GEODESIGN INC

Memorandum

To:	Kevin Dana	From:	Andrew S. Blake, R.G.
Company:	Oregon Department of Environmental Quality Northwest Region	Date:	February 3, 2016
Address:	700 NE Multnomah Street, Suite 600 Portland, OR 97232		

cc:	Mark Desbrow, Green Light Development (via email only)

GDI Project:	GreenLight-3-02
RE:	Supplemental Soil Vapor Evaluation 2721 - 2731 SE Belmont Street Portland, Oregon

INTRODUCTION

This memorandum summarizes 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-gas, and indoor air at the project site. A vapor extraction system (VES) is currently operating at the project site. GeoDesign previously completed a soil vapor evaluation at the project site, which is summarized in our memorandum dated August 6, 2015. Prior to sample collection, the VES was deactivated. Although not discussed specifically herein, our previous assessment concluded the following:

- PCE was not detected at concentrations greater than the most conservative Oregon Department of Environmental Quality (DEQ) vapor intrusion risk-based concentrations (RBCs) in the soil vapor samples collected near the northern and eastern boundaries of the project site, which indicates that the risk of an adverse vapor intrusion condition to adjoining properties to the north and east is low.
- PCE was detected in the soil vapor sample collected near the southern boundary of the project site at a concentration greater than all DEQ generic vapor intrusion RBCs.
- PCE was detected in the soil vapor sample collected near the western boundary of the project site at a concentration greater than the DEQ Residential and Urban Residential RBCs, but less than the Occupational RBC.

The sample locations and analytical results are presented on Figure 1. The VES was reactivated shortly after this sample was collected. Based on these results, soil vapor conditions without VES operation do not pose a risk to future occupational receptors at the project site, but could pose a

risk to urban residential receptors. Also, it was not known whether the VES prevented off-site migration of soil vapors.

GeoDesign collected supplemental vapor samples in November and December 2015 to evaluate whether an adverse vapor intrusion condition exists on residential properties located west of the project site and south of SE Belmont Street.

SUPPLEMENTAL SOIL-GAS EVALUATION

Our specific scope of services was based on correspondence with DEQ, as discussed below:

- Obtained a permit (No. TR-15-132) from the City of Portland to complete a boring in the public right-of way (ROW).
- Contacted the Oregon One-Call Utility Notification Center to mark the location of public utilities beneath the ROWs surrounding the project site.
- Completed two borings to collect soil-gas samples in areas shown on Figure 2. One boring was completed at location SV-01. The purpose of this sample was to evaluate concentrations of vapor-phase HVOCs near the western boundary of the project site while the VES was operational. The second boring was completed at location SV-05 (in the southern ROW of SE Belmont Street). The purpose of the sample was to evaluate concentrations of vapor-phase HVOCs near the residential property located south of the project site. The borings were advanced to a depth of 5.0 feet below ground surface using equipment owned and operated by GeoDesign.
- Collected one soil-gas sample from each of the two borings by advancing an AMS Retract-a-Tip™ soil-gas sampling system (or equivalent). The sampling system utilized disposable Teflon tubing, which connected to the soil-gas sampling probe.
- Sealed the annular space between the soil-gas sampling probe and the boring sidewall with bentonite to minimize ambient air migration into the soil-gas sampling zone.
- Installed a DEQ-approved leak-check system at each location. Specifically, the leak-check system was performed as follows:
  - 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 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.
- All samples were collected using 1 liter summa sample canisters with in-line filters (0.7 micron) and flow controllers (less than 200 milliliters per minute).
- 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 and helium by ASTM International Method 1946.

The above-noted protocol was completed once on November 25, 2015 and repeated on December 4, 2015, resulting in the collection of a total of four samples.

CHEMICAL ANALYTICAL PROGRAM AND RESULTS

The samples were shipped to ESC under general chain-of-custody protocols for analysis of HVOCs by EPA Method TO-15 and helium by ASTM Method 1946. The chemical analytical results associated with SV-01 and SV-05 (and all previous results) are presented in Table 1 and discussed in the following sections. The chemical analytical laboratory reports and chain-of-custody documentation are provided in the Attachment.

