Geosyntec consultants

289 Great Road, Suite 105
Acton, Massachusetts 01720
PH 978.263.9588
FAX 978.263.9594
www.geosyntec.com

Memorandum

Date:	26 April 2011
To:	Joseph Lemay, United States Environmental Protection Agency
Copies to:	Clayton Smith, de maximis, inc.
From:	Todd Creamer, Geosyntec Consultants, Inc.
Subject:	Validated Results of Winter 2011 Residential Sampling Event Wells G&H Superfund Site, Woburn, Massachusetts Alpha Analytical Laboratory Report: L1103698

This memorandum is a transmittal for validated data and associated information for the subject sampling event. Specifically, the attached information includes the Tier IV data validation report for eleven air samples, two field duplicate samples, and one trip blank collected on 17 and 18 March 2011, sampling locations specified on attached Figures 1 and 2, field forms generated during the sampling event, and a tabulated summary of household chemicals observed during the building surveys prior to sampling. Raw, unvalidated data for this residential sampling event were transmitted to the USEPA via email on 05 April 2011.

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SDMS Doc ID 519340

Geosyntec consultants

2240 Sutherland Avenue, Suite 107
Knoxville, TN 37919
PH 865.330.0037
FAX 865.330.9949
www.geosyntec.com

Memorandum

Date: 25 April 2011

To: Todd Creamer

From: Mary Tyler

Copies to: Julia Caprio

Subject: Tier IV Data Validation Alpha Analytical Lab Number L1103698
Wells G&H Superfund Site, Woburn, Massachusetts

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1. INTRODUCTION AND SUMMARY

This report summarizes the findings of a Tier IV data validation for eleven air samples, two field duplicate samples, and one trip blank collected on 17 and 18 March 2011. These samples were collected as part of the Wells G&H Superfund Site Vapor Intrusion Assessment. Air samples were analyzed by Alpha Analytical (Mansfield, Massachusetts) using the following methods:

- EPA Modified Method TO-15 using Selected Ion Monitoring (SIM) - Volatile Organic Compounds (VOCs); and
- Massachusetts DEP Method APH – Air-Phase Petroleum Hydrocarbons (APH)

All samples collected on 17 and 18 March, once received by the lab, were handled, prepared, and measured in the same manner under similar prescribed conditions.

Data for organic compounds were reviewed based on guidance specified in the project-specific Quality Assurance Project Plan (QAPP) in Form F which lists the USEPA Region 2 Guidance document entitled USEPA Hazardous Water Support Branch: Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15 (SOP#HW-31, Revision #4, October 2006). Data for organic compounds were also reviewed based on the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed and validated at a Tier IV level in the data set:

Lab ID	Client ID
L1103698-01	260902-OA
L1103698-02	260902-IA1
L1103698-03	260902-IA2
L1103698-04	260902-IA3
L1103698-05	260903-OA
L1103698-06	260903-IA1
L1103698-07	260903-IA2
L1103698-08	BD01-03182011
L1103698-09	260902-SS1
L1103698-10	260902-SS2
L1103698-11	260903-SS1
L1103698-12	260903-SS2
L1103698-13	BD02-03182011
L1103698-14	TB01-03182011

The conclusion from the Tier IV data validation presented herein and covering the QC parameters listed below, is that the data, as qualified, are usable for meeting the project objectives documented in Form D of the QAPP.

2. VOLATILE ORGANIC COMPOUND ANALYSIS (VOCS)

Eleven air samples, two field duplicate samples and one trip blank sample were analyzed for VOCs per EPA modified Method TO-15, using SIM.

Components of the laboratory data package that were reviewed during this Tier IV data validation are listed below. A check mark (✓) indicates components of the data package that are acceptable. A crossed circle (⊗) signifies components of the data package where issues were raised during the course of the validation review and these issues should be considered to determine whether they have an impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ⊗ Continuing Calibration Verification
- ⊗ Method Blanks
- ✓ Laboratory Control Sample
- ✓ Laboratory Duplicate
- ✓ Trip Blank
- ⊗ Field Duplicate

- ✓ Internal Standards
- ✓ Target Compound Identifications
- ⊗ Target Compound Quantitations
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting the project objectives documented in Form D of the QAPP. The results are considered to be valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

It was noted that for most analytes, reporting limit concentrations were the same as the method detection limit (MDL) concentrations. Review of the reporting limits and MDLs found that the proposed screening levels listed in the QAPP were met.

2.2 Holding Times

The holding time for an air sample collected in a Summa™ canister for TO-15 analysis is 30 days from sample collection. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed by Alpha Analytical. All calibration standards, the air samples and QC samples were analyzed within 24-hours after analyzing the tune standard. All ion abundance criteria were met for the tune standard, bromofluorobenzene (BFB).

2.4 Initial Calibration

Appropriate initial calibrations were performed and documented for each analyte. The laboratory calculated percent relative standard deviations (%RSDs) of the relative response factors (RRFs). The %RSDs met the method criteria of less than or equal to 30%, and the minimum average RRFs were above the method criteria of 0.050.

An initial calibration verification (ICV) standard was analyzed after the initial calibration. The ICV RRFs met the method minimum RRF criteria of 0.050. The percent differences (%Ds) between the RRFs in the initial calibration and the ICV were within the method acceptance criteria of less than or equal to 30%.

2.5 Continuing Calibration Verification (CCV)

The CCV was performed after initial calibration on a daily basis after the BFB tune and prior to the analyses of samples. The CCV RRFs met the method minimum RRF criteria of 0.050. The percent differences (%Ds) between the RRFs in the initial calibration and CCV were within the method acceptance criteria of less than or equal to 30%, with the following exceptions:

- The %D for naphthalene was 35%, with a low bias.
- The only samples qualified due to the low %D in the CCV were 260902-OA, 260903-OA, 260902-SS1 and TB01-03182011.
- The other samples were qualified due to method blank contamination and no additional qualifications were applied to these samples due to the low %D in the CCV.
- The detected concentration of naphthalene in sample 260902-SS1 was J qualified as estimated.
- Naphthalene was not detected at concentrations greater than the MDL in samples 260902-OA, 260903-OA, and TB01-03182011 so these results were UJ qualified as estimated less than the MDL. These qualifications are summarized below.

Sample ID	**Compound**	**Laboratory Concentration (µg/m^3)**	**Validation Concentration (µg/ m^3)**	**EDD Reason Code**
260902-OA	Naphthalene	0.131 U	0.131 UJ	9
260903-OA	Naphthalene	0.131 U	0.131 UJ	9
260902-SS1	Naphthalene	2.38	2.38 J	9
TB01-03182011	Naphthalene	0.131 U	0.131 UJ	9

U-not detected at the reported MDL

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (i.e., one per batch of 20 samples). One method blank was analyzed and reported for the 14 samples. VOCs were not detected in the method blank above the MDLs, with the exception of naphthalene. Naphthalene was detected in the method blank at an estimated concentration of 0.168 µg/m^3, which is greater than the MDL and less than the reporting limit. Therefore, the estimated concentrations greater than the MDL and less than the reporting limit in samples associated with this method blank were U qualified as not detected at the reporting limit. Concentrations less than five times the blank concentration were U qualified as not detected at the reported concentrations. The undetected concentrations of naphthalene in samples 260902-OA, 260903-OA, and TB01-03182011 were not qualified.

Samples qualified based on data for the method blank are summarized below:

Sample ID	**Compound**	**Laboratory Concentration (µg/m^3)**	**Validation Concentration (µg/ m^3)**	**EDD Reason Code**
260902-IA1	Naphthalene	0.723	0.723 U	3
260902-IA2	Naphthalene	0.608	0.608 U	3
260902-IA3	Naphthalene	0.267	0.267 U	3
260903-IA1	Naphthalene	0.173 J	0.262 U	3
260903-IA2	Naphthalene	0.194 J	0.262 U	3

Sample ID	Compound	Laboratory Concentration (µg/m^3)	Validation Concentration (µg/ m^3)	EDD Reason Code
BD01-03182011	Naphthalene	0.571	0.571 U	3
260902-SS2	Naphthalene	0.241 J	0.262 U	3
260903-SS1	Naphthalene	0.246 J	0.262 U	3
260903-SS2	Naphthalene	0.828	0.828 U	3
BD02-03182011	Naphthalene	0.361	0.361 U	3

J- estimated concentration greater than the MDL and less than the reporting limit

2.7 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One laboratory duplicate was analyzed, using sample 260903-SS1. The results for the laboratory duplicate were within the method-specified acceptance criteria for VOCs of 25% D.

