Associated Environmental Group, LLC

January 22, 2020

Ms. Tahni Madden
CHI Franciscan Health
1149 Market Street, MS-10-06
Tacoma, Washington 98402-3515

RE: Vapor Mitigation System Air Sampling Results – November 2019
Franciscan Medical Clinic
4550 Fauntleroy Way SW
Seattle, Washington 98126-3471
AEG Project No. 18-172

Dear Ms. Madden:

Associated Environmental Group, LLC (AEG) is pleased to present this memorandum summarizing the recent sampling performed by AEG and NOW Environmental Services, Inc. (NOW) at the CHI Franciscan clinic, located at the above-referenced address in Seattle (Site).

SUB-SLAB VAPOR SAMPLING – AEG

On November 5, 2019, sub-slab vapor samples were collected by AEG from the three independent sub-slab depressurization (SSD) systems installed in exam room #3, the employee break room, and the storage room near the lower exit (see the attached Figure 1, *Sub-Slab Depressurization Point Locations*). Samples were collected using 1-liter Summa canisters to provide a quantitative value for the reduction of volatile organic compounds (VOCs) removed from beneath the concrete floor. The samples were collected using a 10-minute sampling duration, and were delivered to Libby Environmental, Inc. (Libby) laboratory in Olympia, Washington for VOC analysis of petroleum fractionation of aliphatic hydrocarbons in the air-phase (APH) and VOCs by EPA Method TO-15-APH.

The APH vapor sampling method is used to quantify individual fractions of gaseous phase volatile aliphatic and aromatic hydrocarbons based on the number of carbon atoms included in the constituent compounds. The method quantified aliphatic hydrocarbons within two specific ranges: C5 through C8, and C9 through C12. Additionally, aromatic hydrocarbons are quantified within the C9 through C10 range. These ranges are illustrated on the diagram in Figure 4, *Petroleum Fractions by Carbon Range*.

The laboratory results indicated the SSD points in all three locations were removing high APH VOCs in the gasoline-range that would have the potential of entering the working space in the

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lower floor of the building. Gasoline-range organics (GRO) are generally detected between carbon ranges C4 and C12 (see attached Figure 4). Concentrations of C9 to C12 carbon were detected in the storage room and the employee breakroom SSDs at 3,750 micrograms per cubic meter (µg/m^3) and 3,700 µg/m^3, respectively. Detected constituents with corresponding MTCA Method B sub-slab screening levels are summarized in Table 1, *Summary of Sub-Slab Vapor Analytical Results from Sub-Slab Depressurization Points*, and the laboratory sampling reports are attached. The GRO vapors detected in the samples were directed outside of the building to the exhaust stack on the roof of the clinic via the SSD systems.

The SSD systems were installed to provide a reduced pressure (vacuum) beneath the lower office floor slab, creating a pressure barrier to the interior air space. The volatile vapors collected by the SSD points enter the piping through the three collection points and are then discharged by the fan to the outside atmosphere. The airflow rate is approximately 90 cubic feet per minute (CFM) total from all three SSD locations to the exhaust point. The total concentrations of APH results (as GRO) would calculate to about 28.67 pounds per year (lbs/yr) operating 24 hours per day (see Table 2, *Estimated Hydrocarbons Removal Rate*). This would be equivalent to 4.59 gallons of fuel removed in vapor phase from beneath the basement office concrete floor. As a comparison, the active remediation system at the adjacent and upgradient former BP Facility No. WA-11060 (BP) was removing approximately 719.9 lbs/yr or 1.9 pounds per day (lbs/day) at the source of the spill as reported in the 2018 Annual Site Status Report to Ecology. The correlation is the downgradient SSD system is currently removing an equivalent mass of 4% of total hydrocarbons removed from the spill area in 2018 from beneath the concrete floor of the building.

INDOOR AIR SAMPLING – NOW ENVIRONMENTAL

On November 5 and 6, 2019, concurrent with AEG's Site activities, NOW performed a follow-up round of indoor air testing. This NOW sampling effort was more extensive than prior events, and included sampling the indoor air samples from previous and new locations within the basement office areas using Summa canisters with 8- and 24-hour sampling durations. Analytical results of identified constituents in indoor air were compared to the Model Toxics Control Act (MTCA) Method B indoor air cleanup levels and Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs). Figure 3, *West Seattle Medical Clinic Proposed Sampling Locations Map,* from the December 2019 NOW report shows the locations of the Summa canister placement.

Analytical results of the samples indicated the presence of APHs and VOCs at concentrations exceeding their respective MTCA Method B indoor air cleanup levels. However, concentrations were well below the PELs established by OSHA for an 8-hour work day. A summary of indoor air analytical results is presented in Table 3A, Table 3B, and Table 3C, *Comparison of Indoor Air Samples*.

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CLOSING

The Site work was completed to assess the effectiveness of the SSD system installed by AEG to address health concerns and try to redirect petroleum vapors detected within the lower floor of the building to outside air. The vapor data collected by AEG shows the SSD system is pulling vapors from beneath the slab and redirecting them to the outside air as designed. However, the latest indoor air sampling, which included areas not previously sampled, showed GRO and selected VOCs above their respective MTCA Method B indoor air cleanup levels, though well below the PELs established by OSHA for an 8-hour work day.

The HVAC is now operating in heating mode, which typically recycles air from around the building along with a percentage of "outside fresh air" for energy efficiency. This may account for the indoor air detections during this sampling event.

Additional mitigation options could include either of the following:

1. Expand the SSD network with additional points and a second vacuum fan. AEG would need to examine the condition of the drop ceiling on the south end of the lower offices and to see how to route the conveyance piping to the roof prior to proposing new SSD locations.
2. Add several new SSD points and change the fan to a larger vacuum blower capable of higher vacuum and increased air flow rates. This would have to be sized based on the available power on the roof, the roof load bearing capability, and possibly a small sound enclosure placed on the ground for easier access for maintenance.

AEG had intended to operate the SSD system until such time that BP finishes their investigation of the petroleum impact to Site subsurface associated with the adjacent Shell site to the west. Figure 2, *Groundwater Elevation Contour Map with Analytical Results August 27, 2019,* from BP's consultant (ARCADIS) shows the GRO concentrations in monitoring well GMW-1 to be 2,750 micrograms per liter (µg/L), which exceeds the MTCA Method A Groundwater Cleanup Level of 800 µg/L. According to ARCADIS, the inferred groundwater gradient is to the east of the property (AEG added the redline and text to the attached figure). The SSD system installed by AEG was intended to be temporary and was not designed as a remediation system to clean up the GRO that may have migrated from the BP site to the clinic property.

The soil vapor extraction (SVE) system in operation on the BP site needs to be increased to encompass the clinic property; at a minimum the west side of the clinic building. This would likely address the GRO under the concrete floor of the basement office spaces. At this time, AEG has not received any indications that BP/ARCADIS is going to expand the remediation system to increase the recovery radius of their SVE system.

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AEG would recommend continued seasonal indoor air and SSD vapor sampling to confirm any seasonal changes to the VOC levels, and to ensure continued monitoring of the potential risk levels for employees.

Sincerely,

Associated Environmental Group, LLC

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

Scott Rose, L.H.G.
Senior Hydrogeologist

Attachments:

Figure 1 – *Sub-Slab Depressurization Point Locations*

Figure 2 – *Groundwater Elevation Contour Map with Analytical Results August 27, 2019 (from the Former BP Facility No. WA-11060 (NW2463) – 2019 Groundwater Monitoring Report* by Arcadis, dated November 14, 2019)

Figure 3 – *West Seattle Medical Clinic Proposed Sampling Locations Map* – NOW December 2019

Figure 4 – *Petroleum Fractions by Carbon Range*

Table 1 – *Summary of Sub-Slab Vapor Analytical Results from Sub-Slab Depressurization Points*

