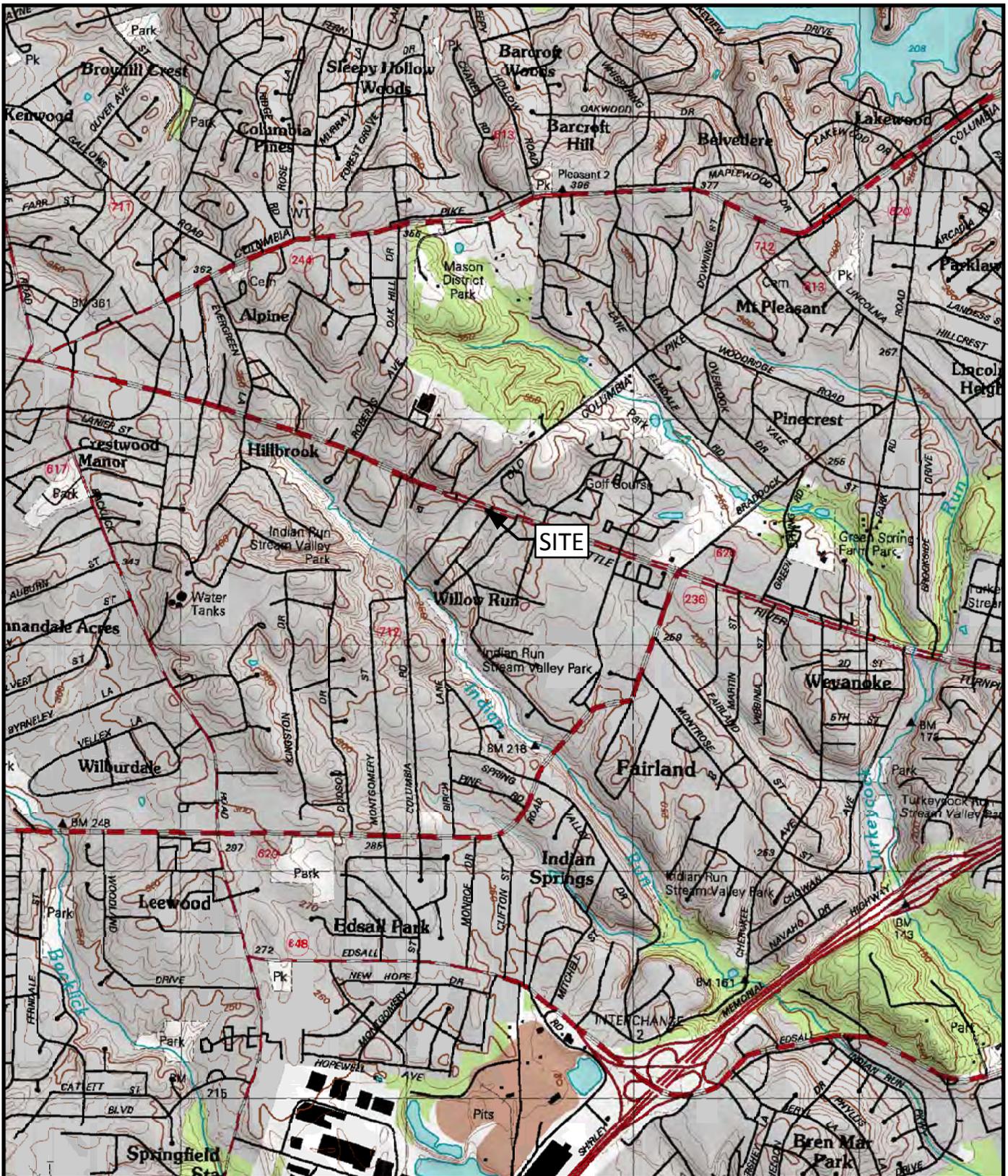
REFERENCES

MM&A (Marshall Miller and Associates, Inc.) 2010. *Release Investigation Demory Residence 4605 Randolph Drive Annandale, Virginia PC# 2010-3275*. October 2010.

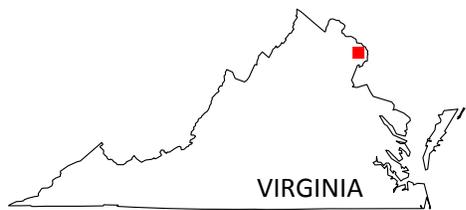
WESTON (Weston Solutions, Inc.). 2010. *START-4 Program-Wide Uniform Federal Policy Act Quality Assurance Project Plan (QAPP)*. October 2010.

APPENDIX A

FIGURES



SITE

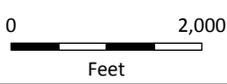


VIRGINIA

Data Sources:
 Basemap - USGS 7.5' Annandale, VA Quadrangle - 1994
 Contour Interval = 10'