2.8 Laboratory Control Sample

One laboratory control sample (LCS) was analyzed for the 14 samples submitted, which is the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). The results for the LCS were within the method-specified acceptance criteria for recovery of 70-130%, with the exception of naphthalene. The recovery of naphthalene was 64% which is below the minimum acceptance criteria of 70%. However, since the associated samples were qualified due to the method blank contamination (see above) and low CCV %D, no additional qualifications were applied to the data.

2.9 Trip Blank

A trip blank, TB01-03182011, accompanied the sample shipment. No VOCs were detected in the trip blank above the MDL.

2.10 Field Duplicate

Two field duplicate samples, BD01-03182011 and BD02-03182011, were collected with the samples. Acceptable precision (RPD $\leq$25%) was demonstrated between each field duplicate and the associated original samples, 260902-IA2 and 260903-SS1, respectively, with the following exceptions:

- 1,2-Dichloroethane and chloroform were detected above the reporting limits in sample 260903-SS1 and not detected above the reporting limit in duplicate BD02-03182011, resulting in a non-calculable and unacceptable RPD between the results.
- Naphthalene was detected at an estimated concentration greater than the MDL and less than the reporting limit in sample 260903-SS1, and detected above the reporting limit in duplicate BD02-03182011, resulting in a non-calculable and unacceptable RPD between the results.

Based on professional judgment, no qualifications were applied to the naphthalene concentrations due to the field duplicate results; the results were qualified as not detected due to the method blank contamination. However, the detected concentrations of 1,2-dichloroethane and chloroform were J qualified as estimated and the undetected concentrations of 1,2-dichloroethane and chloroform were UJ qualified as estimated less than the MDL in duplicate pair 260903-SS1/ BD02-03182011. The calculated RPD of the duplicate pairs and applicable qualifications are summarized below.

Sample ID	**Compound**	**Laboratory Concentration (µg/m3)**	**RPD**	**Validation Concentration (µg/ m3)**	**EDD Reason Code**
260902-IA2	1,2,4-Trimethylbenzene	12.6	1	NA	NA
BD01-03182011	1,2,4-Trimethylbenzene	12.7		NA	NA
260902-IA2	1,2-Dichloroethane	1.44	3	NA	NA
BD01-03182011	1,2-Dichloroethane	1.40		NA	NA
260902-IA2	1,3-Butadiene	0.102	9	NA	NA
BD01-03182011	1,3-Butadiene	0.093		NA	NA
260902-IA2	Benzene	8.78	3	NA	NA
BD01-03182011	Benzene	8.54		NA	NA
260902-IA2	Carbon tetrachloride	0.603	6	NA	NA
BD01-03182011	Carbon tetrachloride	0.566		NA	NA
260902-IA2	Chloroform	0.254	4	NA	NA
BD01-03182011	Chloroform	0.244		NA	NA
260902-IA2	Ethylbenzene	11.7	1	NA	NA
BD01-03182011	Ethylbenzene	11.8		NA	NA
260902-IA2	Naphthalene	0.608	6	NA	NA
BD01-03182011	Naphthalene	0.571		NA	NA
260902-IA2	Tetrachloroethene	0.183	0	NA	NA
BD01-03182011	Tetrachloroethene	0.183		NA	NA
260902-IA2	Toluene	50.7	2	NA	NA
BD01-03182011	Toluene	51.9		NA	NA
260902-IA2	Total Xylene	51.6	1	NA	NA
BD01-03182011	Total Xylene	51.9		NA	NA
260902-IA2	All other VOCs	ND	0	NA	NA
BD01-03182011	All other VOCs	ND		NA	NA
260903-SS1	1,2,4-Trimethylbenzene	0.113	14	NA	NA
BD02-03182011	1,2,4-Trimethylbenzene	0.098		NA	NA
260903-SS1	1,2-Dichloroethane	0.093	NC	0.093 J	7
BD02-03182011	1,2-Dichloroethane	0.081 U		0.081 UJ	7
260903-SS1	1,4-Dichlorobenzene	0.132	10	NA	NA
BD02-03182011	1,4-Dichlorobenzene	0.120		NA	NA
260903-SS1	Chloroform	0.102	NC	0.102 J	7

Sample ID	Compound	Laboratory Concentration (µg/m3)	RPD	Validation Concentration (µg/ m3)	EDD Reason Code
BD02-03182011	Chloroform	0.098 U		0.098 UJ	7
260903-SS1	Naphthalene	0.246 J	NC	NA*	NA
BD02-03182011	Naphthalene	0.361		NA*	NA
260903-SS1	Tetrachloroethene	0.380	3	NA	NA
BD02-03182011	Tetrachloroethene	0.393		NA	NA
260903-SS1	Toluene	0.644	4	NA	NA
BD02-03182011	Toluene	0.621		NA	NA
260903-SS1	Total Xylene	0.295	11	NA	NA
BD02-03182011	Total Xylene	0.265		NA	NA
260903-SS1	All other VOCs	ND	0	NA	NA
BD02-03182011	All other VOCs	ND		NA	NA

U-not detected at the reported MDL
ND-not detected at the MDL
J- estimated concentration greater than the MDL and less than the reporting limit
NC-not calculable
NA-not applicable
*- no additional qualifications applied to the data based on the field duplicate results; results qualified due to method blank contamination

2.11 Internal Standards

The internal standard areas and retention times (RTs) were within method limits of ±40% of the internal standard areas from the most recent calibration and within 0.33 minutes of the retention times for the internal standards from the most recent calibration.

2.12 Target Compound Identifications

The target compound identifications were within the validation criteria.

2.13 Compound Quantitation

The compound quantitations were within the validation criteria with the one sample exception noted below which is a result of field sample collection conditions and not the laboratory analytical system.

Based on measurements collected in the field, there was a helium leak in the probe during collection of sample 260902-SS1 potentially diluting the sub-slab sample with indoor air. The helium concentration in screening samples of sub-slab soil gas collected immediately prior to sample collection was approximately 6% of the average helium in the shroud covering the probe. The sample collection work plan and project specific QAPP specified a maximum helium concentration in the sample equal to 1% of the shroud concentration. Therefore, based on professional judgment, the concentrations of VOCs detected in sample 260902-SS1 were J qualified as estimated. Similarly, analytes that were undetected were UJ qualified as estimated less than the MDLs. These qualifications are summarized below.

Sample ID	Compound	Laboratory Concentration (µg/m3)	Validation Concentration (µg/m3)	EDD Reason Code
260902-SS1	1,1,1-Trichloroethane	0.109 U	0.109 UJ	13
260902-SS1	1,1,2-Trichloroethane	0.109 U	0.109 UJ	13
260902-SS1	1,1-Dichloroethane	0.081 U	0.081 UJ	13
260902-SS1	1,1-Dichloroethene	0.079 U	0.079 UJ	13
260902-SS1	1,2,4-Trimethylbenzene	1.60	1.60 J	13
260902-SS1	1,2-Dibromoethane	0.154 U	0.154 UJ	13
260902-SS1	1,2-Dichloroethane	0.101	0.101 J	13
260902-SS1	1,2-Dichloropropane	0.092 U	0.092 UJ	13
260902-SS1	1,3-Butadiene	0.044 U	0.044 UJ	13
260902-SS1	1,3-Dichlorobenzene	0.18	0.18 J	13
260902-SS1	1,4-Dichlorobenzene	0.198	0.198 J	13
260902-SS1	Benzene	0.744	0.744 J	13
260902-SS1	Bromodichloromethane	0.067 U	0.067 UJ	13
260902-SS1	Bromoform	0.206 U	0.206 UJ	13
260902-SS1	Carbon tetrachloride	0.170	0.170 J	13
260902-SS1	Chlorobenzene	0.092 U	0.092 UJ	13
260902-SS1	Chloroform	0.298	0.298 J	13
260902-SS1	Ethylbenzene	1.42	1.42 J	13
260902-SS1	Isopropylbenzene	2.46 U	2.46 UJ	13
260902-SS1	Methyl tert butyl ether	0.072 U	0.072 UJ	13
260902-SS1	Methylene chloride	1.74 U	1.74 UJ	13
260902-SS1	Naphthalene	2.38	2.38 J	13
260902-SS1	Tetrachloroethene	0.258	0.258 J	13
260902-SS1	Toluene	4.48	4.48 J	13
260902-SS1	Trichloroethene	0.107 U	0.107 UJ	13
260902-SS1	Vinyl chloride	0.051 U	0.051 UJ	13
260902-SS1	Total Xylenes	8.38	8.38	13
260902-SS1	cis-1,2-Dichloroethene	0.079 U	0.079 UJ	13
260902-SS1	trans-1,2-Dichloroethene	0.079 U	0.079 UJ	13
260902-SS1	trans-1,3-Dichloropropene	0.091 U	0.091 UJ	13

U-not detected at the reported MDL

2.14 Electronic Data Deliverables Review

A minimum of 20% of the results and all sample IDs provided in the electronic data deliverable (EDD) were reviewed against information provided in the Level IV report. No discrepancies were identified between the EDD and the Level IV report.