Table 2 – *Estimated Hydrocarbons Removal Rate*

Table 3A – *Comparison of Indoor Air Samples*

Table 3B – *Comparison of Indoor Air Samples*

Table 3C – *Comparison of Indoor Air Samples*

Libby Environmental, Inc. Laboratory Report, dated November 21, 2019

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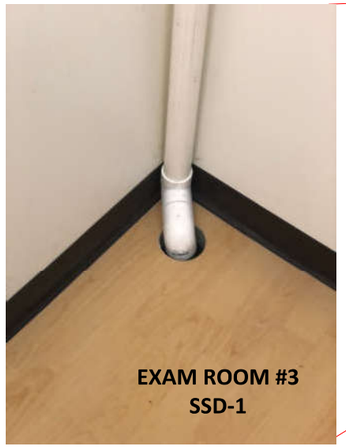
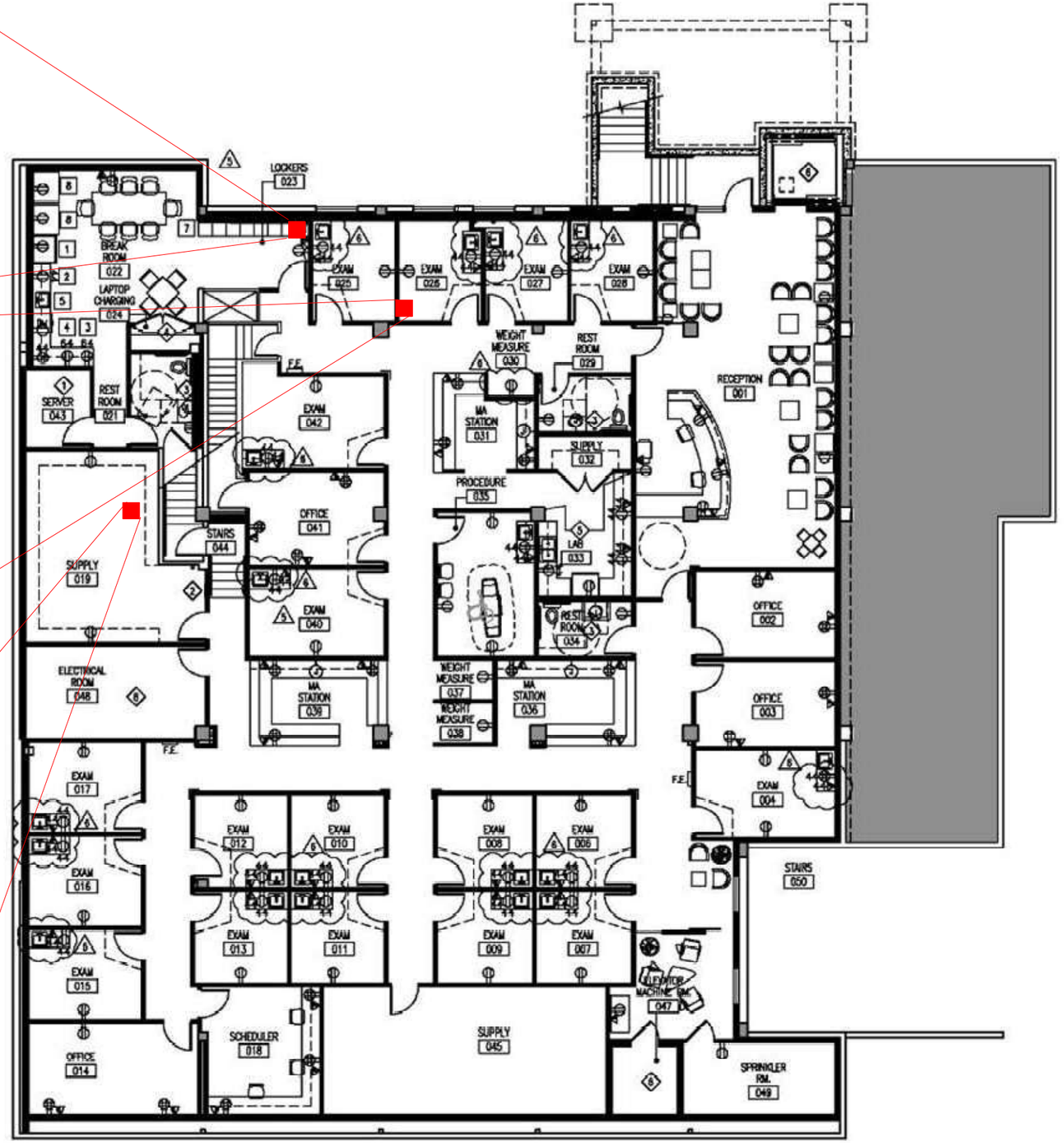
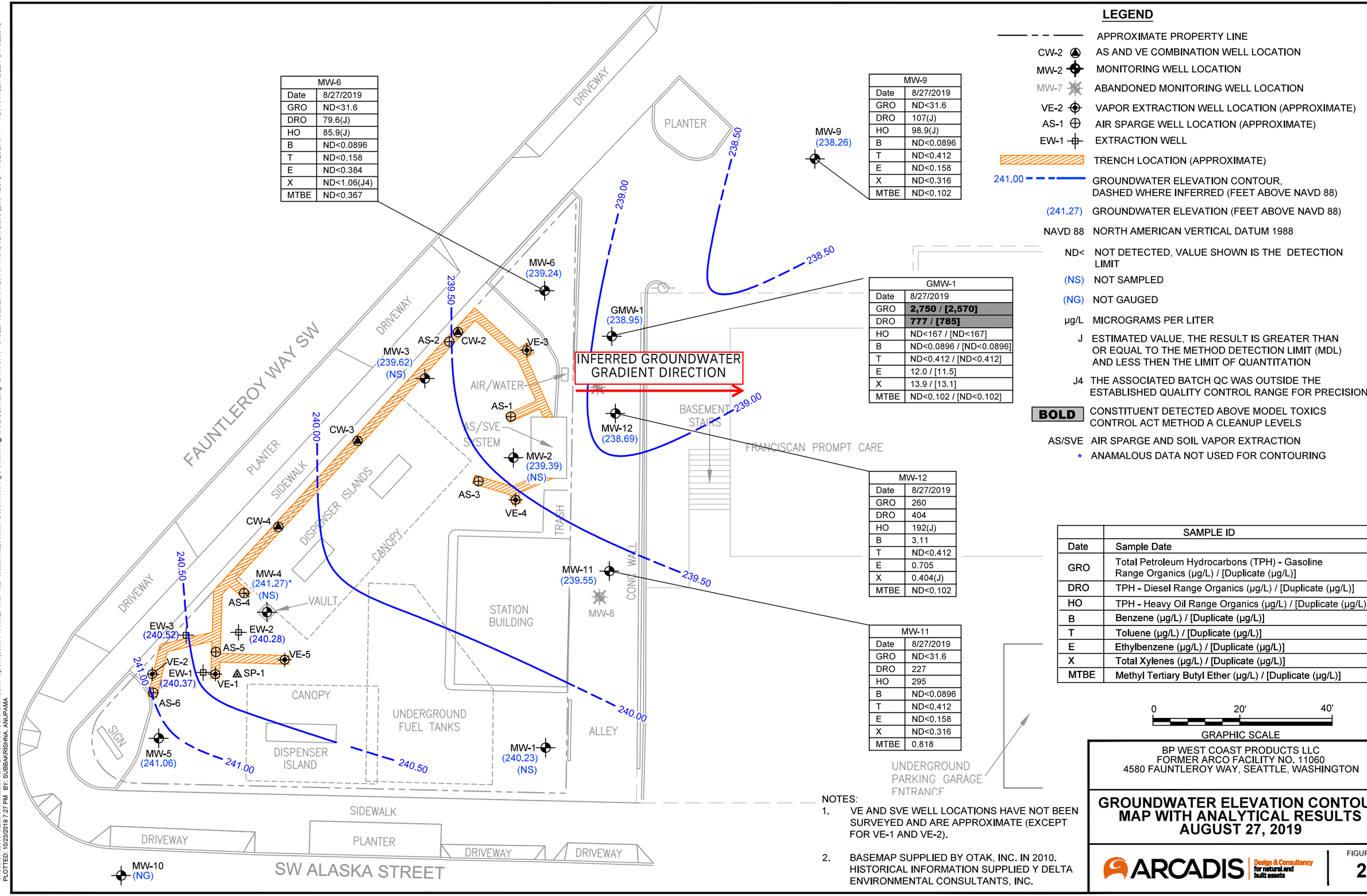




Associated Environmental Group, LLC	FIGURE 1			
	SUB-SLAB DEPRESSURIZATION POINT LOCATIONS FRANCISCAN WEST SEATTLE, WASHINGTON			
PROJECT: 18-172	SIZE	FSCM NO	DWG NO	REV
	SCALE 1 : 1		SHEET 1 OF 3	



MW-6	
Date	8/27/2019
GRO	ND<31.6
DRO	79.6(J)
HO	85.9(J)
B	ND<0.0896
T	ND<0.158
E	ND<0.384
X	ND<1.06(J4)
MTBE	ND<0.367

MW-9	
Date	8/27/2019
GRO	ND<31.6
DRO	107(J)
HO	98.9(J)
B	ND<0.0896
T	ND<0.412
E	ND<0.158
X	ND<0.316
MTBE	ND<0.102

GMW-1	
Date	8/27/2019
GRO	**2,750 / [2,570]**
DRO	**777 / [785]**
HO	ND<167 / [ND<167]
B	ND<0.0896 / [ND<0.0896]
T	ND<0.412 / [ND<0.412]
E	12.0 / [11.5]
X	13.9 / [13.1]
MTBE	ND<0.102 / [ND<0.102]

MW-12	
Date	8/27/2019
GRO	260
DRO	404
HO	192(J)
B	3.11
T	ND<0.412
E	0.705
X	0.404(J)
MTBE	ND<0.102

MW-11	
Date	8/27/2019
GRO	ND<31.6
DRO	227
HO	295
B	ND<0.0896
T	ND<0.412
E	ND<0.158
X	ND<0.316
MTBE	0.818

LEGEND

- APPROXIMATE PROPERTY LINE
- CW-2 — AS AND VE COMBINATION WELL LOCATION
- MW-2 — MONITORING WELL LOCATION
- MW-7 — ABANDONED MONITORING WELL LOCATION
- VE-2 — VAPOR EXTRACTION WELL LOCATION (APPROXIMATE)
- AS-1 — AIR SPARGE WELL LOCATION (APPROXIMATE)
- EW-1 — EXTRACTION WELL
- TRENCH LOCATION (APPROXIMATE)
- 241.00 — GROUNDWATER ELEVATION CONTOUR, DASHED WHERE INFERRED (FEET ABOVE NAVD 88)
- (241.27) — GROUNDWATER ELEVATION (FEET ABOVE NAVD 88)
- NAVD 88 — NORTH AMERICAN VERTICAL DATUM 1988
- ND< — NOT DETECTED, VALUE SHOWN IS THE DETECTION LIMIT
- (NS) — NOT SAMPLED
- (NG) — NOT GAUGED
- µg/L — MICROGRAMS PER LITER
- J — ESTIMATED VALUE, THE RESULT IS GREATER THAN OR EQUAL TO THE METHOD DETECTION LIMIT (MDL) AND LESS THEN THE LIMIT OF QUANTITATION
- J4 — THE ASSOCIATED BATCH QC WAS OUTSIDE THE ESTABLISHED QUALITY CONTROL RANGE FOR PRECISION
- **BOLD** — CONSTITUENT DETECTED ABOVE MODEL TOXICS CONTROL ACT METHOD A CLEANUP LEVELS
- AS/SVE — AIR SPARGE AND SOIL VAPOR EXTRACTION
- * — ANAMALOUS DATA NOT USED FOR CONTOURING

	SAMPLE ID
Date	Sample Date
GRO	Total Petroleum Hydrocarbons (TPH) - Gasoline Range Organics (µg/L) / [Duplicate (µg/L)]
DRO	TPH - Diesel Range Organics (µg/L) / [Duplicate (µg/L)]
HO	TPH - Heavy Oil Range Organics (µg/L) / [Duplicate (µg/L)]
B	Benzene (µg/L) / [Duplicate (µg/L)]
T	Toluene (µg/L) / [Duplicate (µg/L)]
E	Ethylbenzene (µg/L) / [Duplicate (µg/L)]
X	Total Xylenes (µg/L) / [Duplicate (µg/L)]
MTBE	Methyl Tertiary Butyl Ether (µg/L) / [Duplicate (µg/L)]

0 20' 40'

GRAPHIC SCALE

NOTES:
1. VE AND SVE WELL LOCATIONS HAVE NOT BEEN SURVEYED AND ARE APPROXIMATE (EXCEPT FOR VE-1 AND VE-2).
2. BASEMAP SUPPLIED BY OTAK, INC. IN 2010. HISTORICAL INFORMATION SUPPLIED Y DELTA ENVIRONMENTAL CONSULTANTS, INC.

