Associated Environmental Group, LLC

February 19, 2020

Mr. Chang Kim
23886 SE Kent-Kangley Road
Maple Valley, Washington 98038-6848
jbangiek@gmail.com

RE: **Technical Memorandum – SVE System O&M and Performance Monitoring**
4 Corners Cleaners
23886 SE Kent-Kangley Road
Maple Valley, Washington 98038-6848
AEG Project: 17-126

Dear Mr. Kim:

Associated Environmental Group, LLC (AEG) has prepared this Technical Memorandum to provide a summary of ongoing performance monitoring of the soil vapor extraction (SVE) system operating at the *4 Corners Cleaners*, located at the above-referenced address in Maple Valley, Washington (Site). The scope of services for the monitoring of the SVE system was presented in AEG's Cleanup Action Plan, dated May 29, 2019. The system was designed to extract and remove adsorbed vapor-phase tetrachloroethylene (PCE) and other volatile organic compounds (VOCs) from subsurface soil beneath the building, and treat the vapors using granular activated carbon (GAC). The system also mitigates the potential for vapor intrusion of VOCs detected beneath the dry cleaner space into the indoor air.

This memorandum includes a summary of the operations and maintenance (O&M) activities and laboratory sampling results. The Site's current layout, including SVE extraction wells and vapor monitoring locations, is illustrated in Figure 1, *SVE Well Locations Map*.

Background

PCE and its anaerobic sequential degradation chain constituents, including trichloroethylene (TCE), cis-1,2-dichloroethylene (DCE), trans-1,2-DCE, and vinyl chloride, are the contaminants of concern (COCs) for the Site. PCE was the only COC detected in soil above Model Toxics Control Act (MTCA) cleanup levels. Soil and soil vapor are the media affected likely the result of use and storage of PCE formerly used in the dry cleaner machine and dry-cleaning process.

The SVE system was started on October 9, 2019 with GAC filters in-place in compliance with the required Puget Sound Clean Air Agency (PSCAA) regulations. The system has a remote telemetry unit to notify AEG of any system shutdown events, power outages, or when the knockout tank

reaches capacity and stops the blower vacuum. Figure 8, *Process & Instrumentation Diagram*, illustrates the major system components, the flow of soil vapors, and the system controls within the sound enclosure.

Ongoing Operations and Maintenance

Monthly SVE system evaluations include system adjustment and equipment maintenance. Vapor samples will be collected in laboratory-supplied Summa canisters and submitted to a Washington State-certified laboratory for analysis for Chlorinated VOCs via TO-15 SIM.

Site visits include the following:

- Upon arrival at the Site, notifying the appropriate contact person of your presence.
- Visually inspecting the equipment compounds for obvious safety problems, i.e., unsecured compounds, un-labeled drums, etc.
- Checking all piping connections for tightness, and ensure that anchors are secure, and of appropriate design.
- Checking all gauges to ensure that they are working, readable, and clean.
- Listening to all pumps, blowers, etc. Check and lubricate all bearing races as required.
- If drums of waste are generated, using the appropriate labeling to identify the waste. Removing and properly disposing of any garbage, debris, etc. that has accumulated at the Site since the last visit.
- Making a note of any other unusual circumstances.
- Collecting performance discharge vapor samples from sample ports before the vapor treatment system (GAC) and after the vapor treatment system (pre- and post-treatment vapor discharge samples).
- Collecting performance sub-slab vapor samples from the three sub-slab vapor points to monitor the effectiveness of the SVE treatment.

System performance is evaluated by:

- Total time of system operation;
- Measuring the induced vacuum below the building slab;
- Collecting inlet/outlet vapor samples;
- Collecting sub-slab vapor samples; and
- Monitoring indoor air quality on a select schedule.

System Operation

From the startup date of October 9, 2019, the SVE system had two shut down events: October 22, 2019 and December 17, 2019. These events were caused by high water in the moisture knockout tank. AEG restarted the system after the alarms were cleared and the system vacuum was adjusted after the system was initiated.

Sub-Slab Induced Vacuum Monitoring

The response to applied vacuum measured indicates a negative differential pressure has developed underneath the building slab around the extraction points, as compared to indoor air or ambient pressure. Approximate sampling port locations are shown on Figure 1, *SVE Well Locations Map*.

Induced Vacuum Monitoring

Vacuum Monitoring Point	Date	Measured Response (Inches W.C.)[1]	EPA Pressure Reduction Goal (Inches W.C.)[2]
VP-1	10/09/2019	0.04	0.02
	10/24/2019	0.05	0.02
	1/16/2020	0.03	0.02
VP-2	10/09/2019	0.05	0.02
	10/24/2019	0.03	0.02
	01/16/2020	0.00	0.02
VP-3	10/09/2019	0.04	0.02
	10/24/2019	0.03	0.02
	01/16/2020	0.02	0.02

Notes:

All values presented in inches of water column (Inches W.C.)

[1] Readings from permanent vapor monitoring points inside the building (Dwyer Series 2001 Magnehelic gage).

[2] EPA-600-R-08115 Engineering Issue: *Indoor Air Vapor Intrusion Mitigation Approaches*, October 2008

SVE System Vapor Monitoring

Vapor samples were collected from the inlet and exhaust of the GAC filters at system startup on October 9, 2019, and from the inlet only on December 16, 2019 and January 16, 2020. The estimated potential to emit (PTE) vapors were compared to Puget Sound Clean Air Agency (PSCAA) maximum allowable emission rates for soil and groundwater remediation projects involving less than 15 (<15) pounds per year of benzene or vinyl chloride, <500 pounds per year of PCE, and <1,000 pounds per year of toxic air contaminants (ref. PSCAA, Regulation I, Section 6.03).

System Vapor Sampling

Sample ID		INPUT	OUTPUT (Post Carbon)	INPUT-1	INPUT-1	Method B Sub-Slab Screening Level
Date Collected		10/09/2019	10/09/2019	12/16/2019	01/16/2020	
TO-15 - Volatile Organic Compounds	Vinyl Chloride	<0.511	<0.511	<0.511	<0.511	9.33*
	trans-1,2-Dichloroethene	<0.793	<0.793	<0.793	<0.793	NL
	cis-1,2-Dichloroethene	**2.19**	<0.793	<0.793	<0.793	NL
	Trichloroethene (TCE)	**4.48**	<1.07	<1.07	<1.07	12.3*
	Tetrachloroethene (PCE)	**10.3**	<2.03	<2.03	**155**	321*

Notes:

All values presented in micrograms per cubic meter ($\mu g/m^3$)

-- = Not analyzed for constituent

< = Not detected above laboratory limits

* Cancer cleanup/screening level (all other constituents listed have non-cancer values)

Bold indicates the detected concentration is below MTCA Method B screening levels

Red Bold indicates the detected concentration exceeds MTCA Method B screening levels

NL = Not Listed; no cleanup/screening levels have been promulgated for these constituents

VOC discharge from the stack is well below the maximum emission rates allowable by PSCAA regulations (500 pounds per year of PCE and 1,000 pounds per year of total toxic air pollutants). AEG has notified PSCAA that the unit will operate without the carbon vessels to reduce the back pressure and excess heat produced by the carbon vessels. The total estimated halogenated VOCs (HVOCs) for 61 days of operation is 0.314 pounds. The PTE calculations for toxic constituents are presented in Table 1, *Potential to Emit Summary*, and this data along with laboratory reports will be used to document PSCAA compliance.