3. AIR PHASE PETROLEUM HYDROCARBONS (APH)

Eleven air samples, two field duplicate samples and one trip blank sample were analyzed for petroleum hydrocarbons per EPA Massachusetts DEP Method APH.

Components of the laboratory data package that were reviewed during this Tier IV data validation are listed below. A check mark (✓) indicates components of the data package that are acceptable. A crossed circle (⊗) signifies components of the data package where issues were raised during the course of the validation review, and these issues should be considered to determine whether they have an impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Laboratory Control Sample
- ⊗ Laboratory Duplicate
- ✓ Trip Blank
- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ⊗ Target Compound Quantitations
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The APH data reported in this package are considered to be usable for meeting the project objectives documented in Form D of the QAPP. The results are considered to be valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

3.2 Holding Times

The holding time for an air sample collected in a Summa™ canister for APH analysis is 30 days from sample collection. The holding times were met for the sample analyses.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed by Alpha Analytical. All calibration standards, the air samples and QC samples were analyzed within 24-hours after analyzing the tune standard. All ion abundance criteria were met for bromofluorobenzene (BFB).

3.4 Initial Calibration

Appropriate initial calibrations were performed and documented for each analyte. The laboratory calculated %RSDs of the RRFs. The %RSDs met the method criteria of less than or equal to 30% for all compounds except naphthalene, which has a %RSD criteria of less than or equal to 40%.

3.5 Continuing Calibration Verification (CCV)

The CCV was performed after initial calibration on a daily basis after the BFB tune and prior to the analysis of samples. The CCV RRFs met the method minimum RRF criteria of 0.050. The %Ds between the RRFs in the initial and CCVs were within the method acceptance criteria of less than or equal to 30%.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (i.e., one per batch of 20 samples). Two method blanks were analyzed and reported for the 14 samples. APH were not detected in the method blanks above the reporting limits.

3.7 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two laboratory duplicates were analyzed, using samples 260902-OA and 260903-SS1. The results for the laboratory duplicates were within the method-specified acceptance criteria for APH analytes of 25%D, with the following exception:

- C9-C12 Aliphatics was detected in sample 260903-SS1 above the reporting limit and not detected in the laboratory duplicate, resulting in a non-calculable and unacceptable RPD between the results. Therefore, the detected concentration C9-C12 Aliphatics in sample 260903-SS1 was J qualified as estimated. This qualification is summarized below:

Sample ID	Compound	Laboratory Concentration (µg/m^3)	Validation Concentration (µg/ m^3)	EDD Reason Code
260903-SS1	C9-C12 Aliphatics	14	14 J	12

3.8 Laboratory Control Sample

Two LCSs were analyzed for the 14 samples submitted to the laboratory, which is the proper frequency for the number and types of samples analyzed (i.e., one per batch of 20 samples). The results for the LCSs were within the method-specified acceptance criteria for recovery of 70-130%, with the following exception:

- The recovery of o-xylene in the LCS for batch WG460890-3 was 131%, which is above the method-specified acceptance criteria of 130%.

Since o-xylene was not detected above the reporting limit in any of the samples associated with the LCS in batch WG460890-3, no qualifications were applied to the data.

3.9 Trip Blank

A trip blank, TB01-03182011, accompanied the sample shipment. No APH were detected in the trip blank above the reporting limits.

3.10 Field Duplicate

Two field duplicate samples, BD01-03182011 and BD02-03182011, were collected with the samples. Acceptable precision (i.e., RPD ≤25%) was demonstrated between the field duplicates and the original samples, 260902-IA2 and 260903-SS1, respectively, with the following exception:

- C9-C12 aliphatics were detected in sample 260903-SS1 above the reporting limit but not detected in the duplicate sample, BD02-03182011. This results in a non-calculable and unacceptable RPD between the original and duplicate samples.

Therefore, the detected concentrations of C9-C12 aliphatics in sample 260903-SS1 were J qualified as estimated and the undetected concentration of C9-C12 aliphatics were UJ qualified as estimated less than the reporting limits in duplicate BD02-03182011. The calculated RPDs of the duplicate pair and applicable qualifications are summarized below:

Sample ID	Compound	Laboratory Concentration (µg/m^3)	RPD	Validation Concentration (µg/ m^3)	EDD Reason Code
260902-IA2	Benzene	9.5	3	NA	NA
BD01-03182011	Benzene	9.8		NA	NA
260902-IA2	C5-C8 Aliphatics, Adjusted	500	2	NA	NA
BD01-03182011	C5-C8 Aliphatics, Adjusted	510		NA	NA
260902-IA2	C9-C10 Aromatics Total	52	10	NA	NA
BD01-03182011	C9-C10 Aromatics Total	47		NA	NA
260902-IA2	C9-C12 Aliphatics, Adjusted	72	4	NA	NA
BD01-03182011	C9-C12 Aliphatics, Adjusted	75		NA	NA
260902-IA2	Ethylbenzene	12	0	NA	NA
BD01-03182011	Ethylbenzene	12		NA	NA
260902-IA2	Toluene	55	5	NA	NA

Sample ID	Compound	Laboratory Concentration (µg/m^3)	RPD	Validation Concentration (µg/ m^3)	EDD Reason Code
BD01-03182011	Toluene	58		NA	NA
260902-IA2	o-Xylene	14	0	NA	NA
BD01-03182011	o-Xylene	14		NA	NA
260902-IA2	p/m-Xylene	38	0	NA	NA
BD01-03182011	p/m-Xylene	38		NA	NA
260902-IA2	All other APH	ND	0	NA	NA
BD01-03182011	All other APH	ND		NA	NA
260903-SS1	C5-C8 Aliphatics, Adjusted	25	15	NA	NA
BD02-03182011	C5-C8 Aliphatics, Adjusted	29		NA	NA
260903-SS1	C9-C12 Aliphatics, Adjusted	14	NC	14 J	7
BD02-03182011	C9-C12 Aliphatics, Adjusted	14 U		14 UJ	7
260903-SS1	All other APH	ND	0	NA	NA
BD02-03182011	All other APH	ND		NA	NA

U - not detected at the indicated reporting limit
ND - not detected at the reporting limit

3.11 Internal Standards

The internal standard areas and retention times (RTs) were within method limits of ±40% of the internal standard areas from the most recent calibration and within 0.33 minutes of the retention times for the internal standards from the most recent calibration.

3.12 Target Compound Identifications

The target compound identifications were within the validation criteria.

3.13 Compound Quantitation

The compound quantitations were within the validation criteria except for the condition noted below which is a result of field sample collection conditions and not the laboratory analytical system.

Based on measurements collected in the field, there was a helium leak in the probe during collection of sample 260902-SS1 potentially diluting the sub-slab sample with indoor air. The

helium concentration in sub-slab soil gas screening samples collected immediately prior to sample collection was approximately 6% of the average helium in the shroud covering the probe. The sample collection work plan and project specific QAPP specify a maximum helium concentration in the sample equal to 1% of the shroud concentration. Therefore, based on professional judgment, the concentrations of APH detected in sample 260902-SS1 were J qualified as estimated. Undetected concentrations were UJ qualified as estimated less than the reporting limits. A summary of the qualified data are below:

Sample ID	**Compound**	**Laboratory Concentration (µg/m3)**	**Validation Concentration (µg/ m3)**	**EDD Reason Code**
260902-SS1	1,3-Butadiene	2.0 U	2.0 UJ	13
260902-SS1	Benzene	2.0 U	2.0 UJ	13
260902-SS1	C5-C8 Aliphatics, Adjusted	67	67 J	13
260902-SS1	C9-C10 Aromatics Total	10 U	10 UJ	13
260902-SS1	C9-C12 Aliphatics, Adjusted	130	130 J	13
260902-SS1	Ethylbenzene	2.0 U	2.0 UJ	13
260902-SS1	Methyl tert butyl ether	2.0 U	2.0 UJ	13
260902-SS1	Naphthalene	2.3	2.3 J	13
260902-SS1	Toluene	5.5	5.5 J	13
260902-SS1	o-Xylene	3.0	3.0 J	13
260902-SS1	p/m-Xylene	7.0	7.0 J	13

U-not detected at the stated reporting limit

3.14 Electronic Data Deliverables Review

A minimum of 20% of the results and all sample IDs provided in the EDD were reviewed against the information provided in the Level IV report. No discrepancies were identified between the EDD and the Level IV report.

