3810 East Boone Avenue, Suite 101
Spokane, Washington 99202
509.688.5376

September 10, 2018

Mr. Matt Breen
Spokane International Airport
9000 West Airport Drive
Spokane, Washington 99219

RE: Monitoring Well Installation and Groundwater Monitoring for Perfluorinated Chemicals
Spokane International Airport
Spokane, Washington
SIA Contract #18-43-9999-028-001-00
SES Project No.:0270-001

Dear Mr. Breen:

Attached are the results and supporting documentation for the recent, limited groundwater monitoring event for the perfluorinated chemicals, Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS). This monitoring event was conducted per your request so that Spokane International Airport's (SIA) could ascertain if detectable levels of perfluorinated chemicals are present in shallow groundwater beneath the airport. Samples were collected from newly installed monitoring wells MW-15, MW-17 and MW-18. Monitoring well MW-16 was observed to be dry and was not sampled.

Our scope of work for this project included the following tasks:

- Contracted and provided oversight for the installation of additional monitoring wells with locations near the east property line of the Airport. Boring locations were screened for utilities by both public and private utility locate contractors. Monitoring wells were installed on July 30 and 31, 2018 by Geologic Drill, LLC, a Washington-licensed driller in accordance with applicable state regulations.
- Performed one limited groundwater monitoring and sampling event on August 6, 2018. Groundwater samples were collected from the three of the four new monitoring wells MW-15, MW-17 and MW-18. The locations of the wells are shown on Figure 1.
- Groundwater samples were shipped to ALS Global Laboratories' (ALS) laboratory in Kelso, Washington for analysis. ALS is accredited by the Washington State Department of Ecology with the certification number C544. The samples were analyzed for PFOA and PFOS by USEPA Method 537M. Samples were submitted on a standard turnaround time of 15–business days. SES reviewed the analytical data and no data usability issues were identified.
- Prepared this letter report presenting the results of the sampling event, compared the analytical results to national standards, and provided our conclusions and recommendations.

Monitoring Well Installation
Three groundwater monitoring wells (MW-16, MW-17 and MW-18) were installed on July 30 with MW-15 being installed on July 31, 2018. The locations of the wells were approved prior to installation by SIA personnel. Utility clearance was conducted through the public One Call system, with specific boring locations cleared by Advance Underground Utility Locating (AUUL) prior to bringing the driller on site. Monitoring wells were installed using 2-inch diameter poly-vinyl chloride screen and casing and were finished with aboveground steel monuments and protective bollards.

MW-15 is located in an undeveloped area west of the former USAF Ammo Storage area. The well is located in an inferred cross-gradient location to the Airport.

MW-16 is located in an undeveloped area west of runway 3/21. The well is located in an inferred up-gradient location to the Airport.

MW-17 is located in an undeveloped area south of runway 3/21. The well is located in an inferred up-gradient location to the Airport.

MW-18 is located in an area which was part of the former Geiger Field. The well is located in an inferred up-gradient location to the Airport.

Groundwater flow direction was not calculated for this event. Various studies have been conducted in support of the pending Stormwater Discharge Permit and each has concluded that the direction of flow for shallow groundwater across the site is generally northeasterly.

Monitoring well locations are shown on **Figure 1**. Boring logs and well construction information are included in **Attachment A - Boring Logs**.

Groundwater Sampling
Depth to water in each well was measured to the nearest 1/100th of a foot prior to sampling. Groundwater samples were collected from each well using a peristaltic pump. The new wells were purged for approximately one hour prior to measuring field parameters. Purging and sampling using low-flow sampling techniques where flow rates were generally about 0.3 to 0.5 liters per minute (l/min). The purge rate was adjusted to minimize the drawdown of groundwater in the wells during purging.

Field parameters were measured with a Horiba-U52 water quality meter. Parameters include pH, conductivity, turbidity, dissolved oxygen (DO), temperature, and oxidation reduction potential (ORP). Once field parameters stabilized within 10% from reading to reading for each parameter, laboratory-prepared sample containers were filled with water from the wells, sealed and placed on ice. Samples were shipped next-day delivery to the laboratory the same day as collected.