Coordinate System:
 PA State Plane, NAD83, feet

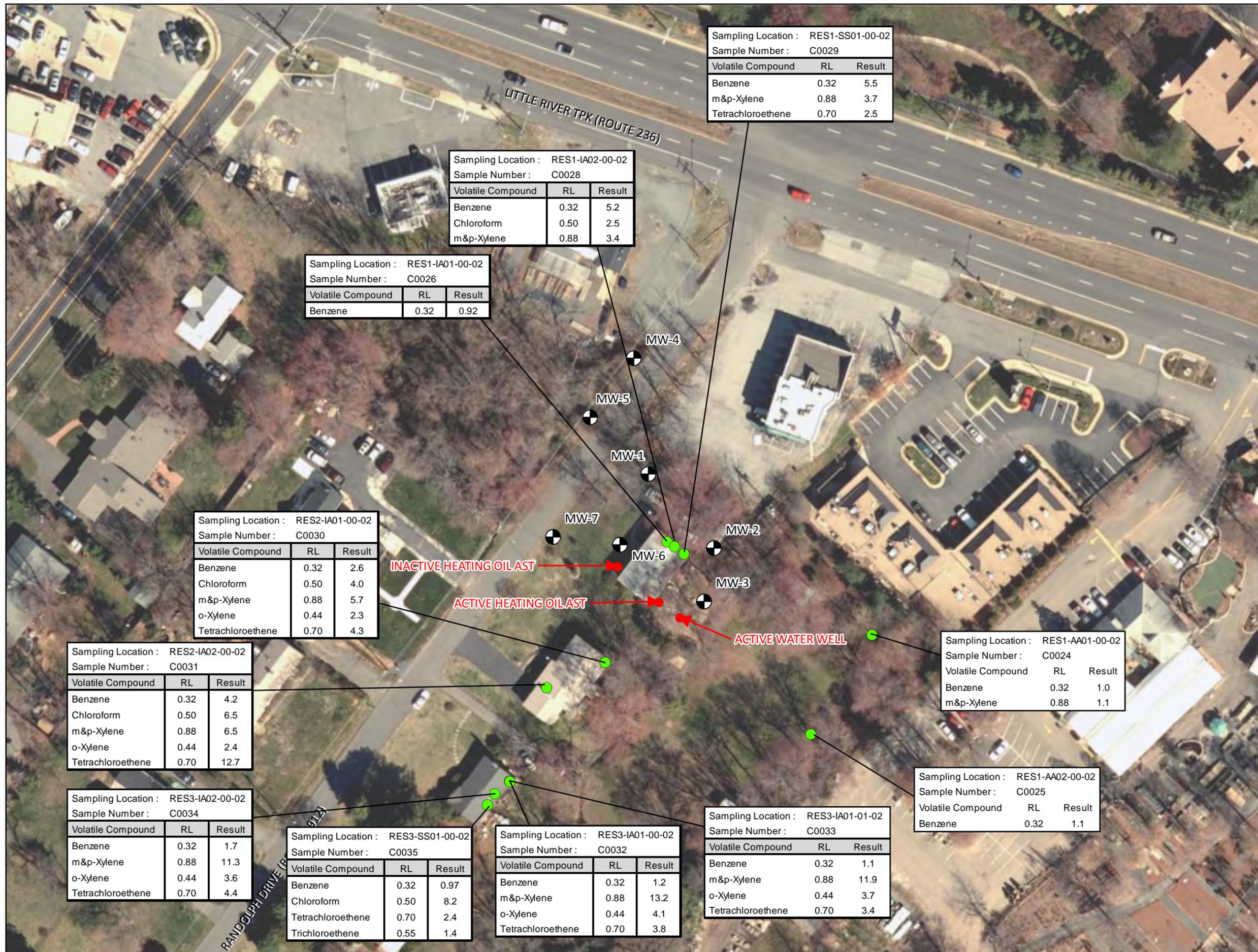


Annandale PCE SITE
 Annandale, Virginia

Figure 1
 Site Location Map

TDD#: WS01-10-10-005
 Contract: EP-S3-10-05





Sampling Location : RES1-SS01-00-02
Sample Number : C0029

Volatile Compound	RL	Result
Benzene	0.32	5.5
m&p-Xylene	0.88	3.7
Tetrachloroethene	0.70	2.5

Sampling Location : RES1-IA02-00-02
Sample Number : C0028

Volatile Compound	RL	Result
Benzene	0.32	5.2
Chloroform	0.50	2.5
m&p-Xylene	0.88	3.4

Sampling Location : RES1-IA01-00-02
Sample Number : C0026

Volatile Compound	RL	Result
Benzene	0.32	0.92

Sampling Location : RES2-IA01-00-02
Sample Number : C0030

Volatile Compound	RL	Result
Benzene	0.32	2.6
Chloroform	0.50	4.0
m&p-Xylene	0.88	5.7
o-Xylene	0.44	2.3
Tetrachloroethene	0.70	4.3

Sampling Location : RES2-IA02-00-02
Sample Number : C0031

Volatile Compound	RL	Result
Benzene	0.32	4.2
Chloroform	0.50	6.5
m&p-Xylene	0.88	6.5
o-Xylene	0.44	2.4
Tetrachloroethene	0.70	12.7

Sampling Location : RES3-IA02-00-02
Sample Number : C0034

Volatile Compound	RL	Result
Benzene	0.32	1.7
m&p-Xylene	0.88	11.3
o-Xylene	0.44	3.6
Tetrachloroethene	0.70	4.4

Sampling Location : RES3-SS01-00-02
Sample Number : C0035

Volatile Compound	RL	Result
Benzene	0.32	0.97
Chloroform	0.50	8.2
Tetrachloroethene	0.70	2.4
Trichloroethene	0.55	1.4

Sampling Location : RES3-IA01-00-02
Sample Number : C0032

Volatile Compound	RL	Result
Benzene	0.32	1.2
m&p-Xylene	0.88	13.2
o-Xylene	0.44	4.1
Tetrachloroethene	0.70	3.8

Sampling Location : RES3-IA01-01-02
Sample Number : C0033

Volatile Compound	RL	Result
Benzene	0.32	1.1
m&p-Xylene	0.88	11.9
o-Xylene	0.44	3.7
Tetrachloroethene	0.70	3.4

Sampling Location : RES1-AA01-00-02
Sample Number : C0024

Volatile Compound	RL	Result
Benzene	0.32	1.0
m&p-Xylene	0.88	1.1

Sampling Location : RES1-AA02-00-02
Sample Number : C0025

Volatile Compound	RL	Result
Benzene	0.32	1.1

- Legend**
- Monitor Well Locations
 - Approximate Sample Locations

Notes:

- All Results Presented in ug/m3 = micrograms per cubic meter
- RL = Laboratory Reporting Limit

Data Sources:
Imagery: ESRI Bing Map Service, 2010

Coordinate System:
GCS WGS 1984

Annandale PCE Site
Annandale, Virginia

Figure 4
Analytical Sample Results
January 2011 Sampling Event

File: \\sfed01\itg\EPA_Region_III\Annandale\mxd\PCE_2011_air_results.mxd, 14-Mar-11 10:25, curtisf

APPENDIX B

PHOTOGRAPHIC DOCUMENTAION LOG



Photographs 1 through 4: Photographs taken looking northeast at sub-slab soil gas sample location RES1-SS01-00-02 located in northeast corner (storage area) of basement at 4605 Randolph Drive. Photographs showing installation of sub-slab sampling equipment and Summa Canister collected on January 25 and 26, 2010. Upper left photograph depicting use of hammer drill and concrete bit for the construction of a sub-slab borehole (shown in upper right photograph). Lower right photograph showing the use of stainless steel tubing and fittings cut to length to allow installation of sampling equipment shown in lower right photograph.

Photograph 5: Photograph taken looking northeast at sample location RES1-IA01-00-02 located in northwest corner of basement (bedroom) at 4605 Randolph Drive. Photograph collected on January 26, 2011.