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ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Attachment 3. Air-Phase Laboratory Data
Wells G and H Superfund Site
Woburn, Massachusetts

			Standards			Indoor Air				Outdoor Air	Sub-Slab Soil Gas	
Method Group	Parameter	Units	MADEP TIAC 90%	EPA RSL Residential Air	MADEP IA Threshold	260902-IA1-3/18/2011	260902-IA2-3/18/2011	BD01-3/18/2011	260902-IA3-3/18/2011	260902-OA-3/18/2011	260902-SS1-3/18/2011	260902-SS2-3/18/2011
APH												
	Adjusted C5-C8 Aliphatics	µg/m3				590	500	510	190	<12	67J	46
	Adjusted C9-C12 Aliphatics	µg/m3				89	72	75	170	26	130J	31
	Aromatics C9-C10	µg/m3	44		10	67	52	47	14	<10	<10	<10
	Benzene	µg/m3	11	0.31	2.3	11	9.5	9.8	3.2	<2	<2	<2
	Butadiene	µg/m3		0.081		<2	<2	<2	<2	<2	<2	<2
	Ethyl benzene	µg/m3	7.4	0.97	7.4	15	12	12	3.4	<2	<2	<2
	m&p-Xylene	µg/m3				49	38	38	11	<4	7J	5.7
	Methyl tert-butyl ether (MTBE)	µg/m3	39	9.4	39	<2	<2	<2	<2	<2	<2	<2
	Naphthalene	µg/m3	2.7	0.072	0.61	<2	<2	<2	<2	<2	2.3J	<2
	o-Xylene	µg/m3		730		18	14	14	3.9	<2	3J	3.5
	Toluene	µg/m3	54	5200	54	66	55	58	16	<2	5.5J	2.4
Volatile Organic Compounds												
	1,1,1-Trichloroethane	µg/m3	3	5200	3	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109
	1,1,2-Trichloroethane	µg/m3	0	0.15	0.15	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109
	1,1-Dichloroethane	µg/m3	0	1.5	0.8	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081
	1,1-Dichloroethene	µg/m3	0	210	0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	1,2,4-Trimethylbenzene	µg/m3		7.3		13.3	12.6	12.7	3.31	0.147	1.6J	1.37
	1,2-Dichloroethane	µg/m3	0	0.094	0.09	1.3	1.44	1.4	4.74	<0.081	0.101J	<0.081
	1,2-Dichloropropane	µg/m3	0	0.24	0.13	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
	1,3-Dichlorobenzene	µg/m3	0.6		0.6	<0.12	<0.12	<0.12	<0.12	<0.12	0.18J	<0.12
	1,4-Dichlorobenzene	µg/m3	1.5	0.22	0.5	<0.12	<0.12	<0.12	<0.12	<0.12	0.198J	<0.12
	Benzene	µg/m3	11	0.31	2.3	9.35	8.78	8.54	2.79	0.501	0.744J	0.574
	Bromodichloromethane	µg/m3	0	0.066	0.14	<0.134	<0.134	<0.134	<0.134	<0.134	<0.067	<0.134
	Bromoform	µg/m3	0	2.2	2.2	<0.206	<0.206	<0.206	<0.206	<0.206	<0.206	<0.206
	Butadiene	µg/m3		0.081		0.102	0.102	0.093	0.124	<0.044	<0.044	0.044
	Carbon tetrachloride	µg/m3	0.86	0.41	0.54	0.534	0.603	0.566	0.578	0.509	0.17J	<0.126
	Chlorobenzene	µg/m3	0	52	2.3	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
	Chloroform	µg/m3	3	0.11	1.9	0.185	0.254	0.244	0.229	0.102	0.298J	1.58
	cis-1,2-Dichloroethene	µg/m3	0		0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	Dichloromethane (Methylene chloride)	µg/m3	11	5.2	5	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74
	Ethyl benzene	µg/m3	7.4	0.97	7.4	12.3	11.7	11.8	3.33	0.152	1.42J	1.06
	Ethylene dibromide	µg/m3	0	0.0041	0.011	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154
	Isopropylbenzene	µg/m3		420		<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
	Methyl tert-butyl ether (MTBE)	µg/m3	39	9.4	39	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	0.4
	Naphthalene	µg/m3	2.7	0.072	0.61	<0.723	<0.608	0.571	<0.267	<0.262	2.38J	<0.241
	Tetrachloroethene	µg/m3	4.1	0.41	1.4	0.176	0.183	0.183	0.264	0.149	0.258J	0.23
	Toluene	µg/m3	54	5200	54	52.5	50.7	51.9	14.3	0.885	4.48J	2.06
	trans-1,2-Dichloroethene	µg/m3	0	63	0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	trans-1,3-Dichloropropene	µg/m3	0		0.6	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091
	Trichloroethene	µg/m3	0.8	1.2	0.8	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107
	Vinyl Chloride	µg/m3	0	0.16	0.27	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
	Xylenes (Total)	µg/m3	28	100	20	54.8	51.6	51.9	14.5	0.512	8.38J	8.4

Notes: < = Not detected, less than laboratory reporting limit.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
BD01-3/18/2011 is a blind duplicate at the 260902-IA2 location

Attachment 3. Air-Phase Laboratory Data
Wells G and H Superfund Site
Woburn, Massachusetts