Sub-Slab Vapor Monitoring

Sub-slab vapor samples were collected on December 16, 2019 and January 16, 2020. The samples from December 2019 were all below the MTCA Method B sub-slab screening levels for PCE. The results also show that the sub-slab vapor concentrations were declining after the SVE startup on October 9, 2019.

The SVE system was shut down December 17, 2019 to January 14, 2020 due to high water in the moisture knockout tank. AEG did not restart the system on January 14, 2020 to allow sufficient time to see if the HVOCs would rebound. The data indicates that "pulsing" the system may increase the removal efficiency. The January 2020 sampling had PCE concentrations detected in all the sub-slab locations (VP-1, VP-2, and VP-3). Only vapor monitoring point VP-3 had a PCE concentration (423 µg/m^3) in excess of MTCA Method B sub-slab screening levels. The laboratory data is presented in Table 2, *Summary of Sub-Slab Vapor Analytical Results*, and the laboratory reports are provided in Appendix A, *Laboratory Datasheets*.

Closing

Monthly O&M and performance monitoring is ongoing. Data collected to date indicates the SVE system is thus far successful in removing HVOCs from the subsurface. AEG will provide another progress report next quarter.

If you have comments or questions, please contact our office at your convenience at 360.352.9835.

Sincerely,

Associated Environmental Group, LLC

Charles S. Swift, R.S.A.
Project Manager

Scott Rose, L.H.G.
Senior Hydrogeologist

State of Washington
Hydrogeologist
2635
Licensed Geologist
SCOTT I ROSE

Attachments: Figure 1 – *SVE Well Locations Map*
Figure 8 – *Process & Instrumentation Diagram*

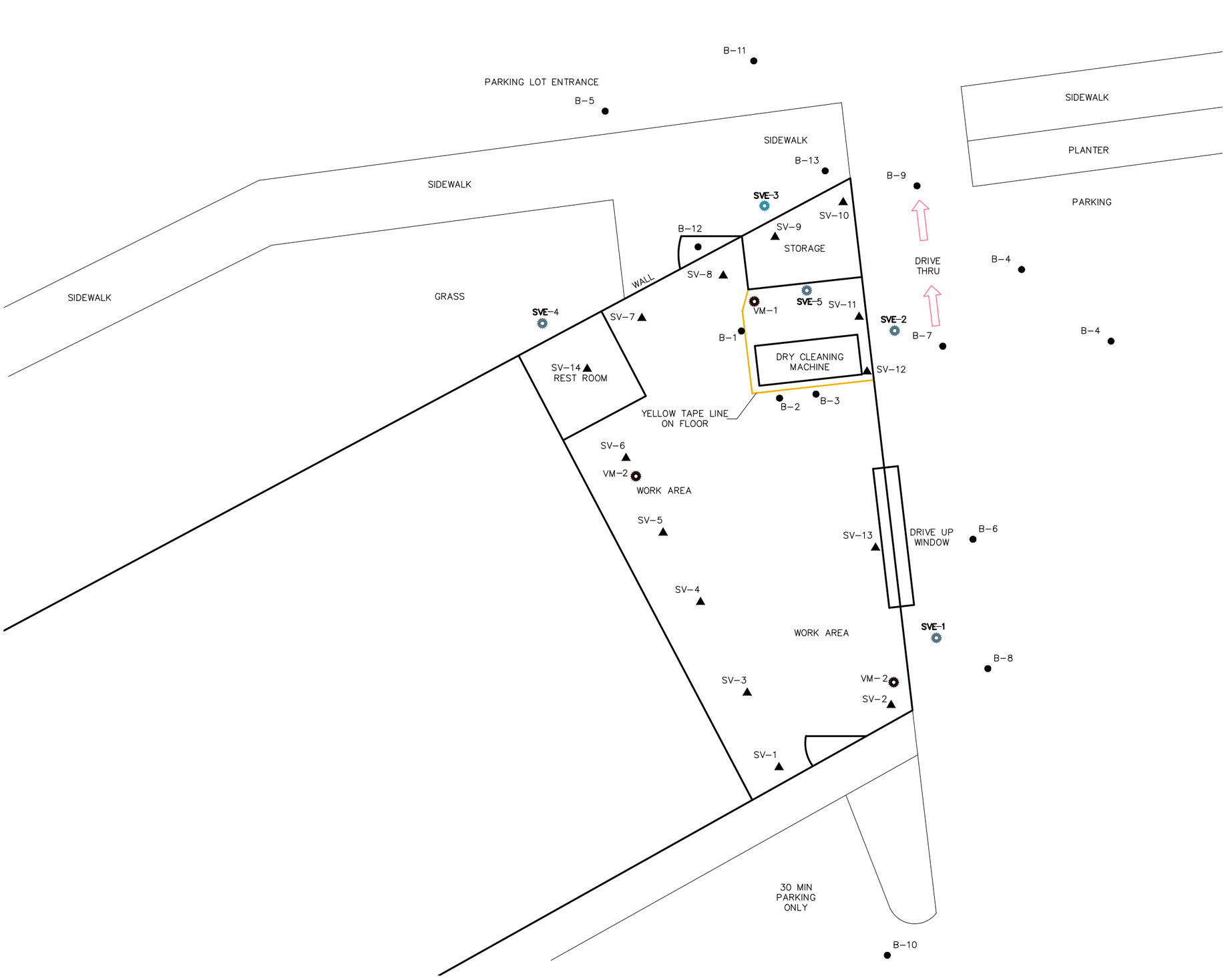
Table 1 – *Potential to Emit Summary*
Table 2 – *Summary of Sub-Slab Vapor Analytical Results*

Appendix A – *Laboratory Datasheets*

FIGURES

2633 Parkmont Lane SW, Suite A • Olympia, WA • 98502
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com

PROJECT NUMBER	17-126
APPROVED BY	BD 1/21/2019
CHECKED BY	BD 1/21/2019
DRAWN BY	ICD 1/21/2019
FILENAME	17-126_1803_1.DWG



LEGEND

B-1	●	SOIL BORING LOCATION
SV-1	▲	SOIL VAPOR LOCATION
SV-1	◎	SOIL VAPOR WELL LOCATION
VM-1	◉	VAPOR MONITORING WELL LOCATION