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Phone: 757-214-6810 • Fax: 757-548-0774

Project Title: **Annandale PCE Site, Annandale, Fairfax County, Virginia**

Photographic Trip Log

Technical Direction Document No:

WS01-10-10-005

Date:

3/14/2011

Pages:

1 of 5



Photograph 6: Photograph taken looking north at sample location RES1-IA02-00-02 located in north central location (living room area) of main level at 4605 Randolph Drive. Photograph collected on January 26, 2011.



Photograph 7: Photograph taken looking west at sample location RES1-AA01-00-02 located along north and east property lines along fence and west of drainage in rear of house approximately 3 feet from ground at 4605 Randolph Drive. Photograph collected on January 25, 2011.



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Photograph 8: Photograph taken looking northwest at sample location RES1-AA02-00-02 located along south and east property lines along fence west of drainage in rear of house approximately 3.0 feet from ground at 4605 Randolph Drive. Photograph collected on January 25, 2011..



Photograph 9: Photograph taken looking northeast at sample location RES2-IA01-00-02 located in northeast corner (bedroom) of basement at 4609 Randolph Drive. Photograph collected on January 25, 2011.



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Date:

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Pages:

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Photograph 10: Photograph taken looking southwest at sample location RES2-IA02-00-02 located in west location (family room) of main level at 4609 Randolph Drive. Photograph collected on January 25, 2011.



Photograph 11: Photograph taken looking southeast at sample location RES3-IA01-00-02 and duplicate sample RES3-IA01-01-02 located in northeast portion of basement at 4613 Randolph Drive. Photograph collected on January 25, 2011.



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Date:

3/14/2011

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Photograph 12 and 13: Photographs showing the installation of sub-slab soil gas sample RES3-SS01-00-02 (looking east) located in southeast portion of basement at 4613 Randolph Drive. Photographs collected on January 25 and 26, 2011.



Photograph 1: Photograph taken looking southeast at sample location RES3-IA02-00-02 located in east location (dining room area) of main level at 4613 Randolph Drive. Photograph collected on January 26, 2011



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Photographic Trip Log

Technical Direction Document No:

WS01-10-10-005

Date:

3/14/2011

Pages:

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ATTACHMENT A
ANALYTICAL DATA PACKAGE



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : February 14, 2011

SUBJECT: Region III Data QA Review

FROM: Colleen Walling 
Region III ESAT RPO (3EA20)

TO: Charlie Fitzsimmons
Remedial Project Manager (3HS31)

Attached is the organic data validation report for the Annandale PCE (DAS# R33626; SDG#: C0024) completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachment

cc: Craig LaCosse (Weston)

TO: TDF: #01102

OFFICE OF ANALYTICAL SERVICES AND QUALITY ASSURANCE

Lockheed Martin IS&GS – Civil
Energy & Environment
ESAT Region 3
US EPA Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Telephone 410-305-3037 Facsimile 410-305-3597

DATE: February 14, 2011

SUBJECT: Organic Data Validation (M2 Level)
DAS: R33626
SDG: C0024
Site: Annandale PCE

FROM: Kurt Roby 
Organic Data Reviewer

Mahboobeh Mecanic 
Senior Oversight Chemist

TO: Colleen Walling
ESAT Region 3 Project Officer

OVERVIEW

DAS R33626, Sample Delivery Group (SDG) C0024, consisted of twelve (12) SUMMA air canister samples including one (1) field duplicate pair and one (1) trip blank analyzed for selected volatile organic compounds. All samples were analyzed by Pace Analytical Services Inc. (PACE) according to the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Method TO-15 through the Delivery of Analytical Services (DAS) program.

SUMMARY

Data were validated according to Innovative Approaches for Validation of Organic Data, Level M2 and is assigned the Superfund Data Validation Label S3VM (Stage_3_Validation_Manual). This level of review includes assessment of all Quality Assurance/Quality Control (QA/QC) data and review of chromatograms, but excludes review of raw data and sample spectra. Areas of concern with respect to data usability are listed below.

MINOR PROBLEM

- Recovery for surrogate 1,4-dichlorobenzene-d₄ was outside the lower control limit (<70%) in the analysis for sample C0027. No positive results were reported in this sample. Quantitation limits for all compounds in this sample were qualified “UJ” on the DSFs by the reviewer.

NOTES

- There were no contaminants found in the analysis of the associated blanks in this data set.
- Recovery for surrogate 1,4-dichlorobenzene-d₄ was outside the lower control limit (<70%) in the analysis of the method blank associated with the samples in this case. No data were qualified based on this outlier.
- Results were reported by the laboratory in units of ppbv (volume/unit volume) and ug/M³. Results were reported on the DSFs in both units by the reviewer.
- No compounds were reported below the Reporting Limits (RLs).
- A quantitation limit of 0.1 ppbv was requested for these analyses. The laboratory met this requirement; however, sample quantitation limits are slightly elevated in all samples based on canister initial and final pressures based on sample volume as reported as dilution factors on the DSFs.
- Sample canister pressure should be between -1 and -10” Hg when the samples are returned from the field. The following samples had canister pressures listed below upon laboratory analysis. No action was taken by the reviewer based on these findings.

<u>Sample(s)</u>	<u>Canister pressure</u>
C0024	1
C0027	-27
C0028, C0031, C0035	0

- All Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries and Relative Percent Differences (RPDs) were within control limits.
- Matrix Spike/Matrix Spike Duplicate (MSD/MSD) analyses were not performed by the laboratory. No data were qualified based on this finding.
- Reported results for field duplicate pair samples C0032/C0033 were comparable.

- Tentatively Identified Compounds (TICs) were reviewed during data validation. TIC Form Is for samples in which TICs were identified are included in Appendix E. Compounds identified as common laboratory or blank contaminants were crossed off TIC Form Is by the reviewer.

ATTACHMENTS

Appendix A – Glossary of Data Qualifier Codes
Appendix B – Data Summary Form(s)
Appendix C – Chain of Custody Records
Appendix D – Laboratory Case Narrative
Appendix E – Tentatively Identified Compounds

DCN: R33626_C0024

Appendix A
Glossary of Data Qualifier Codes

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

NO CODE = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unusable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

Q = No analytical result.