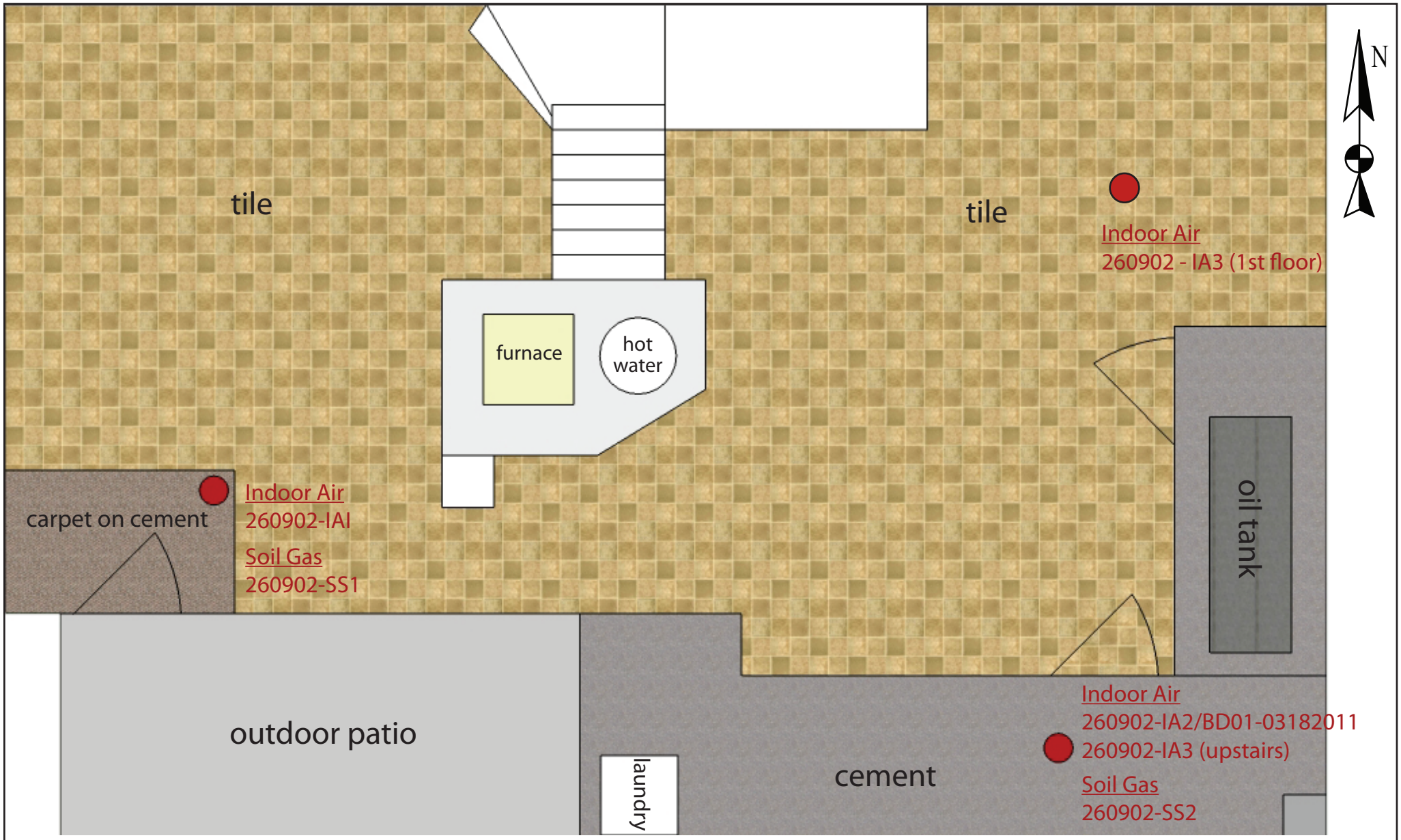
Method Group	Parameter	Units	Standards: MADEP TIAC 90%	Standards: EPA RSL Residential Air	Standards: MADEP IA Threshold	Indoor Air: 260903-IA1-3/18/2011	Indoor Air: 260903-IA2-3/18/2011	Outdoor Air: 260903-OA-3/18/2011	Sub-slab Soil Gas: 260903-SS1-3/18/2011	Sub-slab Soil Gas: BD02-3/18/2011	Sub-slab Soil Gas: 260903-SS2-3/18/2011
APH											
	Adjusted C5-C8 Aliphatics	µg/m3				110	110	<12	25	29	68
	Adjusted C9-C12 Aliphatics	µg/m3				83	80	<14	14J	<14	190
	Aromatics C9-C10	µg/m3	44		10	<10	<10	<10	<10	<10	<10
	Benzene	µg/m3	11	0.31	2.3	<2	<2	<2	<2	<2	<2
	Butadiene	µg/m3		0.081		<2	<2	<2	<2	<2	<2
	Ethyl benzene	µg/m3	7.4	0.97	7.4	<2	<2	<2	<2	<2	<2
	m&p-Xylene	µg/m3				<4	<4	<4	<4	<4	<4
	Methyl tert-butyl ether (MTBE)	µg/m3	39	9.4	39	<2	<2	<2	<2	<2	<2
	Naphthalene	µg/m3	2.7	0.072	0.61	<2	<2	<2	<2	<2	<2
	o-Xylene	µg/m3		730		<2	<2	<2	<2	<2	<2
	Toluene	µg/m3	54	5200	54	5.2	5.1	<2	<2	<2	<2
Volatile Organic Compounds											
	1,1,1-Trichloroethane	µg/m3	3	5200	3	0.114	0.12	<0.109	<0.109	<0.109	<0.109
	1,1,2-Trichloroethane	µg/m3	0	0.15	0.15	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109
	1,1-Dichloroethane	µg/m3	0	1.5	0.8	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081
	1,1-Dichloroethene	µg/m3	0	210	0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	1,2,4-Trimethylbenzene	µg/m3		7.3		0.624	0.673	0.157	0.113	0.098	0.182
	1,2-Dichloroethane	µg/m3	0	0.094	0.09	8.03	7.61	<0.081	0.093J	<0.081	0.348
	1,2-Dichloropropane	µg/m3	0	0.24	0.13	0.508	0.489	<0.092	<0.092	<0.092	<0.092
	1,3-Dichlorobenzene	µg/m3	0.6		0.6	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
	1,4-Dichlorobenzene	µg/m3	1.5	0.22	0.5	0.985	1.15	<0.12	0.132	0.12	0.312
	Benzene	µg/m3	11	0.31	2.3	0.658	0.677	0.485	<0.223	<0.223	<0.223
	Bromodichloromethane	µg/m3	0	0.066	0.14	<0.134	<0.134	<0.134	<0.134	<0.134	<0.134
	Bromoform	µg/m3	0	2.2	2.2	<0.206	<0.206	<0.206	<0.206	<0.206	<0.206
	Butadiene	µg/m3		0.081		0.044	0.046	<0.044	<0.044	<0.044	<0.044
	Carbon tetrachloride	µg/m3	0.86	0.41	0.54	0.673	0.723	0.515	<0.126	<0.126	0.157
	Chlorobenzene	µg/m3	0	52	2.3	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
	Chloroform	µg/m3	3	0.11	1.9	0.634	0.59	0.107	0.102J	<0.098	7.17
	cis-1,2-Dichloroethene	µg/m3	0		0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	Dichloromethane (Methylene chloride)	µg/m3	11	5.2	5	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74
	Ethyl benzene	µg/m3	7.4	0.97	7.4	0.577	0.564	0.134	<0.087	<0.087	0.121
	Ethylene dibromide	µg/m3	0	0.0041	0.011	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154
	Isopropylbenzene	µg/m3		420		<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
	Methyl tert-butyl ether (MTBE)	µg/m3	39	9.4	39	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072
	Naphthalene	µg/m3	2.7	0.072	0.61	<0.173	<0.194	<0.131	<0.246	0.361	<0.828
	Tetrachloroethene	µg/m3	4.1	0.41	1.4	0.549	0.562	0.156	0.38	0.393	0.373
	Toluene	µg/m3	54	5200	54	4.49	4.34	0.919	0.644	0.621	0.802
	trans-1,2-Dichloroethene	µg/m3	0	63	0.8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
	trans-1,3-Dichloropropene	µg/m3	0		0.6	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091
	Trichloroethene	µg/m3	0.8	1.2	0.8	<0.107	<0.107	<0.107	<0.107	<0.107	0.145
	Vinyl Chloride	µg/m3	0	0.16	0.27	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
	Xylenes (Total)	µg/m3	28	100	20	1.93	1.89	0.482	0.295	0.265	0.49

Notes: < = Not detected, less than laboratory reporting limit.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
BD02-3/18/2011 is a blind duplicate at the 260903-SS1 location

Attachment 4. Consumer Product Chemical Survey Summary, Residential Structures
Wells G and H Superfund Site, Woburn, Massachusetts

Product Identified During Building Survey	Known or Suspected to Contain Target Analytes
Residential Structure #1: MBL 26/09/02 - 18 February 2011	
Ajax Cleanser with Bleach	-
Armor All Multipurpose Auto Cleaner-Old Product	-
Armor All Original Protectant	-
Armor All Gels Sytem (PowerWash & Wax-It-Dry)	-
Autoguard Gas Treatment	BTEX
Benjamin Moore REGAL PREMIUM INTERIOR 100% ACRYLIC MATTE FINISH N2	-
Black Magic Tire Wet Foam	-
Furniture Polish Wipes with Pre-Moistened Lemon Scent	BTEX
Glass Plus Cleaner	-
Heet Antifreeze/Water Remover	-
Murphy's Oil Soap	-
Payless Rain & Stain Guard	-
Pine Cleaner (off-brand)	-
Rental Equipment Company Carpet Cleaner	-
Rust Oleum Bright Coat Metallic Finish, Chrome	TEX
Rust Oleum Premium Satin Aerosol 7791 Satin White	TEX
Spectracide Stump Remover	-
Swiffer Dust & Shine	-
TAT Roach Killer	-
Tuff Stuff Multi Purpose Foam Cleaner (aerosol) 22 Fl. Oz.	-
Valspar Stone SprayPaint	-
Valspar Ultra Premium Interior Flat Base 2, 94837	-
WD 40 Aerosol Lubricant-12/01/2004	petroleum
Residential Structure #2: MBL 26/09/03 - 28 January 2011	
Clorox Clean-Up Cleaner with Bleach	-
Clorox Toilet Wand	-
Clorox Ultra Regular Bleach	-
Finish Powerball Tablets	-
Lysol Brand Disinfecting Wipes, 4 In 1, Citrus	-
Oxygen Power Stain Remover (off-brand)	-
Purex Ultra Concentrate Natural Elements Laundry Detergent, Linen and Lillies	-
Woolite For All Colors, Fabric Wash Liquid	-

Notes:
- BTEX refers to the compounds benzene, toluene, ethylbenzene and xylenes collectively.