NOTES

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE
2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

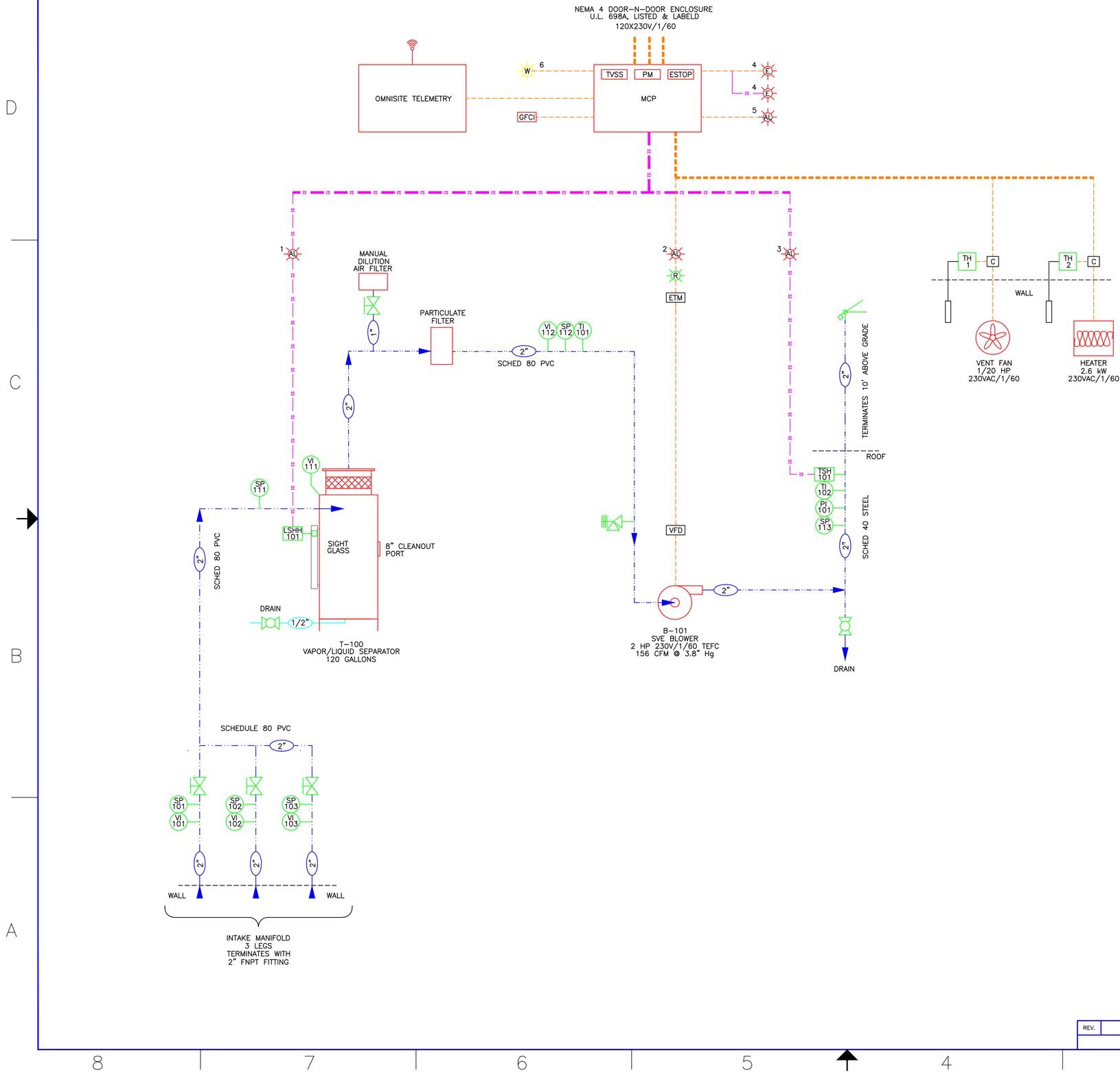
0 5 10
SCALE IN FEET

Associated Environmental Group, LLC

FIGURE 1

SVE WELL LOCATIONS MAP

4 CORNERS CLEANERS
23886 SE KENT KANGLEY ROAD
MAPLE VALLEY, WASHINGTON



LEGEND

C	CONTACTOR
ETM	ELAPSED TIME METER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
LSHH	LEVEL SWITCH HIGH HIGH
MCP	MASTER CONTROL PANEL
PI	PRESSURE INDICATOR
PM	PHASE/VOLTAGE MONITOR
SP	SAMPLE PORT
TH	THERMOSTAT
TI	TEMPERATURE INDICATOR
TSH	TEMPERATURE SWITCH HIGH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESOR
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INDICATOR

- BALL VALVE
- CHECK VALVE
- GATE VALVE
- RAIN CAP
- RELIEF VALVE
- WYE STRAINER

- W — WARNING LIGHT
- AL — ALARM LIGHT
- E — EMERGENCY STOP LIGHT
- R — RUN LIGHT
- AIR LINE
- BREAK
- CONTROL LINE
- IS — INTRINSICALLY SAFE LINE
- AL — INTRINSICALLY SAFE ANALOG LINE
- AL — NON-INTRINSICALLY SAFE ANALOG LINE
- PRODUCT LINE
- WATER LINE

ALARMS

1. VAPOR/LIQUID SEPARATOR HIGH HIGH LEVEL
2. SVE BLOWER MOTOR FAULT
3. SVE HIGH TEMPERATURE
4. EMERGENCY STOP
5. PHASE/VOLTAGE FAULT
6. TVSS DEPLETED

FIGURE 8

REV.	DESCRIPTION	DATE	APPR.
	REVISIONS		

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT, INC.
15 Carroll Drive
Bluffton, SC 29910
(843) 836-1804

TITLE	PROCESS & INSTRUMENTAION DIAGRAM
DRAWN BY	GWL
DATE	6/14/19
CHK BY	
DATE	
APPR BY	
DATE	
ASSOCIATED ENVIRONMENTAL GROUP, LLC 4 CORNERS DRY CLEANERS	
JOB NO.	25196
SCALE	N/A
SIZE	D
DWG NO.	25196GLP
SHEET	1 OF 1
REV	PRELIM

TABLES

2633 Parkmont Lane SW, Suite A • Olympia, WA • 98502
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TABLE 1
Potential to Emit Summary
SVE Testing Event - January 14, 2020
4 Corners Cleaners, Maple Valley, Washington