Appendix B
Data Summary Forms

DATA SUMMARY FORM: VOLATILES (in PPBV)

Case #: R33626

SDG: C0024

Number of SUMMA air canister samples : 12

Site :

ANNANDALE PCE

Lab. :

PACE

Sample Number :		C0024		C0025		C0026		C0027		C0028	
Sampling Location :		RES1-AA01-00-02		RES1-AA02-00-02		RES1-IA01-00-02		RES1-IA01-02-02		RES1-IA02-00-02	
Laboratory ID:		10148340001		10148340002		10148340003		10148340004		10148340005	
Field QC:								Trip Blank			
Matrix :		Air		Air		Air		Air		Air	
Units :		ppbv		ppbv		ppbv		ppbv		ppbv	
Date Sampled :		1/25/2011		1/25/2011		1/25/2011		1/25/2011		1/25/2011	
Time Sampled :		09:26		09:31		10:57		09:00		11:04	
Dilution Factor :		1.25		1.43		1.43		9.71		1.34	
Volatile Compound	RL	Result	Flag								
1,1-Dichloroethene	0.1									UJ	
Benzene	0.1	0.31		0.34		0.28				UJ	1.6
Chloroform	0.1									UJ	0.50
cis-1,2-Dichloroethene	0.1									UJ	
m&p-Xylene	0.2	0.25								UJ	0.77
o-Xylene	0.1									UJ	
Tetrachloroethene	0.1									UJ	
trans-1,2-Dichloroethene	0.1									UJ	
Trichloroethene	0.1									UJ	
Vinyl Chloride	0.1									UJ	

Sample Number :		C0029		C0030		C0031		C0032		C0033	
Sampling Location :		RES1-SS01-00-02		RES2-IA01-00-02		RES2-IA02-00-02		RES3-IA01-00-02		RES3-IA01-01-02	
Laboratory ID:		10148340006		10148340007		10148340008		10148340009		10148340010	
Field QC:								Dup. of C0033		Dup. of C0032	
Matrix :		Air		Air		Air		Air		Air	
Units :		ppbv		ppbv		ppbv		ppbv		ppbv	
Date Sampled :		1/25/2011		1/25/2011		1/25/2011		1/25/2011		1/25/2011	
Time Sampled :		10:51		11:25		11:35		12:30		12:30	
Dilution Factor :		1.48		1.48		1.34		1.88		1.98	
Volatile Compound	RL	Result	Flag								
1,1-Dichloroethene	0.1										
Benzene	0.1	1.69		0.80		1.29		0.37		0.34	
Chloroform	0.1			0.81		1.31					
cis-1,2-Dichloroethene	0.1										
m&p-Xylene	0.2	0.84		1.29		1.47		2.99		2.7	
o-Xylene	0.1			0.52		0.54		0.93		0.84	
Tetrachloroethene	0.1	0.36		0.62		1.84		0.55		0.49	
trans-1,2-Dichloroethene	0.1										
Trichloroethene	0.1										
Vinyl Chloride	0.1										

RL = Reporting Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits multiply the RL by the Dilution Factor

DATA SUMMARY FORM: VOLATILES (in PPBV)

Case #: R33626 SDG: C0024
 Site : ANNANDALE PCE
 Lab. : PACE

Sample Number :		C0034	C0035								
Sampling Location :		RES3-IA02-00-02	RES3-SS01-00-02								
Laboratory ID:		10148340011	10148340012								
Matrix :		Air	Air								
Units :		ppbv									
Date Sampled :		1/25/2011	1/25/2011								
Time Sampled :		12:36	12:58								
Dilution Factor :		1.66	1.34								
Volatile Compound	RL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1-Dichloroethene	0.1										
Benzene	0.1	0.52		0.30							
Chloroform	0.1			1.65							
cis-1,2-Dichloroethene	0.1										
m&p-Xylene	0.2	2.56									
o-Xylene	0.1	0.82									
Tetrachloroethene	0.1	0.64		0.35							
trans-1,2-Dichloroethene	0.1										
Trichloroethene	0.1			0.26							
Vinyl Chloride	0.1										

RL = Reporting Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits multiply the RL by the Dilution Factor

DATA SUMMARY FORM: VOLATILES (ug/M3)

Case #: R33626

SDG: C0024

Number of SUMMA air canister samples : 12

Site :

ANNANDALE PCE

Lab. :

PACE

Sample Number :		C0024		C0025		C0026		C0027		C0028	
Sampling Location :		RES1-AA01-00-02		RES1-AA02-00-02		RES1-IA01-00-02		RES1-IA01-02-02		RES1-IA02-00-02	
Laboratory ID:		10148340001		10148340002		10148340003		10148340004		10148340005	
Field QC:								Trip Blank			
Matrix :		Air									
Units :		ug/M3									
Date Sampled :		1/25/2011		1/25/2011		1/25/2011		1/25/2011		1/25/2011	
Time Sampled :		09:26		09:31		10:57		09:00		11:04	
Dilution Factor :		1.25		1.43		1.43		9.71		1.34	
Volatile Compound	RL	Result	Flag								
1,1-Dichloroethene	0.40								UJ		
Benzene	0.32	1.0		1.1		0.92			UJ	5.2	
Chloroform	0.50								UJ	2.5	
cis-1,2-Dichloroethene	0.40								UJ		
m&p-Xylene	0.88	1.1							UJ	3.4	
o-Xylene	0.44								UJ		
Tetrachloroethene	0.70								UJ		
trans-1,2-Dichloroethene	0.40								UJ		
Trichloroethene	0.55								UJ		
Vinyl Chloride	0.26								UJ		

Sample Number :		C0029		C0030		C0031		C0032		C0033	
Sampling Location :		RES1-SS01-00-02		RES2-IA01-00-02		RES2-IA02-00-02		RES3-IA01-00-02		RES3-IA01-01-02	
Laboratory ID:		10148340006		10148340007		10148340008		10148340009		10148340010	
Field QC:								Dup. of C0033		Dup. of C0032	
Matrix :		Air									
Units :		ug/M3									
Date Sampled :		1/25/2011		1/25/2011		1/25/2011		1/25/2011		1/25/2011	
Time Sampled :		10:51		11:25		11:35		12:30		12:30	
Dilution Factor :		1.48		1.48		1.34		1.88		1.98	
Volatile Compound	RL	Result	Flag								
1,1-Dichloroethene	0.40										
Benzene	0.32	5.5		2.6		4.2		1.2		1.1	
Chloroform	0.50			4.0		6.5					
cis-1,2-Dichloroethene	0.40										
m&p-Xylene	0.88	3.7		5.7		6.5		13.2		11.9	
o-Xylene	0.44			2.3		2.4		4.1		3.7	
Tetrachloroethene	0.70	2.5		4.3		12.7		3.8		3.4	
trans-1,2-Dichloroethene	0.40										
Trichloroethene	0.55										
Vinyl Chloride	0.26										