Not to Scale

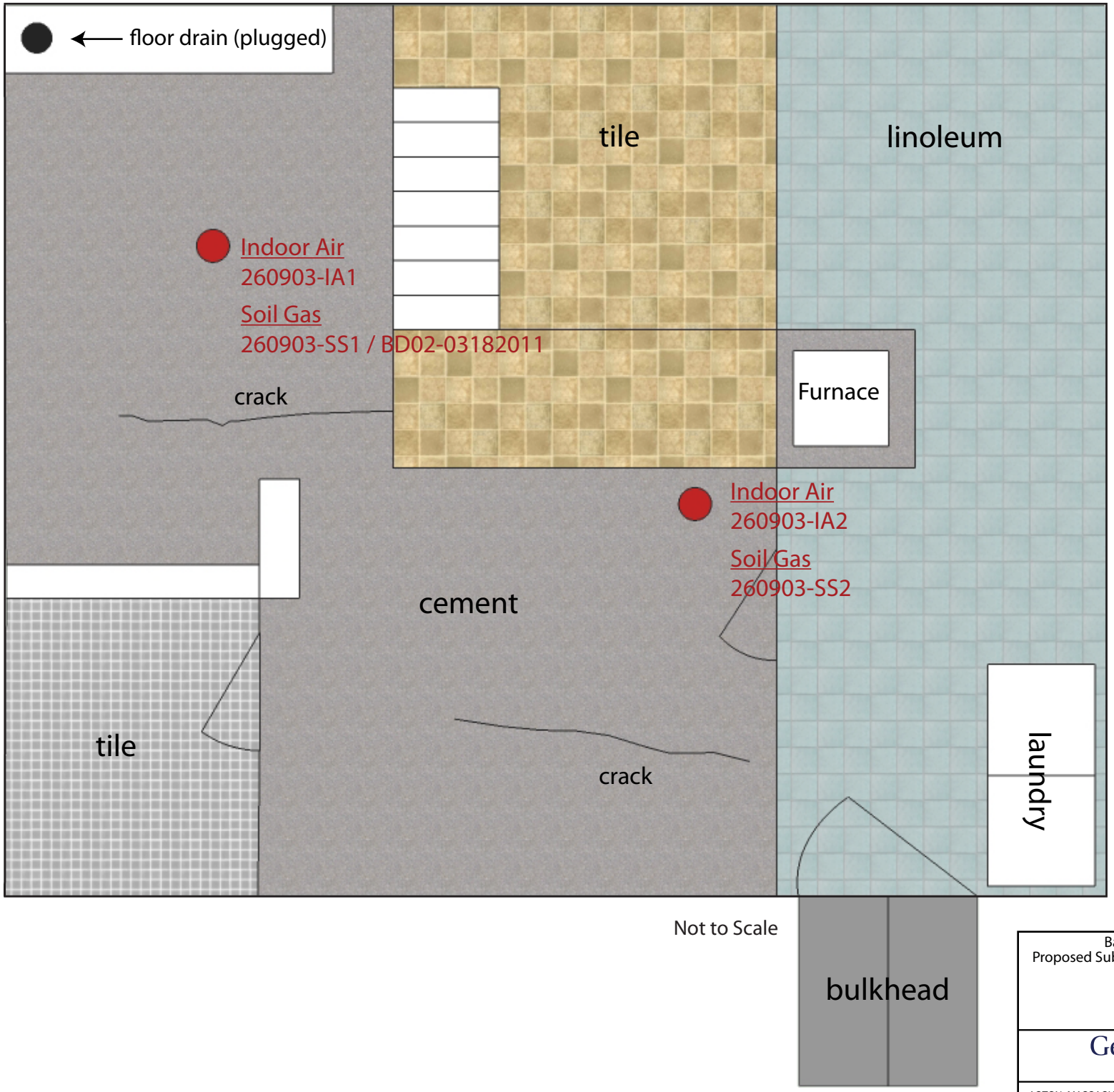
Basement Floor Plan and
Proposed Sub-Slab Soil Gas Sampling Locations
Residence #1

Wells G&H Superfund Site
Woburn, Massachusetts

Geosyntec consultants

ACTON, MASSACHUSETTS | FEBRUARY 2011

Figure 1



Basement Floor Plan and
Proposed Sub-Slab Soil Gas Sampling Locations
Residence #2

Wells G&H Superfund Site
Woburn, Massachusetts

Geosyntec consultants

ACTON, MASSACHUSETTS | FEBRUARY 2011

Figure 2

DAILY FIELD REPORT

Geosyntec consultants
www.geosyntec.com

Project Name: WR Grace VI Assessment
Project Number: BR0220
Field Personnel: SB/TC
Recorded By: SWB
Weather: Fair, calm, mid 30's @ 0800, Fair wind from west @ 8 mph, 50s @ 1500

Date: 17 March 2011
Page 1 of 1
Primary Activities: set indoor/outdoor ambient air canisters @ 260902 & 260903, performed building survey @ 260407

Time	Description of activities - location of work, work performed, equipment & personnel used, incidental information
0745	SB/TC onsite calibrating instruments & checking canister pressures @ 260902
0800	met Jamie Stapleton outside residence *
0825	opened 260902-OA p1: -0.28, p2: -30.07, I: 36"
0828	opened 260902-IA3 (1st floor) p1: -0.00, p2: -29.93, I: 37"
0829	opened 260902-IA1 p1: -0.00, p2: -29.72, I: 39"
0830	opened 260902-IA2 p1: 0.00, p2: -29.63
	opened BD01-03182011 p1: 0.00 p2: -29.84
0835	Owner removed Autoguard 505 treatment + 2 cans rustoleum
0840	outside residence discussing schedule w/ Jamie
0845	off site
1300	TC, SB, Clayton Smith, Jamie Stapleton (TRC), Craig Ziady (Cummings), Justin Magee (Cummings), Joe Lemay (EPA) met for walk through of 260407
1410	Joe Lemay offsite
1435	offsite 260407
1440	onsite @ 260903
1515	opened 260903-IA1 p1: 0.00, p2: 30.21, I: 36"
1516	opened 260903-IA2 p1: 0.00, p2: 30.40, I: 44"
1523	opened 260903-OA p1: 0.00, p2: 30.10, I: 38"
1530	offsite

PID: 0 ppb/zero; 9960 ppb/10 ppm; fresh air peak @ 61 ppb from water kitchen sink

weather station: 36°F 84% humidity 30.12 in Hg

weather station: 78°F (high 50s actual) 30.07", 51% humidity; wind 3-5 mph from W/SW

PID: peak @ 12 ppb

* safety tailgate: be aware of surroundings, avoid slips trips & falls, take extra trips, stairs are narrow, watch your pathway

Daily Field Report

METER CALIBRATION

Geosyntec consultants
www.geosyntec.com

Project Name: WR Grace Date: 17 March 2011 Recorded By: SWB Page 1 of 1
Project Number: BR0200 Weather: PrimaryActivities:

PIDs ppb RAE Model PGM-7240 PINE ID: 7240

Serial Number		Ambient Air (ppm)	~~100ppm~~ 1000ppb Isobutylene (ppm)
250-102013	Initial Time: 0745	~~0745~~ SWB 0	9960
	Final Time: 1530	8	1020
	Initial Time:		
	~~Final Time:~~		
	Initial Time:	SWB	
	Final Time:	3/17/11	
	Initial Time:		
	Final Time:		

GEMs

Serial Number		Ambient Air			Calibration Gas			Ambient Air		
		CH_4(%)	CO_2(%)	CH_4(%)	CO_2(%)	O_2(%)	O_2(%)	CH_4:(15%)	CO_2:(15%)	O_2:(0%)
	Initial Time:									
	Final Time:									
	Initial Time:						SWB 3/17/11			
	Final Time:									
	Initial Time:									
	Final Time:									
	Initial Time:									
	Final Time:									

NOTES: —

Personnel Signature: SWB Date: 3/17/2011

Meter Calibration.xl

DAILY FIELD REPORT

Geosyntec consultants

www.geosyntec.com

Project Name: WR Grace VI Assessment
Project Number: BR0200
Field Personnel: SB/TC
Recorded By: SB
Weather: 0800: overcast, wind from SW, 50s

Date: 18 March 2011
Page 1 of 1
Primary Activities: collect OA/IA canisters @ 260902 & 260905, sub-slab sample @ 260902 & 260903