Date	Sample ID	Contaminant	Laboratory Sample Results parts per million volume (ppmv)	Molecular Weight (1) grams per - mole (g/mole)	Flowrate Measured (2) cubic feet per minute (cfm)	Potential To Emit Estimated pounds per day (lb/day)	*Maximum Allowable Emission Rate pounds per day (lb/day)
1/16/2020	**INPUT**	Tetrachloroethene (PCE)	0.0229	165.85	120	0.0016785	***2.74***
	14:08:00	Trichloroethene (TCE)	0.0000	131.4	120	0.0000000	***1.37***
	Flow Temp = 60 F						
	50-inches W.C.						
	Total System Vacuum						

Estimated Total Pounds of Total HVOCs Removed 61 Days Operating	**0.314142**
Estimated Total Pounds of Total HVOCs Removed 10/9/2019 to 12/17/19	**0.294000**
Estimated Total Pounds of Total HVOCs Removed 1/14/2020 to 1/31/20	**0.020142**

Notes:

CFM = Flow rate of gas (standard cubic feet per minute)
PPMV = Concentration of gas in parts per million by volume
1 Pound = 453.6 grams
1 Liter = 0.03531 cubic feet
1 Mole of gas = 24.46 Liters volume at STP (77"F and 29.92 "w.c.)
ft/min = feet per minute
inches W.C. = Inches of Water Column

* PSCAA Maximum Allowable Emission Rate for soil and groundwater remediation projects involving <15 pounds per year of benzene or vinyl chloride, <500 pounds per year of perchloroethylene (PCE) , and <1,000 pounds per year of toxic air contaminants. *(ref. PSCAA, Regulation I, Section 6.03)*

TO CALCULATE TOTAL POUNDS REMOVED:

TOTAL LBS	=	**MW** g	x	1 lb	x	1 mole	x	1 L	x	**SCFM** std cu ft	x **CONC** ppmv
REMOVED		1 mole		453.6 g		24.46 std L		0.03531 cu ft		min	$1x10^6$ /ppmv

(1) = Taken from the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards.
(2) = Velocity estimated from FPZ Blower Model SCL-K05 flow curves based on 40 inches W.C. vacuum at the system inlet.

Table 2 - Summary of Sub-Slab Vapor Analytical Results
4 Corners Cleaners
Maple Valley, Washington

Sample Number	Depth Collected (feet)	Date Collected	PCE and Daughter Products					Other Detected Volatile Organic Compounds		
			PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Chloroform	Dichloro-difluoromethane	1,1,2-Trichloroethane
SV-1	SUB-SLAB	3/31/2017	**1,600**	<10	<10	<10	<10	<10	<10	<10
SV-2	SUB-SLAB	3/31/2017	**1,800**	<10	<10	<10	<10	<10	**8,600**	<10
SV-3	SUB-SLAB	3/31/2017	**1,500**	<10	<10	<10	<10	<10	**12,000**	<10
SV-4	SUB-SLAB	3/31/2017	**790**	<10	<10	<10	<10	<10	**15,000**	<10
SV-5	SUB-SLAB	3/31/2017	**940**	<10	<10	<10	<10	<10	**8,200**	<10
SV-6	SUB-SLAB	3/31/2017	**850**	<10	<10	<10	<10	<10	**7,200**	<10
SV-7	SUB-SLAB	3/31/2017	**1,700**	<10	<10	<10	<10	<10	**870**	<10
SV-8	SUB-SLAB	3/31/2017	**1,100**	<10	<10	<10	<10	<10	**290**	<10
SV-9	SUB-SLAB	3/31/2017	**2,800**	<10	<10	<10	<10	**310**	**2,500**	<10
SV-10	SUB-SLAB	3/31/2017	**2,100**	<10	<10	<10	<10	**31,000**	**3,100**	**380**
SV-11	SUB-SLAB	3/31/2017	**6,300**	<10	<10	<10	<10	<10	**2,800**	<10
SV-12	SUB-SLAB	3/31/2017	**2,600**	<10	<10	<10	<10	<10	**3,400**	<10
SV-13	SUB-SLAB	3/31/2017	**180**	<10	<10	<10	<10	<10	**9,000**	<10
SV-14	SUB-SLAB	3/31/2017	**2,600**	<10	<10	<10	<10	<10	**610**	<10
SVE SYSTEM STARTUP OCTOBER 9, 2019										
VP-1[1]	SUB-SLAB	10/9/2019	**586**	**4.48**	<0.793	<0.793	<0.511	--	--	--
		12/16/2019	**4.03**	**1.95**	<0.793	<0.793	<0.511	--	--	--
		1/16/2020	**264E**	**3.18**	<0.793	<0.793	<0.511	--	--	--
VP-2[1]	SUB-SLAB	10/9/2019	<2.03	<1.07	<0.793	<0.793	<0.511	--	--	--
		12/16/2019	**4.77**	<1.07	<0.793	<0.793	<0.511	--	--	--
		1/16/2020	**101**	**1.49**	<0.793	<0.793	<0.511	--	--	--
VP-3[1]	SUB-SLAB	10/9/2019	**743**	**1.32**	<0.793	<0.793	<0.511	--	--	--
		12/16/2019	**2.53**	<1.07	<0.793	<0.793	<0.511	--	--	--
		1/16/2020	**423**	<1.07	<0.793	<0.793	<0.511	--	--	--
PQL			2.03	1.07	0.793	0.793	0.511	10.0	10.0	10.0
MTCA Method B Sub-Slab Screening Levels			321	12.3	NL	NL	9.33	3.62	1,520	5.21

Notes:

[1] - Collected from the permanent vapor monitoring point.

All values are presented in micrograms per cubic meter (µg/m³)

< = Not detected at the listed laboratory detection limits

E = Estimated value. The amount exceeds the linear working range of the instrument.

PQL = Practical Quantification Limit (laboratory detection limit)

NL = Not Listed; no sub-slab screening levels have been established for this constituent/

Red Bold indicates the detected concentration exceeds Ecology MTCA Method B sub-slab screening level

Bold indicates the detected concentration is below Ecology MTCA Method B sub-slab screening levels

PCE = Tetrachloroethene

TCE = Trichloroethene

DCE = Dichloroethene

APPENDIX A

Laboratory Datasheets

2633 Parkmont Lane SW, Suite A • Olympia, WA • 98502
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com

Libby Environmental, Inc.
3322 South Bay Road NE • Olympia, WA 98506-2957

December 24, 2019

Becky Dilba
Associated Environmental Group, LLC
2633 Parkmont Lane SW, Suite A
Olympia, WA 98502

Dear Ms. Dilba:

Please find enclosed the analytical data report for the 4 Corners Project located in Maple Valley, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Libby Environmental
Sherry Chilcutt
3322 South Bay Road NE
Olympia, WA 98506

RE: 4 Corners
Work Order Number: 1912281

December 24, 2019

Attention Sherry Chilcutt:

Fremont Analytical, Inc. received 4 sample(s) on 12/17/2019 for the analyses presented in the following report.

