

17 January 2014

Kevin Krueger, P.E.
Unisys Corporation
Corporate Environmental Affairs
3199 Pilot Knob Road
MS F1B05
Eagan, MN 55121

**Subject: HVAC Evaluation Findings
Southside High School Room 127
Elmira, New York**

Dear Kevin:

At Unisys Corporation's (Unisys) request, Geosyntec Consultants (Geosyntec) continued the evaluation of the heating, ventilation and air conditioning (HVAC) system at Southside High School (SSHS) in Elmira New York in accordance with our December 9, 2013 proposal. The purpose of the evaluation was to assess the ability of the existing HVAC system to achieve positive building pressures and to assess the concentration of trichloroethene (TCE) in Room 127. This letter presents the findings of our evaluation.

BACKGROUND

In July and August 2013, Mr. William Wertz, Ph.D. of Geosyntec and Mr. Frederick McKnight, P.E. of Turner Building Science & Design, LLC (TBS) conducted an assessment of the effects of the HVAC operation on the pressure differences between the indoor, subslab and ambient (outdoor) pressures in Room 127 of SSHS and on the concentration of TCE in the indoor air. The results of that assessment and a recommendation to conduct a follow up study at Room 127 during the heating season were described in Geosyntec's September 20, 2013 letter report to Unisys.

FOLLOW UP STUDY

At Unisys request, Geosyntec conducted additional pressure and chemical monitoring at Room 127 on December 26 and 27, 2013 to evaluate the vapor intrusion potential during cold weather. On the morning of December 26, 2013 Mr. William Wertz, Ph.D. of Geosyntec, with the assistance of Mr. Michael Dunn of the Elmira Central School District (ECSD), deployed an Omniguard 4 pressure meter to measure and record the pressure differential between the interior of Room 127 and the subslab below using the

existing subslab sampling port. The meter was used to record the differential pressure from 06:47 December 26, 2013 to 07:48 December 27, 2013. In addition, two (2) sets of air samples (inside and outside the building) were collected to assess the impact of HVAC operation on TCE concentrations in Room 127. The air samples were collected in 6-liter Summa canisters that were individually certified by Air Toxics, Inc. of Folsom, CA (Air Toxics) to be free of the target compounds down to the project reporting limits (which ranged from 0.04 to 0.62 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]). The laboratory similarly certified the flow controllers. The collection periods of the air sample sets were designed to correspond with periods when the HVAC system would normally be operating in occupied mode, and when the HVAC system would normally be in unoccupied mode. Although the school was in Winter Recess during the follow up study, Geosyntec arranged with ECSD personnel to run the building HVAC system in occupied mode during collection of the first set of air samples to simulate pressure conditions that would occur during the times that school is normally in session (0700 – 1530 hours). The HVAC system was then to be returned to unoccupied mode after 1530 hours for the collection of the second set of air samples. Pressure monitoring data collected during sample collection identified a discrepancy with this schedule, as noted below.

Altogether, four (4) air samples were collected as follows:

Set 1

- Indoor Air Sample #1 - Summa placed on a desktop near the center of Room 127 (Photo 1, attached). The sample collection period ran from 06:50 – 15:35 December 26, 2013.
- Outdoor Air Sample #1 - Summa placed at a rooftop location above Room 127 (Photo 2, attached). The sample collection period ran from 07:10 – 15:50 December 26, 2013.

During the time period when those samples were collected, the school building HVAC system was running as if the building was occupied. HVAC operation (07:00 – 15:30) in the occupied mode was confirmed by pressure monitoring data.

Set 2

- Indoor Air Sample #2 - Same location as Indoor Air Sample #1. The sample collection period ran from 15:37 December 26, 2013 to 07:45 December 27, 2013.
- Outdoor Air Sample #2- Same location as Outdoor Air Sample #1. The sample collection period ran from 15:50 December 26, 2013 to 07:48 December 27, 2013.

Although these samples were intended to be collected with the HVAC system operating as if the building was unoccupied, pressure monitoring data indicated the HVAC system was running in occupied mode at the start of, and for part of, the sampling period. As requested, the HVAC system should have ceased occupied mode operations at 15:30, but for unknown reasons it apparently¹ continued to run through the remainder of the day. At the start of the second sampling period (15:30), Dr. Wertz attempted to contact the ECSD maintenance office to request that the HVAC system be shifted to unoccupied mode, but he was unable to reach anyone. As confirmed by pressure monitoring data, HVAC operation in the occupied mode was noted from approximately 15:30 to 0:00, and in the unoccupied mode from approximately 0:00 to 07:48.

The Summa samples were shipped to Air Toxics under chain of custody on December 27, 2013.

RESULTS

Differential Pressure

Pressure monitoring data are attached as Table 1. During the December monitoring event, the differential pressure in Room 127 typically exceeded the sub-slab air pressure by 1.5 to 2.0 pascals when the HVAC system was running in occupied mode between approximately 07:00 on December 26, 2013 and 0:00 on December 27, 2013. As noted earlier, the HVAC system operated in occupied mode longer than originally specified to ECSD personnel. For unknown reasons, occupied mode operations ended at approximately 0:00 instead of the normal time of 15:30. Between approximately 0:00 on December 27, 2013 and the end of pressure monitoring at 07:48, the air pressure in Room 127 was lower than the air pressure in the sub-slab by 0.5 to 1.0 pascals (i.e. the room was under-pressurized with respect to the sub-slab) indicating that the HVAC system was off.

The December pressure monitoring results are somewhat different from those that were observed in July and August 2013. During the summer monitoring events, when the HVAC system was running in occupied mode, the air pressure in Room 127 exceeded the air pressure in the subslab by 5.0 to 6.0 pascals. When the HVAC system was off, the differential pressure became neutral.

¹ Based on the differential pressure monitoring results as discussed in the Results section.

Air Monitoring

Air samples were analyzed by Air Toxics on December 31, 2013 using Modified EPA TO-15 SIM (Selective Ion Monitoring). Geosyntec has validated the analytical data. Those 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%. Table 2 is a summary that presents the results of the detected compounds. Results of the August 2013 sampling event are included in Table 2 for reference. A comprehensive package that includes the December 2013 chemical monitoring results and the Geosyntec data validation report is attached (see attached Air Toxics analytical report and Geosyntec data validation report, respectively).

DISCUSSION

As with previous sampling results, the December 2013 chemical monitoring results indicate that there are two (2) types of volatile organic compounds (VOCs) present in the air samples:

- non-chlorinated hydrocarbons including benzene, toluene, ethyl benzene, m,p-xylene and o-xylene; and
- chlorinated VOCs including TCE, cis-1,2-dichloroethene (cis-1,2-DCE, a daughter product of TCE), and 1,2-dichloroethane (1,2-DCA).

The non-chlorinated hydrocarbons are present at low concentrations in the indoor and outdoor air samples. They are considered background constituents, and their presence in air is not considered by Geosyntec to be due to vapor intrusion. The chlorinated compounds are present at low concentrations in the indoor samples but not in the outdoor air samples. Therefore, they likely originate from the sub-slab, the indoor environment, or both.

Measured concentrations of TCE in the two (2) indoor air samples were below the New York State Guideline Value of $5 \mu\text{g}/\text{m}^3$. As expected based on the previous sampling results, the concentration of TCE in the indoor sample collected during the school-day sampling period ($3.8 \mu\text{g}/\text{m}^3$) when the HVAC system was running entirely in occupied mode (between approximately 07:00 on December 26, 2013 and 0:00 on December 27, 2013) is lower than the concentration in the sample collected during the after-school sampling period ($4.4 \mu\text{g}/\text{m}^3$) when the HVAC system was off for the last half of the sample collection period mode (between approximately 0:00 and 07:48 on December 27, 2013).