BP WEST COAST PRODUCTS LLC
FORMER ARCO FACILITY NO. 11060
4580 FAUNTLEROY WAY, SEATTLE, WASHINGTON

GROUNDWATER ELEVATION CONTOUR MAP WITH ANALYTICAL RESULTS AUGUST 27, 2019

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY:(EMERYVILLE) DIV/GROUP:(EMV) DB:(DCB) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\ASI008813\BIM 360\Arcadis\ANA - BP AMOCO CORPORATION\Project Files\WA-11060\2019\GP18BPWC.WA48.B0000\01-DWG\11060 Fig 3 GWC&AR_AUG 27, 2019.dwg LAYOUT: 3 SAVED: 10/23/2019 7:26 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB
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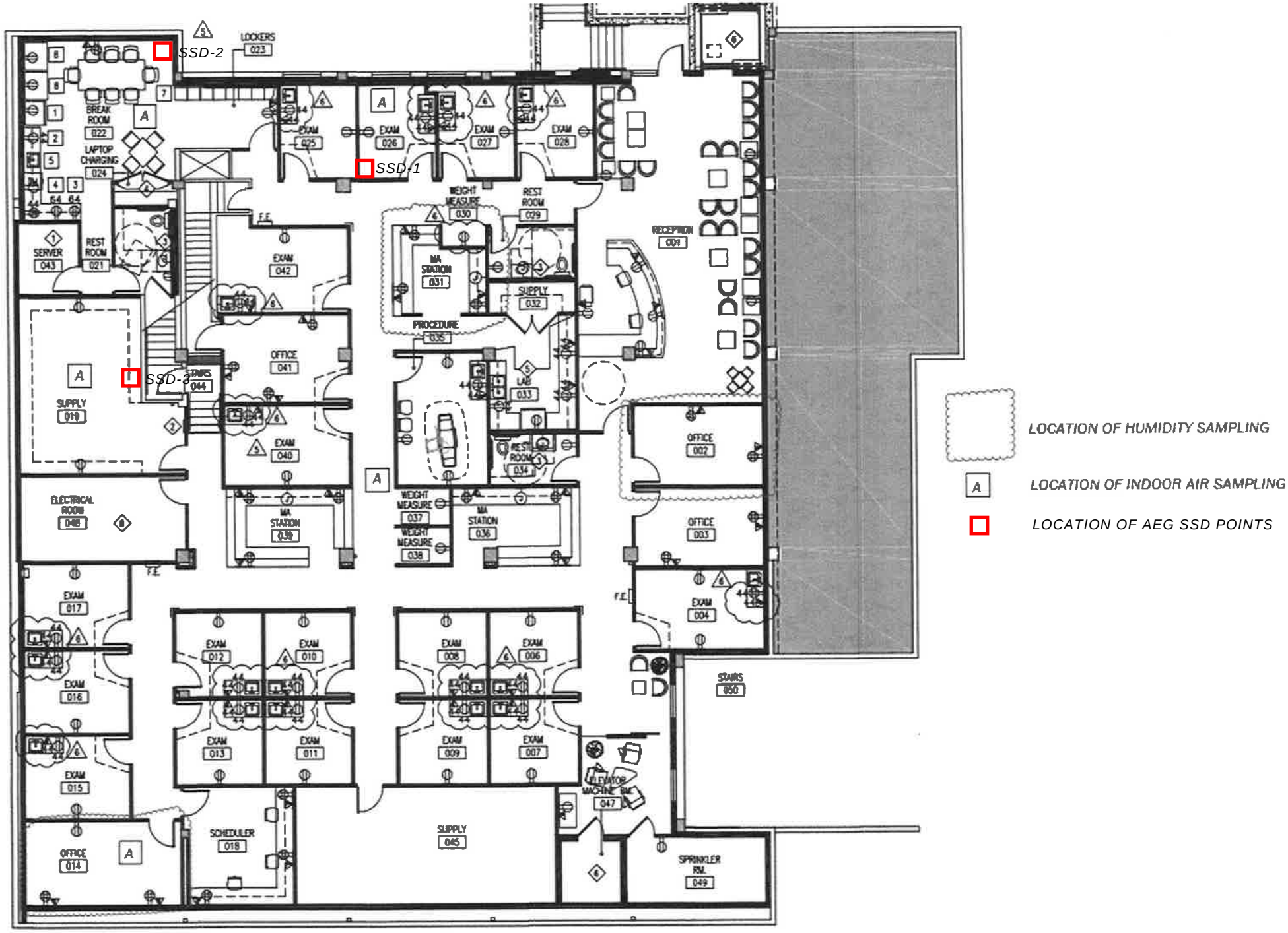

WEST SEATTLE MEDICAL CLINIC

PROPOSED SAMPLING LOCATIONS MAP

FIGURE 3

FIGURE 4

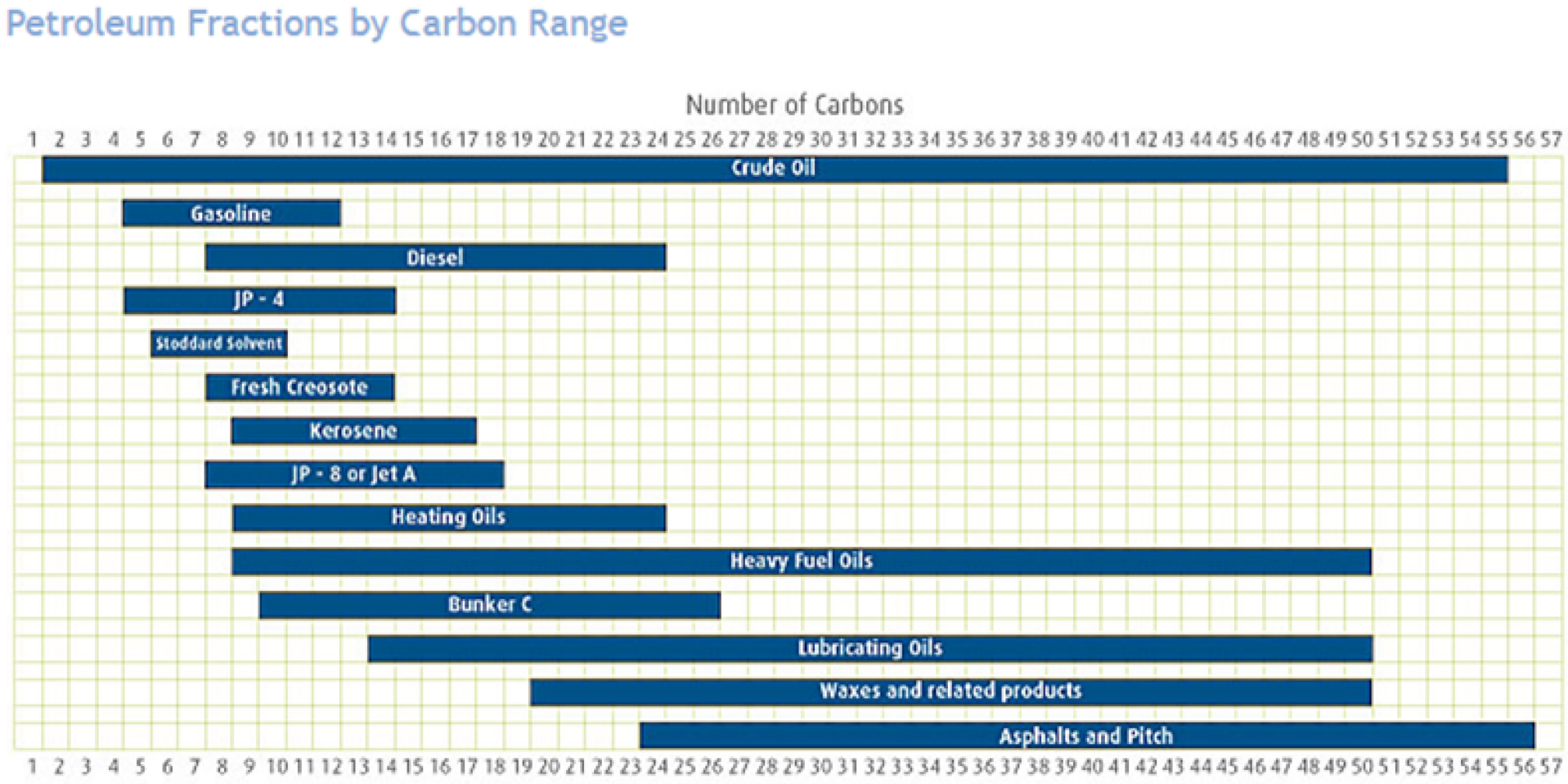
Petroleum Fractions by Carbon Range
Number of Carbons
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57
Crude Oil
Gasoline
Diesel
JP - 4
Stoddard Solvent
Fresh Creosote
Kerosene
JP - 8 or Jet A
Heating Oils
Heavy Fuel Oils
Bunker C
Lubricating Oils
Waxes and related products
Asphalts and Pitch
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57

Table 1

Summary of Sub-Slab Vapor Analytical Results from Sub-Slab Depressurization Points

Franciscan Medical Clinic, West Seattle

Sample Number		Exam Room No. 3 (SSD-1)		Employee Break Room (SSD-2)		Storage Room (SSD-3)		Method B Sub-Slab Screening Level[1]	Method B Indoor Air Cleanup Level[2]	OSHA PEL (8-Hour TWA)	ACGIH TLVs (8-Hour TWA)
Date Collected		4/5/2019	11/5/2019	4/5/2019	11/5/2019	4/5/2019	11/5/2019				
Gasoline-Related Constituents											
APH - Air-Phase Hydrocarbons	EC5-8 Aliphatics	**210**	**378**	**110**	**676**	**330**	**903**	90,000	2,700	NL	NL
	EC9-12 Aliphatics	**120**	**467**	**91**	**3,700**	**180**	**3,750**	4,700	140	NL	NL
	EC9-10 Aromatics	<40	<31.4	<40	<31.4	<37	<31.4	6,000	180	NL	NL
Gasoline-Range Organics[3]		**330**	**845**	**201**	**4,376**	**510**	**4,653**	NL	140	NL	NL
Detected Volatile Organic Compounds											
Volatile Organic Compounds	Hexane	<5.6	<1.41	<5.6	<4.41	**7.9**	<1.41	10,700	320	500,000	50,000
	Benzene	<0.51	**0.439**	<0.51	**0.722**	**0.82 fb**	**0.395**	10.7*	0.321*	1,000	500
	Toluene	**6.8**	<1.51	**3.1**	**2.58**	**17**	**2.11**	76,200	2,290	200,000	20,000
	Ethylbenzene	**0.89**	<1.74	**0.97**	<1.74	**4.4**	<1.74	15,200	457	100,000	20,000
	m,p-Xylene	**2.3**	<3.47	**2.5**	<4.47	**9.4**	<3.47	1,520	45.7	100,000	100,000
	o,p-Xylene	**1.0**	<1.74	**0.99**	<1.71	**4.0**	<1.74	1,520	45.7	100,000	100,000
	Naphthalene	<0.42	**1.2**	<0.42	**5.05**	<0.39	**1.6**	2.45*	0.0735*	10,000	10,000
Other Detected Volatile Organic Compounds											
Selected Volatile Organic Compounds	Dichlorodifluoromethane	**2.4**	**2.58**	**2.4**	**2.56**	<0.13	**2.59**	1,520	45.7	1,000	1,000
	Chloroform	**2.2**	**4.7**	**0.38**	<0.977	**0.25**	<0.977	3.62*	0.1	50	10
	1,2-Dichloroethane (EDC)	**0.097**	<0.809	**0.078**	<0.810	**0.77**	<0.809	3.21*	0.096	100	100
	1,2,4-Trimethylbenzene	<1.2	<1.47	<1.2	<1.47	<3.7	**2.73**	106.6	3.2	NL	25,000
	1,3-Dichlorobenzene	<0.96	**7.38**	<0.96	**8.09**	<0.9	**11.8**	NL	NL	301,000	150,000
	Isopropol Alcohol	**420 ve**	**60.8**	**95**	**54.8**	**55**	**51.9**	NL	NL	980,000	200,000
	Trichloroethylene (TCE)	**4.1**	<0.349	**13**	<0.349	<0.4	<0.349	12.3*	0.37	100	50
	Tetrachloroethylene (PCE)	<11	**4.89**	**43**	<1.36	<10	<1.36	321*	9.60	100	25
	Styrene	<1.4	<1.7	**<1.4**	<1.70	6.2	<1.7	15,200	457	100	50
	Acetone	**52**	**23.9**	**37**	**43.7**	**55**	**13.5**	NL	NL	2,400,000	250,000

Notes:

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

< = Not detected above laboratory reporting limits

fb = The analyte was detected in the method blank.

ve = The analyte response exceeded the valid instrument calibration range. The reported value is an estimate.