Volatile Organic Compounds by EPA Method TO-15

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/24/2019*

CLIENT: Libby Environmental
Project: 4 Corners
Work Order: 1912281

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1912281-001	VP-1	12/16/2019 12:47 PM	12/17/2019 1:20 PM
1912281-002	VP-2	12/16/2019 12:50 PM	12/17/2019 1:20 PM
1912281-003	VP-3	12/16/2019 12:38 PM	12/17/2019 1:20 PM
1912281-004	INPUT	12/16/2019 1:00 PM	12/17/2019 1:20 PM

Case Narrative

WO#: **1912281**
Date: **12/24/2019**

CLIENT: Libby Environmental
Project: 4 Corners

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: **Libby Environmental**
WorkOrder: 1912281
Project: 4 Corners

Client Sample ID: VP-1
Lab ID: 1912281-001A
Sample Type: Summa Canister

Date Sampled: 12/16/2019
Date Received: 12/17/2019

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Tetrachloroethene (PCE)	0.595	4.03	0.300	2.03		EPA-TO-15	12/24/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Trichloroethene (TCE)	0.362	1.95	0.200	1.07		EPA-TO-15	12/19/2019	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	12/19/2019	AD
Surr: 4-Bromofluorobenzene	110 %Rec	--	70-130	--		EPA-TO-15	12/19/2019	AD

Client: **Libby Environmental**
WorkOrder: 1912281
Project: 4 Corners

Client Sample ID: VP-2
Lab ID: 1912281-002A
Sample Type: Summa Canister

Date Sampled: 12/16/2019
Date Received: 12/17/2019

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Tetrachloroethene (PCE)	0.703	4.77	0.300	2.03		EPA-TO-15	12/19/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Trichloroethene (TCE)	<0.200	<1.07	0.200	1.07		EPA-TO-15	12/19/2019	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	12/19/2019	AD
Surr: 4-Bromofluorobenzene	112 %Rec	--	70-130	--		EPA-TO-15	12/19/2019	AD

Client: **Libby Environmental**
WorkOrder: 1912281
Project: 4 Corners

Client Sample ID: VP-3
Lab ID: 1912281-003A
Sample Type: Summa Canister

Date Sampled: 12/16/2019
Date Received: 12/17/2019

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Tetrachloroethene (PCE)	0.373	2.53	0.300	2.03		EPA-TO-15	12/19/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Trichloroethene (TCE)	<0.200	<1.07	0.200	1.07		EPA-TO-15	12/19/2019	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	12/19/2019	AD
Surr: 4-Bromofluorobenzene	112 %Rec	--	70-130	--		EPA-TO-15	12/19/2019	AD

Client: **Libby Environmental**
WorkOrder: 1912281
Project: 4 Corners

Client Sample ID: INPUT
Lab ID: 1912281-004A
Sample Type: Summa Canister

Date Sampled: 12/16/2019
Date Received: 12/17/2019

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Tetrachloroethene (PCE)	<0.300	<2.03	0.300	2.03		EPA-TO-15	12/19/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	12/19/2019	AD
Trichloroethene (TCE)	<0.200	<1.07	0.200	1.07		EPA-TO-15	12/19/2019	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	12/19/2019	AD
Surr: 4-Bromofluorobenzene	111 %Rec	--	70-130	--		EPA-TO-15	12/19/2019	AD

Work Order: 1912281
CLIENT: Libby Environmental
Project: 4 Corners

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R56165A** SampType: **LCS** Units: **ppbv** Prep Date: **12/18/2019** RunNo: **56165**
Client ID: **LCSW** Batch ID: **R56165** Analysis Date: **12/18/2019** SeqNo: **1118845**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.95	0.107	2.000	0	97.6	70	130				
1,1-Dichloroethene (DCE)	1.78	0.400	2.000	0	89.2	70	130				
trans-1,2-Dichloroethene	1.89	0.200	2.000	0	94.3	70	130				
cis-1,2-Dichloroethene	1.72	0.200	2.000	0	85.9	70	130				
Trichloroethene (TCE)	2.09	0.0649	2.000	0	104	70	130				
Tetrachloroethene (PCE)	2.06	0.200	2.000	0	103	70	130				
Surr: 4-Bromofluorobenzene	4.21		4.000		105	70	130				

Sample ID: **MB-R56165A** SampType: **MBLK** Units: **ppbv** Prep Date: **12/18/2019** RunNo: **56165**
Client ID: **MBLKW** Batch ID: **R56165** Analysis Date: **12/18/2019** SeqNo: **1118846**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.107									
1,1-Dichloroethene (DCE)	ND	0.400									
trans-1,2-Dichloroethene	ND	0.200									
cis-1,2-Dichloroethene	ND	0.200									
Trichloroethene (TCE)	ND	0.0649									
Tetrachloroethene (PCE)	ND	0.200									
Surr: 4-Bromofluorobenzene	3.38		4.000		84.5	70	130				

Sample ID: **1912287-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **12/18/2019** RunNo: **56165**
Client ID: **BATCH** Batch ID: **R56165** Analysis Date: **12/18/2019** SeqNo: **1118848**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.107						0		30	
1,1-Dichloroethene (DCE)	ND	0.400						0		30	
trans-1,2-Dichloroethene	ND	0.200						0		30	
cis-1,2-Dichloroethene	ND	0.200						0		30	
Trichloroethene (TCE)	0.0979	0.0649						0.09416	3.94	30	
Tetrachloroethene (PCE)	1.00	0.200						1.387	32.3	30	R

Work Order: 1912281
CLIENT: Libby Environmental
Project: 4 Corners

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **1912287-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **12/18/2019** RunNo: **56165**
Client ID: **BATCH** Batch ID: **R56165** Analysis Date: **12/18/2019** SeqNo: **1118848**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	3.62		4.000		90.5	70	130		0		

NOTES:
R - High RPD observed.