Results
Groundwater levels were measured in the monitoring wells on August 6, 2018. Depth to water ranged from 10.32 to 15.52 feet bgs. Groundwater samples were collected from monitoring wells MW-15, MW-17 and MW-18. Monitoring well MW-16 was observed to be dry.

PFOA was not detected at a concentration exceeding the Method Reporting Limit in the sample collected from monitoring well MW-15. Only one sample (MW-18) collected from the three monitoring wells had detection of PFOS at a level exceeding the screening level of 70 ng\L.

Concentrations of PFOA/PFOS in the remaining samples did not exceed the 70 ng/L screening level.

Analytical results are shown on **Table 1** and the laboratory analytical report is included in **Attachment B – Analytical Results**.

Summary
The highest concentration of perfluorinated compounds was detected in the groundwater sample collected from MW-18. This well is located within the former Geiger Field area. Current and historic aviation practices appear to have impacted shallow groundwater quality in this portion of the Airport.

Limitations
The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area and in general accordance with the terms and conditions set forth in our Agreement, and with the SES proposal dated July 2, 2018. No other warranty, express or implied, is made.

The findings presented in this report are based on conditions observed at specific site locations and sampling intervals at the time of the assessment. Because conditions between the wells and sampling intervals may vary over distance and time, the potential always remains for the presence of unknown, unidentified, unforeseen, or changed surface and subsurface contamination.

This report is for the exclusive use of Spokane International Airport and its representatives. No third party shall have the right to rely on SES's opinions rendered in connection with the services or in this document without our written consent and the third party's agreement to be bound to the same conditions and limitations as Spokane International Airport.

SES appreciates the opportunity to provide these services. Please contact the undersigned regarding any questions related to the information provided in this letter report.

Sincerely,

Spokane Environmental Solutions, LLC.

Gary D. Panther, LG, LEG

Attachments:

Figure 1: Spokane International Airport Additional Site Monitoring Wells
Table 1: Summary of Groundwater Analytical Results
Attachment A: Boring Logs
Attachment B: Analytical Results

Figures

Source: Google Earth Pro

SITE MAP

SPOKANE INTERNATIONAL AIRPORT
ADDITIONAL SITE MONITORING WELLS
SPOKANE, WASHINGTON

SES SPOKANE ENVIRONMENTAL SOLUTIONS

FIGURE 1

Tables

Table 1
Summary of Groundwater Analytical Results
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS)
Spokane International Airport

Well ID	Sample Date	Depth to Water	PFOA (ng/L)	PFOS (ng/L)
Groundwater Screening Level (ng/L) [1]			70	70
MW-15	8/6/2018	10.32	<3.8	1.6
MW-16	8/6/2018	Dry	--	--
MW-17	8/6/2018	15.52	6.2	3.9
MW-18	8/6/2018	10.56	**72**	22

Notes:

[1] Groundwater screening levels were obtained from EPA's "Fact Sheet, PFOA & PFOS Drinking Water Health Advisories," dated November 2016.

Values in **bold** font indicate that the result reported meets or exceeds the groundwater screening level.

Depth to water measured from top of casing.

ng/L - nanogram per liter

PFOA - perfluorooctanoic acid

PFOS - perfluorooctane sulfonic acid

Samples analyzed by ALS Global Laboratories, Kelso, Washington.

Attachment – A

Boring Logs

					SES Project Number: 0270-001	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-15 Well Tag: BKP-260
					Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.622229 N, -117.552446 W
					Auger type/diameter: 8-inch Hollow Stem		
					Contractor: Geologic Drill, LLC		
					Sampling method: 2-inch SPT		Sheet 1 of 1
					Hammer Weight: 140 Lbs		Above-Grade Monument
					Free Fall: 30"		
Blow Counts	Recovery %	Depth in Feet	Graphic Log	Soil Graph/ USCS	Location of Boring: West of SE Ammo Storage Road.		Time 800
					Surface conditions/ Topsoil Depth: Grass-covered.		
							Date 7/31/18
					Material Description		
2-2-4	80%	0		GM	Brown silty GRAVEL with sand. Loose, Dry. With organics.		
		1					
		2					
		3					
		4					
3-10-9	50%	5		GP	Grey- brown GRAVEL with trace silt, Loose, Moist.		
		6					
		7					
		8					
		9					
6-10-9	50%	10		GP	Grey- brown GRAVEL with trace silt, Loose, Wet.		
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20			Completed well depth is 12.0- feet bgs. Well constructed with 5-feet of 20-slot screen.		
		21					
					Boring Completed at 12-feet BGS. Groundwater encountered at 10.0 feet bgs.		