RL = Reporting Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits multiply the RL by the Dilution Factor

DATA SUMMARY FORM: VOLATILES (ug/M3)

Case #: R33626 SDG: C0024
 Site : ANNANDALE PCE
 Lab. : PACE

Sample Number :		C0034		C0035							
Sampling Location :		RES3-IA02-00-02		RES3-SS01-00-02							
Laboratory ID:		10148340011		10148340012							
Matrix :		Air		Air							
Units :		ug/M3		ug/M3							
Date Sampled :		1/25/2011		1/25/2011							
Time Sampled :		12:36		12:58							
Dilution Factor :		1.66		1.34							
Volatile Compound	RL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1-Dichloroethene	0.40										
Benzene	0.32	1.7		0.97							
Chloroform	0.50			8.2							
cis-1,2-Dichloroethene	0.40										
m&p-Xylene	0.88	11.3									
o-Xylene	0.44	3.6									
Tetrachloroethene	0.70	4.4		2.4							
trans-1,2-Dichloroethene	0.40										
Trichloroethene	0.55			1.4							
Vinyl Chloride	0.26										

RL = Reporting Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits multiply the RL by the Dilution Factor

Appendix C
Chain of Custody Records



USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No:
DAS No:

R33626

R

Region: 3		Date Shipped: 1/26/2011	
Project Code:		Carrier Name: FedEx	
Account Code:		Airbill: 871087441442	
CERCLIS ID:		Shipped to: Pace Analytical	
Spill ID: A3QY		1700 Elm Street	
Site Name/State: Annandale PCEVA		Minneapolis MN 55414	
Project Leader: Craig LaCrosse		(612) 607-6386	
Action: Screening Site Investigation			
Sampling Co: Weston Solutions, Inc.			

Chain of Custody Record		
Relinquished By	(Date / Time)	Sampler Signature
1		
2		
3		
4		

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No.	QC Type
C0024	Ambient Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	282 (Not preserved) (3)	RES1-AA01-00-02	S: 1/25/2011 9:26		-
C0025	Ambient Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	283 (Not preserved) (3)	RES1-AA02-00-02	S: 1/25/2011 9:31		-
C0026	Indoor Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	284 (Not preserved) (3)	RES1-IA01-00-02	S: 1/25/2011 10:57		-
C0027	Indoor Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	285 (Not preserved) (3)	RES1-IA01-02-02	S: 1/25/2011 9:00		Trip Blank
C0028	Indoor Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	286 (Not preserved) (3)	RES1-IA02-00-02	S: 1/25/2011 11:04		-
C0029	Indoor Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	287 (Not preserved) (3)	RES1-SS01-00-02	S: 1/25/2011 10:51		-
C0030	Indoor Air/ Craig LaCrosse	L/G	1,1 DCE (14), Benz (14), ChIF (14), PCE (14), TCE (14), VC (14), Xyl (14)	288 (Not preserved) (3)	RES2-IA01-00-02	S: 1/25/2011 11:25		-

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment iced? _____
1,1 DCE = 1,1-dichloroethane, Benz = Benzene, ChIF = Chloroform, PCE = tetrachloroethane, TCE = trichloroethane, VC = vinyl chloride, Xyl = Xylenes			

TR Number: 3-231393613-012711-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 15000 Conference Center Dr., Chantilly, VA. 20151-3819 Phone 703/818-4200; Fax 703/818-4602

REGION COPY



USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: R33626
DAS No: R

Region: 3	Date Shipped: 1/26/2011	Chain of Custody Record	
Project Code:	Carrier Name: FedEx	Relinquished By	Sampler Signature:
Account Code:	Airbill: 871087441442	(Date / Time)	Received By (Date / Time)
CERCLIS ID:	Shipped to: Pace Analytical 1700 Elm Street Minneapolis MN 55414 (612) 607-6386	1	
Spill ID: A3QY		2	
Site Name/State: Annandale PCEVA		3	
Project Leader: Craig LaCosse		4	
Action: Screening Site Investigation			
Sampling Co: Weston Solutions, Inc.			

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No.	QC Type
C0031	Indoor Air/ Craig LaCosse	L/G	1,1 DCE (14), Benz (14), ChlF (14), PCE (14), TCE (14), VC (14), Xyl (14)	289 (Not preserved) (3)	RES2-IA02-00-02	S: 1/25/2011 11:35		
C0032	Indoor Air/ Craig LaCosse	L/G	1,1 DCE (14), Benz (14), ChlF (14), PCE (14), TCE (14), VC (14), Xyl (14)	290 (Not preserved) (3)	RES3-IA01-00-02	S: 1/25/2011 12:30		
C0033	Indoor Air/ Craig LaCosse	L/G	1,1 DCE (14), Benz (14), ChlF (14), PCE (14), TCE (14), VC (14), Xyl (14)	291 (Not preserved) (3)	RES3-IA01-01-02	S: 1/25/2011 12:30		Field Duplicate
C0034	Indoor Air/ Craig LaCosse	L/G	1,1 DCE (14), Benz (14), ChlF (14), PCE (14), TCE (14), VC (14), Xyl (14)	292 (Not preserved) (3)	RES3-IA02-00-02	S: 1/25/2011 12:36		
C0035	Indoor Air/ Craig LaCosse	L/G	1,1 DCE (14), Benz (14), ChlF (14), PCE (14), TCE (14), VC (14), Xyl (14)	293 (Not preserved) (3)	RES3-SS01-00-02	S: 1/25/2011 12:58		

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: 1,1 DCE = 1,1-dichloroethene, Benz = Benzene, ChlF = Chloroform, PCE = Tetrachloroethene, TCE = Trichloroethene, VC = vinyl chloride, Xyl = Xylenes	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced?