Sample ID: **LCS-R56207** SampType: **LCS** Units: **ppbv** Prep Date: **12/23/2019** RunNo: **56207**
Client ID: **LCSW** Batch ID: **R56207** Analysis Date: **12/23/2019** SeqNo: **1119874**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene (PCE)	2.36	0.200	2.000	0	118	70	130				
Surr: 4-Bromofluorobenzene	4.17		4.000		104	70	130				

Sample ID: **1912352-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **12/23/2019** RunNo: **56207**
Client ID: **BATCH** Batch ID: **R56207** Analysis Date: **12/23/2019** SeqNo: **1119877**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene (PCE)	3.97	0.200						7.507	61.6	30	RH
Surr: 4-Bromofluorobenzene	4.71		4.000		118	70	130		0		H

Sample ID: **MB-R56207** SampType: **MBLK** Units: **ppbv** Prep Date: **12/24/2019** RunNo: **56207**
Client ID: **MBLKW** Batch ID: **R56207** Analysis Date: **12/24/2019** SeqNo: **1119893**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene (PCE)	ND	0.200									
Surr: 4-Bromofluorobenzene	3.24		4.000		81.0	70	130				

Sample Log-In Check List

Client Name:	**LIBBY**	Work Order Number:	**1912281**
Logged by:	**Carissa True**	Date Received:	**12/17/2019 1:20:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air samples		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical *3600 Fremont Ave N.* *Seattle, WA 98103* *Tel: 206-352-3790* *Fax: 206-352-7178*	# Air Chain of Custody Record & Laboratory Services Agreement

Client: ~~LIBBY~~ AEG	Date: 12/16/19 Page: 1 of: 1	*Laboratory Project No (Internal):*
Address:	Project Name: 4 corners	Special Remarks:
City, State, Zip:	Project No: 17-124	
Telephone: 360-847-3608	Location: Maple Valley, WA	
Fax:	Collected by: B. Gilba	Air samples are disposed of one week after report is submitted to client unless otherwise requested. ☒ OK to Dispose ☐ Hold (fees may apply)
	Reports to (PM):	
	Email (PM):	

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Sample Type (Matrix) *	Container Type **	Fill Time / Flow Rate	*Internal* Initial Evacuation Pressure (mtorr)	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis: VOCs TO15 SCAN	VOCs TO15 SCAN LL	VOCs TO15 SIM	Siloxanes TO15	Sulfur TO15	Sulfur Ext. TO15	APH TO15	Helium	Major Gases 3C	PCE; Daughters Suite	Comments	*Internal* Final Pressure ("Hg)
1	VP-1	4688 #2 CO	12/16/19 1247	S	1L	10 Min	10mtorr 12/9/2019	-30 12/16/19	-2 12/16/19										\		
2	VP-2	5025 #2 CO	12/16/19 1250	S	1L	10 Min	10mtorr 12/9/2019	-30 12/16/19	-4 12/16/19										\		
3	VP-3	4689 #2 CO	12/16/19 1238	S	1L	10 Min	10mtorr 12/9/2019	-29 12/16/19	-0 12/16/19										\		
4	input	4687 #2 CO	12/16/19 1300		1L	10 Min	10mtorr 12/9/2019	-29 12/16/19	-5 12/16/19										\		
5																					

* Matrix Codes: AA = Ambient Air IA = Indoor Air L = Landfill S = Subslab / Soil Gas

** Container Codes: BV = 1 Liter Bottle Vac 6L = 6L Canister 1L = 1L Canister CYL = High Pressure Cylinder F = Filter S = Sorbent Tube TB = Tedlar Bag

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	12/16/19 1520	x [signature]	12/16/19 1520
x		x	

Turn-Around Time:

☒ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day ______ (*specify*)

Air Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

12/16/2019 Page: 1 of: 1

Laboratory Project No (Internal): 1912281

Special Remarks: OK TO DISPOSE

Client:	Libby Environmental, Inc.
Address:	3322 South Bay Road NE
City, State, Zip:	Olympia, WA 98506
Telephone:	360-352-2110
Fax:	
Project Name:	4 Corners
Project No:	L191216-3
Location:	
Collected by:	BD
Reports to (PM):	Sherry Chilcutt
Email (PM):	libbyenv@gmail.com

Air samples are disposed of one week after report is submitted to client unless otherwise requested. [X] OK to Dispose [ ] Hold (fees may apply)

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Sample Type (Matrix) *	Container Type **	Fill Time / Flow Rate	Internal: Initial Evacuation Pressure (mtorr)	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis: VOCs TO15 SCAN	VOCs TO15 SCAN LL	VOCs TO15 SIM	Siloxanes TO15	Sulfur TO15	Sulfur Ext. TO15	APH TO15	Helium	Major Gases 3C	PCE + DAUGHTERS	Comments	Internal: Final Pressure ("Hg)
1	VP-1	4688 Canister / #2 CO Flow Reg.	12/16/2019 Date / 12:47 Time	S	1L	10 min	10mtorr Pressure / 12/9/2019 Date	-30 Pressure / 12/16/2019 Date	-2 Pressure / 12/16/2019 Date										x		-2
2	VP-2	5025 Canister / #2 CO Flow Reg.	12/16/2019 Date / 12:50 Time	S	1L	10 min	10mtorr Pressure / 12/9/2019 Date	-30 Pressure / 12/16/2019 Date	-4 Pressure / 12/16/2019 Date										x		-5
3	VP-3	4689 Canister / #2 CO Flow Reg.	12/16/2019 Date / 12:38 Time	S	1L	10 min	10mtorr Pressure / 12/9/2019 Date	-29 Pressure / 12/16/2019 Date	0 Pressure / 12/16/2019 Date										x		0
4	INPUT	4687 Canister / #2 CO Flow Reg.	7/16/2019 Date / 13:00 Time		1L	10 min	10mtorr Pressure / 12/9/2019 Date	-29 Pressure / 12/16/2019 Date	-5 Pressure / 12/16/2019 Date										x		-5
5		Canister / Flow Reg.	Date / Time				Pressure / Date	Pressure / Date	Pressure / Date												

* Matrix Codes: AA = Ambient Air IA = Indoor Air L = Landfill S = Subslab / Soil Gas

** Container Codes: BV = 1 Liter Bottle Vac 6L = 6L Canister 1L = 1L Canister CYL = High Pressure Cylinder F = Filter S = Sorbent Tube TB = Tedlar Bag

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	12/16/19 1630	x UPS	
x VPS		x [signature]	12/17/19 1320

Turn-Around Time:

- [X] Standard
- [ ] 3 Day
- [ ] 2 Day
- [ ] Next Day
- Same Day ____ (specify)

Libby Environmental, Inc.
3322 South Bay Road NE • Olympia, WA 98506-2957

January 27, 2020

Becky Dilba
Associated Environmental Group, LLC
2633 Parkmont Lane SW, Suite A
Olympia, WA 98502

Dear Ms. Dilba:

Please find enclosed the analytical data report for 4 Corners Cleaners Project located in Maple Valley, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Libby Environmental
Sherry Chilcutt
3322 South Bay Road NE
Olympia, WA 98506

RE: 4 Corners Cleaners
Work Order Number: 2001282

January 24, 2020

Attention Sherry Chilcutt:

Fremont Analytical, Inc. received 4 sample(s) on 1/17/2020 for the analyses presented in the following report.

