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TestAmerica Spokane 11922 East 1st Ave Spokane, WA 99206 Phone (509) 924-9200 Fax (509) 924-9290		Chain	of Cu	stody	Rec	ord	n I					IWA				Test/	
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TestAmerica Spokane

Page 15 of 17

4/2/2019 (Rev. 1)

Login Sample Receipt Checklist

Client: Spokane Environmental Solutions LLC

Login Number: 10497 List Number: 1 Creator: O'Toole, Maria C

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	One of the two trip blanks was broken
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	No analysis requiring residual chlorine check assigned.

Job Number: 590-10497-1

List Source: TestAmerica Spokane

Login Sample Receipt Checklist

Client: Spokane Environmental Solutions LLC

Login Number: 10497 List Number: 2 Creator: Hobbs, Kenneth F

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Job Number: 590-10497-1

List Source: TestAmerica Seattle

List Creation: 03/02/19 12:49 PM



SITE ASSESSMENT REPORT

Spokane International Airport

Spokane, WA

APPENDIX B.2

SES, 2019b. Limited Assessment of Electric Avenue Waste Disposal/Fire Pit Training Area.



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

April 23, 2019

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

RE: Limited Assessment of Electric Avenue Waste Disposal/Fire Pit Training Area Spokane International Airport Spokane, Washington SIA Contract #19-43-9999-006 <u>SES Project No.: 0270-003</u>

Dear Mr. Breen:

Attached are the results and supporting documentation for the recent, limited groundwater monitoring event for the perfluorinated chemicals and conventional chemistry contaminants of concern. This monitoring event was conducted per your request to provide a snapshot of current shallow groundwater conditions beneath the Site. Samples were collected from groundwater monitoring wells installed in the 1990s on behalf of the Army Corps of Engineers and/or Spokane International Airports (SIA). The Site location is shown on **Figure 1**.

We understand that the site was formerly used for live fire training exercises where fires were intentionally set for training firefighting skills and techniques. We further understand that the site has an extensive history of assessment dating back to 1984. The latest Site Closure Summary was conducted by Herrera and Associates in 2003 which reported that the only contaminates of concern (COCs) exceeding the Model Toxics Control Act (MTCA) Method A cleanup criteria for unrestricted use in shallow groundwater were diesel-range petroleum hydrocarbons. These exceedances were reported as 'minor and infrequent'. The last reported sampling of these wells was in August 1999. Arsenic was sporadically detected in groundwater samples with exceedances of cleanup criteria observed in samples collected from both upgradient and down gradient wells.

BTEXN compounds were detected in soil samples collected from the boring (Sample FP001) where concentrations exceeding MTCA Method A cleanup criteria were observed. Concentrations of contaminants were observed to decrease with depth with minor exceedances of cleanup criteria noted in the sample collected at a depth of 10 feet bgs. SVOCs and furans/dioxins were also sampled, but none of these compounds exceeded cleanup criteria. SES did not collect soil samples during this limited assessment.

Because this area was used for active fire training exercises, sampling for PFOA/PFOS compounds and for polycyclic aromatic hydrocarbons (PAHs) was conducted to determine if these compounds are present at concentrations exceeding cleanup criteria. PAHs are often formed as a byproduct of incomplete combustion and this was one process formerly present at the site.

Site Monitoring Wells

There are four pairs of monitoring wells located on site. Each pair consists of a shallow- and a deep-screened well. Monitoring well pairs MW-7 and MW-8 were installed by the Army Corps of Engineers in 1990. Monitoring well pairs MW-13 and MW-14 were installed by SIA in 1992. In each of the well pairs, the well designated by an A suffix is the deeper of the pair and is generally screened across the contact between sequenced flood sediments and the underlying basalt. Specific construction details of those wells sampled during this event are further discussed below. Monitoring well locations are shown on **Figure 2**. Monitoring Well Logs are shown in **Attachment A**.

SES found integrity issues with many of the wells. Well monuments and caps were found to be distressed and in need of repair or replacement in order to maintain the structural integrity of the well and to protect groundwater. SES can provide an estimate for the repair of these monuments upon request. Details are provided in the Photographic Log included as **Attachment B**.

Groundwater Sampling

Groundwater samples were collected for PFOA/PFOS analysis from site monitoring wells MW-7, MW-8B, MW-13A, MW-13B, and MW-14B. Samples from MW-13A, MW-13B, and MW-14B were analyzed with the remaining samples placed on Hold.