TR Number: 3-231393613-012711-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, 15000 Conference Center Dr., Chantilly, VA. 20151-3819 Phone 703/818-4200; Fax 703/818-4602

REGION COPY

U.S EPA Region III Analytical Request Form

9/5/12-22-10

OASQA USE ONLY	
Control #	CT5280
DAS#	R33626
PES #	
	Analytical TAT
	14 DAYS

Date: 21 December 2010		Site Activity: Removal Site Assessments	
Site Name: Annandale PCE Site			
City: Annandale		Street Address: 6701 Little River Turnpike	
State: VA		Latitude:	
Program: SUPERFUND		Acct. #: 2011 T03 N 302DC6C A3QY RS 00	
Site ID: A3QY		CERCLIS #: VAN000306725	
Spill ID:		Operable Unit: 00	
Site Specific QA Plan Submitted: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		Title: Abbreviated Sampling Plan Indoor Air and Sub-Slab Soil Gas Sampling For The Annandale PCE Site	
Date Approved: 21 December 2010		Date Approved: 21 December 2010	
EPA Project Leader: Charlie Fitzsimmons		Cell Phone #: 443.223.9774	
Request Preparer: Christina Schauss		E-mail: Fitzsimmons.Charlie@epamail.epa.gov	
Site Leader: CRAIG LACOSSE		Cell Phone #: 443-564-6609	
Contractor: Weston Solutions, Inc.		E-mail: Christina.Schauss@WestonSolutions.com	
EPA CO/PO: John Robb/Karen Wodarczyk		Cell Phone #: 414-406-1673	
#Samples 12 (9 samples, 2 ambient air, 1 trip blank)		EPA CO/PO: John Robb/Karen Wodarczyk	
Matrix: Air		Parameter: chloroform, benzene, xylenes, cis-1,2-DCE, trans-1,2-DCE, TCE, PCE, 1,1 DCE, and VC	
Method: TO-15		33265	
Ship Date From: 11 January 2011	Ship Date To: 12 January 2011	Org. Validation Level M2	Inorg. Validation Level
Unvalidated Data Requested: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	If Yes, TAT Needed: <input checked="" type="checkbox"/> 14days <input type="checkbox"/> 7days <input type="checkbox"/> 48hrs <input type="checkbox"/> 24hrs <input type="checkbox"/> Other (Specify)		
Validated Data Package Due: <input type="checkbox"/> 42 days <input type="checkbox"/> 30 days <input checked="" type="checkbox"/> 21days <input type="checkbox"/> 14 days <input type="checkbox"/> Other (Specify)			
Electronic Data Deliverables Required: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (EDDs will be provided in Region 3 EDD Format)			
Special Instructions: Laboratory must provide twelve (12) 6-L Summa Canisters with a regulator/gauge and 24-hour flow restrictors, and one T splitter (for co-located sample) to EPA FOSC Charlie Fitzsimmons at the Environmental Science Center-3HS31 located at 701 Mapes Rd., Ft. Meade, Md 20755, phone 410.305.3027 by January 10, 2010.			
Please have the laboratory supply a certificate of cleanliness for each canister. Please have the laboratory provide the initial and final canister pressure as recorded by the laboratory prior to shipment and prior to analysis by the lab, respectively in the laboratory report. Provide this information with the validation report.			
Please report sample results in ppbv and ug/m3. Required detection limit is 0.1 ppbv for all compounds (see attached).			

Revision

FORM ARF- 11/09

Method EPA TO-15 Detection Limits Needed (Units in ppbv)		
Volatile Compound	CAS Number	DL/RL
Chloroform	67663	0.1
benzene	71432	0.1
xylenes	1330207	0.1
trans-1,2-Dichloroethene	156605	0.1
cis-1,2-Dichloroethene	156592	0.1
Trichloroethene	79016	0.1
Tetrachloroethene	127184	0.1
1,1-dichloroethene	75354	0.1
Vinyl chloride	75014	0.1

Appendix D
Laboratory Case Narrative



Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

February 03, 2011

Mr. John Kwedar
EPA Region 3
Office of Analytical Svcs & QA
701 Mapes Road
Fort Mead, MD 20755

RE: Project: R33626
Pace Project No.: 10148340

Dear Mr. Kwedar:

Enclosed are the analytical results for sample(s) received by the laboratory on January 28, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Scott Unze

scott.unze@pacelabs.com
Project Manager

Enclosures

cc: Annette Lage, EPA Region 3

REPORT OF LABORATORY ANALYSIS

Page 1 of 19

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10148340



Page 1 of 756

SAMPLE SUMMARY

Project: R33626
Pace Project No.: 10148340

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10148340001	C0024	Air	01/25/11 09:26	01/28/11 10:00
10148340002	C0025	Air	01/25/11 09:31	01/28/11 10:00
10148340003	C0026	Air	01/25/11 10:57	01/28/11 10:00
10148340004	C0027	Air	01/25/11 09:00	01/28/11 10:00
10148340005	C0028	Air	01/25/11 11:04	01/28/11 10:00
10148340006	C0029	Air	01/25/11 10:51	01/28/11 10:00
10148340007	C0030	Air	01/25/11 11:25	01/28/11 10:00
10148340008	C0031	Air	01/25/11 11:35	01/28/11 10:00
10148340009	C0032	Air	01/25/11 12:30	01/28/11 10:00
10148340010	C0033	Air	01/25/11 12:30	01/28/11 10:00
10148340011	C0034	Air	01/25/11 12:36	01/28/11 10:00
10148340012	C0035	Air	01/25/11 12:58	01/28/11 10:00

REPORT OF LABORATORY ANALYSIS

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Appendix E
Tentatively Identified Compounds (TICs)

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
Lab Smp Id: 10148340001
Operator : DR1
Sample Location:
Sample Matrix: AIR
Analysis Type: VOA
Inj Date: 01-FEB-2011 18:46

Client SDG: 020111.b
Sample Date:
Sample Point:
Date Received:
Level: LOW

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	25.9	J
2.	Unknown	3.638	2.00	J
3.	Unknown	4.491	3.86	J
4. 1072-85-1	Benzene, 1-bromo-2-fluoro-	12.676	12.7	NJ

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
Lab Smp Id: 10148340002
Operator : DR1
Sample Location:
Sample Matrix: AIR
Analysis Type: VOA
Inj Date: 01-FEB-2011 19:44

Client SDG: 020111.b
Sample Date:
Sample Point:
Date Received:
Level: LOW

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.490	27.2	J
2.	Unknown	3.644	1.57	J
3.	Unknown	3.933	1.47	J
4. 67-64-1	Acetone	4.504	1.72	NJ
5. 1073-06-9	Benzene, 1-bromo-3-fluoro	12.676	14.0	NJ

TB

DV
2/11/11

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340003
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 20:41