Volatile Organic Compounds by EPA Method TO-15

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *01/24/2020*

CLIENT: Libby Environmental
Project: 4 Corners Cleaners
Work Order: 2001282

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2001282-001	VP-2	01/16/2020 11:52 AM	01/17/2020 11:04 AM
2001282-002	VP-3	01/16/2020 2:00 PM	01/17/2020 11:04 AM
2001282-003	VP-1	01/16/2020 1:45 PM	01/17/2020 11:04 AM
2001282-004	Input-1	01/16/2020 2:08 PM	01/17/2020 11:04 AM

Case Narrative

WO#: **2001282**
Date: **1/24/2020**

CLIENT: Libby Environmental
Project: 4 Corners Cleaners

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: **Libby Environmental**
WorkOrder: 2001282
Project: 4 Corners Cleaners

Client Sample ID: VP-2
Lab ID: 2001282-001A
Sample Type: Summa Canister

Date Sampled: 1/16/2020
Date Received: 1/17/2020

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
Tetrachloroethene (PCE)	62.4	423	3.00	20.3		EPA-TO-15	01/22/2020	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
Trichloroethene (TCE)	0.277	1.49	0.200	1.07		EPA-TO-15	01/22/2020	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	01/22/2020	AD
Surr: 4-Bromofluorobenzene	93.5 %Rec	--	70-130	--		EPA-TO-15	01/22/2020	AD

Client: **Libby Environmental**
WorkOrder: 2001282
Project: 4 Corners Cleaners

Client Sample ID: VP-3
Lab ID: 2001282-002A
Sample Type: Summa Canister

Date Sampled: 1/16/2020
Date Received: 1/17/2020

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
Tetrachloroethene (PCE)	14.9	101	0.300	2.03		EPA-TO-15	01/22/2020	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/22/2020	AD
Trichloroethene (TCE)	<0.200	<1.07	0.200	1.07		EPA-TO-15	01/22/2020	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	01/22/2020	AD
Surr: 4-Bromofluorobenzene	96.7 %Rec	--	70-130	--		EPA-TO-15	01/22/2020	AD

Client: **Libby Environmental**
WorkOrder: 2001282
Project: 4 Corners Cleaners

Client Sample ID: VP-1
Lab ID: 2001282-003A
Sample Type: Summa Canister

Date Sampled: 1/16/2020
Date Received: 1/17/2020

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
Tetrachloroethene (PCE)	38.9	264	0.300	2.03	E	EPA-TO-15	01/23/2020	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
Trichloroethene (TCE)	0.592	3.18	0.200	1.07		EPA-TO-15	01/23/2020	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	01/23/2020	AD
Surr: 4-Bromofluorobenzene	90.4 %Rec	--	70-130	--		EPA-TO-15	01/23/2020	AD

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Client: **Libby Environmental**
WorkOrder: 2001282
Project: 4 Corners Cleaners

Client Sample ID: Input-1
Lab ID: 2001282-004A
Sample Type: Summa Canister

Date Sampled: 1/16/2020
Date Received: 1/17/2020

Volatile Organic Compounds by EPA Method TO-15

Analyte	Concentration (ppbv)	Concentration (ug/m³)	Reporting Limit (ppbv)	Reporting Limit (ug/m³)	Qual	Method	Date/Analyst	
1,1-Dichloroethene (DCE)	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
Tetrachloroethene (PCE)	22.9	155	0.300	2.03	E	EPA-TO-15	01/23/2020	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	01/23/2020	AD
Trichloroethene (TCE)	<0.200	<1.07	0.200	1.07		EPA-TO-15	01/23/2020	AD
Vinyl chloride	<0.200	<0.511	0.200	0.511		EPA-TO-15	01/23/2020	AD
Surr: 4-Bromofluorobenzene	90.1 %Rec	--	70-130	--		EPA-TO-15	01/23/2020	AD

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Work Order: 2001282
CLIENT: Libby Environmental
Project: 4 Corners Cleaners

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R56827** SampType: **LCS** Units: **ppbv** Prep Date: **1/22/2020** RunNo: **56827**
Client ID: **LCSW** Batch ID: **R56827** Analysis Date: **1/22/2020** SeqNo: **1132689**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.38	0.107	2.000	0	119	70	130				
1,1-Dichloroethene (DCE)	2.36	0.400	2.000	0	118	70	130				
trans-1,2-Dichloroethene	2.38	0.200	2.000	0	119	70	130				
cis-1,2-Dichloroethene	2.32	0.200	2.000	0	116	70	130				
Trichloroethene (TCE)	2.34	0.0649	2.000	0	117	70	130				
Tetrachloroethene (PCE)	2.34	0.200	2.000	0	117	70	130				
Surr: 4-Bromofluorobenzene	4.17		4.000		104	70	130				

Sample ID: **MB-R56827** SampType: **MBLK** Units: **ppbv** Prep Date: **1/22/2020** RunNo: **56827**
Client ID: **MBLKW** Batch ID: **R56827** Analysis Date: **1/22/2020** SeqNo: **1132690**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0268									
1,1-Dichloroethene (DCE)	ND	0.100									
trans-1,2-Dichloroethene	ND	0.0500									
cis-1,2-Dichloroethene	ND	0.0500									
Trichloroethene (TCE)	ND	0.0162									
Tetrachloroethene (PCE)	ND	0.0500									
Surr: 4-Bromofluorobenzene	0.848		1.000		84.8	70	130				

Sample ID: **LCS-R56865** SampType: **LCS** Units: **ppbv** Prep Date: **1/23/2020** RunNo: **56865**
Client ID: **LCSW** Batch ID: **R56865** Analysis Date: **1/23/2020** SeqNo: **1133524**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.35	0.107	2.000	0	118	70	130				
1,1-Dichloroethene (DCE)	2.39	0.400	2.000	0	120	70	130				
trans-1,2-Dichloroethene	2.42	0.200	2.000	0	121	70	130				
cis-1,2-Dichloroethene	2.35	0.200	2.000	0	117	70	130				
Trichloroethene (TCE)	2.36	0.0649	2.000	0	118	70	130				
Tetrachloroethene (PCE)	2.33	0.200	2.000	0	116	70	130				

Work Order: 2001282
CLIENT: Libby Environmental
Project: 4 Corners Cleaners

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R56865**	SampType: **LCS**	Units: **ppbv**	Prep Date: **1/23/2020**	RunNo: **56865**
Client ID: **LCSW**	Batch ID: **R56865**		Analysis Date: **1/23/2020**	SeqNo: **1133524**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	4.20		4.000		105	70	130				

Sample ID: **2001281-001AREP**	SampType: **REP**	Units: **ppbv**	Prep Date: **1/23/2020**	RunNo: **56865**
Client ID: **BATCH**	Batch ID: **R56865**		Analysis Date: **1/23/2020**	SeqNo: **1133527**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.107						0		30	
1,1-Dichloroethene (DCE)	ND	0.400						0		30	
trans-1,2-Dichloroethene	ND	0.200						0		30	
cis-1,2-Dichloroethene	ND	0.200						0		30	
Trichloroethene (TCE)	ND	0.0649						0		30	
Tetrachloroethene (PCE)	ND	0.200						0		30	
Surr: 4-Bromofluorobenzene	3.60		4.000		90.0	70	130		0		

