



August 15, 2019  
Project 101.02207.00001

Dr. Jerome Cruz  
Washington Department of Ecology  
3190 – 160<sup>th</sup> Avenue SE  
Bellevue, Washington 98008

**Re: Request to Remove Vapor Treatment from AS/SVE System, SeaTac Development Site (MasterPark Lot C), SeaTac, Washington**

Dear Dr. Cruz:

The in-situ air sparging/soil vapor extraction (IAS/SVE) system at the SeaTac Development site has been off since the summer of 2017. Prior to the shutdown of the system, the petroleum hydrocarbon concentrations in the groundwater samples from the monitoring wells located inside of the IAS/SVE system area had shown significant reductions and were below or close to the site cleanup levels. Groundwater sampling events have subsequently been conducted to evaluate any rebound of the groundwater concentrations, and after the May 2017 sampling event, MW-07, MW-12, and MW-18 were the only wells on the MasterPark Lot C property (the subject property) that contained petroleum hydrocarbon concentrations greater than the site cleanup levels. Wells MW-07, MW-12, and MW-18 are located at the northern and northwestern parts of the subject property (see Figure 1).

To remediate the remaining source of the petroleum hydrocarbon-impacted groundwater at MW-07, MW-12, and MW-18, and decrease the remaining groundwater concentrations beneath the northern and northwestern parts of subject property to below the site cleanup levels, SLR International Corporation (SLR) plans to reactivate the IAS/SVE system and focus the system operations at the northern half of the system area. SLR recently replaced and repaired several system components, and conducted system testing. On August 5, 2019, SLR turned on the northern half of the IAS/SVE system (17 AS points and 10 SVE points; see Figure 1) for approximately 60 minutes, and then collected an air sample (designated System Effluent – 080519) from the influent line to the inactive catalytic oxidizer. At the time of sampling, the airflow rate of the system effluent was approximately 310 cubic feet per minute (cfm). After collecting the sample, the system was deactivated.

The sample was submitted to Fremont Analytical, Inc., for analysis of benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, and 1,2-dibromoethane (EDB) by EPA Method TO-15. The analytical results showed that the sample contained benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, and EDB concentrations of 531, 918, 115, 374, 139, and 7.39 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), respectively. A copy of the laboratory report is provided in Attachment 1.

Since the site remediation is being conducted in accordance with a consent decree, the operations of the reactivated system must meet the substantive requirements of Puget Sound Clean Air Agency (PSCAA) regulations. Based on the system effluent sample analytical results and the airflow rate, SLR reviewed the PSCAA regulations and evaluated if emissions from the reactivated IAS/SVE system would meet the requirements of an air quality impact analysis.

PSCAA Regulation III regulates emissions of toxic air pollutants. Section 2.07(c) provides procedures by which an acceptable air quality analysis for toxic chemicals may be demonstrated. Section 2.07(c)(1)(A) permits comparison of toxic emission rates to the Small Quantity Emission Rates (SQERs) listed in WAC 173-460-150; a source whose toxic emissions are below the SQER for each contaminant has satisfied the air quality impact analysis. The SQERs for the volatile contaminants of concern at the site (benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, and EDB) are presented in Table 1 below.

The laboratory analytical results of the recent emission sample from the SVE system are presented in Table 1. The airflow rate of the system (310 cfm or 0.15 cubic meters per second) was used to convert each concentration to an emission rate (in grams per second). Assuming continuous system operation, these emission rates were converted to pounds per day or pounds per year and compared to the appropriate SQER in WAC 173-460-150. The detailed emissions calculations are presented in Attachment 2. As shown on Table 1 and the emission rate calculation spreadsheet in Attachment 2, all of the emission rates for the volatile site contaminants are below their respective SQERs. As noted above, these emission rates are expected to be conservative over the remaining life of the project since as the contaminant concentrations in the soil and groundwater should decrease over time.