HELIUM

All four soil vapor samples were analyzed for helium by ASTM Method 1946. Helium was detected in all four samples at concentrations ranging between 56,000 and 142,000 parts per million, which indicated ambient air breakthrough of 5.6 percent and 14.2 percent in the sample train.

HVOCs

All four soil vapor samples were analyzed for the HVOCs cis-1,2-dichloroethene, trans-1,2-dichloroethene, PCE, trichloroethene, and vinyl chloride by EPA Method TO-15. HVOCs were either not detected at concentrations greater than laboratory reported detection limits or were detected at concentrations less than generic DEQ Urban Residential and Occupational RBCs for vapor intrusion into buildings in the samples analyzed. Due to ambient air breakthrough detected in the samples, the HVOC chemical analytical results were corrected using a DEQ-approved equation (result [1.0 + detected helium %]). Table 1 presents *maximum corrected values* that were derived by multiplying the reported laboratory values by a correction factor that is based on percent breakthrough. The corrected values are also less than DEQ Urban Residential and Occupational RBCs for vapor intrusion into buildings.

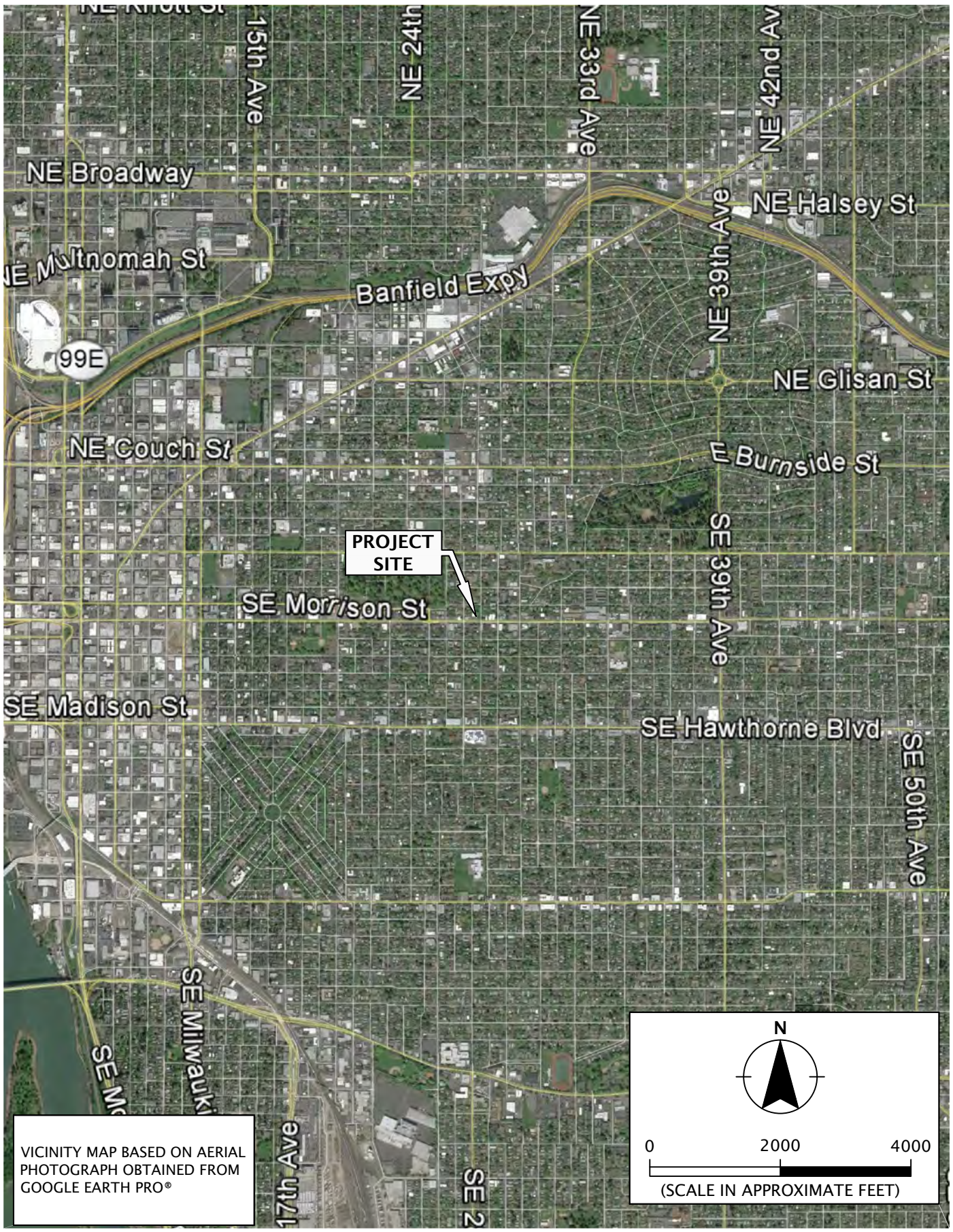
CONCLUSION

Based on the results of our assessment, it is our professional opinion that the project site does not pose a risk of an adverse vapor intrusion condition to residential properties located west or south of the project site. We recommend continued operation of the VES. Green Light Development and DEQ are currently in the process of negotiating a Prospective Purchaser Agreement (PPA) for the project site. In addition to the PPA, we would like to schedule a meeting to discuss a path forward towards pursuing a determination of No Further Action of the project site.

ASB:JSO:rc
Attachments
One copy submitted
Document ID: GreenLight-3-02-020316-envm.docx