* Cancer screening level (all other constituents listed do not have cancer values)

[1]An exceedance of Ecology's Method B sub-slab screening level indicates the constituent is present at a concentration in sub-slab vapor that has the potential to migrate into indoor air.

[2]An exceedance of Ecology's Method B cleanup level for indoor air indicates that, for the Site to receive a determination of No Further Action, mitigation is required via either removal of the source or redirection of vapors from the breathing zone.

[3]Gasoline-Range Organics were estimated using the sum of the results for APH EC5-8, APH EC9-12, and APH EC9-10

Red Bold indicates the detected concentration exceeds one or more regulatory levels

Bold indicates the detected concentration is below all regulatory levels

OSHA PEL = U.S. Department of Labor, Occupational Safety and Health Administration Permissible Exposure Limit. Federal regulatory standard.

TWA = Time-Weighted Average.

NL = Not Listed; no values have been established for these constituents.

ACGIH TLVs = American Conference of Governmental Industrial Hygienists Threshold Limit Values. ACGIH® is a private, not-for-profit, nongovernmental corporation. It is not a standards setting body. ACGIH® is a scientific association that develops recommendations or guidelines to assist in the control of occupational health hazards. TLVs® are health-based values and are not intended to be used as legal standards. Threshold Limit Values (TLVs®) refer to airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse effects.

TABLE 2
Estimated Hydrocarbons Removal Rate
Franciscan Health Clinic - Seattle, 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 Actual Flow Rate estimated pounds per day (lb/day)	Potential To Emit Actual Flow Rate (3) estimated pounds per year (lb/year)
11/5/2019	**SSDs Combined**	Benzene	0.0006	78.11	90.00	0.0000159	0.0058
		Toluene	0.0013	92.13	90.00	0.0000398	0.0145
		Ethylbenzene	0.0000	106.2	90.00	0.0000000	0.0000
	10-inches W.C.	Xylenes	0.0000	106.2	90.00	0.0000000	0.0000
	Total System Vacuum	Gasoline	2.2569	105	90.00	0.0785475	28.6699
						BTEX Daily	**0.0001**
						TPH-G Daily	**0.0785**
						BTEX Totals Yearly	**0.0203**
						TPH-G Totals Yearly	**28.6699**

Notes:
CFM = Flow rate of gas (standard cubic feet per minute)
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 Water Column Vacuum
System restarted on 12/14/2018

Conversion from ug/m^3 to PPMV

	ug/m3	Mol Wt.	PPMV
TPH-Gx	9,874	105	2.257
Benzene	2	78.11	0.001
Toluene	5	92.13	0.001
Ethylbenzene	0	106.2	0.000
Xylenes	0	106.2	0.000

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 blower flow curves based on 40.0 inches W.C. vacuum at the system inlet.
(3) = Potential emission rate as indicated by no treatment or no Best Available Control Technology (BACT) Method on 24-hours of operation per day.
(4) = System restarted on 12/14/2019 with ART Well #5 operating (compressor hours = 5,190 hours)

Table 3A
Comparison of Indoor Air Samples
Franciscan Medical Clinic, West Seattle

Sample Number		Exam Room No. 3								Method B Sub-Slab Screening Level[1]	Method B Indoor Air Cleanup Level[2]	OSHA PEL (8-Hour TWA)	ACGIH TLVs (8-Hour TWA)
Date Collected		5/3/2018 (before SSD system online)	5/23/2018 (before SSD system online)	1/18/2019 (before SSD system online)	1/18/2019 (before SSD system online)	4/4/2019 (after SSD system online)	4/4/2019 (after SSD system online)	11/5/2019 (after SSD system online)	11/5/2019 (after SSD system online)				
Sample Duration		8 Hours	8 Hours	8 Hours	24 Hours	8 Hours	24 Hours	8 Hours	24 Hours				
Gasoline-Related Constituents													
Gasoline-Range Organics[3]		**26,300**	**1,100**	**41.5**	**42.0**	**16.4**	**73.2**	**62.4**	**295**	NL	140	NL	NL
Volatile Organic Compounds	Hexane	**223**	**10.7**	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	10,700	320	500,000	50,000
	Benzene	**0.902**	**0.628**	**0.543**	**0.637**	<0.286	<0.286	**0.667**	**0.585**	10.7*	0.321*	1,000	500
	Toluene	**9.32**	**3.14**	**4.54**	**4.54**	**1.64**	**1.75**	**47**	**1.97**	76,200	2,290	200,000	20,000
	Ethylbenzene	**4.24**	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74	15,200	457	100,000	20,000
	m,p-Xylene	**15.1**	<3.47	<3.47	<3.47	<3.47	<3.47	<3.47	<3.47	1,520	45.7	100,000	100,000
	o,p-Xylene	**4.86**	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74	<1.74	1,520	45.7	100,000	100,000
	1,2,4-trimethylbenzene	**4.31**	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	107	3.20	NL	NL
	Naphthalene	<0.524	<0.524	<0.524	<0.524	<0.524	<0.524	<.524	<0.524	2.45*	0.0735*	10,000	10,000
Other Detected Volatile Organic Compounds													
Selected Volatile Organic Compounds	Dichlorodifluoromethane	**3.24**	<1.98	**2.55**	**2.59**	**2.78**	**2.77**	**2.54**	**2.77**	1,520	45.7	1,000	1,000
	Carbon tetrachloride	**0.712**	<0.413	**0.419**	**0.431**	**0.482**	**0.480**	**0.423**	**0.421**	1,520*	45.7*	10	5
	Methyl ethyl ketone	**5.80**	**924**	<2.95	<2.95	<2.95	<2.95	<2.95	<2.95	76,200	2,290	200	200
	Trichloroethylene (TCE)	<0.349	<0.349	<0.349	<0.349	<0.349	**0.612**	<0.349	<0.349	12.3*	0.37*	100	50
	Tetrachloroethylene (PCE)	<1.36	<1.36	**1.62**	<1.36	<1.36	<1.36	<1.36	<1.36	321*	9.6*	100	25

Notes:

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

< = Not detected above laboratory reporting limits

fb = The analyte was detected in the method blank.

ve = The analyte response exceeded the valid instrument calibration range. The reported value is an estimate.

* Cancer screening level (all other constituents listed do not have cancer values)

[1]An exceedance of Ecology's Method B sub-slab screening level indicates the constituent is present at a concentration in sub-slab vapor that has the potential to migrate into indoor air.

[2]An exceedance of Ecology's Method B cleanup level for indoor air indicates that, for the Site to receive a determination of No Further Action, mitigation is required via either removal of the source or redirection of vapors from the breathing zone.

[3]Gasoline-Range Organics were estimated using the sum of the results for APH EC5-8, APH EC9-12, and APH EC9-10

Red Bold indicates the detected concentration exceeds one or more regulatory levels

Bold indicates the detected concentration is below all regulatory levels

SSD = Sub-Slab Depressurization

OSHA PEL = U.S. Department of Labor, Occupational Safety and Health Administration Permissible Exposure Limit. Federal regulatory standard.

TWA = Time-Weighted Average.

NL = Not Listed; no values have been established for these constituents.

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Table 3B

Comparison of Indoor Air Samples

Franciscan Medical Clinic, West Seattle

Sample Number		Storage Room						Method B Sub-Slab Screening Level[1]	Method B Indoor Air Cleanup Level[2]	OSHA PEL (8-Hour TWA)	ACGIH TLVs (8-Hour TWA)
Date Collected		5/3/2018 (before SSD system online)	1/18/2019 (before SSD system online)	4/4/2019 (after SSD system online)	4/4/2019 (after SSD system online)	11/5/2019 (after SSD system online)	11/5/2019 (after SSD system online)				
Sample Duration		8 Hours	24 Hours	8 Hours	24 Hours	8 Hours	24 Hours				
Gasoline-Related Constituents											
Gasoline-Range Organics[3]		**32,400**	**74.4**	**60.3**	**70.7**	**159**	**106**	NL	140	NL	NL
Volatile Organic Compounds	Hexane	**466**	<1.41	<1.41	<1.41	<1.41	<1.41	10,700	320	500,000	50,000
	Benzene	**0.974**	**0.458**	<0.286	<0.286	**1.58**	**0.722**	10.7*	0.321*	1,000	500
	Toluene	**19.8**	<1.51	**1.79**	**1.96**	**3.75**	**1.91**	76,200	2,290	200,000	20,000
	Ethylbenzene	**8.98**	<1.74	<1.74	<1.74	<1.74	<1.74	15,200	457	100,000	20,000
	m,p-Xylene	**36.6**	<3.47	<3.47	<3.47	<3.47	<3.47	1,520	45.7	100,000	100,000
	o,p-Xylene	**16.5**	<1.74	<1.74	<1.74	**1.9**	<1.74	1,520	45.7	100,000	100,000
	1,2,4-trimethylbenzene	**6.67**	<1.47	<1.47	<1.47	<2.23	<1.47	107	3.20	NL	NL
	Naphthalene	<0.524	<0.524	<0.524	<0.52	**0.694**	<0.524	2.45*	0.0735*	10,000	10,000
Other Detected Volatile Organic Compounds											
Selected Volatile Organic Compounds	Dichlorodifluoromethane	**2.73**	**2.67**	**2.67**	**2.79**	**2.66**	**2.52**	1,520	45.7	1,000	1,000
	Carbon tetrachloride	**0.572**	**0.468**	**0.477**	**0.484**	**0.414**	**0.435**	1,520*	45.7*	10	5
	Methyl ethyl ketone	**7.94**	<2.95	<2.95	<2.95	<2.95	<2.95	76,200	2,290	200	200
	Trichloroethylene (TCE)	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349	12.3*	0.37*	100	50
	Tetrachloroethylene (PCE)	<1.36	<1.36	<1.36	<1.36	<1.36	<1.36	321*	9.6*	100	25

Notes:

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

< = Not detected above laboratory reporting limits

fb = The analyte was detected in the method blank.

ve = The analyte response exceeded the valid instrument calibration range. The reported value is an estimate.

* Cancer screening level (all other constituents listed do not have cancer values)

[1]An exceedance of Ecology's Method B sub-slab screening level indicates the constituent is present at a concentration in sub-slab vapor that has the potential to migrate into indoor air.