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.484	38.1	J
2.	Unknown	3.628	3.72	J
3. 75-28-5	Isobutane	3.795	15.7	NJ
4.	Unknown	3.871	2.61	J
5.	Unknown	3.930	17.2	J
6. 64-17-5	Ethanol	4.222	9.52	NJ
7. 67-64-1	Acetone	4.487	14.6	NJ
8. 75-09-2	Methylene Chloride	4.907	31.2	NJ
9. 110-54-3	Hexane	5.714	16.0	NJ
10. 110-82-7	Cyclohexane	6.271	2.17	NJ
11. 592-13-2	Hexane, 2,5-dimethyl-	8.104	4.84	NJ
12.	Unknown	8.167	4.30	J
13. 564-02-3	Pentane, 2,2,3-trimethyl-	8.262	3.11	NJ
14. 589-53-7	Heptane, 4-methyl-	8.606	28.6	NJ
15. 560-21-4	Pentane, 2,3,3-trimethyl-	8.763	37.0	NJ
16. 108-88-3	Toluene	9.049	1.87	NJ
17. 1072-85-1	Benzene, 1-bromo-2-fluoro-	12.676	14.4	NJ
18.	Unknown	13.653	3.04	J
19. 5989-27-5	D-Limonene	14.958	1.94	NJ
20. 33617-38-8	Benzaldehyde, 2,4-bis(trimethyl-)	16.637	4.76	NJ

TB
TB

DV
2/11/11

Data File: \\192.168.10.12\chem\10air0.i\020111.b\03228.D
Report Date: 02-Feb-2011 06:38

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
Lab Smp Id: 10148340004
Operator : DR1
Sample Location:
Sample Matrix: AIR
Analysis Type: VOA
Inj Date: 01-FEB-2011 21:10

Client SDG: 020111.b
Sample Date:
Sample Point:
Date Received:
Level: LOW

Trip Blank

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.484	156	J
2. 75-09-2	Methylene Chloride	4.907	18.4	NJ
3. 1073-06-9	Benzene, 1-bromo-3-fluoro-	12.676	91.1	NJ

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340005
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 21:38

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 13

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	44.6	J
2. 75-71-8	Dichlorodifluoromethane	3.657	1.42	NJ
3.	Unknown	3.877	2.22	J
4.	Unknown	3.926	1.55	J
5. 64-17-5	Ethanol	4.225	9.17	NJ
6.	Unknown	4.359	2.77	J
7. 67-63-0	Isopropyl Alcohol	4.540	18.1	NJ
8. 75-09-2	Methylene Chloride	4.910	6.83	NJ
9. 107-83-5	Pentane, 2-methyl-	5.291	1.89	NJ
10.	Unknown	5.717	4.23	J
11. 544-25-2	1,3,5-Cycloheptatriene	9.045	1.53	NJ
12. 1072-85-1	Benzene, 1-bromo-2-fluoro-	12.675	13.2	NJ
13. 556-67-2	Cyclotetrasiloxane, octamet	13.656	1.49	NJ

TB

DU
 2/11/11

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340006
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 22:07

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	86.9	J
2.	Unknown	3.871	10.9	J
3. 67-64-1	Acetone	4.484	29.3	NJ
4. 107-83-5	Pentane, 2-methyl-	5.294	4.95	NJ
5.	Unknown	5.665	4.32	J
6. 110-54-3	Hexane	5.717	3.24	NJ
7.	Unknown	6.268	2.95	J
8. 589-34-4	Hexane, 3-methyl-	7.012	3.28	NJ
9. 540-84-1	Pentane, 2,2,4-trimethyl-	7.291	8.82	NJ
10.	Unknown	8.101	3.94	J
11. 565-75-3	Pentane, 2,3,4-trimethyl-	8.600	4.04	NJ
12.	Unknown	8.760	2.77	J
13. 105-54-4	Butanoic acid, ethyl ester	9.521	7.40	NJ
14. 105-66-8	Butanoic acid, propyl ester	11.718	7.66	NJ
15. 1073-06-9	Benzene, 1-bromo-3-fluoro	12.676	17.2	NJ
16. 108-83-8	4-Heptanone, 2,6-dimethyl-	13.463	4.46	NJ
17.	Unknown	13.656	6.32	J
18. 109-21-7	Butanoic acid, butyl ester	13.899	4.67	NJ
19. 123-66-0	Hexanoic acid, ethyl ester	13.961	4.82	NJ
20. 99-87-6	Benzene, 1-methyl-4-(1-meth	14.843	2.73	NJ

FB

DV
 2/11/11

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340007
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 22:36

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 19

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	45.8	J
2.	Unknown	3.638	4.56	J
3. 115-10-6	Dimethyl ether	3.743	16.2	NJ
4.	Unknown	3.795	10.3	J
5.	Unknown	3.867	3.10	J
6.	Unknown	3.930	3.08	J
7. 64-17-5	Ethanol	4.228	35.2	NJ
8.	Unknown	4.356	3.31	J
9. 67-63-0	Isopropyl Alcohol	4.546	25.2	NJ
10. 107-83-5	Pentane, 2-methyl-	5.287	1.63	NJ
11.	Unknown	6.268	2.04	J
12. 71-36-3	1-Butanol	6.737	3.42	NJ
13. 108-88-3	Toluene	9.049	4.24	NJ
14. 123-86-4	Acetic acid, butyl ester	9.816	3.15	NJ
15. 1073-06-9	Benzene, 1-bromo-3-fluoro-	12.676	14.0	NJ
16.	Unknown	12.974	1.82	J
17. 95-63-6	Benzene, 1,2,4-trimethyl-	13.486	1.59	NJ
18.	Unknown	13.653	9.88	J
19. 138-86-3	Limonene	14.961	3.56	NJ

TB

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340008
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 23:04

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	36.4	J
2.	Unknown	3.638	4.43	J
3. 115-10-6	Dimethyl ether.	3.739	32.8	NJ
4.	Unknown	3.795	8.93	J
5.	Unknown	3.871	3.68	J
6.	Unknown	3.930	3.80	J
7. 64-17-5	Ethanol	4.235	38.1	NJ
8.	Unknown	4.356	4.63	J
9. 67-63-0	Isopropyl Alcohol	4.556	49.5	NJ
10. 78-79-5	1,3-Butadiene, 2-methyl-	4.648	2.60	NJ
11. 75-09-2	Methylene Chloride	4.910	2.40	NJ
12. 107-83-5	Pentane, 2-methyl-	5.291	3.44	NJ
13. 594-82-1	Butane, 2,2,3,3-tetramethyl	7.288	3.41	NJ
14. 108-88-3	Toluene	9.045	6.52	NJ
15. 541-05-9	Cyclotrisiloxane, hexamethy	9.859	14.1	NJ
16. 1073-06-9	Benzene, 1-bromo-3-fluoro	12.676	13.3	NJ
17. 620-14-4	Benzene, 1-ethyl-3-methyl-	13.486	2.02	NJ
18. 556-67-2	Cyclotetrasiloxane, octamet	13.653	6.89	NJ
19. 138-86-3	Limonene	14.958	3.68	NJ
20.	Unknown	16.637	7.25	J