Expires 06/30/2016

FIGURES



GEODESIGN INC 15575 SW Sequoia Parkway - Suite 100 Portland OR 97224 Off 503.968.8787 Fax 503.968.3068	GREENLIGHT-3-02	**VICINITY MAP**	
	FEBRUARY 2016	2721 - 2731 SE BELMONT STREET PORTLAND, OR	**FIGURE 1**

Printed By: mmiller | Print Date: 2/3/2016 11:08:30 AM
File Name: J:\E-L\GreenLight\GreenLight-3\GreenLight-3-02\Figures\CAD\GreenLight-3-02-VM01.dwg | Layout: FIGURE 1

LEGEND:

SV-01 (5,500 µg/m³) — SOIL VAPOR SAMPLE (CONCENTRATION OF PCE)

N

0 40 80

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, JULY 28, 2015

GEODESIGN INC
15575 SW Sequoia Parkway - Suite 100
Portland OR 97224
Off 503.968.8787 Fax 503.968.3068

GREENLIGHT-3-02	**SITE PLAN**	
FEBRUARY 2016	2721 - 2731 SE BELMONT STREET PORTLAND, OR	**FIGURE 2**

TABLES

TABLE 1
Summary of Vapor Sample Chemical Analytical Results[1]
HVOCs
2721 - 2731 SE Belmont Street
Portland, Oregon

Sample I.D.	Sample Date	Sample Depth (feet)	Helium % by ASTM Method 1946 or GasCheck Model G3 Helium Detector	HVOCs by EPA Method TO-15 (µg/m³)					
				cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene (PCE)		Trichloroethene (TCE)	Vinyl Chloride
						Reported Value	Maximum Corrected Value[2]		
SV-01	07/20/15	5.0	<1	1.6 U	1.6 U	**5,500**	**5,555**	2.1 U	1 U
	11/25/15		10.9	1.59 U	1.59 U	**3,110**	**3,449**	2.14 U	1.02 U
	12/04/15[3]		5.8	1.59 U	1.59 U	**3,280**	**3,470**	2.14 U	1.02 U
SV-02	07/20/15		<1	20 U	20 U	**95,000**	**95,950**	27 U	13 U
SV-03	07/20/15		<1	1.6 U	1.6 U	**1,500**	**1,515**	2.1 U	1 U
SV-04	07/20/15		<1	1.6 U	1.6 U	**290**	**292.9**	2.1 U	1 U
SV-05	11/25/15		14.2	19.8 U	19.8 U	33.9 U	38.7 U	26.8 U	12.8 U
	12/04/15[4]		5.6	1.59 U	1.59 U	**7.09**	**7.49**	**2.50**	1.02 U
DEQ Generic RBCs[5]									
Vapor Intrusion into Buildings									
Urban Residential				>Pv	>Pv	5,100		200	41
Occupational				>Pv	>Pv	47,000		2,900	2,800