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[3]Gasoline-Range Organics were estimated using the sum of the results for APH EC5-8, APH EC9-12, and APH EC9-10

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Table 3C
Comparison of Indoor Air Samples
Franciscan Medical Clinic, West Seattle

Sample Number		Back Office Pod	Front Office Pod	Employee Break Room		Hall Across From Main Desk		Dr. Koang's Office Rm #14		Method B Sub-Slab Screening Level[1]	Method B Indoor Air Cleanup Level[2]	OSHA PEL (8-Hour TWA)	ACGIH TLVs (8-Hour TWA)
Date Collected		5/23/2018 (before SSD system online)	1/18/2019 (before SSD system online)	11/5/2019 (SSD system online)	11/5/2019 (SSD system online)	11/5/2019 (SSD system online)	11/5/2019 (SSD system online)	11/5/2019 (SSD system online)	11/5/2019 (SSD system online)				
Sample Duration		8 Hours	8 Hours	8 Hours	24 Hours	8 Hours	24 Hours	8 Hours	24 Hours				
Gasoline-Related Constituents													
Gasoline-Range Organics[3]		**1,020**	**55.9**	**62.4**	**295**	**131**	**126**	**100**	**81.7**	NL	140	NL	NL
Volatile Organic Compounds	Hexane	**11.0**	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	10,700	320	500,000	50,000
	Benzene	**0.516**	**0.820**	**0.667**	**0.716**	**1.25**	**0.643**	**0.768**	**0.621**	10.7*	0.321*	1,000	500
	Toluene	**1.59**	**1.97**	**1.90**	**4.07**	**47**	**1.69**	**2.10**	**1.69**	76,200	2,290	200,000	20,000
	Ethylbenzene	<1.74	<1.74	<1.74	<1.74	**0.567**	**0.567**	<1.74	<1.74	15,200	457	100,000	20,000
	m,p-Xylene	<3.47	<3.47	<3.47	<3.47	**7.24**	<3.47	<3.47	<3.47	1,520	45.7	100,000	100,000
	o,p-Xylene	<1.74	<1.74	<1.74	<1.74	**2.24**	<1.74	<1.74	<1.74	1,520	45.7	100,000	100,000
	1,2,4-trimethylbenzene	<1.47	<1.47	<1.47	<1.47	<1.47	**1.55**	<1.47	<1.47	107	3.20	NL	NL
	Naphthalene	<0.524	<0.524	<0.524	<0.524	<0.524	**2.92**	**0.614**	<0.524	2.45*	0.0735*	10,000	10,000
Other Detected Volatile Organic Compounds													
Selected Volatile Organic Compounds	Dichlorodifluoromethane	**2.73**	**2.56**	**2.58**	**2.53**	**2.55**	**2.58**	**2.50**	**2.59**	1,520	45.7	1,000	1,000
	Carbon tetrachloride	**0.572**	**0.454**	<0.413	**0.423**	<0.413	**0.434**	**0.414**	<0.413	1,520*	45.7*	10	5
	Methyl ethyl ketone	**7.94**	<2.95	<2.95	**9.89**	<2.95	<2.95	<2.95	<2.95	76,200	2,290	200	200
	Trichloroethylene (TCE)	<0.349	<0.349	<0.349	**0.87**	**1.14**	**1.3**	<0.349	<0.349	12.3*	0.37*	100	50
	Tetrachloroethylene (PCE)	<1.36	<1.36	<1.36	**33.4**	**2.24**	**17.8**	<1.36	<1.36	321*	9.6*	100	25

Notes:

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

November 21, 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 Franciscan West Seattle Project located in Seattle, 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: Franciscan West Seattle
Work Order Number: 1911061

November 21, 2019

Attention Sherry Chilcutt:

Fremont Analytical, Inc. received 3 sample(s) on 11/5/2019 for the analyses presented in the following report.

Petroleum Fractionation by EPA Method TO-15
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: *11/21/2019*

CLIENT: Libby Environmental
Project: Franciscan West Seattle
Work Order: 1911061

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1911061-001	SSD-BR	11/05/2019 10:51 AM	11/05/2019 3:25 PM
1911061-002	SSD-SR	11/05/2019 10:26 AM	11/05/2019 3:25 PM
1911061-003	SSD-E3	11/05/2019 11:22 AM	11/05/2019 3:25 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1911061**
Date: **11/21/2019**

CLIENT: Libby Environmental
Project: Franciscan West Seattle

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).

11/21/19: Revision 1 includes APH data.

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: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-BR
Lab ID: 1911061-001A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	178	676	75.0	285		EPA-TO-15	11/21/2019	AD
Aliphatic Hydrocarbon (EC9-12)	629	3,700	75.0	442		EPA-TO-15	11/21/2019	AD
Aromatic Hydrocarbon (EC9-10)	<6.25	<31.4	6.25	31.4		EPA-TO-15	11/19/2019	AD
Surr: 4-Bromofluorobenzene	103 %Rec	--	70-130	--		EPA-TO-15	11/19/2019	AD
Volatile Organic Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
1,1,1-Trichloroethane	<0.400	<2.18	0.400	2.18		EPA-TO-15	11/09/2019	AD
1,1,2,2-Tetrachloroethane	<0.300	<2.06	0.300	2.06		EPA-TO-15	11/09/2019	AD
CFC-113	<0.400	<3.07	0.400	3.07		EPA-TO-15	11/09/2019	AD
1,1,2-Trichloroethane (TCA)	<0.500	<2.73	0.500	2.73		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethane	<0.200	<0.810	0.200	0.810		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethene (DCE)	<0.400	<1.59	0.400	1.59		EPA-TO-15	11/09/2019	AD
1,2,4-Trichlorobenzene	<0.300	<2.23	0.300	2.23		EPA-TO-15	11/09/2019	AD
1,2,4-Trimethylbenzene	0.505	2.48	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,2-Dibromoethane (EDB)	<0.200	<1.54	0.200	1.54		EPA-TO-15	11/09/2019	AD
1,2-Dichlorobenzene	<0.400	<2.40	0.400	2.40		EPA-TO-15	11/09/2019	AD
1,2-Dichloroethane	<0.200	<0.809	0.200	0.809		EPA-TO-15	11/09/2019	AD
1,2-Dichloropropane	<0.500	<2.31	0.500	2.31		EPA-TO-15	11/09/2019	AD
1,3,5-Trimethylbenzene	<0.300	<1.47	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,3-Butadiene	<0.500	<1.11	0.500	1.11		EPA-TO-15	11/09/2019	AD
1,3-Dichlorobenzene	1.35	8.09	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dichlorobenzene	<0.300	<1.80	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dioxane	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD
(MEK) 2-Butanone	<1.00	<2.95	1.00	2.95		EPA-TO-15	11/09/2019	AD
2-Hexanone	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Isopropyl Alcohol	22.3	54.8	1.00	2.46		EPA-TO-15	11/09/2019	AD
4-Methyl-2-pentanone (MIBK)	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Acetone	18.4	43.7	1.00	2.38		EPA-TO-15	11/09/2019	AD
Acrolein	<0.500	<1.15	0.500	1.15		EPA-TO-15	11/09/2019	AD
Benzene	0.226	0.722	0.0895	0.286		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-BR
Lab ID: 1911061-001A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Benzyl chloride	<0.500	<2.59	0.500	2.59		EPA-TO-15	11/09/2019	AD
Dichlorobromomethane	<0.300	<2.01	0.300	2.01		EPA-TO-15	11/09/2019	AD
Bromoform	<0.200	<2.07	0.200	2.07		EPA-TO-15	11/09/2019	AD
Bromomethane	<0.500	<1.94	0.500	1.94		EPA-TO-15	11/09/2019	AD
Carbon disulfide	3.81	11.9	1.50	4.67		EPA-TO-15	11/09/2019	AD
Carbon tetrachloride	<0.0657	<0.413	0.0657	0.413		EPA-TO-15	11/09/2019	AD
Chlorobenzene	<0.200	<0.921	0.200	0.921		EPA-TO-15	11/09/2019	AD
Dibromochloromethane	<0.500	<4.26	0.500	4.26		EPA-TO-15	11/09/2019	AD
Chloroethane	<0.400	<1.06	0.400	1.06		EPA-TO-15	11/09/2019	AD
Chloroform	<0.200	<0.977	0.200	0.977		EPA-TO-15	11/09/2019	AD
Chloromethane	<0.500	<1.03	0.500	1.03		EPA-TO-15	11/09/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
cis-1,3-dichloropropene	<0.400	<1.82	0.400	1.82		EPA-TO-15	11/09/2019	AD
Cyclohexane	<0.400	<1.38	0.400	1.38		EPA-TO-15	11/09/2019	AD
Dichlorodifluoromethane (CFC-12)	0.518	2.56	0.400	1.98		EPA-TO-15	11/09/2019	AD
Dichlorotetrafluoroethane (CFC-114)	<0.400	<2.80	0.400	2.80		EPA-TO-15	11/09/2019	AD
Ethyl acetate	<1.00	<3.60	1.00	3.60		EPA-TO-15	11/09/2019	AD
Ethylbenzene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
Heptane	<0.400	<1.61	0.400	1.61		EPA-TO-15	11/09/2019	AD
Hexachlorobutadiene	<1.00	<10.7	1.00	10.7		EPA-TO-15	11/09/2019	AD
m,p-Xylene	<0.800	<3.47	0.800	3.47		EPA-TO-15	11/09/2019	AD
Methyl methacrylate	<0.400	<1.64	0.400	1.64		EPA-TO-15	11/09/2019	AD
Methylene chloride	<2.00	<6.95	2.00	6.95		EPA-TO-15	11/09/2019	AD
Naphthalene	0.963	5.05	0.100	0.524		EPA-TO-15	11/09/2019	AD
n-Hexane	<0.400	<1.41	0.400	1.41		EPA-TO-15	11/09/2019	AD
o-Xylene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
4-Ethyltoluene	<0.400	<1.97	0.400	1.97		EPA-TO-15	11/09/2019	AD
Propylene	1.59	2.74	0.400	0.688		EPA-TO-15	11/09/2019	AD
Styrene	<0.400	<1.70	0.400	1.70		EPA-TO-15	11/09/2019	AD
Methyl tert-butyl ether (MTBE)	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-BR
Lab ID: 1911061-001A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

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	
Tetrachloroethene (PCE)	<0.200	<1.36	0.200	1.36		EPA-TO-15	11/09/2019	AD
Tetrahydrofuran	<0.400	<1.18	0.400	1.18		EPA-TO-15	11/09/2019	AD
Toluene	0.686	2.58	0.400	1.51		EPA-TO-15	11/09/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
trans-1,3-dichloropropene	<0.500	<2.27	0.500	2.27		EPA-TO-15	11/09/2019	AD
Trichloroethene (TCE)	<0.0649	<0.349	0.0649	0.349		EPA-TO-15	11/09/2019	AD
Trichlorofluoromethane (CFC-11)	<0.400	<2.25	0.400	2.25		EPA-TO-15	11/09/2019	AD
Vinyl acetate	<1.00	<3.52	1.00	3.52		EPA-TO-15	11/09/2019	AD
Vinyl chloride	<0.107	<0.274	0.107	0.274		EPA-TO-15	11/09/2019	AD
Surr: 4-Bromofluorobenzene	107 %Rec	--	70-130	--		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-SR
Lab ID: 1911061-002A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	237	903	75.0	285		EPA-TO-15	11/21/2019	AD
Aliphatic Hydrocarbon (EC9-12)	637	3,750	75.0	442		EPA-TO-15	11/21/2019	AD
Aromatic Hydrocarbon (EC9-10)	<6.25	<31.4	6.25	31.4		EPA-TO-15	11/19/2019	AD
Surr: 4-Bromofluorobenzene	101 %Rec	--	70-130	--		EPA-TO-15	11/19/2019	AD
Volatile Organic Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
1,1,1-Trichloroethane	<0.400	<2.18	0.400	2.18		EPA-TO-15	11/09/2019	AD
1,1,2,2-Tetrachloroethane	<0.300	<2.06	0.300	2.06		EPA-TO-15	11/09/2019	AD
CFC-113	<0.400	<3.07	0.400	3.07		EPA-TO-15	11/09/2019	AD
1,1,2-Trichloroethane (TCA)	<0.500	<2.73	0.500	2.73		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethane	<0.200	<0.810	0.200	0.810		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethene (DCE)	<0.400	<1.59	0.400	1.59		EPA-TO-15	11/09/2019	AD
1,2,4-Trichlorobenzene	<0.300	<2.23	0.300	2.23		EPA-TO-15	11/09/2019	AD
1,2,4-Trimethylbenzene	0.556	2.73	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,2-Dibromoethane (EDB)	<0.200	<1.54	0.200	1.54		EPA-TO-15	11/09/2019	AD
1,2-Dichlorobenzene	<0.400	<2.40	0.400	2.40		EPA-TO-15	11/09/2019	AD
1,2-Dichloroethane	<0.200	<0.809	0.200	0.809		EPA-TO-15	11/09/2019	AD
1,2-Dichloropropane	<0.500	<2.31	0.500	2.31		EPA-TO-15	11/09/2019	AD
1,3,5-Trimethylbenzene	<0.300	<1.47	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,3-Butadiene	<0.500	<1.11	0.500	1.11		EPA-TO-15	11/09/2019	AD
1,3-Dichlorobenzene	1.95	11.8	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dichlorobenzene	<0.300	<1.80	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dioxane	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD
(MEK) 2-Butanone	<1.00	<2.95	1.00	2.95		EPA-TO-15	11/09/2019	AD
2-Hexanone	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Isopropyl Alcohol	21.1	51.9	1.00	2.46	E	EPA-TO-15	11/09/2019	AD
4-Methyl-2-pentanone (MIBK)	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Acetone	5.69	13.5	1.00	2.38		EPA-TO-15	11/09/2019	AD
Acrolein	<0.500	<1.15	0.500	1.15		EPA-TO-15	11/09/2019	AD
Benzene	0.124	0.395	0.0895	0.286		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-SR
Lab ID: 1911061-002A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

