



Memorandum

To:	Kevin Dana	From:	Andrew S. Blake, R.G.
Company:	Oregon Department of Environmental Quality	Date:	July 31, 2017
Address:	700 Multnomah Street, Suite 600 Portland, OR 97232		
cc:	Mark Desbrow, Green Light Development (via email only) Duston Larsen, Green Light Development (via email only)		
SEC Project:	GL-1-01		
RE:	Supplemental Soil Vapor Evaluation 2721 - 2731 SE Belmont Street - DEQ ECSI # 5731 Portland, Oregon		

Succeed Environmental Consulting LLC (SEC) is pleased to present this memorandum discussing the results of our supplemental soil vapor evaluation completed at the former Washworld facility located at 2721 - 2731 SE Belmont Street in Portland, Oregon (project site). The project site includes a vacant commercial structure that was historically occupied by a dry-cleaning facility. During its operation, dry-cleaning solvents containing halogenated volatile organic compounds (HVOCs), primarily tetrachloroethylene (PCE), were released into the subsurface and impacted soil, groundwater, soil vapor at the project site. A sub-slab vapor extraction system (VES) was constructed and activated beneath the project site structure in October 2014, and it operated until October 2016. GeoDesign, Inc. of Wilsonville, Oregon previously completed two soil vapor evaluations at the project site, which are summarized in their *Supplemental Soil Vapor Evaluation* memorandum dated February 3, 2016. The previous soil vapor evaluation consisted of the collection of soil vapor samples from five locations (SV-01 through SV-05), which are shown on Figure 1. On July 17, 2017, SEC re-collected vapor samples SV-01, SV-03, and SV-04 to evaluate soil vapor conditions near the project site structure. The details regarding SEC's supplemental soil vapor evaluation are provided in the following sections.

SUPPLEMENTAL SOIL VAPOR EVALUATION

On July 17, 2017, SEC advanced three borings (SV-01, SV-03, and SV-04) to collect soil vapor samples at the locations shown on Figure 1. The borings were advanced to a depth of approximately 5.0 feet below ground surface using equipment that is owned and operated by SEC. Specifically, SEC collected one soil vapor sample from each of the three borings from sampling systems consisting of laboratory provided 1-liter Summa™ canisters with in-line filters (0.7 micron) and flow controllers (less than 200 milliliters per minute), which were connected to decontaminated stainless steel soil-gas sampling probes via Teflon™ tubing. SEC sealed the annular space between the soil vapor sampling probe and the boring sidewall with bentonite and cement grout (as appropriate) to minimize ambient air migration into the soil-gas sampling zone. A leak-check system was installed at each location. Specifically, dedicated tubing was attached to the soil-gas probe, passed through a plastic shroud, and connected to the sampling manifold. Swagelok™ fittings and hose barb



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connections were used to create a reasonably closed system. The plastic shroud was placed over the soil-gas probe and charged with helium gas. For each sample, the sampling train was slowly purged using a photoionization detector. A helium detector was used to measure helium concentrations during purging. Based on the field measurements, the sampling train was airtight (less than 1% breakthrough). After purging each sample train and waiting at least 30 minutes (equilibration time), each sample was collected. The samples were shipped to ESC Lab Sciences of Mt. Juliet, Tennessee (ESC), under general chain-of-custody protocols for analysis of HVOCs by U.S. Environmental Protection Agency (EPA) Method TO-15.

CHEMICAL ANALYTICAL PROGRAM AND RESULTS

The vapor samples were analyzed for HVOCs by EPA Method TO-15. PCE was not detected in the soil vapor samples collected at the project site at concentrations greater than the Oregon Department of Environmental Quality (DEQ) Urban Residential and Occupational vapor intrusion risk-based concentrations (RBCs), which indicates that the risk of an adverse vapor intrusion condition to adjoining properties is low. HVOCs were otherwise not detected at concentrations greater than laboratory reported detection limits in the samples analyzed. The chemical analytical results are presented in Table 1. The chemical analytical laboratory report and chain-of-custody documentation are provided in the Attachment.

CONCLUSION

Based on the results of this assessment, operation of the VES between 2014 and 2016 has reduced HVOC concentrations beneath the northern portion of the project site to levels that should not pose a risk to occupants of properties adjoining the project site to the west, north, and east. Accordingly, continued operation of the VES does not appear warranted at this time. It should be noted that elevated concentrations of vapor-phase PCE likely remain beneath the parking lot located in the southern portion of the project site. We understand that redevelopment plans include the construction of a residential structure over both the northern and southern portions of the project site. SEC recommends that future redevelopment activities be performed in accordance with the Contaminated Media Management Plan and Remedial Action Plan that were prepared for the project site and approved by DEQ.



Expires 06/30/2018

Two copies submitted

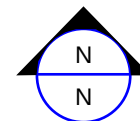
Document ID: GL-1-01-072817-envm-doc

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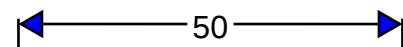


LEGEND:

-  **PROJECT SITE BOUNDARY
(SHOWN IN YELLOW)**
-  **SV-01
(4,000 ug/m³)** **SOIL VAPOR SAMPLE
(PCE CONCENTRATION)**



(APPROXIMATE SCALE IN FEET)



MEASUREMENTS DERIVED FROM THIS FIGURE
SHOULD BE CONSIDERED APPROXIMATE.

TABLE 1
Summary of Sub-Slab Vapor Chemical Analytical Results¹
HVOCs by EPA Method TO-15
2721 - 2731 SE Belmont Street
Portland, Oregon

		1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethylene (PCE)	Trichloroethylene	Vinyl Chloride
Sample I.D.	Date Collected	Results (µg/m ³)					
SV-01	7/17/2017	1.59 U	1.59 U	1.59 U	4,000	2.14 U	1.02 U
SV-03	7/17/2017	1.59 U	1.59 U	1.59 U	534	2.14 U	1.02 U
SV-04	7/17/2017	1.59 U	1.59 U	1.59 U	39.0	2.14 U	1.02 U
DEQ Generic RBCs dated 11/1/2015							
Urban Residential Vapor Intrusion into Buildings		42,000	>Pv	>Pv	5,100	200	41
Occupational Vapor Intrusion into Buildings		880,000	>Pv	>Pv	47,000	2,900	2,800

Notes:

1. Chemical analysis performed by ESC Lab Sciences of Mt. Juliet, Tennessee.

U: Analyte not detected at a concentration greater than the laboratory RDL (shown).

Bolding indicates analyte was detected at a concentration greater than the laboratory RDL.

>Pv: The air concentration reported for the RBC exceeds the vapor pressure of the pure chemical.

Succeed Environmental Consulting

Sample Delivery Group: L923152
Samples Received: 07/18/2017
Project Number: GL-1-01
Description:

Report To: Andrew Blake
6028 NE 49th Avenue
Portland, OR 97218

Entire Report Reviewed By:



Brian Ford
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
SV-01 L923152-01	5	
SV-03 L923152-02	6	⁴ Cn
SV-04 L923152-03	7	⁵ Sr
Qc: Quality Control Summary	8	
Volatile Organic Compounds (MS) by Method TO-15	8	⁶ Qc
Gl: Glossary of Terms	9	
Al: Accreditations & Locations	10	⁷ Gl
Sc: Chain of Custody	11	⁸ Al
		⁹ Sc



SV-01 L923152-01 Air

Collected by
Andrew BlakeCollected date/time
07/17/17 16:40Received date/time
07/18/17 16:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG1000410	2	07/19/17 11:18	07/19/17 11:18	MBF
Volatile Organic Compounds (MS) by Method TO-15	WG1000410	25	07/19/17 13:23	07/19/17 13:23	MBF

¹ Cp² Tc³ Ss

SV-03 L923152-02 Air

Collected by
Andrew BlakeCollected date/time
07/17/17 16:35Received date/time
07/18/17 16:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG1000410	2	07/19/17 12:01	07/19/17 12:01	MBF

⁴ Cn⁵ Sr⁶ Qc

SV-04 L923152-03 Air

Collected by
Andrew BlakeCollected date/time
07/17/17 16:50Received date/time
07/18/17 16:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG1000410	2	07/19/17 12:44	07/19/17 12:44	MBF

⁷ Gl⁸ Al⁹ Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1-Dichloroethene	75-35-4	96.90	0.400	1.59	ND	ND		2	WG1000410
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG1000410
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG1000410
Tetrachloroethylene	127-18-4	166	5.00	33.9	589	4000		25	WG1000410
Trichloroethylene	79-01-6	131	0.400	2.14	ND	ND		2	WG1000410
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG1000410
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		95.9				WG1000410
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		96.8				WG1000410

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1-Dichloroethene	75-35-4	96.90	0.400	1.59	ND	ND		2	WG1000410
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG1000410
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG1000410
Tetrachloroethylene	127-18-4	166	0.400	2.72	78.7	534		2	WG1000410
Trichloroethylene	79-01-6	131	0.400	2.14	ND	ND		2	WG1000410
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG1000410
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		108				WG1000410

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1-Dichloroethene	75-35-4	96.90	0.400	1.59	ND	ND		2	WG1000410
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG1000410
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG1000410
Tetrachloroethylene	127-18-4	166	0.400	2.72	5.75	39.0		2	WG1000410
Trichloroethylene	79-01-6	131	0.400	2.14	ND	ND		2	WG1000410
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG1000410
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		99.2				WG1000410

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3234445-2 07/19/17 09:26

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
1,1-Dichloroethene	U		0.0490	0.200
cis-1,2-Dichloroethene	U		0.0389	0.200
trans-1,2-Dichloroethene	U		0.0464	0.200
Tetrachloroethylene	U		0.0497	0.200
Trichloroethylene	U		0.0545	0.200
Vinyl chloride	U		0.0457	0.200
(S) 1,4-Bromofluorobenzene	97.8			60.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3234445-1 07/19/17 08:44 • (LCSD) R3234445-3 07/19/17 10:10

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Vinyl chloride	3.75	3.53	3.71	94.1	99.1	70.0-130			5.17	25
1,1-Dichloroethene	3.75	3.85	3.86	103	103	70.0-130			0.0900	25
trans-1,2-Dichloroethene	3.75	3.89	3.89	104	104	70.0-130			0.0400	25
cis-1,2-Dichloroethene	3.75	3.86	3.89	103	104	70.0-130			0.780	25
Trichloroethylene	3.75	3.79	3.83	101	102	70.0-130			0.980	25
Tetrachloroethylene	3.75	3.85	3.86	103	103	70.0-130			0.240	25
(S) 1,4-Bromofluorobenzene				98.1	98.2	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
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The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



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* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**