Figure 1 depicts the changes in pressure and TCE concentration that were observed over the course of the December 2013 sampling program. Those TCE data support the hypothesis that operation of the HVAC system is responsible for reducing the concentration of TCE in the indoor air in Room 127. The fact that TCE concentrations were higher during the December 2013 sampling event than they were in August 2013 is not surprising because the stack effect² of the building is greater in cold weather than it is in warm weather. In December 2013, Room 127 was less positively pressurized when the HVAC system was running in occupied mode than it had been under similar operating conditions during the July and August monitoring events, and Room 127 was consistently under-pressurized during the December monitoring period when the HVAC system was off as a result of the increase in the stack effect in cold weather.

The presence of cis-1,2-DCE in the indoor air samples was previously ascribed to vapor intrusion because the change in cis-1,2-DCE concentrations followed the same pattern as the change in TCE concentrations. Unlike the trend that was observed in the August 2013 samples, the cis-1,2-DCE concentration decreased slightly between the school-day and after-school sampling periods ($0.58 \mu\text{g}/\text{m}^3$ to $0.32 \mu\text{g}/\text{m}^3$, respectively), which is not what would be expected if the presence of cis-1,2-DCE in indoor air was due entirely to vapor intrusion.

The presence of 1,2-DCA in the indoor air samples is most likely not related to vapor intrusion. That compound was not detected in either the indoor air or the sub-slab at concentrations above the reporting limit in samples collected during the December 2009 sampling event at the school (NYSDOH, 2010). As noted in our September 20, 2013 letter report, plastic decorations on tables in Room 127 may be potential sources of 1,2-DCA.

CONCLUSIONS

1. During the December 2013 sampling event, the differential pressure between Room 127 and the subslab was monitored to evaluate the effect of HVAC operation on the pressurization of the room. Room 127 was positively pressurized with respect to the subslab when the HVAC system was running in

² The “stack effect” is the movement of heated indoor air that rises up within the building and leaks through roofs and or upper floors, reducing the pressure at the base of the building. The effect is increased by larger temperature differences between the inside air and outside.

occupied mode and was under-pressurized with respect to the subslab when the system was in unoccupied mode.

2. VOCs detected in indoor air in August and December 2013 included non-chlorinated and chlorinated compounds. The non-chlorinated VOCs are considered background constituents due to their detection in outdoor air. TCE concentrations detected are less than the New York State guideline value of $5 \mu\text{g}/\text{m}^3$. The detection of 1,2 -DCA is likely due to the presence of indoor sources. The detection of TCE is likely due to sub-slab sources. The December 2013 dataset for cis-1,2-DCE indicates a concentration decrease from occupied to unoccupied mode of HVAC operation, in contrast to the August 2013 dataset which exhibited an increase with the change in HVAC operation. This conflicting data suggests that the presence of cis-1,2-DCE during the December 2013 sampling event may not be entirely due to vapor intrusion.
3. Chemical monitoring data support the hypothesis that operation of the HVAC system in occupied mode is responsible for reducing the concentrations of TCE in the indoor air in Room 127. Given the observed relationships between the operation of the Room 127 HVAC system and the differential pressure between the subslab and indoor air space, air samples collected during any time periods (or parts thereof) when the classroom is not normally occupied (i.e., mid-afternoon through early morning, or weekends) will not be representative of conditions that exist when the room is occupied.

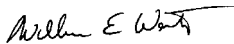
RECOMMENDATIONS

Because the measured concentration of TCE in the indoor air in Room 127 was below the New York State guideline value of $5 \mu\text{g}/\text{m}^3$, therefore, no immediate actions are recommended to reduce indoor concentrations of TCE. Continued monitoring for two additional rounds (one cooling season and one heating season) is recommended to validate the results from the previous samplings. Any subsequent air monitoring performed to evaluate potential presence of TCE in indoor air should take place during time periods that coincide with the occupation of the room (or the operation of the HVAC system as if the room were occupied). Any time that chemical air samples are collected; coincidental differential pressure monitoring between the room and the subslab should be performed and logged throughout the sampling period.

Mr. Kevin Krueger
17 January 2014
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Thank you for the opportunity to assist you with this project. Should you have any questions regarding this letter or have additional questions please contact the undersigned at 518.477.5499 or 410.381.4333.

Sincerely,



William E Wertz, Ph.D.
Senior Consultant



Aron Krasnopoler, Ph.D., P.E.
Project Manager

Attachments: Table 1 – December 2013 Indoor/Subslab Differential Pressure Log, Room 127, Southside High School, Elmira, New York
Table 2 –December 2013 Air Sampling Results Summary, Southside High School, Elmira, New York
Figure 1 – Room 127 Differential Pressure Monitoring and Indoor Air Analyses, Southside High School, Elmira, New York
Photographic Record, Southside High School, Elmira, New York
Complete Validation Package. Work Order 1312482. Air Toxics, 2 January 2014.

Copies: Paul Brookner MBA, P.G. Geosyntec

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

Date and Time	Time	Serial Date	Diferential Pressure (pa)		
			Max	Min	Avg
12/26/2013 6:47	6:47 AM	41634.2827	0.50	0.00	0.25
12/26/2013 6:52	6:52 AM	41634.2861	0.50	0.00	0.25
12/26/2013 6:57	6:57 AM	41634.2896	0.00	0.00	0.00
12/26/2013 7:02	7:02 AM	41634.2931	0.50	0.00	0.25
12/26/2013 7:07	7:07 AM	41634.2965	2.00	0.00	1.00
12/26/2013 7:12	7:12 AM	41634.3000	2.00	1.50	1.75
12/26/2013 7:17	7:17 AM	41634.3035	2.00	0.00	1.00
12/26/2013 7:22	7:22 AM	41634.3069	2.00	1.50	1.75
12/26/2013 7:27	7:27 AM	41634.3104	2.00	1.50	1.75
12/26/2013 7:32	7:32 AM	41634.3139	2.00	1.50	1.75
12/26/2013 7:37	7:37 AM	41634.3174	2.00	1.50	1.75
12/26/2013 7:42	7:42 AM	41634.3208	2.00	1.50	1.75
12/26/2013 7:47	7:47 AM	41634.3243	2.00	1.50	1.75
12/26/2013 7:52	7:52 AM	41634.3278	2.00	1.50	1.75
12/26/2013 7:57	7:57 AM	41634.3313	2.00	1.50	1.75
12/26/2013 8:02	8:02 AM	41634.3347	2.00	1.50	1.75
12/26/2013 8:07	8:07 AM	41634.3382	2.00	1.50	1.75
12/26/2013 8:12	8:12 AM	41634.3417	2.00	1.50	1.75
12/26/2013 8:17	8:17 AM	41634.3451	2.00	1.50	1.75
12/26/2013 8:22	8:22 AM	41634.3486	2.00	1.50	1.75
12/26/2013 8:27	8:27 AM	41634.3521	2.00	1.50	1.75
12/26/2013 8:32	8:32 AM	41634.3556	2.00	1.50	1.75
12/26/2013 8:37	8:37 AM	41634.3590	2.00	1.50	1.75
12/26/2013 8:42	8:42 AM	41634.3625	2.00	1.50	1.75
12/26/2013 8:47	8:47 AM	41634.3660	2.00	1.50	1.75
12/26/2013 8:52	8:52 AM	41634.3694	2.00	1.50	1.75
12/26/2013 8:57	8:57 AM	41634.3729	2.00	2.00	2.00
12/26/2013 9:02	9:02 AM	41634.3764	2.00	2.00	2.00
12/26/2013 9:07	9:07 AM	41634.3799	2.00	2.00	2.00
12/26/2013 9:12	9:12 AM	41634.3833	2.00	2.00	2.00
12/26/2013 9:17	9:17 AM	41634.3868	2.00	2.00	2.00
12/26/2013 9:22	9:22 AM	41634.3903	2.00	1.50	1.75