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	
Benzyl chloride	<0.500	<2.59	0.500	2.59		EPA-TO-15	11/09/2019	AD
Dichlorobromomethane	<0.300	<2.01	0.300	2.01		EPA-TO-15	11/09/2019	AD
Bromoform	<0.200	<2.07	0.200	2.07		EPA-TO-15	11/09/2019	AD
Bromomethane	<0.500	<1.94	0.500	1.94		EPA-TO-15	11/09/2019	AD
Carbon disulfide	<1.50	<4.67	1.50	4.67		EPA-TO-15	11/09/2019	AD
Carbon tetrachloride	<0.0657	<0.413	0.0657	0.413		EPA-TO-15	11/09/2019	AD
Chlorobenzene	<0.200	<0.921	0.200	0.921		EPA-TO-15	11/09/2019	AD
Dibromochloromethane	<0.500	<4.26	0.500	4.26		EPA-TO-15	11/09/2019	AD
Chloroethane	<0.400	<1.06	0.400	1.06		EPA-TO-15	11/09/2019	AD
Chloroform	<0.200	<0.977	0.200	0.977		EPA-TO-15	11/09/2019	AD
Chloromethane	<0.500	<1.03	0.500	1.03		EPA-TO-15	11/09/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
cis-1,3-dichloropropene	<0.400	<1.82	0.400	1.82		EPA-TO-15	11/09/2019	AD
Cyclohexane	<0.400	<1.38	0.400	1.38		EPA-TO-15	11/09/2019	AD
Dichlorodifluoromethane (CFC-12)	0.523	2.59	0.400	1.98		EPA-TO-15	11/09/2019	AD
Dichlorotetrafluoroethane (CFC-114)	<0.400	<2.80	0.400	2.80		EPA-TO-15	11/09/2019	AD
Ethyl acetate	<1.00	<3.60	1.00	3.60		EPA-TO-15	11/09/2019	AD
Ethylbenzene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
Heptane	<0.400	<1.61	0.400	1.61		EPA-TO-15	11/09/2019	AD
Hexachlorobutadiene	<1.00	<10.7	1.00	10.7		EPA-TO-15	11/09/2019	AD
m,p-Xylene	<0.800	<3.47	0.800	3.47		EPA-TO-15	11/09/2019	AD
Methyl methacrylate	<0.400	<1.64	0.400	1.64		EPA-TO-15	11/09/2019	AD
Methylene chloride	<2.00	<6.95	2.00	6.95		EPA-TO-15	11/09/2019	AD
Naphthalene	0.306	1.60	0.100	0.524		EPA-TO-15	11/09/2019	AD
n-Hexane	<0.400	<1.41	0.400	1.41		EPA-TO-15	11/09/2019	AD
o-Xylene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
4-Ethyltoluene	<0.400	<1.97	0.400	1.97		EPA-TO-15	11/09/2019	AD
Propylene	1.00	1.72	0.400	0.688		EPA-TO-15	11/09/2019	AD
Styrene	<0.400	<1.70	0.400	1.70		EPA-TO-15	11/09/2019	AD
Methyl tert-butyl ether (MTBE)	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-SR
Lab ID: 1911061-002A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

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	
Tetrachloroethene (PCE)	<0.200	<1.36	0.200	1.36		EPA-TO-15	11/09/2019	AD
Tetrahydrofuran	<0.400	<1.18	0.400	1.18		EPA-TO-15	11/09/2019	AD
Toluene	0.560	2.11	0.400	1.51		EPA-TO-15	11/09/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
trans-1,3-dichloropropene	<0.500	<2.27	0.500	2.27		EPA-TO-15	11/09/2019	AD
Trichloroethene (TCE)	<0.0649	<0.349	0.0649	0.349		EPA-TO-15	11/09/2019	AD
Trichlorofluoromethane (CFC-11)	<0.400	<2.25	0.400	2.25		EPA-TO-15	11/09/2019	AD
Vinyl acetate	<1.00	<3.52	1.00	3.52		EPA-TO-15	11/09/2019	AD
Vinyl chloride	<0.107	<0.274	0.107	0.274		EPA-TO-15	11/09/2019	AD
Surr: 4-Bromofluorobenzene	104 %Rec	--	70-130	--		EPA-TO-15	11/09/2019	AD

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

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-E3
Lab ID: 1911061-003A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	99.4	378	75.0	285		EPA-TO-15	11/21/2019	AD
Aliphatic Hydrocarbon (EC9-12)	79.2	467	75.0	442		EPA-TO-15	11/21/2019	AD
Aromatic Hydrocarbon (EC9-10)	<6.25	<31.4	6.25	31.4		EPA-TO-15	11/20/2019	AD
Surr: 4-Bromofluorobenzene	98.0 %Rec	--	70-130	--		EPA-TO-15	11/20/2019	AD
Volatile Organic Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
1,1,1-Trichloroethane	<0.400	<2.18	0.400	2.18		EPA-TO-15	11/09/2019	AD
1,1,2,2-Tetrachloroethane	<0.300	<2.06	0.300	2.06		EPA-TO-15	11/09/2019	AD
CFC-113	<0.400	<3.07	0.400	3.07		EPA-TO-15	11/09/2019	AD
1,1,2-Trichloroethane (TCA)	<0.500	<2.73	0.500	2.73		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethane	<0.200	<0.810	0.200	0.810		EPA-TO-15	11/09/2019	AD
1,1-Dichloroethene (DCE)	<0.400	<1.59	0.400	1.59		EPA-TO-15	11/09/2019	AD
1,2,4-Trichlorobenzene	<0.300	<2.23	0.300	2.23		EPA-TO-15	11/09/2019	AD
1,2,4-Trimethylbenzene	<0.300	<1.47	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,2-Dibromoethane (EDB)	<0.200	<1.54	0.200	1.54		EPA-TO-15	11/09/2019	AD
1,2-Dichlorobenzene	<0.400	<2.40	0.400	2.40		EPA-TO-15	11/09/2019	AD
1,2-Dichloroethane	<0.200	<0.809	0.200	0.809		EPA-TO-15	11/09/2019	AD
1,2-Dichloropropane	<0.500	<2.31	0.500	2.31		EPA-TO-15	11/09/2019	AD
1,3,5-Trimethylbenzene	<0.300	<1.47	0.300	1.47		EPA-TO-15	11/09/2019	AD
1,3-Butadiene	<0.500	<1.11	0.500	1.11		EPA-TO-15	11/09/2019	AD
1,3-Dichlorobenzene	1.23	7.38	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dichlorobenzene	<0.300	<1.80	0.300	1.80		EPA-TO-15	11/09/2019	AD
1,4-Dioxane	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD
(MEK) 2-Butanone	<1.00	<2.95	1.00	2.95		EPA-TO-15	11/09/2019	AD
2-Hexanone	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Isopropyl Alcohol	24.7	60.8	1.00	2.46	E	EPA-TO-15	11/09/2019	AD
4-Methyl-2-pentanone (MIBK)	<1.00	<4.10	1.00	4.10		EPA-TO-15	11/09/2019	AD
Acetone	10.1	23.9	1.00	2.38		EPA-TO-15	11/09/2019	AD
Acrolein	<0.500	<1.15	0.500	1.15		EPA-TO-15	11/09/2019	AD
Benzene	0.137	0.439	0.0895	0.286		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-E3
Lab ID: 1911061-003A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

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	
Benzyl chloride	<0.500	<2.59	0.500	2.59		EPA-TO-15	11/09/2019	AD
Dichlorobromomethane	<0.300	<2.01	0.300	2.01		EPA-TO-15	11/09/2019	AD
Bromoform	<0.200	<2.07	0.200	2.07		EPA-TO-15	11/09/2019	AD
Bromomethane	<0.500	<1.94	0.500	1.94		EPA-TO-15	11/09/2019	AD
Carbon disulfide	<1.50	<4.67	1.50	4.67		EPA-TO-15	11/09/2019	AD
Carbon tetrachloride	<0.0657	<0.413	0.0657	0.413		EPA-TO-15	11/09/2019	AD
Chlorobenzene	<0.200	<0.921	0.200	0.921		EPA-TO-15	11/09/2019	AD
Dibromochloromethane	<0.500	<4.26	0.500	4.26		EPA-TO-15	11/09/2019	AD
Chloroethane	<0.400	<1.06	0.400	1.06		EPA-TO-15	11/09/2019	AD
Chloroform	0.961	4.69	0.200	0.977		EPA-TO-15	11/09/2019	AD
Chloromethane	<0.500	<1.03	0.500	1.03		EPA-TO-15	11/09/2019	AD
cis-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
cis-1,3-dichloropropene	<0.400	<1.82	0.400	1.82		EPA-TO-15	11/09/2019	AD
Cyclohexane	<0.400	<1.38	0.400	1.38		EPA-TO-15	11/09/2019	AD
Dichlorodifluoromethane (CFC-12)	0.522	2.58	0.400	1.98		EPA-TO-15	11/09/2019	AD
Dichlorotetrafluoroethane (CFC-114)	<0.400	<2.80	0.400	2.80		EPA-TO-15	11/09/2019	AD
Ethyl acetate	<1.00	<3.60	1.00	3.60		EPA-TO-15	11/09/2019	AD
Ethylbenzene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
Heptane	<0.400	<1.61	0.400	1.61		EPA-TO-15	11/09/2019	AD
Hexachlorobutadiene	<1.00	<10.7	1.00	10.7		EPA-TO-15	11/09/2019	AD
m,p-Xylene	<0.800	<3.47	0.800	3.47		EPA-TO-15	11/09/2019	AD
Methyl methacrylate	<0.400	<1.64	0.400	1.64		EPA-TO-15	11/09/2019	AD
Methylene chloride	13.0	45.0	2.00	6.95		EPA-TO-15	11/09/2019	AD
Naphthalene	0.228	1.20	0.100	0.524		EPA-TO-15	11/09/2019	AD
n-Hexane	<0.400	<1.41	0.400	1.41		EPA-TO-15	11/09/2019	AD
o-Xylene	<0.400	<1.74	0.400	1.74		EPA-TO-15	11/09/2019	AD
4-Ethyltoluene	<0.400	<1.97	0.400	1.97		EPA-TO-15	11/09/2019	AD
Propylene	0.962	1.66	0.400	0.688		EPA-TO-15	11/09/2019	AD
Styrene	<0.400	<1.70	0.400	1.70		EPA-TO-15	11/09/2019	AD
Methyl tert-butyl ether (MTBE)	<0.400	<1.44	0.400	1.44		EPA-TO-15	11/09/2019	AD