**Table 1. Emission Rates from Reactivated SVE System and Comparison to SQERs**

<b>Substance</b>	<b>Analyzed Concentration (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Emission Rate (g/s)</b>	<b>Emission Rate (lb/day)</b>	<b>SQER (lb/day)</b>
m,p-Xylene	374	5.47E-05	0.010	29
o-Xylene	139	2.03E-05	0.004	29
Toluene	918	1.34E-04	0.026	657
<b>Substance</b>	<b>Analyzed Concentration (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Emission Rate (g/s)</b>	<b>Emission Rate (lb/yr)</b>	<b>SQER (lb/yr)</b>
EDB	7.39	1.08E-06	0.08	2.71
Benzene	531	7.77E-05	5.40	6.62
Ethylbenzene	115	1.68E-05	1.17	76.8

Since the conservative emission rates are below the SQERs, SLR is requesting the Washington Department of Ecology's (Ecology's) approval to operate the IAS/SVE system at the SeaTac Development site without the catalytic oxidizer or any other vapor treatment system. After reactivation of the IAS/SVE system, SLR plans to collect system effluent samples on a quarterly basis to verify that the emission rates are below the SQERs. The samples will be analyzed for benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, and EDB by EPA Method TO-15. The airflow rate of the emissions will be measured at the time of sampling. If any updated

Dr. Jerome Cruz

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contaminant emission rate exceeds its SQER, a notification letter will be submitted to Ecology within 15 calendar days of receipt of the sample analytical results, and the letter will describe the sampling results, the calculated emission rates, and the proposed corrective actions.

If you have any questions, please contact me at (425) 471-0479 or [mstaton@slrconsulting.com](mailto:mstaton@slrconsulting.com).

Sincerely,

**SLR International Corporation**

A handwritten signature in black ink, appearing to read "M D Staton", written over a horizontal line.

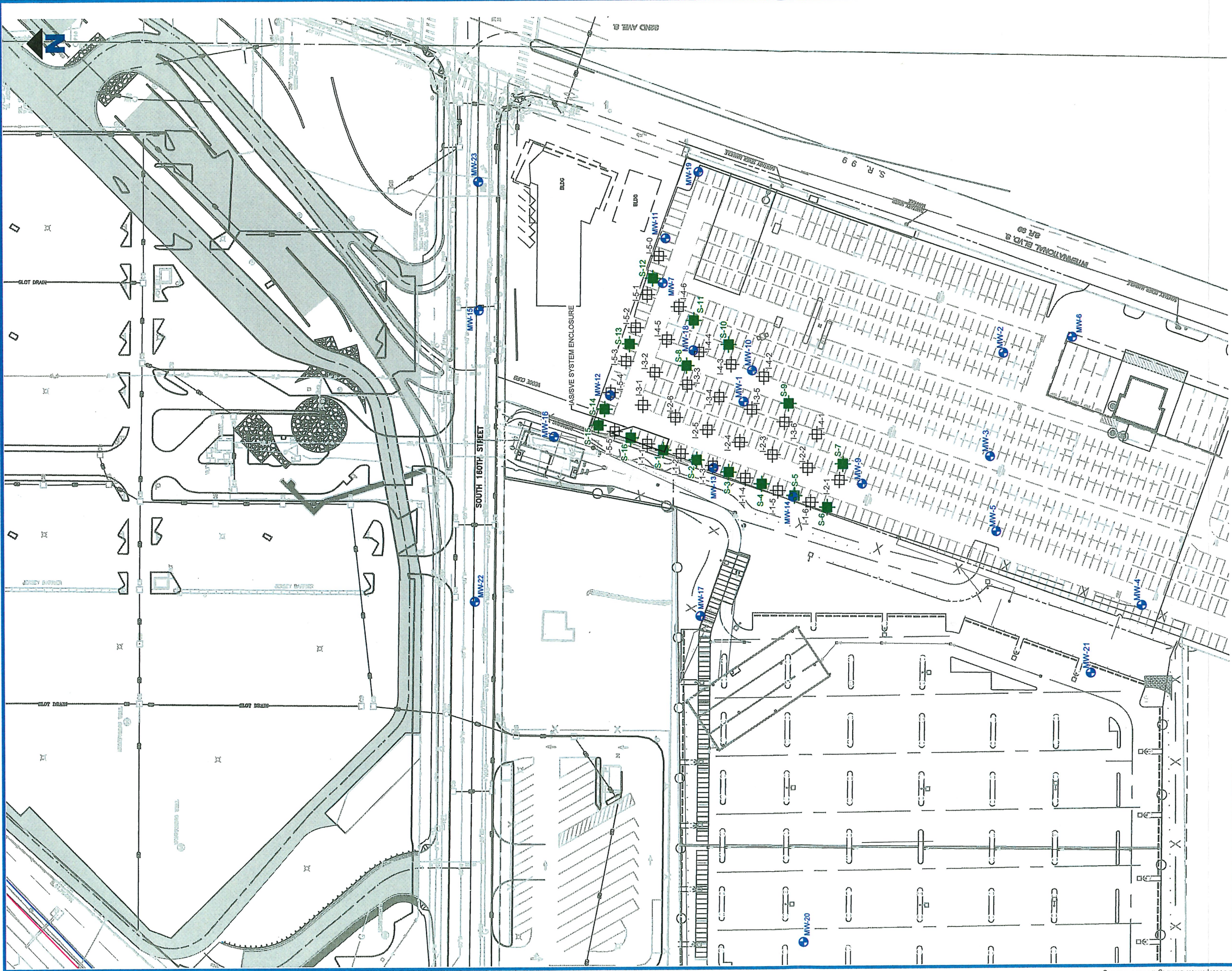
Michael D. Staton, L.G.  
Managing Principal