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12/26/2013 9:27	9:27 AM	41634.3938	2.00	1.50	1.75
12/26/2013 9:32	9:32 AM	41634.3972	2.00	1.50	1.75
12/26/2013 9:37	9:37 AM	41634.4007	2.00	1.50	1.75
12/26/2013 9:42	9:42 AM	41634.4042	2.00	1.50	1.75
12/26/2013 9:47	9:47 AM	41634.4076	2.00	2.00	2.00
12/26/2013 9:52	9:52 AM	41634.4111	2.00	2.00	2.00
12/26/2013 9:57	9:57 AM	41634.4146	2.00	2.00	2.00
12/26/2013 10:02	10:02 AM	41634.4181	2.00	1.50	1.75
12/26/2013 10:07	10:07 AM	41634.4215	2.00	2.00	2.00
12/26/2013 10:12	10:12 AM	41634.4250	2.00	2.00	2.00
12/26/2013 10:17	10:17 AM	41634.4285	2.00	1.50	1.75
12/26/2013 10:22	10:22 AM	41634.4319	2.00	1.50	1.75
12/26/2013 10:27	10:27 AM	41634.4354	2.00	1.50	1.75
12/26/2013 10:32	10:32 AM	41634.4389	2.00	2.00	2.00
12/26/2013 10:37	10:37 AM	41634.4424	2.00	1.50	1.75
12/26/2013 10:42	10:42 AM	41634.4458	2.00	2.00	2.00
12/26/2013 10:47	10:47 AM	41634.4493	2.00	1.50	1.75
12/26/2013 10:52	10:52 AM	41634.4528	2.00	2.00	2.00
12/26/2013 10:57	10:57 AM	41634.4563	2.00	2.00	2.00
12/26/2013 11:02	11:02 AM	41634.4597	2.00	2.00	2.00
12/26/2013 11:07	11:07 AM	41634.4632	2.00	2.00	2.00
12/26/2013 11:12	11:12 AM	41634.4667	2.00	1.50	1.75
12/26/2013 11:17	11:17 AM	41634.4701	2.00	2.00	2.00
12/26/2013 11:22	11:22 AM	41634.4736	2.00	2.00	2.00
12/26/2013 11:27	11:27 AM	41634.4771	2.00	2.00	2.00
12/26/2013 11:32	11:32 AM	41634.4806	2.00	2.00	2.00
12/26/2013 11:37	11:37 AM	41634.4840	2.00	2.00	2.00
12/26/2013 11:42	11:42 AM	41634.4875	2.00	2.00	2.00
12/26/2013 11:47	11:47 AM	41634.4910	2.00	2.00	2.00
12/26/2013 11:52	11:52 AM	41634.4944	2.00	2.00	2.00
12/26/2013 11:57	11:57 AM	41634.4979	2.00	2.00	2.00
12/26/2013 12:02	12:02 PM	41634.5014	2.50	2.00	2.25
12/26/2013 12:07	12:07 PM	41634.5049	2.00	2.00	2.00
12/26/2013 12:12	12:12 PM	41634.5083	2.00	2.00	2.00
12/26/2013 12:17	12:17 PM	41634.5118	2.00	2.00	2.00

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12/26/2013 12:22	12:22 PM	41634.5153	2.00	2.00	2.00
12/26/2013 12:27	12:27 PM	41634.5188	2.00	2.00	2.00
12/26/2013 12:32	12:32 PM	41634.5222	2.00	1.50	1.75
12/26/2013 12:37	12:37 PM	41634.5257	2.00	1.50	1.75
12/26/2013 12:42	12:42 PM	41634.5292	2.00	1.50	1.75
12/26/2013 12:47	12:47 PM	41634.5326	2.00	1.50	1.75
12/26/2013 12:52	12:52 PM	41634.5361	2.00	2.00	2.00
12/26/2013 12:57	12:57 PM	41634.5396	2.00	1.50	1.75
12/26/2013 13:02	1:02 PM	41634.5431	2.00	2.00	2.00
12/26/2013 13:07	1:07 PM	41634.5465	2.00	2.00	2.00
12/26/2013 13:12	1:12 PM	41634.5500	2.50	2.00	2.25
12/26/2013 13:17	1:17 PM	41634.5535	2.50	2.00	2.25
12/26/2013 13:22	1:22 PM	41634.5569	2.50	2.00	2.25
12/26/2013 13:27	1:27 PM	41634.5604	2.50	2.00	2.25
12/26/2013 13:32	1:32 PM	41634.5639	2.00	2.00	2.00
12/26/2013 13:37	1:37 PM	41634.5674	2.00	2.00	2.00
12/26/2013 13:42	1:42 PM	41634.5708	2.50	2.00	2.25
12/26/2013 13:47	1:47 PM	41634.5743	2.50	2.00	2.25
12/26/2013 13:52	1:52 PM	41634.5778	2.50	2.00	2.25
12/26/2013 13:57	1:57 PM	41634.5813	2.50	2.00	2.25
12/26/2013 14:02	2:02 PM	41634.5847	2.50	2.00	2.25
12/26/2013 14:07	2:07 PM	41634.5882	2.50	2.00	2.25
12/26/2013 14:12	2:12 PM	41634.5917	2.50	2.00	2.25
12/26/2013 14:17	2:17 PM	41634.5951	2.50	2.00	2.25
12/26/2013 14:22	2:22 PM	41634.5986	2.50	2.00	2.25
12/26/2013 14:27	2:27 PM	41634.6021	2.00	2.00	2.00
12/26/2013 14:32	2:32 PM	41634.6056	2.50	2.00	2.25
12/26/2013 14:37	2:37 PM	41634.6090	2.50	2.00	2.25
12/26/2013 14:42	2:42 PM	41634.6125	2.50	2.00	2.25
12/26/2013 14:47	2:47 PM	41634.6160	2.00	0.50	1.25
12/26/2013 14:52	2:52 PM	41634.6194	2.50	1.50	2.00
12/26/2013 14:57	2:57 PM	41634.6229	2.50	0.00	1.25
12/26/2013 15:02	3:02 PM	41634.6264	2.50	0.00	1.25
12/26/2013 15:08	3:08 PM	41634.6306	2.50	1.50	2.00

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12/26/2013 15:13	3:13 PM	41634.6340	2.00	1.50	1.75
12/26/2013 15:18	3:18 PM	41634.6375	2.00	1.50	1.75
12/26/2013 15:23	3:23 PM	41634.6410	2.00	1.50	1.75
12/26/2013 15:28	3:28 PM	41634.6444	2.00	0.50	1.25
12/26/2013 15:33	3:33 PM	41634.6479	2.00	0.50	1.25
12/26/2013 15:38	3:38 PM	41634.6514	2.00	1.50	1.75
12/26/2013 15:43	3:43 PM	41634.6549	2.50	1.50	2.00
12/26/2013 15:48	3:48 PM	41634.6583	2.00	2.00	2.00
12/26/2013 15:53	3:53 PM	41634.6618	2.50	1.00	1.75
12/26/2013 15:58	3:58 PM	41634.6653	2.50	1.00	1.75
12/26/2013 16:03	4:03 PM	41634.6688	2.50	2.00	2.25
12/26/2013 16:08	4:08 PM	41634.6722	2.50	2.00	2.25
12/26/2013 16:13	4:13 PM	41634.6757	2.50	2.00	2.25
12/26/2013 16:18	4:18 PM	41634.6792	2.50	0.00	1.25
12/26/2013 16:23	4:23 PM	41634.6826	2.50	2.00	2.25
12/26/2013 16:28	4:28 PM	41634.6861	2.50	2.00	2.25
12/26/2013 16:33	4:33 PM	41634.6896	2.50	2.00	2.25
12/26/2013 16:38	4:38 PM	41634.6931	2.50	2.00	2.25
12/26/2013 16:43	4:43 PM	41634.6965	2.50	2.00	2.25
12/26/2013 16:48	4:48 PM	41634.7000	2.50	2.00	2.25
12/26/2013 16:53	4:53 PM	41634.7035	2.50	2.00	2.25
12/26/2013 16:58	4:58 PM	41634.7069	2.50	2.00	2.25
12/26/2013 17:03	5:03 PM	41634.7104	2.50	2.00	2.25
12/26/2013 17:08	5:08 PM	41634.7139	2.50	2.00	2.25
12/26/2013 17:13	5:13 PM	41634.7174	2.50	2.00	2.25
12/26/2013 17:18	5:18 PM	41634.7208	2.50	2.00	2.25
12/26/2013 17:23	5:23 PM	41634.7243	2.50	2.00	2.25
12/26/2013 17:28	5:28 PM	41634.7278	2.50	2.00	2.25
12/26/2013 17:33	5:33 PM	41634.7313	2.50	2.00	2.25
12/26/2013 17:38	5:38 PM	41634.7347	2.50	2.00	2.25
12/26/2013 17:43	5:43 PM	41634.7382	2.00	2.00	2.00
12/26/2013 17:48	5:48 PM	41634.7417	2.50	2.00	2.25
12/26/2013 17:53	5:53 PM	41634.7451	2.50	2.00	2.25
12/26/2013 17:58	5:58 PM	41634.7486	2.50	2.00	2.25