				SES Project Number: 0270-001	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-16 Well Tag: BKP-263
				Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.611527 N, -117.558968 W
				Auger type/diameter: 8-inch Hollow Stem		
				Contractor: Geologic Drill, LLC		
				Sampling method: 2-inch SPT		Sheet 1 of 1
				Hammer Weight: 140 Lbs		Above-Grade Monument
				Free Fall: 30"		
				Location of Boring: East of S. Center Road.		Time 700
				Surface conditions/ Topsoil Depth: Grass-covered.		
						Date 7/30/18

Blow Counts	Recovery %	Depth in Feet	Graphic Log	Soil Graph/ USCS	Material Description
2-3-2	8%	0		SM	Brown silty SAND with occasional gravel. Loose, Moist. With organics.
		1			
		2			
		3			
		4			
6-7-7	8%	5		SM	Grey- brown SAND with trace silt, Loose, Moist.
		6			
		7			
50/0	0%	8		RX	Refusal on Basalt.
		9			
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			Completed well depth is 8.5- feet bgs.
		20			Well constructed with 2.5-feet of 20-slot screen.
		21			Boring Completed at 8.5-feet BGS. Groundwater was not encountered.

					SES Project Number: 0270-001	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-17 Well Tag: BKP-262
					Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.604917 N, -117.552602 W
					Auger type/diameter: 8-inch Hollow Stem		
					Contractor: Geologic Drill, LLC		
					Sampling method: 2-inch SPT		Sheet 1 of 1
					Hammer Weight: 140 Lbs		Above-Grade Monument
					Free Fall: 30"		
Blow Counts	Recovery %	Depth in Feet	Graphic Log	Soil Graph/ USCS	Location of Boring: South of W. Electric Avenue.		Time 1000
					Surface conditions/ Topsoil Depth: Grass-covered.		
							Date 7/30/18
					Material Description		
		0		SM	Brown silty SAND with occasional gravel. Loose, Moist. With organics.		
		1					
		2					
		3					
		4					
3-3-4	80%	5		SP	Grey- brown SAND with trace silt, Loose, Moist.		
		6					
		7					
		8					
		9					
11-11-19	70%	10		SP	Grey- brown SAND with occasional gravel, Medium-dense, Moist.		
		11					
		12					
		13					
		14					
15-19-26	80%	15		SP	Grey- brown SAND with occasional gravel, Medium-dense, Wet.		
		16					
		17					
		18					
		19					
10-11-12	90%	20		SM	Brown silty SAND with occasional gravel. Medium-dense, Wet.		
					Completed well depth is 25.0- feet bgs.		
		21			Well constructed with 10-feet of 20-slot screen.		
					Boring Completed at 25.0-feet BGS. Groundwater encountered at 15.5 feet bgs.		

					SES Project Number: 0270-001	Spokane International Airports, New Wells PFOA-PFOS Assessment	Boring Number: MW-18 Well Tag: BKP-261
					Equipment Type/ model #: Mobile G-2400		Location NAD 83 47.619878 N, -117.517124 W
					Auger type/diameter: 8-inch Hollow Stem		
					Contractor: Geologic Drill, LLC		
					Sampling method: 2-inch SPT		Sheet 1 of 1
					Hammer Weight: 140 Lbs		Above-Grade Monument
					Free Fall: 30"		
Blow Counts	Recovery %	Depth in Feet	Graphic Log	Soil Graph/ USCS	Location of Boring: South of W. Electric Avenue.		Time 1300
					Surface conditions/ Topsoil Depth: Grass-covered.		
							Date 7/30/18
					Material Description		
		0		GM	Brown silty Gravel with sand. Loose, Dry. With organics.		
		1					
		2					
		3					
		4					
3-7-9	60%	5		GM	Grey- brown silty GRAVEL with sand, Loose, Dry.		
		6					
		7					
		8					
		9					
10-12-15	70%	10		SP	Grey- brown SAND, Loose, Wet.	Becomes weathered Basalt	
		11		Rx	Weathered Basalt. Refusal at 13.0 feet bgs.		
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19			Completed well depth is 12.0- feet bgs.		
		20			Well constructed with 5-feet of 20-slot screen.		
		21			Boring Completed at 13.0-feet BGS. Groundwater encountered at 10.0 feet bgs.		