cc: Roger McCracken, SeaTac Investments, LLC  
Tamarah Knapp Hancock, Scarsella Bros., Inc.  
Steve Van Slyke, Puget Sound Clean Air Agency

Attachments: Figure 1  
Laboratory Report  
Emission Calculations

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NOTES  
1. BASEMAP BASED ON IAS AND SVE PIPING LAYOUT FIGURE (12/02/15)  
AND GROUNDWATER MONITORING LOCATIONS MAP (05/01/19) PRODUCED  
BY GOLDER ASSOCIATES.

- LEGEND
- S-10 SVE POINT LOCATION AND DESIGNATION
  - I-4-3 IAS POINT LOCATION AND DESIGNATION
  - MW-5 SITE MONITORING WELL LOCATION AND DESIGNATION



SEATAC DEVELOPMENT SITE  
SEATAC, WASHINGTON

Drawing  
MONITORING WELL LOCATIONS

Date	August 14, 2019	Scale	AS SHOWN	Fig. No.	1
File Name	01-01	Project No.	101.02207.00001		



**ATTACHMENT 1**

**LABORATORY REPORT**



**Fremont**  
*Analytical*

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

**SLR International**  
Mike Staton  
22118 20th Ave SE. G 202  
Bothell, WA 98021

**RE: MasterPark Lot C**  
**Work Order Number: 1908078**

August 08, 2019

**Attention Mike Staton:**

Fremont Analytical, Inc. received 1 sample(s) on 8/6/2019 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: 08/08/2019

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**CLIENT:** SLR International  
**Project:** MasterPark Lot C  
**Work Order:** 1908078

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## Work Order Sample Summary

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Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1908078-001	System Effluent - 080519	08/05/2019 2:45 PM	08/06/2019 4:09 PM

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**CLIENT:** SLR International  
**Project:** MasterPark Lot C

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**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).