Client: **Libby Environmental**
WorkOrder: 1911061
Project: Franciscan West Seattle

Client Sample ID: SSD-E3
Lab ID: 1911061-003A
Sample Type: Summa Canister

Date Sampled: 11/5/2019
Date Received: 11/5/2019

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	
Tetrachloroethene (PCE)	0.721	4.89	0.200	1.36		EPA-TO-15	11/09/2019	AD
Tetrahydrofuran	<0.400	<1.18	0.400	1.18		EPA-TO-15	11/09/2019	AD
Toluene	<0.400	<1.51	0.400	1.51		EPA-TO-15	11/09/2019	AD
trans-1,2-Dichloroethene	<0.200	<0.793	0.200	0.793		EPA-TO-15	11/09/2019	AD
trans-1,3-dichloropropene	<0.500	<2.27	0.500	2.27		EPA-TO-15	11/09/2019	AD
Trichloroethene (TCE)	<0.0649	<0.349	0.0649	0.349		EPA-TO-15	11/09/2019	AD
Trichlorofluoromethane (CFC-11)	<0.400	<2.25	0.400	2.25		EPA-TO-15	11/09/2019	AD
Vinyl acetate	<1.00	<3.52	1.00	3.52		EPA-TO-15	11/09/2019	AD
Vinyl chloride	<0.107	<0.274	0.107	0.274		EPA-TO-15	11/09/2019	AD
Surr: 4-Bromofluorobenzene	99.2 %Rec	--	70-130	--		EPA-TO-15	11/09/2019	AD

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

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Petroleum Fractionation by EPA Method TO-15

Sample ID: **LCS-R55481** SampType: **LCS** Units: **ppbv** Prep Date: **11/19/2019** RunNo: **55481**
Client ID: **LCSW** Batch ID: **R55481** Analysis Date: **11/19/2019** SeqNo: **1103996**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (EC9-10)	9.39	6.25	10.00	0	93.9	70	130				
Surr: 4-Bromofluorobenzene	4.14		4.000		103	70	130				

Sample ID: **MB-R55481** SampType: **MBLK** Units: **ppbv** Prep Date: **11/19/2019** RunNo: **55481**
Client ID: **MBLKW** Batch ID: **R55481** Analysis Date: **11/19/2019** SeqNo: **1103997**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (EC9-10)	ND	6.25									
Surr: 4-Bromofluorobenzene	3.64		4.000		91.1	70	130				

Sample ID: **1911061-003AREP** SampType: **REP** Units: **ppbv** Prep Date: **11/20/2019** RunNo: **55481**
Client ID: **SSD-E3** Batch ID: **R55481** Analysis Date: **11/20/2019** SeqNo: **1104001**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (EC9-10)	ND	6.25						0		30	
Surr: 4-Bromofluorobenzene	3.72		4.000		93.1	70	130		0		

Sample ID: **LCS-R55482** SampType: **LCS** Units: **ppbv** Prep Date: **11/21/2019** RunNo: **55482**
Client ID: **LCSW** Batch ID: **R55482** Analysis Date: **11/21/2019** SeqNo: **1104013**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	12.0	7.50	12.00	0	100	70	130				
Aliphatic Hydrocarbon (EC9-12)	12.7	7.50	12.00	0	106	70	130				
Surr: 4-Bromofluorobenzene	3.98		4.000		99.4	70	130				

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Petroleum Fractionation by EPA Method TO-15

Sample ID: **1911061-003AREP** SampType: **REP** Units: **ppbv** Prep Date: **11/21/2019** RunNo: **55482**
Client ID: **SSD-E3** Batch ID: **R55482** Analysis Date: **11/21/2019** SeqNo: **1104017**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	79.1	75.0						99.40	22.8	30	
Aliphatic Hydrocarbon (EC9-12)	59.8	75.0						79.24	28.0	30	
Surr: 4-Bromofluorobenzene	35.1		40.00		87.8	70	130		0		

Sample ID: **MB-R55482** SampType: **MBLK** Units: **ppbv** Prep Date: **11/21/2019** RunNo: **55482**
Client ID: **MBLKW** Batch ID: **R55482** Analysis Date: **11/21/2019** SeqNo: **1104018**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	ND	1.88									
Aliphatic Hydrocarbon (EC9-12)	ND	1.88									I
Surr: 4-Bromofluorobenzene	0.966		1.000		96.6	70	130				

NOTES:
I - Indicates an analyte with an internal standard that does not meet established acceptance criteria. Biased high.

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R55202** SampType: **LCS** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **LCSW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097203**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	69.2	1.00	72.00	0	96.1	70	130				
Propylene	1.67	0.400	2.000	0	83.5	70	130				
Dichlorodifluoromethane (CFC-12)	1.93	0.400	2.000	0	96.7	70	130				
Chloromethane	2.03	0.500	2.000	0	101	70	130				
Dichlorotetrafluoroethane (CFC-114)	1.93	0.400	2.000	0	96.4	70	130				
Vinyl chloride	1.68	0.107	2.000	0	83.8	70	130				
1,3-Butadiene	1.49	0.500	2.000	0	74.3	70	130				
Bromomethane	1.85	0.500	2.000	0	92.3	70	130				
Trichlorofluoromethane (CFC-11)	1.96	0.400	2.000	0	97.8	70	130				
Chloroethane	1.74	0.400	2.000	0	86.9	70	130				
Acrolein	1.49	0.500	2.000	0	74.4	70	130				
1,1-Dichloroethene (DCE)	1.71	0.400	2.000	0	85.7	70	130				
Acetone	1.99	1.00	2.000	0	99.3	70	130				
Isopropyl Alcohol	1.53	1.00	2.000	0	76.7	70	130				
Methylene chloride	2.10	2.00	2.000	0	105	70	130				
Carbon disulfide	1.91	1.50	2.000	0	95.5	70	130				
trans-1,2-Dichloroethene	1.70	0.200	2.000	0	84.8	70	130				
Methyl tert-butyl ether (MTBE)	1.51	0.400	2.000	0	75.3	70	130				
n-Hexane	1.41	0.400	2.000	0	70.6	70	130				
1,1-Dichloroethane	1.73	0.200	2.000	0	86.3	70	130				
Vinyl acetate	1.64	1.00	2.000	0	81.8	70	130				
cis-1,2-Dichloroethene	1.61	0.200	2.000	0	80.5	70	130				
(MEK) 2-Butanone	1.46	1.00	2.000	0	72.9	70	130				
Ethyl acetate	1.45	1.00	2.000	0	72.7	70	130				
Chloroform	1.86	0.200	2.000	0	93.0	70	130				
Tetrahydrofuran	1.52	0.400	2.000	0	76.1	70	130				
1,1,1-Trichloroethane	1.67	0.400	2.000	0	83.4	70	130				
Carbon tetrachloride	1.76	0.0657	2.000	0	88.2	70	130				
1,2-Dichloroethane	1.73	0.200	2.000	0	86.7	70	130				
Benzene	1.71	0.0895	2.000	0	85.7	70	130				
Cyclohexane	1.45	0.400	2.000	0	72.3	70	130				

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R55202** SampType: **LCS** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **LCSW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097203**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene (TCE)	1.82	0.0649	2.000	0	90.9	70	130				
1,2-Dichloropropane	1.81	0.500	2.000	0	90.6	70	130				
Methyl methacrylate	1.84	0.400	2.000	0	91.8	70	130				
Dichlorobromomethane	1.82	0.300	2.000	0	90.8	70	130				
1,4-Dioxane	1.77	0.400	2.000	0	88.3	70	130				
cis-1,3-dichloropropene	1.53	0.400	2.000	0	76.3	70	130				
Toluene	1.46	0.400	2.000	0	72.9	70	130				
trans-1,3-dichloropropene	1.48	0.500	2.000	0	74.1	70	130				
1,1,2-Trichloroethane (TCA)	1.80	0.500	2.000	0	89.8	70	130				
Tetrachloroethene (PCE)	1.79	0.200	2.000	0	89.7	70	130				
Dibromochloromethane	1.70	0.500	2.000	0	85.0	70	130				
1,2-Dibromoethane (EDB)	1.70	0.200	2.000	0	84.9	70	130				
Chlorobenzene	1.76	0.200	2.000	0	87.8	70	130				
Ethylbenzene	1.78	0.400	2.000	0	89.1	70	130				
m,p-Xylene	3.43	0.800	4.000	0	85.9	70	130				
o-Xylene	1.77	0.400	2.000	0	88.6	70	130				
Styrene	1.64	0.400	2.000	0	82.2	70	130				
Bromoform	1.84	0.200	2.000	0	92.1	70	130				
1,1,2,2-Tetrachloroethane	1.92	0.300	2.000	0	96.1	70	130				
1,3,5-Trimethylbenzene	1.69	0.300	2.000	0	84.3	70	130				
1,2,4-Trimethylbenzene	1.66	0.300	2.000	0	82.8	70	130				
Benzyl chloride	1.64	0.500	2.000	0	82.2	70	130				
4-Ethyltoluene	1.72	0.400	2.000	0	85.8	70	130				
1,3-Dichlorobenzene	1.61	0.300	2.000	0	80.7	70	130				
1,4-Dichlorobenzene	1.53	0.300	2.000	0	76.5	70	130				
1,2-Dichlorobenzene	1.53	0.400	2.000	0	76.7	70	130				
1,2,4-Trichlorobenzene	1.79	0.300	2.000	0	89.6	70	130				
Hexachlorobutadiene	1.79	1.00	2.000	0	89.6	70	130				
Naphthalene	2.02	0.100	2.000	0	101	70	130				
2-Hexanone	1.79	1.00	2.000	0	89.4	70	130				
4-Methyl-2-pentanone (MIBK)	1.78	1.00	2.000	0	89.0	70	130				

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R55202** SampType: **LCS** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **LCSW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097203**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
CFC-113	2.28	0.400	2.000	0	114	70	130				
Heptane	1.77	0.400	2.000	0	88.4	70	130				
Surr: 4-Bromofluorobenzene	3.94		4.000		98.6	70	130				

Sample ID: **MB-R55202** SampType: **MBLK** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **MBLKW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097204**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	1.00									
Propylene	ND	0.400									
Dichlorodifluoromethane (CFC-12)	ND	0.400									
Chloromethane	ND	0.500									
Dichlorotetrafluoroethane (CFC-114)	ND	0.400									
Vinyl chloride	ND	0.107									
1,3-Butadiene	ND	0.500									
Bromomethane	ND	0.500									
Trichlorofluoromethane (CFC-11)	ND	0.400									
Chloroethane	ND	0.400									
Acrolein	ND	0.500									
1,1-Dichloroethene (DCE)	ND	0.400									
Acetone	ND	1.00									
Isopropyl Alcohol	ND	1.00									
Methylene chloride	ND	2.00									
Carbon disulfide	ND	1.50									
trans-1,2-Dichloroethene	ND	0.200									
Methyl tert-butyl ether (MTBE)	ND	0.400									
n-Hexane	ND	0.400									
1,1-Dichloroethane	ND	0.200									
Vinyl acetate	ND	1.00									
cis-1,2-Dichloroethene	ND	0.200									

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **MB-R55202** SampType: **MBLK** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **MBLKW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097204**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
(MEK) 2-Butanone	ND	1.00									
Ethyl acetate	ND	1.00									
Chloroform	ND	0.200									
Tetrahydrofuran	ND	0.400									
1,1,1-Trichloroethane	ND	0.400									
Carbon tetrachloride	ND	0.0657									
1,2-Dichloroethane	ND	0.200									
Benzene	ND	0.0895									
Cyclohexane	ND	0.400									
Trichloroethene (TCE)	ND	0.0649									
1,2-Dichloropropane	ND	0.500									
Methyl methacrylate	ND	0.400									
Dichlorobromomethane	ND	0.300									
1,4-Dioxane	ND	0.400									
cis-1,3-dichloropropene	ND	0.400									
Toluene	ND	0.400									
trans-1,3-dichloropropene	ND	0.500									
1,1,2-Trichloroethane (TCA)	ND	0.500									
Tetrachloroethene (PCE)	ND	0.200									
Dibromochloromethane	ND	0.500									
1,2-Dibromoethane (EDB)	ND	0.200									
Chlorobenzene	ND	0.200									
Ethylbenzene	ND	0.400									
m,p-Xylene	ND	0.800									
o-Xylene	ND	0.400									
Styrene	ND	0.400									
Bromoform	ND	0.200									
1,1,2,2-Tetrachloroethane	ND	0.300									
1,3,5-Trimethylbenzene	ND	0.300									
1,2,4-Trimethylbenzene	ND	0.300									
Benzyl chloride	ND	0.500									

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **MB-R55202** SampType: **MBLK** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **MBLKW** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097204**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Ethyltoluene	ND	0.400									
1,3-Dichlorobenzene	ND	0.300									
1,4-Dichlorobenzene	ND	0.300									
1,2-Dichlorobenzene	ND	0.400									
1,2,4-Trichlorobenzene	ND	0.300									
Hexachlorobutadiene	ND	1.00									
Naphthalene	ND	0.100									
2-Hexanone	ND	1.00									
4-Methyl-2-pentanone (MIBK)	ND	1.00									
CFC-113	ND	0.400									
Heptane	ND	0.400									
Surr: 4-Bromofluorobenzene	3.35		4.000		83.7	70	130				

Sample ID: **1911060-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **BATCH** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097206**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	70.2	1.00						70.39	0.316	30	
Propylene	29.8	0.400						29.29	1.86	30	E
Dichlorodifluoromethane (CFC-12)	0.520	0.400						0.5151	0.866	30	
Chloromethane	0.877	0.500						0.8620	1.71	30	
Dichlorotetrafluoroethane (CFC-114)	ND	0.400						0		30	
Vinyl chloride	ND	0.107						0		30	
1,3-Butadiene	ND	0.500						0		30	
Bromomethane	ND	0.500						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.400						0		30	
Chloroethane	ND	0.400						0		30	
Acrolein	ND	0.500						0		30	
1,1-Dichloroethene (DCE)	ND	0.400						0		30	
Acetone	6.19	1.00						5.989	3.36	30	

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **1911060-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **BATCH** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097206**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropyl Alcohol	1.46	1.00						1.258	15.1	30	
Methylene chloride	4.29	2.00						4.396	2.46	30	
Carbon disulfide	ND	1.50						0		30	
trans-1,2-Dichloroethene	ND	0.200						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.400						0		30	
n-Hexane	1.94	0.400						1.781	8.71	30	
1,1-Dichloroethane	ND	0.200						0		30	
Vinyl acetate	ND	1.00						0		30	
cis-1,2-Dichloroethene	ND	0.200						0		30	
(MEK) 2-Butanone	ND	1.00						0		30	
Ethyl acetate	ND	1.00						0		30	
Chloroform	ND	0.200						0		30	
Tetrahydrofuran	ND	0.400						0		30	
1,1,1-Trichloroethane	ND	0.400						0		30	
Carbon tetrachloride	0.0705	0.0657						0.07140	1.21	30	
1,2-Dichloroethane	ND	0.200						0		30	
Benzene	0.989	0.0895						0.9523	3.83	30	
Cyclohexane	1.22	0.400						1.165	4.37	30	
Trichloroethene (TCE)	ND	0.0649						0		30	
1,2-Dichloropropane	ND	0.500						0		30	
Methyl methacrylate	ND	0.400						0		30	
Dichlorobromomethane	ND	0.300						0		30	
1,4-Dioxane	ND	0.400						0		30	
cis-1,3-dichloropropene	ND	0.400						0		30	
Toluene	6.57	0.400						6.511	0.967	30	
trans-1,3-dichloropropene	ND	0.500						0		30	
1,1,2-Trichloroethane (TCA)	ND	0.500						0		30	
Tetrachloroethene (PCE)	0.372	0.200						0.3732	0.371	30	
Dibromochloromethane	ND	0.500						0		30	
1,2-Dibromoethane (EDB)	ND	0.200						0		30	
Chlorobenzene	ND	0.200						0		30	

Work Order: 1911061
CLIENT: Libby Environmental
Project: Franciscan West Seattle

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **1911060-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **11/9/2019** RunNo: **55202**
Client ID: **BATCH** Batch ID: **R55202** Analysis Date: **11/9/2019** SeqNo: **1097206**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	1.10	0.400						1.058	3.79	30	
m,p-Xylene	5.37	0.800						5.210	3.01	30	
o-Xylene	2.19	0.400						2.112	3.75	30	
Styrene	ND	0.400						0		30	
Bromoform	ND	0.200						0		30	
1,1,2,2-Tetrachloroethane	ND	0.300						0		30	
1,3,5-Trimethylbenzene	0.599	0.300						0.5801	3.12	30	
1,2,4-Trimethylbenzene	2.12	0.300						2.024	4.83	30	
Benzyl chloride	ND	0.500						0		30	
4-Ethyltoluene	ND	0.400						0		30	
1,3-Dichlorobenzene	ND	0.300						0		30	
1,4-Dichlorobenzene	ND	0.300						0		30	
1,2-Dichlorobenzene	ND	0.400						0		30	
1,2,4-Trichlorobenzene	ND	0.300						0		30	
Hexachlorobutadiene	ND	1.00						0		30	
Naphthalene	0.422	0.100						0.4198	0.452	30	
2-Hexanone	ND	1.00						0		30	
4-Methyl-2-pentanone (MIBK)	ND	1.00						0		30	
CFC-113	ND	0.400						0		30	
Heptane	1.26	0.400						1.241	1.87	30	
Surr: 4-Bromofluorobenzene	4.11		4.000		103	70	130		0		

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

Sample Log-In Check List

Client Name:	**LIBBY**	Work Order Number:	**1911061**
Logged by:	**Clare Griggs**	Date Received:	**11/5/2019 3:25:00 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

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: 11/5/19 Page: 1 of: 1

Laboratory Project No (Internal): 1911061

Project Name: Franciscan West Seattle

Special Remarks: (4) added by C. Swift via email 11-14-19 STD

Page 22 of 22

Client: Libby Environmental

Project No: 18-172

Address:

Location: Seattle, WA

City, State, Zip:

Collected by:

Telephone:

Reports to (PM):

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

Fax:

Email (PM): libbyc@gmail.com

	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	SSD-BR	4691	11/5/19	S	1L	10min	10mtorr	-30	-4	X						X					-3
		CO#2	1051				10/22/2019	11/5/19	11/5/19												
2	SSD-SR	5021	11/5/19	S	1L	10min	10mtorr	-30	-4	X						X					-4
		CO#2	1026				10/22/2019	11/5/19	11/5/19												
3	SSD-E3	4902	11/5/19	S	1L	10min	10mtorr	-30	-2	X						X					-3
		CO#2	1122				10/22/2019	11/5/19	11/5/19												
4																					
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

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Relinquished	Date/Time	Received	Date/Time
x [signature]	11/5/19 1525	x [signature]	11/5/19 1525
Relinquished	Date/Time	Received	Date/Time
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: 11/5/19 Page: of:

Project Name: Franciscan West Seattle

Project No:

Location:

Collected by:

Reports to (PM):

Email (PM): libby@gmail.com

Laboratory Project No (Internal): 1911061

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 Environmental

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	SSD-BR	4691 Canister	11/5/19 Date	S	1L	10min	10mtorr Pressure	-30 Pressure	-4 Pressure	Y											-3
		CO#2 Flow Reg	1051 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
2	SSD-SR	5021 Canister	11/5/19 Date	S	1L	10min	10mtorr Pressure	-30 Pressure	-4 Pressure	Y											-4
		CO#2 Flow Reg	1026 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
3	SSD-E3	4902 Canister	11/5/19 Date	S	1L	10min	10mtorr Pressure	-30 Pressure	-2 Pressure	Y											-3
		CO#2 Flow Reg	1122 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
4		Canister	Date				Pressure	Pressure	Pressure												
		Flow Reg	Time				Date	Date	Date												
5		Canister	Date				Pressure	Pressure	Pressure												
		Flow Reg	Time				Date	Date	Date												

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Air Chain of Custody Record & Laboratory Services Agreement

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

Date: 11/5/19 Page: of:

Laboratory Project No (Internal): 1911061

Project Name: Franciscan West Seattle

Special Remarks: (X) Add-analysis per SC 11/14/19 pm

Client: Libby Environmental

Project No:

Address:

Location:

City, State, Zip:

Collected by:

Telephone:

Reports to (PM):

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

Fax:

Email (PM): libbyc@gmail.com

	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)
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		CO#2 Flow Reg	1051 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
2	SSD-SR	5021 Canister	11/5/19 Date	S	1L	10min	10mtorr Pressure	-30 Pressure	-4 Pressure	Y						X					-4
		CO#2 Flow Reg	1026 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
3	SSD-E3	4902 Canister	11/5/19 Date	S	1L	10min	10mtorr Pressure	-30 Pressure	-2 Pressure	Y						X					-3
		CO#2 Flow Reg	1122 Time				10/22/2019 Date	11/5/19 Date	11/5/19 Date												
4		Canister	Date				Pressure	Pressure	Pressure												
		Flow Reg	Time				Date	Date	Date												
5		Canister	Date				Pressure	Pressure	Pressure												
		Flow Reg	Time				Date	Date	Date												

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- Same Day _____ (specify)