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

12/26/2013 18:03	6:03 PM	41634.7521	2.50	2.00	2.25
12/26/2013 18:08	6:08 PM	41634.7556	2.50	2.00	2.25
12/26/2013 18:13	6:13 PM	41634.7590	2.50	2.00	2.25
12/26/2013 18:18	6:18 PM	41634.7625	2.50	2.00	2.25
12/26/2013 18:23	6:23 PM	41634.7660	2.00	1.50	1.75
12/26/2013 18:28	6:28 PM	41634.7694	2.00	2.00	2.00
12/26/2013 18:33	6:33 PM	41634.7729	2.00	1.50	1.75
12/26/2013 18:38	6:38 PM	41634.7764	2.00	2.00	2.00
12/26/2013 18:43	6:43 PM	41634.7799	2.00	1.50	1.75
12/26/2013 18:48	6:48 PM	41634.7833	2.00	1.50	1.75
12/26/2013 18:53	6:53 PM	41634.7868	2.00	1.50	1.75
12/26/2013 18:58	6:58 PM	41634.7903	2.00	1.50	1.75
12/26/2013 19:03	7:03 PM	41634.7938	2.00	2.00	2.00
12/26/2013 19:08	7:08 PM	41634.7972	2.00	1.50	1.75
12/26/2013 19:13	7:13 PM	41634.8007	2.00	1.50	1.75
12/26/2013 19:18	7:18 PM	41634.8042	2.00	1.50	1.75
12/26/2013 19:23	7:23 PM	41634.8076	2.00	1.50	1.75
12/26/2013 19:28	7:28 PM	41634.8111	2.00	1.50	1.75
12/26/2013 19:33	7:33 PM	41634.8146	2.00	2.00	2.00
12/26/2013 19:38	7:38 PM	41634.8181	2.00	2.00	2.00
12/26/2013 19:43	7:43 PM	41634.8215	2.00	2.00	2.00
12/26/2013 19:48	7:48 PM	41634.8250	2.00	2.00	2.00
12/26/2013 19:53	7:53 PM	41634.8285	2.00	2.00	2.00
12/26/2013 19:58	7:58 PM	41634.8319	2.00	2.00	2.00
12/26/2013 20:03	8:03 PM	41634.8354	2.00	2.00	2.00
12/26/2013 20:08	8:08 PM	41634.8389	2.00	2.00	2.00
12/26/2013 20:13	8:13 PM	41634.8424	2.00	2.00	2.00
12/26/2013 20:18	8:18 PM	41634.8458	2.00	1.50	1.75
12/26/2013 20:23	8:23 PM	41634.8493	2.00	1.50	1.75
12/26/2013 20:28	8:28 PM	41634.8528	2.50	2.00	2.25
12/26/2013 20:33	8:33 PM	41634.8563	2.00	2.00	2.00
12/26/2013 20:38	8:38 PM	41634.8597	2.00	2.00	2.00
12/26/2013 20:43	8:43 PM	41634.8632	2.00	2.00	2.00
12/26/2013 20:48	8:48 PM	41634.8667	2.00	2.00	2.00

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

12/26/2013 20:53	8:53 PM	41634.8701	2.50	2.00	2.25
12/26/2013 20:58	8:58 PM	41634.8736	2.00	2.00	2.00
12/26/2013 21:03	9:03 PM	41634.8771	2.00	2.00	2.00
12/26/2013 21:08	9:08 PM	41634.8806	2.50	2.00	2.25
12/26/2013 21:13	9:13 PM	41634.8840	2.00	2.00	2.00
12/26/2013 21:18	9:18 PM	41634.8875	2.00	2.00	2.00
12/26/2013 21:23	9:23 PM	41634.8910	2.00	2.00	2.00
12/26/2013 21:28	9:28 PM	41634.8944	2.00	2.00	2.00
12/26/2013 21:33	9:33 PM	41634.8979	2.00	2.00	2.00
12/26/2013 21:38	9:38 PM	41634.9014	2.00	2.00	2.00
12/26/2013 21:43	9:43 PM	41634.9049	2.00	2.00	2.00
12/26/2013 21:48	9:48 PM	41634.9083	2.00	2.00	2.00
12/26/2013 21:53	9:53 PM	41634.9118	2.00	2.00	2.00
12/26/2013 21:58	9:58 PM	41634.9153	2.00	2.00	2.00
12/26/2013 22:03	10:03 PM	41634.9188	2.00	2.00	2.00
12/26/2013 22:08	10:08 PM	41634.9222	2.50	2.00	2.25
12/26/2013 22:13	10:13 PM	41634.9257	2.00	2.00	2.00
12/26/2013 22:18	10:18 PM	41634.9292	2.00	2.00	2.00
12/26/2013 22:23	10:23 PM	41634.9326	2.50	2.00	2.25
12/26/2013 22:28	10:28 PM	41634.9361	2.00	2.00	2.00
12/26/2013 22:33	10:33 PM	41634.9396	2.00	2.00	2.00
12/26/2013 22:38	10:38 PM	41634.9431	2.00	2.00	2.00
12/26/2013 22:43	10:43 PM	41634.9465	2.00	2.00	2.00
12/26/2013 22:48	10:48 PM	41634.9500	2.00	2.00	2.00
12/26/2013 22:53	10:53 PM	41634.9535	2.00	2.00	2.00
12/26/2013 22:58	10:58 PM	41634.9569	2.00	2.00	2.00
12/26/2013 23:03	11:03 PM	41634.9604	2.00	2.00	2.00
12/26/2013 23:08	11:08 PM	41634.9639	2.50	2.00	2.25
12/26/2013 23:13	11:13 PM	41634.9674	2.00	2.00	2.00
12/26/2013 23:18	11:18 PM	41634.9708	2.00	2.00	2.00
12/26/2013 23:23	11:23 PM	41634.9743	2.00	2.00	2.00
12/26/2013 23:28	11:28 PM	41634.9778	2.50	2.00	2.25
12/26/2013 23:33	11:33 PM	41634.9813	2.50	2.00	2.25
12/26/2013 23:38	11:38 PM	41634.9847	2.00	2.00	2.00