**Client:** SLR International

**WorkOrder:** 1908078

**Project:** MasterPark Lot C

**Client Sample ID:** System Effluent - 080519

**Date Sampled:** 8/5/2019

**Lab ID:** 1908078-001A

**Date Received:** 8/6/2019

**Sample Type:** Summa Canister

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
<u>Volatile Organic Compounds by EPA Method TO-15</u>								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,2-Dibromoethane (EDB)	0.961	7.39	0.200	1.54		EPA-TO-15	08/06/2019	AD
Benzene	166	531	0.895	2.86		EPA-TO-15	08/07/2019	AD
Ethylbenzene	26.5	115	4.00	17.4		EPA-TO-15	08/07/2019	AD
m,p-Xylene	86.0	374	8.00	34.7		EPA-TO-15	08/07/2019	AD
o-Xylene	32.1	139	4.00	17.4		EPA-TO-15	08/07/2019	AD
Toluene	244	918	4.00	15.1	E	EPA-TO-15	08/07/2019	AD
Surr: 4-Bromofluorobenzene	104 %Rec	--	70-130	--		EPA-TO-15	08/07/2019	AD

**NOTES:**

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



Date: 8/8/2019

Work Order: 1908078

CLIENT: SLR International

Project: MasterPark Lot C

# QC SUMMARY REPORT

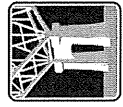
## Volatile Organic Compounds by EPA Method TO-15

Sample ID	LCS-R53105	SampType: LCS	Units: ppbv	Prep Date: 8/6/2019	RunNo: 53105
Client ID:	LCSW	Batch ID: R53105	Analysis Date: 8/6/2019	SeqNo: 1049372	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Benzene	1.89	0.0895	2.000	0	94.3 70 130
Toluene	2.00	0.400	2.000	0	100 70 130
1,2-Dibromoethane (EDB)	2.01	0.200	2.000	0	100 70 130
Ethylbenzene	1.91	0.400	2.000	0	95.5 70 130
m,p-Xylene	3.78	0.800	4.000	0	94.6 70 130
o-Xylene	1.75	0.400	2.000	0	87.6 70 130
Surr: 4-Bromofluorobenzene	4.03		4.000		101 70 130

Sample ID	MB-R53105	SampType: MBLK	Units: ppbv	Prep Date: 8/6/2019	RunNo: 53105
Client ID:	MBLKW	Batch ID: R53105	Analysis Date: 8/6/2019	SeqNo: 1049373	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Benzene	ND	0.0895			
Toluene	ND	0.400			
1,2-Dibromoethane (EDB)	ND	0.200			
Ethylbenzene	ND	0.400			
m,p-Xylene	ND	0.800			
o-Xylene	ND	0.400			
Surr: 4-Bromofluorobenzene	3.40		4.000		85.1 70 130

Sample ID	1908078-001AREP	SampType: REP	Units: ppbv	Prep Date: 8/6/2019	RunNo: 53105
Client ID:	System Effluent - 0805	Batch ID: R53105	Analysis Date: 8/6/2019	SeqNo: 1049375	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Benzene	178	0.0895			175.9 1.33 30 E
Toluene	127	0.400			129.9 1.96 30 E
1,2-Dibromoethane (EDB)	0.889	0.200			0.9612 7.76 30
Ethylbenzene	21.7	0.400			21.93 1.19 30 E
m,p-Xylene	70.4	0.800			70.58 0.231 30 E
o-Xylene	23.5	0.400			23.68 0.691 30 E

Original



**Fremont**  
Analytical

Date: 8/8/2019

Work Order: 1908078

CLIENT: SLR International

Project: MasterPark Lot C

**QC SUMMARY REPORT**  
**Volatile Organic Compounds by EPA Method TO-15**

Sample ID	1908078-001AREP	SampType:	REP	Units:	ppbv	Prep Date:	8/6/2019	RunNo:	53105				
Client ID:	System Effluent - 0805	Batch ID:	R53105			Analysis Date:	8/6/2019	SeqNo:	1049375				
Analyte		Result		RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: 4-Bromofluorobenzene 5.06 4.000 126 70 130 0