Attachment – B

Analytical Results

August 31, 2018 Service Request No:K1807404

Gary Panther
Spokane Environmental Solutions, LLC
3810 E. Boone Avenue, Ste 101
Spokane, WA 99202

Laboratory Results for: SIA

Dear Gary,

Enclosed are the results of the sample(s) submitted to our laboratory August 08, 2018
For your reference, these analyses have been assigned our service request number **K1807404.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

for Chris Leaf
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Spokane Environmental Solutions, LLC
Project: SIA
Sample Matrix: Water

Service Request: K1807404
Date Received: 08/08/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 08/08/2018. The samples were received in good condition and consistent with the accompanying chain of custody form except as noted on the cooler receipt and preservation form included in this report. Please note that these samples were received above the recommended cooler temperature of six degrees C. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

Organic LC:

No significant anomalies were noted with this analysis.

Approved by Noe D. Date 08/31/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: MW-15			Lab ID: K1807404-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Perfluorooctanoic acid (PFOA)	1.6			1.5	ng/L	PFC/537M

CLIENT ID: MW-17			Lab ID: K1807404-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Perfluorooctanoic acid (PFOA)	3.9			1.5	ng/L	PFC/537M
Perfluorooctane sulfonic acid (PFOS)	6.2			3.8	ng/L	PFC/537M

CLIENT ID: MW-18			Lab ID: K1807404-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Perfluorooctanoic acid (PFOA)	22			1.5	ng/L	PFC/537M
Perfluorooctane sulfonic acid (PFOS)	72			3.8	ng/L	PFC/537M

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Spokane Environmental Solutions, LLC **Service Request:**K1807404
Project: SIA/270-001

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K1807404-001	MW-15	8/6/2018	1500
K1807404-002	MW-17	8/6/2018	1230
K1807404-003	MW-18	8/6/2018	1100

ALS Environmental

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

CHAIN OF CUSTODY
91636

001

SR# 1051464

COC Set____of____

COC#_____

Project Name: SIA	Project Number: 270-001
Project Manager: GARY PANTHER	
Company: SES	
Address: 3808 E. Boone, Spokane, WA 99202	
Phone #: 509-954-5090	email: GARY@SPOKANEENVIRONMENTAL.COM
Sampler Signature:	Sampler Printed Name: GARY D. PANTHER

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	14D PFC/537M / PFOA	1	2	3	4	5	Remarks
1. MW-15		8-6-18	1500	W	2	X						
2. MW-17		8-6-18	1230	W	2	X						
3. MW-18		8-6-18	1100	W	2	X						
4.												
5.												
6.												
7.												
8.												
9.												
10.												

Report Requirements

- X I. Routine Report: Method Blank, Surrogate, as required
- __ II. Report Dup., MS, MSD as required
- __ III. CLP Like Summary (no raw data)
- __ IV. Data Validation Report
- __ V. EDD

Invoice Information

P.O.# 270-001

Bill To: SES

Turnaround Requirements

- __ 24 hr.
- __ 48 hr.
- __ 5 Day
- X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: GARY D. PANTHER	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm: SES	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time: 8-6-18 1600	Date/Time: 8/8/18 1010	Date/Time	Date/Time	Date/Time	Date/Time

PC CL

Cooler Receipt and Preservation Form

Client SES Service Request K18 C7464

Received: 8/8/18 Opened: 8/8/18 By: CT Unloaded: 8/8/18 By: SR

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ NA
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? one, front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
13.4	13.9	13.2	13.3	+0.1	284		7227 2443 3404	
						Thawed		

4. Packing material: *Inserts* (*Baggies*) (*Bubble Wrap*) (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
All		X								

Notes, Discrepancies, & Resolutions: _____

Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001		

Sample Name:	MW-15	**Date Collected:**	08/6/18
Lab Code:	K1807404-001	**Date Received:**	08/8/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
PFC/537M	NHILLIKER	CMULLER