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

12/26/2013 23:43	11:43 PM	41634.9882	2.00	2.00	2.00
12/26/2013 23:48	11:48 PM	41634.9917	2.00	2.00	2.00
12/26/2013 23:53	11:53 PM	41634.9951	2.00	2.00	2.00
12/26/2013 23:58	11:58 PM	41634.9986	2.00	0.00	1.00
12/27/2013 0:03	12:03 AM	41635.0021	0.00	-1.00	-0.50
12/27/2013 0:08	12:08 AM	41635.0056	-0.50	-1.00	-0.75
12/27/2013 0:13	12:13 AM	41635.0090	-0.50	-1.00	-0.75
12/27/2013 0:18	12:18 AM	41635.0125	-0.50	-1.00	-0.75
12/27/2013 0:23	12:23 AM	41635.0160	-0.50	-1.00	-0.75
12/27/2013 0:28	12:28 AM	41635.0194	-0.50	-1.00	-0.75
12/27/2013 0:33	12:33 AM	41635.0229	-0.50	-1.00	-0.75
12/27/2013 0:38	12:38 AM	41635.0264	-1.00	-1.00	-1.00
12/27/2013 0:43	12:43 AM	41635.0299	-0.50	-1.00	-0.75
12/27/2013 0:48	12:48 AM	41635.0333	-0.50	-1.00	-0.75
12/27/2013 0:53	12:53 AM	41635.0368	-0.50	-1.00	-0.75
12/27/2013 0:58	12:58 AM	41635.0403	-0.50	-1.00	-0.75
12/27/2013 1:03	1:03 AM	41635.0438	-0.50	-1.00	-0.75
12/27/2013 1:08	1:08 AM	41635.0472	-0.50	-1.00	-0.75
12/27/2013 1:13	1:13 AM	41635.0507	-0.50	-1.00	-0.75
12/27/2013 1:18	1:18 AM	41635.0542	-0.50	-1.00	-0.75
12/27/2013 1:23	1:23 AM	41635.0576	-0.50	-1.00	-0.75
12/27/2013 1:28	1:28 AM	41635.0611	-0.50	-1.00	-0.75
12/27/2013 1:33	1:33 AM	41635.0646	-0.50	-1.00	-0.75
12/27/2013 1:38	1:38 AM	41635.0681	-0.50	-1.00	-0.75
12/27/2013 1:43	1:43 AM	41635.0715	-0.50	-1.00	-0.75
12/27/2013 1:48	1:48 AM	41635.0750	-0.50	-1.00	-0.75
12/27/2013 1:53	1:53 AM	41635.0785	-0.50	-1.00	-0.75
12/27/2013 1:58	1:58 AM	41635.0819	-0.50	-1.00	-0.75
12/27/2013 2:03	2:03 AM	41635.0854	-0.50	-1.00	-0.75
12/27/2013 2:08	2:08 AM	41635.0889	-0.50	-1.00	-0.75
12/27/2013 2:13	2:13 AM	41635.0924	-0.50	-1.00	-0.75
12/27/2013 2:18	2:18 AM	41635.0958	-0.50	-1.00	-0.75
12/27/2013 2:23	2:23 AM	41635.0993	-0.50	-1.00	-0.75
12/27/2013 2:28	2:28 AM	41635.1028	-0.50	-1.00	-0.75

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

12/27/2013 2:33	2:33 AM	41635.1063	-0.50	-1.00	-0.75
12/27/2013 2:38	2:38 AM	41635.1097	-0.50	-1.00	-0.75
12/27/2013 2:43	2:43 AM	41635.1132	-0.50	-1.00	-0.75
12/27/2013 2:48	2:48 AM	41635.1167	-0.50	-1.00	-0.75
12/27/2013 2:53	2:53 AM	41635.1201	-0.50	-1.00	-0.75
12/27/2013 2:58	2:58 AM	41635.1236	-0.50	-1.00	-0.75
12/27/2013 3:03	3:03 AM	41635.1271	-0.50	-1.00	-0.75
12/27/2013 3:08	3:08 AM	41635.1306	-0.50	-1.00	-0.75
12/27/2013 3:13	3:13 AM	41635.1340	-0.50	-1.00	-0.75
12/27/2013 3:18	3:18 AM	41635.1375	-0.50	-1.00	-0.75
12/27/2013 3:23	3:23 AM	41635.1410	-0.50	-1.00	-0.75
12/27/2013 3:28	3:28 AM	41635.1444	-0.50	-1.00	-0.75
12/27/2013 3:33	3:33 AM	41635.1479	-0.50	-1.00	-0.75
12/27/2013 3:38	3:38 AM	41635.1514	-0.50	-1.00	-0.75
12/27/2013 3:43	3:43 AM	41635.1549	-0.50	-1.00	-0.75
12/27/2013 3:48	3:48 AM	41635.1583	-0.50	-1.00	-0.75
12/27/2013 3:53	3:53 AM	41635.1618	-0.50	-1.00	-0.75
12/27/2013 3:58	3:58 AM	41635.1653	-0.50	-1.00	-0.75
12/27/2013 4:03	4:03 AM	41635.1688	-0.50	-1.00	-0.75
12/27/2013 4:08	4:08 AM	41635.1722	-0.50	-1.00	-0.75
12/27/2013 4:13	4:13 AM	41635.1757	-0.50	-1.00	-0.75
12/27/2013 4:18	4:18 AM	41635.1792	-0.50	-1.00	-0.75
12/27/2013 4:23	4:23 AM	41635.1826	-0.50	-1.00	-0.75
12/27/2013 4:28	4:28 AM	41635.1861	-0.50	-1.00	-0.75
12/27/2013 4:33	4:33 AM	41635.1896	-0.50	-1.00	-0.75
12/27/2013 4:38	4:38 AM	41635.1931	-0.50	-1.00	-0.75
12/27/2013 4:43	4:43 AM	41635.1965	-0.50	-1.00	-0.75
12/27/2013 4:48	4:48 AM	41635.2000	-0.50	-1.00	-0.75
12/27/2013 4:53	4:53 AM	41635.2035	-0.50	-1.00	-0.75
12/27/2013 4:58	4:58 AM	41635.2069	-0.50	-1.00	-0.75
12/27/2013 5:03	5:03 AM	41635.2104	-0.50	-1.00	-0.75
12/27/2013 5:08	5:08 AM	41635.2139	-0.50	-1.00	-0.75
12/27/2013 5:13	5:13 AM	41635.2174	-0.50	-1.00	-0.75
12/27/2013 5:18	5:18 AM	41635.2208	-0.50	-1.00	-0.75

Table 1
Indoor/Subslab Differential Pressure Log
Room 127 Southside High School
Elmira, New York

Omniguard 4 Differential Pressure Meter

Positive values indicate that the room air pressure is greater than that in the subslab

12/27/2013 5:23	5:23 AM	41635.2243	-0.50	-1.00	-0.75
12/27/2013 5:28	5:28 AM	41635.2278	-0.50	-1.00	-0.75
12/27/2013 5:33	5:33 AM	41635.2313	-0.50	-1.00	-0.75
12/27/2013 5:38	5:38 AM	41635.2347	-0.50	-1.00	-0.75
12/27/2013 5:43	5:43 AM	41635.2382	-0.50	-0.50	-0.50
12/27/2013 5:48	5:48 AM	41635.2417	-0.50	-1.00	-0.75
12/27/2013 5:53	5:53 AM	41635.2451	-0.50	-1.00	-0.75
12/27/2013 5:58	5:58 AM	41635.2486	-0.50	-1.00	-0.75
12/27/2013 6:03	6:03 AM	41635.2521	-0.50	-1.00	-0.75
12/27/2013 6:08	6:08 AM	41635.2556	-0.50	-1.00	-0.75
12/27/2013 6:13	6:13 AM	41635.2590	-0.50	-1.00	-0.75
12/27/2013 6:18	6:18 AM	41635.2625	-0.50	-1.00	-0.75
12/27/2013 6:23	6:23 AM	41635.2660	-0.50	-1.00	-0.75
12/27/2013 6:28	6:28 AM	41635.2694	-0.50	-1.00	-0.75
12/27/2013 6:33	6:33 AM	41635.2729	-0.50	-1.00	-0.75
12/27/2013 6:38	6:38 AM	41635.2764	-0.50	-1.00	-0.75
12/27/2013 6:43	6:43 AM	41635.2799	-0.50	-1.00	-0.75
12/27/2013 6:48	6:48 AM	41635.2833	-0.50	-1.00	-0.75
12/27/2013 6:53	6:53 AM	41635.2868	-0.50	-1.00	-0.75
12/27/2013 6:58	6:58 AM	41635.2903	-0.50	-1.00	-0.75
12/27/2013 7:03	7:03 AM	41635.2938	-0.50	-0.50	-0.50
12/27/2013 7:08	7:08 AM	41635.2972	-0.50	-1.00	-0.75
12/27/2013 7:13	7:13 AM	41635.3007	-0.50	-1.00	-0.75
12/27/2013 7:18	7:18 AM	41635.3042	-0.50	-1.00	-0.75
12/27/2013 7:23	7:23 AM	41635.3076	-0.50	-1.00	-0.75
12/27/2013 7:28	7:28 AM	41635.3111	-0.50	-1.00	-0.75
12/27/2013 7:33	7:33 AM	41635.3146	-0.50	-0.50	-0.50
12/27/2013 7:38	7:38 AM	41635.3181	-0.50	-0.50	-0.50
12/27/2013 7:43	7:43 AM	41635.3215	-0.50	-0.50	-0.50
12/27/2013 7:48	7:48 AM	41635.3250	-0.50	-1.00	-0.75