Groundwater samples were collected for conventional chemistry and for PAHs from MW-7, MW-8B, MW-13B, and MW-14B. Samples from MW-13B and MW-14B were analyzed with the remaining samples placed on Hold.

While there are two wells associated with the MW-7 well pair, the wells were not labeled in the field and only one was readily accessible. The sample was named MW-7 in the field and it was determined later that this was monitoring well MW-7B.

Depth to water in each accessible well was measured to the nearest 1/100th of a foot prior to sampling. Groundwater flow was not calculated during this event as top of casing elevations were not readily available. However, regional groundwater flow is generally to the northeast, based on our review of previous reports.

Groundwater samples were collected from each well using a peristaltic pump with dedicated tubing for each well sampled. SES has vetted the sampling materials and has found them to be free of perfluorinated compounds. Purging and sampling using low-flow sampling techniques where flow rates were generally about 0.2 to 0.3 liters per minute (I/min) minimize drawdown and mixing of water within the well during purging and sampling.

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. In general, the field parameters indicated that groundwater was not adversely impaired by petroleum hydrocarbons or metals as dissolved oxygen was present and ORP readings were positive.



Monitoring Wells Sampled

Monitoring well MW-13A is the deepest of this well pair. The well has a total depth of 42 feet and is screened across the contact of sediment and basalt from 32-42 feet. Groundwater sampled is presumed to flow primarily atop this contact. SES placed the intake at approximately 38 feet in this well.

Monitoring well MW-13B is 20 feet in depth and is screened from 10-20 feet. SES placed the intake at approximately 16 feet in this well.

Monitoring well MW-14B is 20.5 feet in depth and is screened from 9-19 feet. SES placed the intake at approximately 18 feet in this well.

Analytical Results

PFOA and PFOS were detected in each of the samples collected. As concentrations of PFOA/PFOS are to be summed for compliance, each sample collected exhibited concentrations exceeding the screening level of 70 ng\L. Analytical results are shown in **Table 1**.

Concentrations of BTEX, Dx compounds and total arsenic did not exceed Method Reporting Limits (MRL) and/or MTCA Method A cleanup criteria in the samples collected. Analytical results are shown in **Table 2**.

cPAHs were not detected in samples at concentrations exceeding MRL. As Ecology uses a formula to determine compliance with cleanup criteria, the analytical values were calculated and determined to be less than the cleanup level for each of the samples submitted. Analytical results and method calculations are shown in **Table 3.** Laboratory analytical reports are included in **Attachment C** Analytical Results.

Summary

The highest concentration of perfluorinated compounds was detected in the groundwater sample collected from monitoring well MW-13B. This well is screened near-surface. In the deeper companion well MW-13A, concentrations are much lower. This well pair is in an inferred downgradient position for the former training area. The Analytical results suggest that perfluorinated compounds are either bound to soil within the capillary fringe of the vadose zone (smear zone) or are being diluted by a higher flow regimen in the lower portion of the perched aquifer. There is not enough sampling data either temporally or spatially to make a conclusive determination.

Concentrations of BTEX, Dx compounds and cPAHs were not detected at concentrations of regulatory significance during this sampling event. This could be the result of seasonal variability in flow with spring melt fostering dilution; a sampling event scheduled for late summer could verify this hypothesis.

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 revised SES proposal dated January 31, 2019. 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 Airports 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 Airports.

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: Location Map Figure 2: Site Map

- Table 1: Summary of Groundwater Analytical Results PFOA-PFOS
- **Table 2:** Summary of Groundwater Analytical Results Conventional Chemistry
- **Table 3:** Summary of Groundwater Analytical Results PAHs

Attachment A: Boring Logs Attachment B: Photographs Attachment C: Analytical Results



Figures







Notes:

- The locations of all features shown are approximate.
 This drawing is for information purposes. it is intended to assist in showing features discussed in an attached document.





LEGEND:

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Site Monitoring Wells Pairs

Burn Pit - location based on observation from historic aerial photographs.



Notes:

- 1. The locations of all features shown are approximate.
- This drawing is for information purposes. it is intended to assist in showing features discussed in an attached document.

Source: Google Maps



Tables



Table 1

Summary of Groundwater Analytical Results - Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS) Limited Groundwater Assessment Electric Avenue Waste Disposal/Fire Training Area Spokane International Airport

			EPA-PF0	C/537M
Well ID	Sample Date	Depth to Water	PFOA (ng/L)	PFOS (ng/L)
MW-13A	3/27/2019	17.00	60	480
MW-13B	3/27/2019	13.90	5200	1100
MW-14B	3/27/2019	16.25	860	230
Groundw	ater Screening Lev	el (ng/L) ¹	70	70

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.