Notes:
1. Chemical analysis completed by ESC Lab Sciences of Mt. Juliet, Tennessee.
2. Corrected value is calucated by multiplying the reported value by (1.0 + detected helium %)
3. This sample is noted as SG-01 on the laboratory report.
4. This sample is noted as SG-05 on the laboratory report.
5. DEQ Generic RBCs updated November 1, 2015

DEQ: Oregon Department of Environmental Quality
HVOC: halogenated volatile organic compound
I.D.: identification
PCE: tetrachloroethene
RBC: risk-based concentration
RDL: reported detection limit
TCE: trichloroethene
µg/m³: micrograms per cubic meter
>Pv: The air concentration reported for the RBC exceeds the vapor pressure of the pure chemical. It can be assumed that this constituent cannot create an unacceptable risk by this pathway.
U: not detected at concentrations greater than the laboratory RDL (shown)
Bolding indicates analyte detection.
Shading indicated analyte detected at a concentration greater than one or more DEQ RBCs.

ATTACHMENT

ANALYTICAL REPORT

December 01, 2015

GeoDesign Inc.

Sample Delivery Group:	L803627
Samples Received:	11/27/2015
Project Number:	GREENLIGHT-3-02
Description:	Greenlight-3-02

Report To:

Andrew Blake
15575 SW Sequoia Pkwy. Suite 100
Portland, OR 97224

Entire Report Reviewed By:

Jarred Willis
Technical Service Representative

TABLE OF CONTENTS

SV-01 L803627-01 Air

Collected by: Kevin Cline
Collected date/time: 11/25/15 10:17
Received date/time: 11/27/15 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG832269	2	11/30/15 22:02	11/30/15 22:02	MBF
Volatile Organic Compounds (MS) by Method TO-15	WG832436	25	12/01/15 11:21	12/01/15 11:21	MBF

SV-05 L803627-02 Air

Collected by: Kevin Cline
Collected date/time: 11/25/15 14:30
Received date/time: 11/27/15 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG832269	25	11/30/15 22:46	11/30/15 22:46	MBF

SV-01 L803627-03 Air

Collected by: Kevin Cline
Collected date/time: 11/25/15 10:17
Received date/time: 11/27/15 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method ASTM 1946	WG832256	50	11/30/15 12:38	11/30/15 12:38	HJF

SV-05 L803627-04 Air

Collected by: Kevin Cline
Collected date/time: 11/25/15 14:30
Received date/time: 11/27/15 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method ASTM 1946	WG832256	50	11/30/15 14:53	11/30/15 14:53	HJF

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.

Jarred Willis
Technical Service Representative

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppb	RDL2 ug/m3	ppbv ppb	ug/m3	Qualifier	Dilution	Batch
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG832269
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG832269
Tetrachloroethylene	127-18-4	166	5.00	33.9	459	3110		25	WG832436
Trichloroethylene	79-01-6	131	0.400	2.14	ND	ND		2	WG832269
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG832269
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*101*				WG832269

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppb	RDL2 ug/m3	ppbv ppb	ug/m3	Qualifier	Dilution	Batch
cis-1,2-Dichloroethene	156-59-2	96.90	5.00	19.8	ND	ND		25	WG832269
trans-1,2-Dichloroethene	156-60-5	96.90	5.00	19.8	ND	ND		25	WG832269
Tetrachloroethylene	127-18-4	166	5.00	33.9	ND	ND		25	WG832269
Trichloroethylene	79-01-6	131	5.00	26.8	ND	ND		25	WG832269
Vinyl chloride	75-01-4	62.50	5.00	12.8	ND	ND		25	WG832269
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*94.5*				WG832269

Sample Narrative:

TO-15 L803627-02 WG832269: Non-target compounds too high to run at a lower dilution.