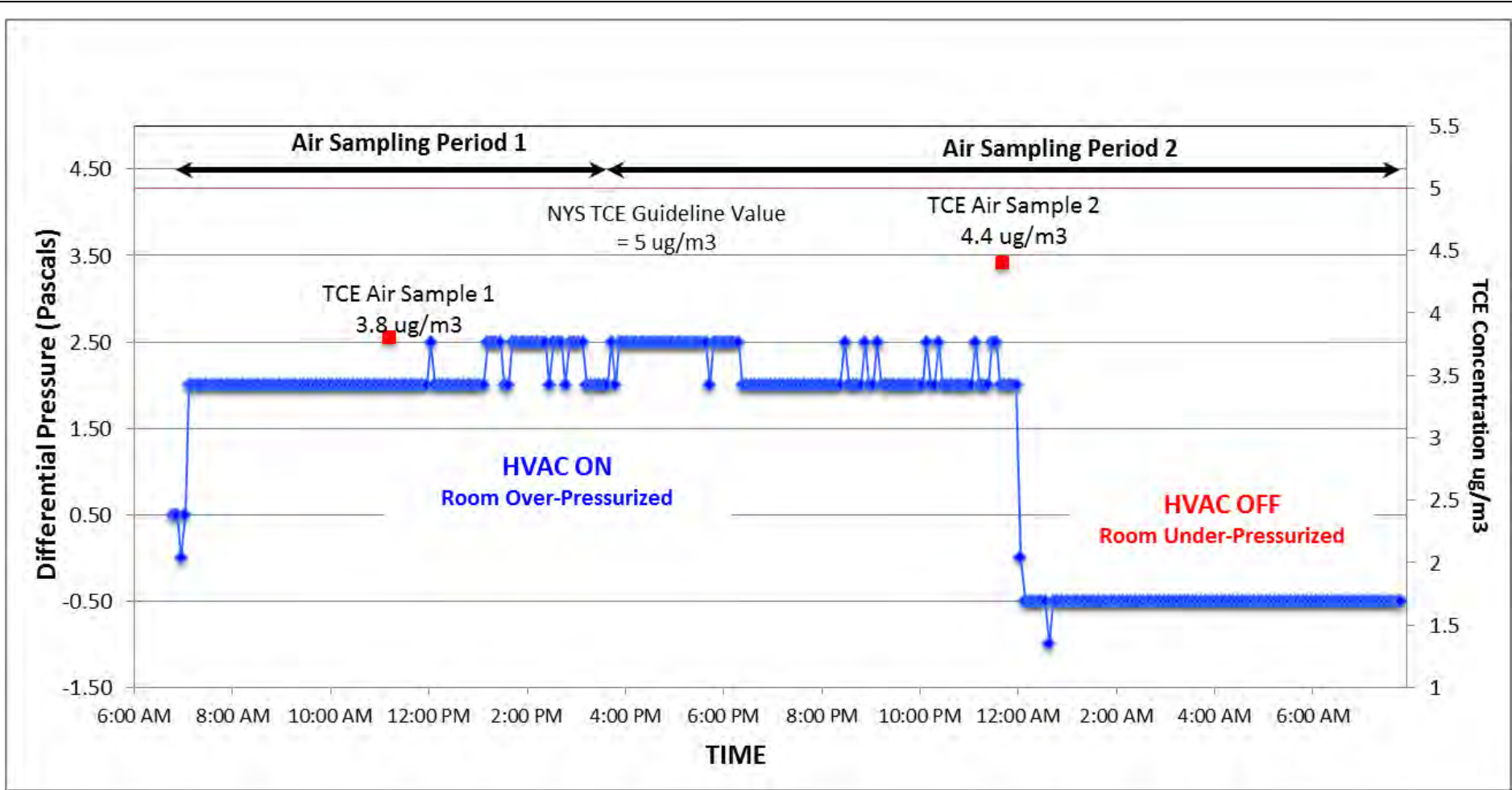
Table 2
December 2013 Air Sampling Results Summary
Southside High School
Elmira, New York

Sample Location	Concentration (ug/m3)								
	TCE	cis-1,2-DCE	PCE	1,2-DCA	Benzene	Toluene	Ethyl Benzene	m,p-Xylene	o-Xylene
Indoor Air Sample # 1	3.8	0.58	ND (<0.21)	0.32	0.46	0.8	0.18	0.74	0.28
Indoor Air Sample # 2	4.4	0.32	0.24	0.4	0.74	4.7	0.59	2.1	0.69
Outdoor Air Sample #1	ND (<0.16)	ND (<0.11)	ND (<0.20)	ND (<0.12)	0.51	0.86	0.15	0.5	0.2
Outdoor Air Sample #2	ND (<0.15)	ND (<0.11)	ND (<0.19)	ND (<0.11)	0.48	0.52	ND (<0.12)	0.31	0.12

August 2013 Air Sampling Results Summary

Sample Description	Concentration (ug/m3)								
	TCE	cis-1,2-DCE	PCE	1,2-DCA	Benzene	Toluene	Ethyl Benzene	m,p-Xylene	o-Xylene
Indoor Air Sample # 1	1.70	0.20	ND (<0.21)	0.51	0.4	2.3	0.39	1.4	0.49
Indoor Air Sample # 2	3.00	0.34	ND (<0.21)	7.30	0.36	2.7	0.48	1.7	0.6
Outdoor Air Sample #1	ND (<0.18)	ND (<0.14)	ND (<0.23)	ND (<0.14)	ND (<0.27)	0.99	0.25	0.85	0.29
Outdoor Air Sample #2	ND (<0.16)	ND (<0.12)	ND (<0.21)	ND (<0.12)	0.25	0.65	ND (<0.13)	0.42	0.15

Note: TCE concentrations are below the New York State Guideline Value of 5 ug/m3 for TCE in Air



Notes

NYS – New York State
 TCE – Trichloroethene
 ug/m³ – micrograms per cubic meter

**Room 127 Differential Pressure Monitoring
 and Indoor Air Analyses
 Southside High School
 Elmira, New York**



MN0832/Southside HS Rm 127 Figure 1.pptx

Geosyntec Consultants

Photographic Record

Client: Unisys Corporation

Project Number: MN0832

Site Name: Southside High School

Site Location: Elmira, New York

Photograph 1

Date: 26 December 2013

Comments:

View of Summa Canister
placement for indoor air
samples in Room 127



Geosyntec Consultants

Photographic Record

Client: Unisys Corporation

Project Number: MN0832

Site Name: Southside High School

Site Location: Elmira, New York

Photograph 2

Date: 26 December 2013

Comments:

View of Summa Canister
placement for outdoor air
samples on roof above Room
127



Geosyntec Consultants

Photographic Record

Client: Unisys Corporation

Project Number: MN0832

Site Name: Southside High School

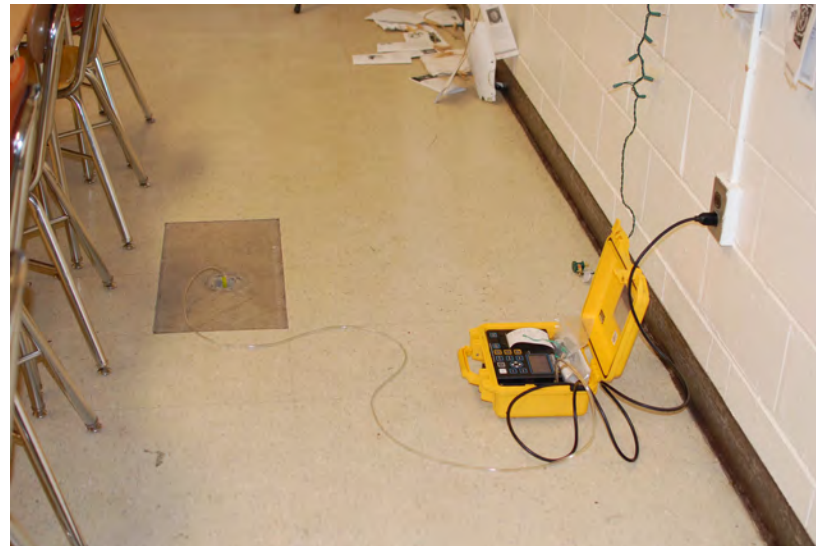
Site Location: Elmira, New York

Photograph 3

Date: 26 December 2013

Comments:

Omniguard 4 connected to
subslab port in Room 127



1/2/2014

Mr. William Wertz
GeoSyntec Consultants
26 Century Hill Drive
Suite 205
Latham NY 12110

Project Name: Southside High School
Project #: MN0832.99
Workorder #: 1312482

Dear Mr. William Wertz

The following report includes the data for the above referenced project for sample(s) received on 12/28/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Karen Stempson
Project Manager

WORK ORDER #: 1312482

Work Order Summary

CLIENT:	Mr. William Wertz GeoSyntec Consultants 26 Century Hill Drive Suite 205 Latham, NY 12110	BILL TO:	Ms. Hester Groenevelt GeoSyntec Consultants 130 Research Lane Suite 2 Guelph, Ontario N1G5G3
PHONE:	518-785-0800	P.O. #	
FAX:		PROJECT #	MN0832.99 Southside High School
DATE RECEIVED:	12/28/2013	CONTACT:	Karen Stempson
DATE COMPLETED:	01/02/2014		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SSHS-12-26-13-IA-01	Modified TO-15 SIM	4.2 "Hg	5 psi
02A	SSHS-12-26-13-OA-01	Modified TO-15 SIM	2.2 "Hg	5 psi
03A	SSHS-12-26-13-IA-02	Modified TO-15 SIM	1.6 "Hg	5 psi
04A	SSHS-12-26-13-OA-02	Modified TO-15 SIM	1.2 "Hg	5 psi
05A	Lab Blank	Modified TO-15 SIM	NA	NA
06A	CCV	Modified TO-15 SIM	NA	NA
07A	LCS	Modified TO-15 SIM	NA	NA
07AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: 
 Technical Director

DATE: 01/02/14

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-13-6, UT NELAP CA009332013-4, VA NELAP - 460197, WA NELAP - C935
 Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
 Accreditation number: CA300005, Effective date: 10/18/2013, Expiration date: 10/17/2014.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
Modified TO-15 SIM
GeoSyntec Consultants
Workorder# 1312482

Four 6 Liter Summa Canister (SIM Certified) samples were received on December 28, 2013. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
ICAL %RSD acceptance criteria	$\leq 30\%$ RSD with 2 compounds allowed out to <math>< 40\%</math> RSD	Project specific; default criteria is $\leq 30\%$ RSD with 10% of compounds allowed out to <math>< 40\%</math> RSD
Daily Calibration	+/- 30% Difference	Project specific; default criteria is $\leq 30\%$ Difference with 10% of compounds allowed out up to $\leq 40\%$; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: SSHS-12-26-13-IA-01

Lab ID#: 1312482-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.031	0.14	0.12	0.58
Benzene	0.078	0.14	0.25	0.46
1,2-Dichloroethane	0.031	0.078	0.13	0.32
Trichloroethene	0.031	0.71	0.17	3.8
Toluene	0.031	0.21	0.12	0.80
Ethyl Benzene	0.031	0.042	0.14	0.18
m,p-Xylene	0.062	0.17	0.27	0.74
o-Xylene	0.031	0.066	0.14	0.28

Client Sample ID: SSHS-12-26-13-OA-01

Lab ID#: 1312482-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.072	0.16	0.23	0.51
Toluene	0.029	0.23	0.11	0.86
Ethyl Benzene	0.029	0.034	0.12	0.15
m,p-Xylene	0.058	0.12	0.25	0.50
o-Xylene	0.029	0.045	0.12	0.20

Client Sample ID: SSHS-12-26-13-IA-02

Lab ID#: 1312482-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.028	0.080	0.11	0.32
Benzene	0.071	0.23	0.23	0.74
1,2-Dichloroethane	0.028	0.10	0.11	0.40
Trichloroethene	0.028	0.83	0.15	4.4
Toluene	0.028	1.2	0.11	4.7
Tetrachloroethene	0.028	0.036	0.19	0.24
Ethyl Benzene	0.028	0.14	0.12	0.59
m,p-Xylene	0.057	0.48	0.25	2.1
o-Xylene	0.028	0.16	0.12	0.69

**Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM**

Client Sample ID: SSHA-12-26-13-OA-02

Lab ID#: 1312482-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.070	0.15	0.22	0.48
Toluene	0.028	0.14	0.10	0.52
m,p-Xylene	0.056	0.072	0.24	0.31
o-Xylene	0.028	0.028	0.12	0.12



Air Toxics

Client Sample ID: SSHS-12-26-13-IA-01

Lab ID#: 1312482-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123107sim	Date of Collection:	12/26/13 3:35:00 PM
Dil. Factor:	1.56	Date of Analysis:	12/31/13 12:20 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.062	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.13	Not Detected
cis-1,2-Dichloroethene	0.031	0.14	0.12	0.58
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
Benzene	0.078	0.14	0.25	0.46
1,2-Dichloroethane	0.031	0.078	0.13	0.32
Trichloroethene	0.031	0.71	0.17	3.8
Toluene	0.031	0.21	0.12	0.80
1,1,2-Trichloroethane	0.031	Not Detected	0.17	Not Detected
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected
Ethyl Benzene	0.031	0.042	0.14	0.18
m,p-Xylene	0.062	0.17	0.27	0.74
o-Xylene	0.031	0.066	0.14	0.28
1,1,2,2-Tetrachloroethane	0.031	Not Detected	0.21	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.62	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.56	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: SSHS-12-26-13-OA-01

Lab ID#: 1312482-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123108sim	Date of Collection: 12/26/13 3:50:00 PM
Dil. Factor:	1.45	Date of Analysis: 12/31/13 12:56 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.014	Not Detected	0.037	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.057	Not Detected
1,1-Dichloroethane	0.029	Not Detected	0.12	Not Detected
cis-1,2-Dichloroethene	0.029	Not Detected	0.11	Not Detected
1,1,1-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Benzene	0.072	0.16	0.23	0.51
1,2-Dichloroethane	0.029	Not Detected	0.12	Not Detected
Trichloroethene	0.029	Not Detected	0.16	Not Detected
Toluene	0.029	0.23	0.11	0.86
1,1,2-Trichloroethane	0.029	Not Detected	0.16	Not Detected
Tetrachloroethene	0.029	Not Detected	0.20	Not Detected
Ethyl Benzene	0.029	0.034	0.12	0.15
m,p-Xylene	0.058	0.12	0.25	0.50
o-Xylene	0.029	0.045	0.12	0.20
1,1,2,2-Tetrachloroethane	0.029	Not Detected	0.20	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.57	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.52	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: SSHS-12-26-13-IA-02