Table 2

Summary of Groundwater Analytical Results - Conventional Chemistry Limited Groundwater Assessment Electric Avenue Waste Disposal/Fire Training Area Spokane International Airport

				EPA-	8260C	NWTI DRO	EPA-6020B		
Sample ID	Date Sampled	Depth to Water	Benzene ug/L	Toluene ug/L	Ethylbenzene ug/L	Total Xylenes ug/L	DRO mg/L	RRO mg/L	Arsenic mg/L
MW-13B	3/27/2019	13.90	<0.4	<1.0	<1.0	<3.0	<0.23	<0.38	<0.0050
MW-14B	3/27/2019	16.25	<0.4	<1.0	<1.0	<3.0	0.34	<0.40	<0.0050
MTCA Method A Cl	eanup Level ^a		5	1000	700	1000	0.5	0.5	0.005

Notes:

a: MTCA = Model Toxics Control Act Method A cleanup level for unrestricted use. Method B value used where Method A value not established.

-- = Not Analyzed

DRO = Diesel-Range Organics.

RRO = Residual-Range Organics.

BTEX = benzene, toluene, ethylbenzene, (total) xylenes.

BOLD = Exceedance of cleanup level.

Samples Analyzed by TestAmerica, Spokane, WA



Table 3

Summary of Groundwater Analytical Results - PAH Toxicity Equiviency Factors Limited Groundwater Assessment Electric Avenue Waste Disposal/Fire Training Area Spokane International Airport

сРАН	MW-13B Measured Groundwater Concentration (ug/L)	Toxicity Equivilency Factor TEF (unitless) ¹	Toxicity Equivilent Concentration TEQ (ug/L) ²
Benzo(a)pyrene	0.0455	1	0.0455
Benzo(a)anthracene	0.0455	0.1	0.00455
Benzo(b)flouranthene	0.0455	0.1	0.00455
Benzo(k)flouranthene	0.0455	0.1	0.00455
Chrysene	0.0455	0.1	0.00455
Dibenz(a,h)anthracene	0.0455	0.1	0.00455
indeno(1,2,3-cd)pyrene	0.0455	0.1	0.00455
Sum	0.3185		0.04095
Method A Cleanup Level (Table 720-1)	0.1 ug/L		
сРАН	MW-14B Measured Groundwater Concentration (ug/L)	Toxicity Equivilency Factor TEF (unitless) ¹	Toxicity Equivilent Concentration TEQ (ug/L) ²
Benzo(a)pyrene	0.0455	1	0.0455
Benzo(a)anthracene	0.0455	0.1	0.00455
Benzo(b)flouranthene	0.0455	0.1	0.00455
Benzo(k)flouranthene	0.0455	0.1	0.00455
Chrysene	0.0455	0.1	0.00455
Dibenz(a,h)anthracene	0.0455	0.1	0.00455
indeno(1,2,3-cd)pyrene	0.0455	0.1	0.00455
Sum	0.3185		0.04095
Advalue of A. Characteristic Jack (Table 700.4)			

Notes:

1. Toxicity Equivilency Factor (TEF) from MTCA Table 720-1.

2. TEQ = cPAH measured concentration * TEF

cPAH = Carcinigenic Polycyclic Aromatic Hydrocarbons

MTCA = Model Toxics Control Act Method Table 720-1 cleanup level for unrestricted use.

BOLD = Exceedance of cleanup level.

Samples Analyzed by TestAmerica, Spokane, WA



Attachment – A

Boring Logs



RESOURCE PROTECTION WELL REPORT

START CARD NO. 57709

PROJECT NAME: SPOKANE AIRPORT BURN PIT	LOCATION: TZAN, RAZE, SEC. 6 1/4 NE 1/4 NE
RILLING METHOD: 414" HOLLOW STEM AUGER \$ AL	ARY DISTANCE (W) 112_ FT. FROM N/S SECTION LINE
DRILLER: WILL HAYES (2035) FIRM: EVEN DRILLING, INC (RUENCOT)	159 BATUM: USES MONUMENT 250' SOUTH OF RUNWAY
SIGNATURE:	WATER LEVEL ELEVATION: (23') 2,357.1'
REPRESENTATIVE: DEB SULLEL	DEVELOPED: 12/22/92



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