Volatile Organic Compounds (GC) by Method ASTM 1946

Analyte	CAS #	Mol. Wt.	RDL	Result	Qualifier	Dilution	Batch
			ppb	ppb			
Helium	7440-59-7		5000000	10900000		50	WG832256

Volatile Organic Compounds (GC) by Method ASTM 1946

Analyte	CAS #	Mol. Wt.	RDL	Result	Qualifier	Dilution	Batch
			ppb	ppb			
Helium	7440-59-7		5000000	14200000		50	WG832256

Method Blank (MB)

(MB) 11/30/15 11:22

Analyte	MB Result	MB Qualifier	MB RDL
	ppm		ppm
Helium	ND		100

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

(LCS) 11/30/15 10:46 • (LCSD) 11/30/15 11:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppm	ppm	ppm	%	%	%			%	%
Helium	500	417	425	83.4	84.9	70.0-130			1.77	25

Method Blank (MB)

(MB) 11/30/15 09:10

Analyte	MB Result	MB Qualifier	MB RDL
	ppb		ppb
cis-1,2-Dichloroethene	ND		0.200
trans-1,2-Dichloroethene	ND		0.200
Tetrachloroethylene	ND		0.200
Trichloroethylene	ND		0.200
Vinyl chloride	ND		0.200
(S) 1,4-Bromofluorobenzene	*96.9*		*60.0-140*

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

(LCS) 11/30/15 09:55 • (LCSD) 11/30/15 11:35

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppb	ppb	ppb	%	%	%			%	%
Vinyl chloride	3.75	4.63	4.47	123	119	70.0-130			3.44	25
trans-1,2-Dichloroethene	3.75	4.73	4.43	126	118	70.0-130			6.34	25
cis-1,2-Dichloroethene	3.75	4.66	4.36	124	116	70.0-130			6.54	25
Trichloroethylene	3.75	4.67	4.39	124	117	70.0-130			6.06	25
Tetrachloroethylene	3.75	4.65	4.48	124	119	70.0-130			3.65	25
(S) 1,4-Bromofluorobenzene				*99.5*	*101*	*60.0-140*				

Method Blank (MB)

(MB) 12/01/15 06:35

Analyte	MB Result	MB Qualifier	MB RDL
	ppb		ppb
Tetrachloroethylene	ND		0.200

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

(LCS) 12/01/15 04:50 • (LCSD) 12/01/15 05:43

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppb	ppb	ppb	%	%	%			%	%
Tetrachloroethylene	3.75	4.09	4.22	109	112	70.0-130			2.94	25

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(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.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

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

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**

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
Conneticut	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 [1 4]	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		

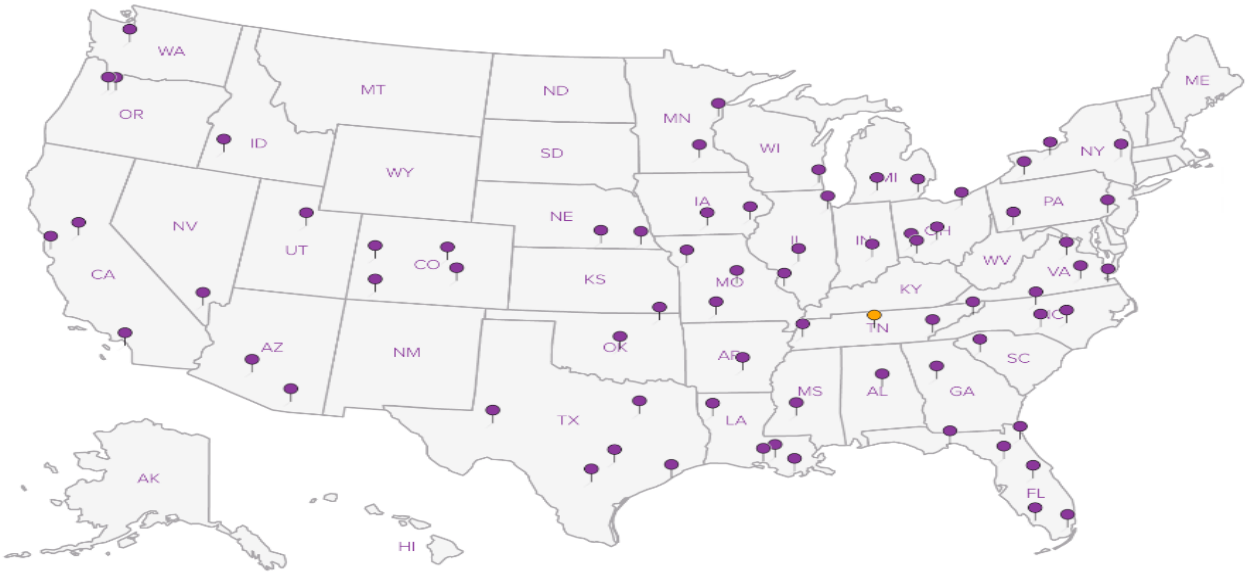
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	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.**