Time	Description of activities - location of work, work performed, equipment & personnel used, incidental information
0745	onsite @ 260902 unloading equipment (TC/SB), Jamie Stapleton
0805	closed 260902-IA1 @ -5.78
0806	closed 260902-IA2 @ -5.78 and BD01-03182011 @ -5.52
0810	closed 260902-IA3 @ -7.73, took canisters out of house
0815	safety tailgate: take extra trips carrying, ear plugs while drilling
	safety glasses ~~& ear plugs~~ while working w/ tank & drill (SWB)
0818	started drilling 260902-SS1 & SS-2
0855	finished setting probes
0925	connected @ 260902-SS2, shut-in test, purge test, 0ppm direct read from tubing
0949	opened 260902-SS2
1017	closed 260902-SS2, purge test
1030	connected @ 260902-SS1, shut-in test @ 1040, purge test
	- measured He in tedlar bag, tightened fittings, purged
	several times, tried various things 1045-1140, pulled out
	probe, redrilled hole, set probe @ 1200, lunch
1229	purge test new probe, still measured He in tedlar, see
	field form, made decision to sample, 5000 ppm (direct reading He from tubing)
1337	opened 260902-SS1
1404	closed 260902-SS1, 1410-1450 mob to 260903
(SWB) ~~1500~~ 1456	closed 260903-IA1 @ -5.95, 260903-IA2 @ -5.84
1458	closed 260903-OA @ -4.27
1520	set 260903-SS2 <5 min between drilling/sealing
1525	set 260903-SS1 <5 min between drilling/sealing
(SWB) ~~1640~~	purge test @ 260903-SS2, 38% He 100 ppm direct from tube
1640 1645	opened 260903-SS2
1735	purge test @ 260903-SS1, BD02-03182011, direct read from tubing trends down from 900 ppm (ambient)
1736	closed 260903-SS2
1742	opened 260903-SS1, BD02-03182011
1842	closed 260903-SS1, BD02-03182011
1903	offsite

weather station 1535
74°F (high 60s actual)
9-11 mph NNW
29.68" Hg

Daily Field Report

SOIL GAS PROBE MEASUREMENTS

Geosyntec consultants

① Project Name: WR Grace VI Assessment
Date: 3/18/2011 Project Number: BR0200
Site Location: 260902
Weather:
Field Personnel: TC/SB
Recorded By: SB

Probe No.: 260902-SS2 ☒ Sub-slab probe ☐ Soil gas probe
Mini Rae 2000 Serial No.: N/A Lamp: 10.6 / 11.7 eV
Landtech GEM 2000 Landfill Gas Meter Serial No. M: N/A
MDG 2002 Helium detector Serial No.: 17740
Tracer Gas: ☒ Helium ☐ Other UHP He

② Surface Type: ☐ Asphalt ☒ Concrete ☐ Grass ☐ Other_____
Surface Thickness 4.5 (inches) centimeters ☐ Unknown
(i.e., asphalt or concrete)

③ 1 Casing Volume
☐ Sub-slab <0.1 L
Soil gas probe _____ (L)

⑤ Shut in test prior to pneumatic test completed 66 in. H_2O held for 10 seconds.

⑥ Start of Pneumatic Test: N/A

Elapsed Time (min.)	Pump Flow Rate (LPM)	Well Head Vacuum in. H_2O
	0.1	
	0.2	
	0.5	

④ Initial Vacuum (prior to pumping) N/A in. H_2O

⑦ Field tubing blank reading (ppm_v) completed? ☐ Yes ☒ No PID Reading N/A ppm_v

⑧ Shut in test prior to purging completed? Yes ☒ No ☐

⑨ Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate ml ~~(LPM)~~ min	Cumulative Volume ~~(L)~~ ml	CH_4 (%)	CO_2 (%)	O_2 (%)	Tracer Gas Shroud (%) Min	Tracer Gas Shroud (%) Max	Tracer Gas Sample (ppm_v, %) (circle one)	VOCs by PID (ppm_v)
3/18/2011	0940	0942	2	1	200	400	–	–	–	39	48	0	–
3/18/2011	1020	1022	2	1	200	400	–	–	–	~~35~~ 25	35	325	–

SWB 3/18/11

⑩ Helium concentration in field screened samples is less than 5% of minimum concentration in the shroud? ☒ Yes ☐ No
Note: 1% helium = 10,000 ppm_v

⑪ Shut in test prior to sample collection completed? Yes ☒ No ☐

⑫ Sample Collection

Date	Time	Sample ID	Summa Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)
3/18/2011	0949-1017	260902-SS-2	937	0038	1	-29.52	-2.84

SWB 3/18/11

Comments: ✓

SGP measurements - pneumatic testing.xls

SOIL GAS PROBE MEASUREMENTS

Geosyntec consultants

① Project Name: WR Grace VI Assessment
Date: 18 March 2011 Project Number: BF0020
Site Location: 260902
Weather:
Field Personnel: TC/SB
Recorded By: SB

Probe No.: 260902-SS1 ☒ Sub-slab probe ☐ Soil gas probe
Mini Rae 2000 Serial No.: N/A Lamp: 10.6 / 11.7 eV
Landtech GEM 2000 Landfill Gas Meter Serial No. M: N/A
MDG 2002 Helium detector Serial No.: 17740
Tracer Gas: ☒ Helium ☐ Other UHP He

② Surface Type: ☐ Asphalt ☒ Concrete ☐ Grass ☐ Other
Surface Thickness 4.5 (inches/centimeters) ☐ Unknown
(i.e., asphalt or concrete)

③ 1 Casing Volume
☐ Sub-slab <0.1 L
Soil gas probe _____ (L)

④ Initial Vacuum (prior to pumping) N/A in. H_2O

⑤ Shut in test prior to pneumatic test completed. 54 in. H_2O held for 10 seconds.

⑥ Start of Pneumatic Test: N/A

Elapsed Time (min.)	Pump Flow Rate (LPM)	Well Head Vacuum in. H_2O
	0.1	
	0.2	
	0.5	

⑦ Field tubing blank reading (ppm_v) completed? ☐ Yes ☒ No PID Reading N/A ppm_v

⑧ Shut in test prior to purging completed? Yes ☒ No ☐

⑨ Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate ml ~~(LPM)~~ min	Cumulative Volume ~~(L)~~ mL	CH_4 (%)	CO_2 (%)	O_2 (%)	Tracer Gas Shroud (%) Min	Tracer Gas Shroud (%) Max	Tracer Gas Sample (ppm_v, %) (circle one)	VOCs by PID (ppm_v)
3/18/2011	1048	1050	2	1	200	400	–	–	–	38	52	7.4%	–
3/18/2011	1103	1105	2	1	200	400	–	–	–	44	48	8.7%	–
3/18/2011	1124/1139	1125/1140	1	1	200	200	–	–	–	39/36	50/48	4%/3%	–
3/18/2011	1224/1245	1226/1246	1	1	200	200	–	–	–	40/0	48/0	3%/3%	–
3/18/2011	1316	1318	2	1	200	400	–	–	–	38	45	2.3%	–

⑩ Helium concentration in field screened samples is less than 5% of minimum concentration in the shroud? ☐ Yes ☐ No
Note: 1% helium = 10,000 ppm_v

⑪ Shut in test prior to sample collection completed? Yes ☒ No ☐

⑫ Sample Collection

Date	Time	Sample ID	Summa Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)
3/18/2011	1337/1404	260902-SS1	586	0331	1	-29.57	-3.47
		SB/3/18/11					

Comments:

SGP measurements - pneumatic testing.xls

SOIL GAS PROBE MEASUREMENTS

Geosyntec consultants

① Project Name: WR Grace VI Assessment
Date: 18 March 2011 Project Number: BP0200
Site Location: 260903
Weather:
Field Personnel: TC/SB
Recorded By: SB

Probe No.: 260903-SS1 ☒ Sub-slab probe ☐ Soil gas probe
Mini Rae 2000 Serial No.: N/A Lamp: 10.6 / 11.7 eV
Landtech GEM 2000 Landfill Gas Meter Serial No. M: N/A
MDG 2002 Helium detector Serial No.: 17740
Tracer Gas: ☒ Helium ☐ Other UHP He

② Surface Type: ☐ Asphalt ☒ Concrete ☐ Grass ☐ Other____
Surface Thickness 6 inches/centimeters ☐ Unknown
(i.e., asphalt or concrete)

③ 1 Casing Volume
☐ Sub-slab <0.1 L
Soil gas probe _____ (L)

④ Initial Vacuum (prior to pumping) N/A in. H_2O

⑤ Shut in test prior to pneumatic test completed, 42 in. H_2O held for 10 seconds.

⑥ Start of Pneumatic Test: N/A

Elapsed Time (min.)	Pump Flow Rate (LPM)	Well Head Vacuum in. H_2O
	0.1	
	0.2	
	0.5	

⑦ Field tubing blank reading (ppm_v) completed? ☐ Yes ☒ No PID Reading – ppm_v

⑧ Shut in test prior to purging completed? Yes ☒ No ☐

⑨ Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate ~~(LPM)~~ ml/min	Cumulative Volume ~~(L)~~ ml	CH_4 (%)	CO_2 (%)	O_2 (%)	Tracer Gas Shroud (%) Min	Tracer Gas Shroud (%) Max	Tracer Gas Sample (ppm_v, %) (circle one)	VOCs by PID (ppm_v)
3/18/2011	~~1535~~ 1735	~~1538~~ 1738	3	1	200	600	–	–	–	36	48	0	–
	SWB												
						SWP 3/18/11							

⑩ Helium concentration in field screened samples is less than 5% of minimum concentration in the shroud? ☒ Yes ☐ No **Note:** 1% helium = 10,000 ppm_v

⑪ Shut in test prior to sample collection completed? Yes ☒ No ☐

⑫ Sample Collection

Date	Time	Sample ID	Summa Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)
3/18/2011	1742/1842	260903-SS1	725	0443	1	-29.52	-2.50
3/18/2011	1742/1842	BD02-03182011	1552	0443	1	-29.51	-2.58
–	–	–	–	–	–	–	–

Comments: –

SGP measurements - pneumatic testing.ai

SOIL GAS PROBE MEASUREMENTS

Geosyntec consultants

① Project Name: WR Grace VI Assessment
Date: 18 March 2011 Project Number: BP0200
Site Location: 260903
Weather:
Field Personnel: SB/TC
Recorded By: SB

Probe No.: 260903-SS2 ☒ Sub-slab probe ☐ Soil gas probe
Mini Rae 2000 Serial No.: N/A Lamp: 10.6 / 11.7 eV
Landtech GEM 2000 Landfill Gas Meter Serial No. M: N/A
MDG 2002 Helium detector Serial No.: 17740
Tracer Gas: ☒ Helium ☐ Other UHP He

② Surface Type: ☐ Asphalt ☒ Concrete ☐ Grass ☐ Other_____
Surface Thickness 6 inches/centimeters ☐ Unknown
(i.e., asphalt or concrete)

③ 1 Casing Volume
☐ Sub-slab <0.1 L
Soil gas probe _____ (L)

⑤ Shut in test prior to pneumatic test completed, 40 in. H_2O held for 10 seconds.

④ Initial Vacuum (prior to pumping) N/A in. H_2O

⑥ Start of Pneumatic Test:

Elapsed Time (min.)	Pump Flow Rate (LPM)	Well Head Vacuum in. H_2O
	0.1	
	0.2	
	0.5	

⑦ Field tubing blank reading (ppm_v) completed? ☐ Yes ☒ No PID Reading — ppm_v

⑧ Shut in test prior to purging completed? Yes ☒ No ☐

⑨ Purging

	Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM)	Cumulative Volume (L)	CH_4 (%)	CO_2 (%)	O_2 (%)	Tracer Gas Shroud (%) Min	Tracer Gas Shroud (%) Max	Tracer Gas Sample (ppm_v, %) (circle one)	VOCs by PID (ppm_v)
	3/18/2011	1640	1642	2	1	200	400	–	–	–	16	20	675	–
*	3/18/2011	1752	1754	2	–	–	–	–	–	–	22	20	300-500	–
*	3/18/2011	1815	1817	2	–	–	–	–	–	–	38	38	100	–

⑩ Helium concentration in field screened samples is less than 5% of minimum concentration in the shroud? ☐ Yes ☐ No
Note: 1% helium = 10,000 ppm_v

⑪ Shut in test prior to sample collection completed? Yes ☐ No ☐

⑫ Sample Collection

Date	Time	Sample ID	Summa Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)
3/18/2011	1645/1726	260903-SS2	1594	0442	–	-29.50	-2.46

Comments: * direct reading from tubing

SGP measurements - pneumatic testing.xls

AIR ANALYSIS

PAGE 1 OF 2

ALPHA ANALYTICAL

CHAIN OF CUSTODY

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client: GeoSynthec Consultants
Address: 289 Great Rd, Ste 105
Acton, MA 01720
Phone: (978) 263-9588
Fax: (978) 263-9594
Email: tcreamer@geosynthec.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: WR Grace VI Assessment
Project Location: Woburn, MA
Project #: B20200
Project Manager: Todd Creamer
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*

Date Due: **Time:**

Report Information - Data Deliverables

☐ FAX
☒ ADEx
Criteria Checker: TBD
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☐ Additional Deliverables:

Report to: (if different than Project Manager)

Billing Information

☒ Same as Client info PO #: B20200

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria
See	QAPP	

Other Project Specific Requirements/Comments:

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
	260902-OA		0825 3/17/2011	0825 3/18/2011	-29.94	-5.19	AA	SWB	6L	811	0497			X	X				
	260902-IA1		0829 3/17/2011	0805 3/18/2011	-29.90	-5.04	AA	SWB	6L	653	0459			X	X				
	260902-IA2		0830 3/17/2011	0806 3/18/2011	-29.91	-5.00	AA	SWB	6L	620	0267			X	X				
	260902-IA3		0828 3/17/2011	0808 3/18/2011	-29.92	-7.73	AA	SWB	6L	787	0287			X	X				
	260903-OA		1523 3/17/2011	1458 3/18/2011	-29.86	-4.27	AA	SWB	6L	789	0010			X	X				
	260903-IA1		1515 3/17/2011	1456 3/18/2011	-29.80	-5.95	AA	SWB	6L	1578	0299			X	X				
	260903-IA2		1516 3/17/2011	1456 3/18/2011	-29.88	-5.84	AA	SWB	6L	936	0436			X	X				
	BD01-03182011		3/17/2011	3/18/2011	-29.92	-4.66	AA	SWB	6L	1550	0363			X	X				
								SWB	3/21/11										

***SAMPLE MATRIX CODES**

AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Relinquished By:	Date/Time	Received By:	Date/Time:
[illegible]	3/21/2011 1400	[illegible]	3/21/11 1400

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Form No: 101-02 (19-Jun-09)

AIR ANALYSIS

PAGE 2 OF 2

ALPHA ANALYTICAL — ***CHAIN OF CUSTODY***

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client: Geosyntec Consultants
Address: 289 Great Road, Suite 105, Acton, MA 01720
Phone: (978) 263-9588
Fax: (978) 263-9594
Email: tcreamer@geosyntec.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: WR Grace VI Assessment
Project Location: Woburn, MA
Project #: BR0200
Project Manager: Todd Creamer
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*

Date Due: **Time:**

Report Information - Data Deliverables

☐ FAX
☒ ADEx
Criteria Checker: TBD
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☐ Additional Deliverables:

Report to: (if different than Project Manager)

Billing Information

☒ Same as Client info PO #: BR0200

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria
see	QAPP	

Other Project Specific Requirements/Comments:

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
	260902-SS1	3/18/2011	1337	1404	-29.57	-3.47	SV	SWB	6L	586	0331			X	X				
	260902-SS2	3/18/2011	0949	1017	-29.52	-2.84	SV	SWB	6L	937	0038			X	X				
	260903-SS1	3/18/2011	1742	1842	-29.52	-2.50	SV	SWB	6L	725	0443			X	X				
	260903-SS2	3/18/2011	1645	1736	-29.50	-2.46	SV	SWB	6L	1594	0442			X	X				
	BD02-03182011	3/18/2011	–	–	-29.51	-2.58	SV	SWB	6L	1552	tee			X	X				
	TB01-03182011	3/18/2011	–	–	–	-29.74	AIR	–	6L	970	N/A			X	X				* can lost a little ~~pressure~~ when vacuum reading vacuum in office SWB 3/22/11

SWB 3/21/11

*SAMPLE MATRIX CODES
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Relinquished By:	Date/Time	Received By:	Date/Time:
[signature]	3/21/2011 1400	[signature]	3/21/11 1400

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Form No: 101-02 (19-Jun-09)