Lab ID#: 1312482-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123109sim	Date of Collection: 12/27/13 7:45:00 AM
Dil. Factor:	1.42	Date of Analysis: 12/31/13 01:32 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.014	Not Detected	0.036	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.056	Not Detected
1,1-Dichloroethane	0.028	Not Detected	0.11	Not Detected
cis-1,2-Dichloroethene	0.028	0.080	0.11	0.32
1,1,1-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Benzene	0.071	0.23	0.23	0.74
1,2-Dichloroethane	0.028	0.10	0.11	0.40
Trichloroethene	0.028	0.83	0.15	4.4
Toluene	0.028	1.2	0.11	4.7
1,1,2-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Tetrachloroethene	0.028	0.036	0.19	0.24
Ethyl Benzene	0.028	0.14	0.12	0.59
m,p-Xylene	0.057	0.48	0.25	2.1
o-Xylene	0.028	0.16	0.12	0.69
1,1,2,2-Tetrachloroethane	0.028	Not Detected	0.19	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.56	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.51	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	97	70-130



Air Toxics

Client Sample ID: SSHS-12-26-13-OA-02

Lab ID#: 1312482-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123110sim	Date of Collection: 12/27/13 7:48:00 AM
Dil. Factor:	1.40	Date of Analysis: 12/31/13 02:07 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.014	Not Detected	0.036	Not Detected
1,1-Dichloroethene	0.014	Not Detected	0.056	Not Detected
1,1-Dichloroethane	0.028	Not Detected	0.11	Not Detected
cis-1,2-Dichloroethene	0.028	Not Detected	0.11	Not Detected
1,1,1-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Benzene	0.070	0.15	0.22	0.48
1,2-Dichloroethane	0.028	Not Detected	0.11	Not Detected
Trichloroethene	0.028	Not Detected	0.15	Not Detected
Toluene	0.028	0.14	0.10	0.52
1,1,2-Trichloroethane	0.028	Not Detected	0.15	Not Detected
Tetrachloroethene	0.028	Not Detected	0.19	Not Detected
Ethyl Benzene	0.028	Not Detected	0.12	Not Detected
m,p-Xylene	0.056	0.072	0.24	0.31
o-Xylene	0.028	0.028	0.12	0.12
1,1,2,2-Tetrachloroethane	0.028	Not Detected	0.19	Not Detected
trans-1,2-Dichloroethene	0.14	Not Detected	0.56	Not Detected
Methyl tert-butyl ether	0.14	Not Detected	0.50	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	97	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1312482-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123106sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/31/13 11:33 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130

Client Sample ID: CCV

Lab ID#: 1312482-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123102sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/31/13 08:38 AM

Compound	%Recovery
Vinyl Chloride	97
1,1-Dichloroethene	96
1,1-Dichloroethane	97
cis-1,2-Dichloroethene	101
1,1,1-Trichloroethane	95
Benzene	87
1,2-Dichloroethane	89
Trichloroethene	84
Toluene	93
1,1,2-Trichloroethane	93
Tetrachloroethene	96
Ethyl Benzene	104
m,p-Xylene	106
o-Xylene	108
1,1,2,2-Tetrachloroethane	86
trans-1,2-Dichloroethene	99
Methyl tert-butyl ether	107

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

Client Sample ID: LCS

Lab ID#: 1312482-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123103sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/31/13 09:20 AM

Compound	%Recovery	Method Limits
Vinyl Chloride	96	70-130
1,1-Dichloroethene	110	70-130
1,1-Dichloroethane	101	70-130
cis-1,2-Dichloroethene	118	70-130
1,1,1-Trichloroethane	97	70-130
Benzene	90	70-130
1,2-Dichloroethane	90	70-130
Trichloroethene	88	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	98	70-130
Ethyl Benzene	108	70-130
m,p-Xylene	118	70-130
o-Xylene	117	70-130
1,1,2,2-Tetrachloroethane	88	70-130
trans-1,2-Dichloroethene	88	60-140
Methyl tert-butyl ether	110	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	107	70-130



Air Toxics

Client Sample ID: LCSD

Lab ID#: 1312482-07AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	c123104sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/31/13 10:02 AM

Compound	%Recovery	Method Limits
Vinyl Chloride	93	70-130
1,1-Dichloroethene	108	70-130
1,1-Dichloroethane	100	70-130
cis-1,2-Dichloroethene	118	70-130
1,1,1-Trichloroethane	97	70-130
Benzene	91	70-130
1,2-Dichloroethane	90	70-130
Trichloroethene	88	70-130
Toluene	97	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	100	70-130
Ethyl Benzene	106	70-130
m,p-Xylene	109	70-130
o-Xylene	107	70-130
1,1,2,2-Tetrachloroethane	88	70-130
trans-1,2-Dichloroethene	87	60-140
Methyl tert-butyl ether	109	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	101	70-130

Memorandum

Date: 6 January 2014
To: William Wertz
Aron Krasnopoler
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable – Selected Volatile Organic Compounds by EPA Method TO-15 Using Selected Ion Monitoring – Eurofins Air Toxics, Inc. Work Order #1312482**

SITE: Southside High School

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of four air samples, collected on December 26-27, 2013 in support of the Southside High School sampling event. Air Toxics, Inc., Folsom, California analyzed the samples. The samples were analyzed for the following test:

- EPA Method TO-15 Using Selected Ion Monitoring (SIM) – Selected Volatile Organic Compounds (VOCs)

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Overall, based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent method referenced by the data package and professional judgment.

The following samples were analyzed and validated at a Stage 4 level in the data set:

Lab ID	Client ID
1312482-01A	SSHS-12-26-13-IA-01
1312482-02A	SSHS-12-26-13-OA-01
1312482-03A	SSHS-12-26-13-IA-02

Lab ID	Client ID
1312482-04A	SSHS-12-26-13-OA-02

1.0 VOLATILE ORGANIC COMPOUNDS

Four air samples were analyzed for selected VOCs per EPA Method TO-15 SIM. The following compounds were reported: Vinyl chloride, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, 1,1,1-trichloroethane, benzene, 1,2-dichloroethane, trichloroethene, toluene, 1,1,2-trichloroethane, tetrachloroethene, ethyl benzene, m,p-xylene, o-xylene, 1,1,2,2-tetrachloroethane, trans-1,2-dichloroethene and methyl tert-butyl ether.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Sensitivity
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. 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%.

1.2 Holding Times

The holding time for an air sample is 30 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

Instrument performance check samples (tune standards) were analyzed at the beginning of each 24-hour period during sample analysis. The samples were analyzed within the 24-hour period. The method TO-15 ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the compounds met the method specified acceptance criteria of less than or equal to 30%RSD, with two exceptions up to a limit of 40% RSD.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The percent differences (%Ds) between the RRFs in the initial and continuing calibration standards for the compounds were within the method specified acceptance criteria of less than or equal to 30%D.

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data. VOCs were not detected in the method blanks above the reporting limits (RLs).

1.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The recovery and relative percent difference (RPD) results reported for the LCS/LCSD pair were within the method specified acceptance criteria.

1.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.9 Sensitivity

The samples were reported to the RLs. Elevated non-detect results were reported for the samples due to the dilutions analyzed.

1.10 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.11 Internal Standards

The internal standard areas and retention times were within the method specified acceptance limits.

1.12 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.14 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

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