Chain of Custody Page 1 of 1

ESC LAB SCIENCES — YOUR LAB OF CHOICE

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
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L# 6803627
C177

Acctnum: GEODESPOR
Template: T105374
Prelogin: P530909
TSR: 358 - Jarred Willis
PB: 34K 11-11-15
Shipped Via: FedEX Ground

GeoDesign Inc.

15575 SW Sequoia Pkwy. Suite 100
Portland, OR 97224

Billing Information:
Accounts Payable
15575 SW Sequoia Pkwy. Ste 100
Portland, OR 97224

Email To: ablake@geodesigninc.com

Report to: Andrew Blake

Project Description: Greenlight-3-02

City/State Collected:

Phone: 503-968-8787
Fax:

Client Project #: GREENLIGHT-3-02

Lab Project #: GEODESPOR-GREENLIGHT

Collected by (print): Kevin Cline

Site/Facility ID #:

P.O. #:

Collected by (signature): [signature]

Immediately Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? ___No X Yes
FAX? ___No ___Yes

Analysis / Container / Preservative: TO-15 Summa; Helium & H2S

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	TO-15 Summa	Helium & H2S	Rem./Contaminant	Sample # (lab only)
SV-01	GRAB	Air	5'	11-25-15	1017	1	X	X		-01/-03
SV-05	↓	Air	5'	↓	14:30	1	X	X		-02/-04
Discard	—	—	—	—	—					

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other ______

Remarks:(2) 1L summa can and (2) sampling manifolds with tubing/fittings

pH ______ Temp ______
Flow ______ Other ______

6573 5220 5064

Hold #

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ ______

Condition: (lab use only) 3 ST 1 empty M10

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
[signature]	11/25/15	FEDEX	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) [signature]

Temp: AMB °C Bottles Received: 2

COC Seal Intact: ___Y ___N ___NA

Date: 11/27/15 Time: 1030

pH Checked:

NCF:

ANALYTICAL REPORT

December 09, 2015

GeoDesign Inc.

Sample Delivery Group:	L805071
Samples Received:	12/05/2015
Project Number:	GREENLIGHT-3-02
Description:	Greenlight-3-02

Report To: Andrew Blake
15575 SW Sequoia Pkwy. Suite 100
Portland, OR 97224

Entire Report Reviewed By:

Jason Romer
Technical Service Representative

TABLE OF CONTENTS

SG-01 L805071-01 Air

Collected by | Collected date/time 12/04/15 10:05 | Received date/time 12/05/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG833880	2	12/08/15 15:56	12/08/15 15:56	MBF
Volatile Organic Compounds (MS) by Method TO-15	WG834424	25	12/09/15 13:29	12/09/15 13:29	SNH

SG-05 L805071-02 Air

Collected by | Collected date/time 12/04/15 11:10 | Received date/time 12/05/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (MS) by Method TO-15	WG833880	2	12/08/15 16:49	12/08/15 16:49	MBF

SG-01 L805071-03 Air

Collected by | Collected date/time 12/04/15 10:05 | Received date/time 12/05/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method ASTM 1946	WG834400	5	12/09/15 14:40	12/09/15 14:40	SNH

SG-05 L805071-04 Air

Collected by | Collected date/time 12/04/15 11:10 | Received date/time 12/05/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method ASTM 1946	WG834400	5	12/09/15 14:53	12/09/15 14:53	SNH

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.