Sample Name:	MW-17	**Date Collected:**	08/6/18
Lab Code:	K1807404-002	**Date Received:**	08/8/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
PFC/537M	NHILLIKER	CMULLER

Sample Name:	MW-18	**Date Collected:**	08/6/18
Lab Code:	K1807404-003	**Date Received:**	08/8/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
PFC/537M	NHILLIKER	CMULLER

Sample Results

ALS Environmental—Kelso Laboratory
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High Performance Liquid Chromatography

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Analytical Report

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001	**Date Collected:**	08/06/18 15:00
Sample Matrix:	Water	**Date Received:**	08/08/18 10:10
Sample Name:	MW-15	**Units:**	ng/L
Lab Code:	K1807404-001	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids						
Perfluorooctane sulfonic acid (PFOS)	ND U	3.8	1	08/22/18 13:08	8/10/18	
Perfluoroalkane Carboxylic Acids						
Perfluorooctanoic acid (PFOA)	**1.6**	1.5	1	08/22/18 13:08	8/10/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C4-PFOA	67	31 - 142	08/22/18 13:08	
13C4-PFOS	62	27 - 142	08/22/18 13:08	

Analytical Report

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001	**Date Collected:**	08/06/18 12:30
Sample Matrix:	Water	**Date Received:**	08/08/18 10:10
Sample Name:	MW-17	**Units:**	ng/L
Lab Code:	K1807404-002	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids						
Perfluorooctane sulfonic acid (PFOS)	**6.2**	3.8	1	08/22/18 13:18	8/10/18	
Perfluoroalkane Carboxylic Acids						
Perfluorooctanoic acid (PFOA)	**3.9**	1.5	1	08/22/18 13:18	8/10/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C4-PFOA	67	31 - 142	08/22/18 13:18	
13C4-PFOS	65	27 - 142	08/22/18 13:18	

Analytical Report

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001	**Date Collected:**	08/06/18 11:00
Sample Matrix:	Water	**Date Received:**	08/08/18 10:10
Sample Name:	MW-18	**Units:**	ng/L
Lab Code:	K1807404-003	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids						
Perfluorooctane sulfonic acid (PFOS)	**72**	3.8	1	08/22/18 13:29	8/10/18	
Perfluoroalkane Carboxylic Acids						
Perfluorooctanoic acid (PFOA)	**22**	1.5	1	08/22/18 13:29	8/10/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C4-PFOA	64	31 - 142	08/22/18 13:29	
13C4-PFOS	60	27 - 142	08/22/18 13:29	

QC Summary Forms

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Client: Spokane Environmental Solutions, LLC **Service Request:** K1807404
Project: SIA/270-001
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Extraction Method: EPA 3535A

Sample Name	Lab Code	13C4-PFOA 31-142	13C4-PFOS 27-142
MW-15	K1807404-001	67	62
MW-17	K1807404-002	67	65
MW-18	K1807404-003	64	60
Method Blank	KQ1810863-03	85	75
Lab Control Sample	KQ1810863-01	79	72
Duplicate Lab Control Sample	KQ1810863-02	68	65

Analytical Report

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/L
Lab Code:	KQ1810863-03	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Perfluoroalkane Sulfonic Acids						
Perfluorooctane sulfonic acid (PFOS)	ND U	5.0	1	08/22/18 10:52	8/10/18	
Perfluoroalkane Carboxylic Acids						
Perfluorooctanoic acid (PFOA)	ND U	2.0	1	08/22/18 10:52	8/10/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C4-PFOA	85	31 - 142	08/22/18 10:52	
13C4-PFOS	75	27 - 142	08/22/18 10:52	

Client:	Spokane Environmental Solutions, LLC	**Service Request:**	K1807404
Project:	SIA/270-001	**Date Analyzed:**	08/22/18
Sample Matrix:	Water	**Date Extracted:**	08/10/18

Duplicate Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method:	PFC/537M	**Units:**	ng/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	603453

	Lab Control Sample KQ1810863-01			Duplicate Lab Control Sample KQ1810863-02					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perfluorooctane sulfonic acid (PFOS)	161	149	108	170	149	114	29-162	5	30
Perfluorooctanoic acid (PFOA)	134	160	84	174	160	109	52-147	26	30