Sample ID: **MB-R56865**	SampType: **MBLK**	Units: **ppbv**	Prep Date: **1/24/2020**	RunNo: **56865**
Client ID: **MBLKW**	Batch ID: **R56865**		Analysis Date: **1/24/2020**	SeqNo: **1133736**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0268									
1,1-Dichloroethene (DCE)	ND	0.100									
trans-1,2-Dichloroethene	ND	0.0500									
cis-1,2-Dichloroethene	ND	0.0500									
Trichloroethene (TCE)	ND	0.0162									
Tetrachloroethene (PCE)	ND	0.0500									
Surr: 4-Bromofluorobenzene	0.830		1.000		83.0	70	130				

Sample Log-In Check List

Client Name:	**LIBBY**	Work Order Number:	**2001282**
Logged by:	**Carissa True**	Date Received:	**1/17/2020 11:04:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☐	No	☑	NA ☐
		Air samples				
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes	☐	No	☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes	☐	No	☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☑	No	☐	NA ☐

Person Notified:	Kodev Elev	Date:	1/20/2020
By Whom:	Carissa True	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Confirmation of report distrubution.		
Client Instructions:	Report only to Libby.		

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Air Chain of Custody Record & Laboratory Services Agreement

Laboratory Project No (internal): 2001282

Special Remarks: edits per K.E. 1/22/20 cg

Client: Libby
Address:
City, State, Zip:
Telephone:
Fax:

Date: 1/16/20 Page: of:
Project Name: 4 Corners Cleaners
Project No: 17-126
Location: Maple Valley, Washington
Collected by: Charlie Swift
Reports to (PM): B. Dilbe
Email (PM): CSwift@ [illegible] .com

Air samples are disposed of one week after report is submitted to client unless otherwise requested. ☐ OK to Dispose ☐ Hold (fees may apply)

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Sample Type (Matrix) *	Container Type **	Fill Time / Flow Rate	Initial Evacuation Pressure (mtorr) (Internal)	Field Initial Sample Pressure ("Hg)	Field Final Sample Pressure ("Hg)	VOCs TO15 SCAN	VOCs TO15 SCAN LL	VOCs TO15 SIM	Siloxanes TO15	Sulfur TO15	Sulfur Ext. TO15	APH TO15	Helium	Major Gases 3C	PLE+ Breakdown	Comments	Final Pressure ("Hg) (Internal)
1	UP-2	4680 / #2 CO	1/16/20 13:52		1L	10 min	10mtorr 1/13/202	30 1/16/20	8 1/16/20							~~X~~			⊗	Start = 1:52 Stop = 2:03	10
2	UP-3	4685 / #2 CO	1/16/20 14:00		1L	10 min	10mtorr 1/13/2020	30 1/16/20	10 1/16/18							~~X~~			⊗	Start = 2:00	12
3	UP-1	5025 / #2 CO	1/16/20 13:45		1L	10 min	10mtorr 1/6/2020	30 1/16/20	10 1/16/20							~~X~~			⊗	Start = 1:45 Stop 1:55	11
4	Input-1	3487 / #2CO	1/16/20 14:08		1L	10 min		28 1/16/20	7.5 1/16/18							~~X~~			⊗	Start - 2:08 Stop - 2:18	9
5																					

* Matrix Codes: AA = Ambient Air IA = Indoor Air L = Landfill S = Subslab / Soil Gas

** Container Codes: BV = 1 Liter Bottle Vac 6L = 6L Canister 1L = 1L Canister CYL = High Pressure Cylinder F = Filter S = Sorbent Tube TB = Tedlar Bag

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	1/17/20 11:07	x [signature]	1/17/20 1104
x		x	

Turn-Around Time:
☒ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day ______ (specify)

Air Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 1/16/20 Page: of:

Project Name: 4 Corners Cleaners

Project No: 17-126

Location: Maple Valley, Washington

Collected by: Chuck Swift

Reports to (PM): B. Dills

Email (PM): cswift@ecywa.com

Laboratory Project No (Internal): 2001282

Special Remarks:

Air samples are disposed of one week after report is submitted to client unless otherwise requested. ☐ OK to Dispose ☐ Hold (fees may apply)

Client: Libby

Address:

City, State, Zip:

Telephone:

Fax:

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Sample Type (Matrix) *	Container Type **	Fill Time / Flow Rate	Internal: Initial Evacuation Pressure (mtorr)	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis: VOCs TO15 SCAN	VOCs TO15 SCAN LL	VOCs TO15 SIM	Siloxanes TO15	Sulfur TO15	Sulfur Ext. TO15	APH TO15	Helium	Major Gases 3C		Comments	Internal: Final Pressure ("Hg)
1	UP-2	4680 Canister / #2 CO Flow Reg	1/16/20 Date / 13:52 Time		1L	10 min	10mtorr Pressure / 1/13/2020 Date	30 Pressure / 1/16/20 Date	8 Pressure / 1/16/20 Date							X				Start = 1:52 Stop = 2:03	10
2	UP-3	4685 Canister / #2 CO Flow Reg	1/16/20 Date / 14:00 Time		1L	10 min	10mtorr Pressure / 1/13/2020 Date	30 Pressure / 1/16/20 Date	10 Pressure / 1/16/20 Date							X				Start = 2:00	12
3	UP-1	5025 Canister / #2 CO Flow Reg	1/16/20 Date / 13:45 Time		1L	10 min	10mtorr Pressure / 1/6/2020 Date	30 Pressure / 1/16/20 Date	10 Pressure / 1/16/20 Date							X				Start = 1:45 Stop 1:55	11
4	Input-1	3487 Canister / #2CO Flow Reg	1/16/20 Date / 14:08 Time		1L	10 min	Pressure / Date	28 Pressure / 1/16/20 Date	7.5 Pressure / 1/16/20 Date							X				Start - 2:08 Stop - 2:18	9
5		Canister / Flow Reg	Date / Time				Pressure / Date	Pressure / Date	Pressure / Date												

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- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Air Chain of Custody Record & Laboratory Services Agreement

Client: Libby

Address:

City, State, Zip:

Telephone:

Fax:

Date: 1/16/20 Page: of:

Project Name: 4 Corners Cleaners

Project No: 17-126

Location: Maple Valley, Washington

Collected by: Charlie Swift

Reports to (PM): B. Dilbe

Email (PM): CSwift@ ... .com

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x		x	

Turn-Around Time:
- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day ____ (specify)