Jason Romer
Technical Service Representative

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppb	RDL2 ug/m3	ppbv ppb	ug/m3	Qualifier	Dilution	Batch
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG833880
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG833880
Tetrachloroethylene	127-18-4	166	5.00	33.9	484	3280		25	WG834424
Trichloroethylene	79-01-6	131	0.400	2.14	ND	ND		2	WG833880
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG833880
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*98.6*				WG833880

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppb	RDL2 ug/m3	ppbv ppb	ug/m3	Qualifier	Dilution	Batch
cis-1,2-Dichloroethene	156-59-2	96.90	0.400	1.59	ND	ND		2	WG833880
trans-1,2-Dichloroethene	156-60-5	96.90	0.400	1.59	ND	ND		2	WG833880
Tetrachloroethylene	127-18-4	166	0.400	2.72	1.04	7.09		2	WG833880
Trichloroethylene	79-01-6	131	0.400	2.14	0.466	2.50		2	WG833880
Vinyl chloride	75-01-4	62.50	0.400	1.02	ND	ND		2	WG833880
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*99.0*				WG833880

Volatile Organic Compounds (GC) by Method ASTM 1946

Analyte	CAS #	Mol. Wt.	RDL	Result	Qualifier	Dilution	Batch
			ppb	ppb			
Helium	7440-59-7		500000	5810000		5	WG834400

Volatile Organic Compounds (GC) by Method ASTM 1946

Analyte	CAS #	Mol. Wt.	RDL	Result	Qualifier	Dilution	Batch
			ppb	ppb			
Helium	7440-59-7		500000	5570000		5	WG834400

Method Blank (MB)

(MB) 12/09/15 12:41

Analyte	MB Result	MB Qualifier	MB RDL
	ppm		ppm
Helium	ND		100

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

(LCS) 12/09/15 11:48 • (LCSD) 12/09/15 12:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppm	ppm	ppm	%	%	%			%	%
Helium	500	479	491	95.7	98.3	70.0-130			2.59	25

Method Blank (MB)

(MB) 12/08/15 04:26

Analyte	MB Result	MB Qualifier	MB RDL
	ppb		ppb
cis-1,2-Dichloroethene	ND		0.200
trans-1,2-Dichloroethene	ND		0.200
Tetrachloroethylene	ND		0.200
Trichloroethylene	ND		0.200
Vinyl chloride	ND		0.200
(S) 1,4-Bromofluorobenzene	*92.9*		*60.0-140*

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

(LCS) 12/08/15 01:46 • (LCSD) 12/08/15 02:39

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppb	ppb	ppb	%	%	%			%	%
Vinyl chloride	3.75	3.83	3.92	102	105	70.0-130			2.29	25
trans-1,2-Dichloroethene	3.75	3.70	3.82	98.6	102	70.0-130			3.26	25
cis-1,2-Dichloroethene	3.75	3.88	3.88	103	103	70.0-130			0.0900	25
Trichloroethylene	3.75	3.91	3.86	104	103	70.0-130			1.27	25
Tetrachloroethylene	3.75	3.97	4.01	106	107	70.0-130			0.940	25
(S) 1,4-Bromofluorobenzene				*102*	*101*	*60.0-140*				

Method Blank (MB)

(MB) 12/09/15 12:37

Analyte	MB Result	MB Qualifier	MB RDL
	ppb		ppb
Tetrachloroethylene	ND		0.200

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

(LCS) 12/09/15 11:18 • (LCSD) 12/09/15 11:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppb	ppb	ppb	%	%	%			%	%
Tetrachloroethylene	3.75	3.93	4.09	105	109	70.0-130			4.11	25