AV
 2/11/11

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340009
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 01-FEB-2011 23:33

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.484	35.4	J
2. 111-84-2	Nonane	11.869	142	NJ
3. 4923-78-8	Cyclohexane, 1-ethyl-2-meth	12.331	77.2	NJ
4.	Unknown	12.669	102	J
5. 13395-76-1	Cyclohexanone, 2,3-dimethyl	12.840	125	NJ
6. 7058-05-1	Cyclohexane, 1-ethyl-2,3-di	13.013	31.7	NJ
7.	Unknown	13.154	37.3	J
8.	Unknown	13.269	63.1	J
9.	Unknown	13.381	29.2	J
10.	Unknown	13.492	35.6	J
11.	Unknown	13.568	49.8	J
12.	Unknown	13.807	33.8	J
13.	Unknown	13.909	36.4	J
14. 589-90-2	Cyclohexane, 1,4-dimethyl-	14.001	74.0	NJ
15. 124-18-5	Decane	14.096	116	NJ
16.	Unknown	14.351	46.2	J
17. 2847-72-5	Decane, 4-methyl-	14.581	50.6	NJ
18.	Unknown	14.948	48.2	J
19. 1678-93-9	Cyclohexane, butyl-	15.037	38.9	NJ
20. 1120-21-4	Undecane	16.011	35.2	NJ

T3

DJ
 2/11/11

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340010
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 02-FEB-2011 08:11

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20

CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	42.7	J
2. 111-84-2	Nonane	11.862	130	NJ
3. 3728-54-9	Cyclohexane, 1-ethyl-2-meth	12.331	69.6	NJ
4. 2051-30-1	Octane, 2,6-dimethyl-	12.669	96.2	NJ
5. 13395-76-1	Cyclohexanone, 2,3-dimethyl	12.836	114	NJ
6. 7058-05-1	Cyclohexane, 1-ethyl-2,3-di	13.010	28.1	NJ
7.	Unknown	13.154	33.2	J
8.	Unknown	13.269	57.7	J
9.	Unknown	13.489	35.4	J
10.	Unknown	13.564	43.4	J
11. 6069-98-3	Cyclohexane, 1-methyl-4-(1-	13.807	31.8	NJ
12.	Unknown	13.905	32.2	J
13. 4291-79-6	Cyclohexane, 1-methyl-2-pro	13.994	66.5	NJ
14. 124-18-5	Decane	14.089	106	NJ
15.	Unknown	14.348	40.8	J
16. 17302-28-2	Nonane, 2,6-dimethyl-	14.578	32.4	NJ
17.	Unknown	14.938	44.3	J
18. 1678-93-9	Cyclohexane, butyl-	15.033	36.5	NJ
19. 493-02-7	Naphthalene, decahydro-, tr	15.742	26.2	NJ
20. 1120-21-4	Undecane	16.007	33.2	NJ

Pace Analytical Services, Inc.

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name:
 Lab Smp Id: 10148340011
 Operator : DR1
 Sample Location:
 Sample Matrix: AIR
 Analysis Type: VOA
 Inj Date: 02-FEB-2011 00:31

Client SDG: 020111.b
 Sample Date:
 Sample Point:
 Date Received:
 Level: LOW

Number TICs found: 20
 CONCENTRATION UNITS:
 (ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.490	64.1	J
2. 111-84-2	Nonane	11.866	116	NJ
3. 4923-78-8	Cyclohexane, 1-ethyl-2-meth	12.331	61.3	NJ
4.	Unknown	12.669	75.4	J
5. 13395-76-1	Cyclohexanone, 2,3-dimethyl	12.839	90.9	NJ
6. 7058-05-1	Cyclohexane, 1-ethyl-2,3-di	13.017	21.6	NJ
7.	Unknown	13.158	24.3	J
8. 17301-94-9	Nonane, 4-methyl-	13.269	42.2	NJ
9.	Unknown	13.489	24.2	J
10.	Unknown	13.564	33.3	J
11.	Unknown	13.686	299	J
12. 589-90-2	Cyclohexane, 1,4-dimethyl-	13.997	46.7	NJ
13. 124-18-5	Decane	14.099	81.3	NJ
14.	Unknown	14.355	23.5	J
15. 2847-72-5	Decane, 4-methyl-	14.584	28.3	NJ
16.	Unknown	14.948	23.1	J
17. 1678-93-9	Cyclohexane, butyl-	15.037	22.2	NJ
18. 493-02-7	Naphthalene, decahydro-, tr	15.745	19.4	NJ
19. 1120-21-4	Undecane	16.011	22.8	NJ
20.	Unknown	16.640	23.5	J

Data File: \\192.168.10.12\chem\10air0.i\020111.b\03250.D
Report Date: 02-Feb-2011 11:45

Pace Analytical Services

TENTATIVELY IDENTIFIED COMPOUNDS

Client Name: Client SDG: 020111.b
Lab Smp Id: 10148340012
Operator : DR1 Sample Date:
Sample Location: Sample Point:
Sample Matrix: AIR Date Received:
Analysis Type: VOA Level: LOW
Inj Date: 02-FEB-2011 07:42

Number TICs found: 13

CONCENTRATION UNITS:
(ug/L or ug/KG) ppbv

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	3.487	9.08	J
2.	Unknown	3.628	2.66	J
3.	Unknown	3.887	3.92	J
4. 67-64-1	Acetone	4.491	5.89	NJ
5. 1066-40-6	Silanol, trimethyl-	5.219	1.51	NJ
6. 110-54-3	Hexane	5.710	2.21	NJ
7. 108-88-3	Toluene	9.042	1.78	NJ
8.	Unknown	9.580	2.41	J
9. 541-05-9	Cyclotrisiloxane, hexamethy	9.862	5.75	NJ
10. 1073-06-9	Benzene, 1-bromo 3-fluoro-	12.676	12.8	NJ
11.	Unknown	12.869	2.18	J
12. 5877-42-9	1-Octyn-3-ol, 4-ethyl-	13.141	1.79	NJ
13. 556-67-2	Cyclotetrasiloxane, octamet	13.656	2.22	NJ

TS