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



## Sample Log-In Check List

Client Name: **SLR**  
Logged by: **Carissa True**

Work Order Number: **1908078**  
Date Received: **8/6/2019 4:09:00 PM**

### Chain of Custody

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

### 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  $>0^{\circ}\text{C}$  to  $10.0^{\circ}\text{C}$  \* 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:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

### Item Information

\* Note: DoD/ELAP and TNI require items to be received at  $4^{\circ}\text{C}$   $\pm$   $2^{\circ}\text{C}$

Original



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

# Air Chain of Custody Record & Laboratory Services Agreement

Date: 8/5/19 Page: 1 of 1  
Laboratory Project No (Internal): 1908078  
Special Remarks:

Client: SLR  
Address: 2216 20TH AVE SE, G-202  
City, State, Zip: BOTHELL WA 98021  
Telephone: (425) 402-8800  
Fax: (425) 402-8488

Project Name: MASTERPARK LOT C  
Project No: 101.02207.00001 TASK 4  
Location: SEATTLE, WA  
Collected by: CHRIS LGE  
Reports to (PM): MIKE STATION  
Email (PM): mstation@shconsulting.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	Internal		Analysis								Comments	Final Pressure ("Hg)		
						Initial Evacuation Pressure (mtorr)	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
1 SYSTEM EFFLUENT - 080519	13973 N/A	8/5/19 1445	S	6L	Grab	10mtorr 8/2/2019	-30 8/5/19	6 8/5/19	X									BTEX & EDB	-7
2																			
3																			
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

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	8/6/19	X	8/6/19
Relinquished	Date/Time	Received	Date/Time
X		X	

Turn-Around Time:

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



**ATTACHMENT 2**

**EMISSIONS CALCULATIONS**



Attachment 2  
Emissions Calculations for Reactivated IAS/SVE System

Substance	Analyzed Concentration (micrograms/cubic meter)	System Airflow Rate (cubic feet per minute)	System Airflow Rate (cubic meters/second) <sup>(a)</sup>	Emission Rate (g/s) <sup>(b)</sup>	Emission Rate (lb/hr) <sup>(c)</sup>	Emission Rate (lb/day) <sup>(d)</sup>	Emission Rate (lb/yr) <sup>(e)</sup>	WAC 173-460-150 SQER (lb)	WAC 173-460-150 Averaging Period	SVE Emissions (lb/averaging period)	Are SVE Emissions Less Than WAC SQER?
1,2-Dibromoethane	7.39	310	0.15	1.08E-06	8.58E-06	2.06E-04	7.52E-02	2.71	Year	0.08	Yes
Benzene	531	310	0.15	7.77E-05	6.17E-04	1.48E-02	5.40E+00	6.62	Year	5.40	Yes
Ethylbenzene	115	310	0.15	1.68E-05	1.34E-04	3.20E-03	1.17E+00	76.8	Year	1.17	Yes
m,p Xylene	374	310	0.15	5.47E-05	4.34E-04	1.04E-02	3.80E+00	29	24 Hours	0.01	Yes
o Xylene	139	310	0.15	2.03E-05	1.61E-04	3.87E-03	1.41E+00	29	24 Hours	0.00	Yes
Toluene	918	310	0.15	1.34E-04	1.07E-03	2.56E-02	9.34E+00	657	24 Hours	0.03	Yes

Calculations:

- (a) System airflow rate (cubic meters/second) = System airflow rate (cubic feet/minute) \* (1 meter/3.28 ft)<sup>3</sup> \* (1 minute / 60 seconds)
- (b) Emission Rate (g/s) = System airflow rate (cubic meters/second) \* Concentration (micrograms/cubic meter) \* ( 1 g / 10<sup>6</sup> micrograms)
- (c) Emission Rate (lb/hr) = Emission Rate (g/s) \* (1 lb / 453.6 g) \* (3,600 s / 1 hr)
- (d) Emission Rate (lb/day) = Emisison Rate (lb/hr) \* (24 hours / 1 day)
- (e) Emission Rate (lb/yr) = Emisison Rate (lb/hr) \* (8,760 hours / 1 year)