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(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.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

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

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**
***** 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
Conneticut	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 [1 4]	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		

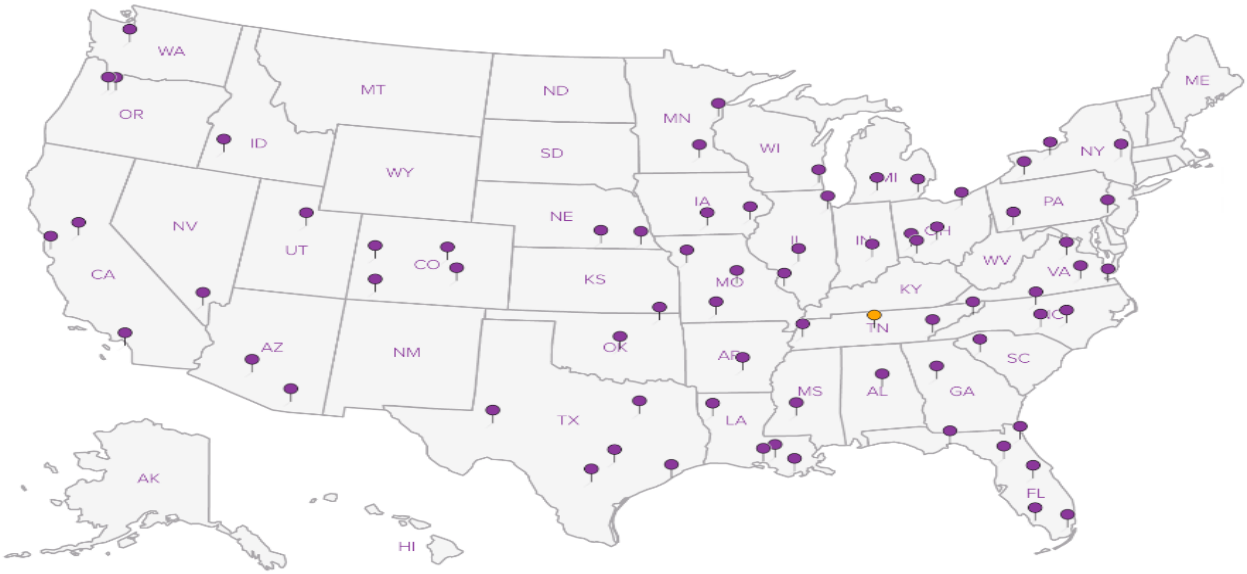
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	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.**



GeoDesign Inc.

15575 SW Sequoia Pkwy. Suite 100
Portland, OR 97224

Billing Information:

Accounts Payable
15575 SW Sequoia Pkwy. Ste 100
Portland, OR 97224

Report to: **Andrew Blake**

Email To: **ablake@geodesigninc.com**

Project Description: **Greenlight-3-02**

City/State Collected:

Phone: **503-968-8787**
Fax:

Client Project # **GREENLIGHT-3-02**

Lab Project # **GEODESPOR-GREENLIGHT**

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ____ Y ____

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? ___No X__Yes
FAX? ___No ___Yes

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	TO-15 / Helium Summa	Rem./Contaminant	Sample # (lab only)
SG-01		Air	5'	12.4.15	1005	1	X		-01/03
SG-05		Air	5'	12.4.15	1110	1	X		02/04

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

Remarks:(2) 1L summa can and (2) sampling manifolds with tubing/fittings

pH _____ Temp _____

Flow _____ Other _____

6573 5222 5416

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	12-4-15	1400	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: Amb °C Bottles Received: 2

Date: 12-5 Time: 900

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

ESC LABORATORIES
YOUR LAB OF CHOICE

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L805071

L016

Acctnum: **GEODESPOR**
Template: **T105374**
Prelogin: **P534247**
TSR: **358 - Jarred Willis**
PB: **BAK 12-2-15**

Shipped Via: **FedEX Priority**

Hold #

Condition: (lab use only) GOOD

2.5T

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF: