

# STEMEN ENVIRONMENTAL, INC.

P.O. BOX 3644  
LACEY, WASHINGTON 98509-3644  
CONTR. LIC. #STEMEEI081J9

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Telephone 360-438-9521 Fax 360-412-1225

February 8, 2017

Mr. John Meek  
Meek Logging  
Olympia, Washington

Dear Mr. Meek:

RE: ADDITIONAL ENVIRONMENTAL INVESTIGATIONS FOR THE FLINTSTONE FUEL SITE LOCATED 2840 C BLACK LAKE BLVD., TUMWATER, WASHINGTON.

The following additional investigations were performed to further characterize the current environmental conditions on the subject property.

## **1.0 Above ground storage tank excavation Area**

On January 27, 2017, a total of three (3) investigative boreholes were advanced at selected locations within and/or directly adjacent to the AST remedial excavation area.

### Sampling Location S1

Sampling location S1 is located in the northwest portion of the AST remedial excavation area.

Soils present depths of approximately 4 feet b.g.s. or less consisted of gravelly, recently placed backfill materials while soils present at depths of 4-8 feet b.g.s. consisted of brown soils intermixed with black basalt gravels.

Soil sample S1-6 was obtained from native soils and gravels present at a depth of 6 feet b.g.s.

Laboratory analyses results for soil sample S1-6 reported no presence of gasoline range TPH, BTEXs, PCBs and/or PAHs.

### Sampling Location S2

Sampling location S2 is located in the eastern portion of the AST remedial excavation area.

Soils present depths of approximately 4 feet b.g.s. or less consisted of gravelly, recently placed backfill materials while soils present at depths of 4-8 feet b.g.s. consisted of brown soils intermixed with black basalt gravels.

Soil sample S2-6 was obtained from native soils and gravels present at a depth of 6 feet b.g.s.

Laboratory analyses results for soil sample S1-6 reported no presence of gasoline range TPH, BTEXs, PCBs and/or PAHs.

#### Sampling Location W1

Sampling location W1 is located approximately 10 feet east of the eastern end of the AST remedial excavation area.

Water sample W1 was obtained from waters present at an approximate depth of

Laboratory analyses results for water sample W1 reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH, BTEXs, PCBs, MTCA 5 Metals, and PAHs at levels that exceed MTCA Method A Clean Up Levels.

The sampling of the groundwater at one (1) selected location near the southern end of the AST Excavation Area.

All investigative soil and groundwater samples was obtained using a Direct Push Sampling System supplied and operated by Licensed Geologists from ESN Northwest Inc., Olympia, Washington.

## **2.0 UST Excavation Area**

On January 27, 2017, a total of four (4) investigative groundwater samples were obtained from selected locations located to the north-northeast and south-southeast of the eastern portion of the UST excavation area.

#### Sample Location PW1

Sample location PW1 is located approximately 10 ft. east and 10 ft. north of the southeast corner of the on-site Scale House building.

Water sample PW1 was obtained from waters present at an approximate depth of 5 ft. b.g.s.

Laboratory analyses results for water sample PW1 reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH and/or Lead at levels that exceed MTCA Method A Clean Up Levels.

#### Sample Location PW2

Sample location PW2 is located approximately 10 ft. east and 10 ft. north of the southeast corner of the on-site Scale House building.



Water sample PW2 was obtained from waters present at an approximate depth of 5.5 ft. b.g.s.

Laboratory analyses results for water sample PW2 reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH and/or Lead at levels that exceed MTCA Method A Clean Up Levels.

#### Sample Location PW3

Sample location PW3 is located approximately 25 ft. east and 137 ft. south of the southeast corner of the on-site Scale House building.

Water sample PW3 was obtained from waters present at an approximate depth of 2.5 ft. b.g.s.

Laboratory analyses results for water sample PW3 reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH and/or Lead at levels that exceed MTCA Method A Clean Up Levels.

#### Sample Location PW4

Sample location PW4 is located approximately 5 ft. west and 137 ft. south of the southeast corner of the on-site Scale House building.

Water sample PW4 was obtained from waters present at an approximate depth of 5 ft. b.g.s.

Laboratory analyses results for water sample PW4 reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH and/or Lead at levels that exceed MTCA Method A Clean Up Levels.

### **3.0 SOIL SAMPLING, GROUNDWATER SAMPLING AND LABORATORY ANALYSES PROTOCOLS**

#### **3.1 Direct Push Borehole Soil Sampling Protocols**

Discreet soil samples were obtained using a “Direct Push Sampling System” provided and operated by Licensed Geologists from ESN Northwest, Inc. of Olympia, Washington. Continuous soil boreholes were extended to depths of approximately 15 feet below ground surface (b.g.s.) or less. Continuous soil coring/samples (split spoon samplers/liners) were laid out in order by depth on the surface to facilitate field screening and observation of the soils obtained from various depths.

The soil samples were immediately removed from the liner and placed in recommended sample jars using a stainless steel sampling spoon.

EPA Method 5035 sampling protocols were practiced when sampling soils to be analyzed for Volatile Organic Compounds.

### **3.2 Direct Push Borehole Groundwater Sampling Protocols**

All discreet groundwater samples were obtained using a variable speed peristaltic pump, set at a low flow setting, and the "Direct Push Sampling System". A temporary PVC screen is placed in the sampling tube/borehole. The system's sampling tube was purged of all collected waters and then allowed to recharge prior to the collection of these water samples. The sampled waters were transferred directly into laboratory supplied containers for temporary storage.

All sampling tubing used in conjunction with the peristaltic pump was replaced between each discreet groundwater sampling event to prevent any cross sample contamination.

The temporary water sampling screen is replaced after each water sampling event.

All used tubing and water screens are properly disposed of as solid waste.

### **3.3 Quality Controls and Assurances**

All sampling tools/devices were properly cleaned between individual samples to prevent cross sample contamination. All soil and/or water samples were placed in recommended sample containers with zero head space, properly refrigerated and transported with proper chain of custody forms, to Environmental Services Network Northwest, Inc. of Olympia, Washington, for appropriate laboratory analyses.

Disposable Easy Draw Syringes were used to comply with EPA Method 5035 sampling protocols. A new Syringe was used for each individual soil sample.

The tubing used in association with the peristaltic pump was changed after each individual sampling event to prevent cross sample contamination.

### **3.4 Groundwater Elevations**

Groundwater elevations were measured using an electronic water level indicator. Depth to water was measured from the ground surface at each sampling location.

### **3.5 Laboratory Analyses**

Soil and/or groundwater samples were screened for gasoline range TPH (total petroleum hydrocarbons) using method NWTPH-Gx, diesel fuel range TPH/lube oil range TPH using method NWTPH-Dx/Dx Extended, VOCs using method 8260, semi-volatile organic compounds using method 8270, PCBs using method 8082A, and MTCA 5 Metals/Lead using EPA method 6020.

## **4.0 SUMMARY**

**Laboratory analyses results for soil samples S1-6 and S2-6, obtained from soils present in the AST excavation area, reported no presence of gasoline range TPH, BTEXs, PCBs and/or PAHs at levels that exceed MTCA Method A Clean Up Levels for Unrestricted Land Use.**



**Laboratory analyses results for water sample W1 sample obtained in close proximity to the AST excavation area reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH, BTEXs, PCBs, MTCA 5 Metals, and PAHs at levels that exceed MTCA Method A Clean Up Levels for Unrestricted Land Use.**

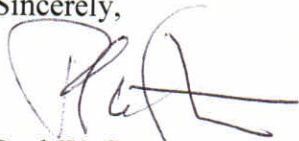
**Laboratory analyses results for groundwater samples PW1, PW2, PW3, and PW4, obtained from selected locations in close proximity to the UST excavation area, reported no presence of gasoline range TPH, diesel fuel range TPH, lube oil range TPH and/or Lead at levels that exceed MTCA Method A Clean Up Levels for Unrestricted Land Use.**

**All remedial investigations and/or remedial corrective actions performed on this site meet current industry and regulatory standards for these actions.**

**All opinions, observations, and statements set forth in this report are based on currently available information and current on-site conditions, and cannot predict or report on the impacts of future events and/or revised regulatory requirements on this site.**

If you have any questions or need further information please feel free to contact us at the above phone number.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Stemen', with a large, sweeping horizontal stroke at the end.

Paul W. Stemen  
Ecology-Registered Site Assessment Supervisor  
ASTM Certified  
IFCI #0874201-U2

# UST EXCAVATION AREA WATER STORAGE TANK SAMPLES

ANALYSIS OF DIESEL RANGE ORGANICS, LUBE OIL RANGE ORGANICS, GASOLINE RANGE ORGANICS & BTEX IN WATER BY METHOD NWTPH DxDx EXTENDED AND METHOD NWTPH-Gx/8260										
SAMPLE NUMBER	SAMPLE DATE	DEPTH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	GASOLINE RANGE ORGANICS	DIESEL RANGE ORGANICS	LUBE OIL RANGE ORGANICS	
W1	1/27/2017		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	
PW1	1/27/2017	5'	ND	ND	ND	ND	ND	ND	ND	
PW2	1/27/2017	5.5'	ND	ND	ND	ND	ND	ND	ND	
PW3	1/27/2017	2.5'	ND	2.3	ND	ND	ND	ND	ND	
PW4	1/27/2017	5'	ND	ND	ND	ND	ND	ND	ND	
REPORTING LIMITS										
METHOD "A" CLEAN UP LEVELS			1	1	1	3	100	250	500	
			5	1000	700	1000	1000	2000	2000	
ANALYSIS OF DIESEL RANGE ORGANICS, LUBE OIL RANGE ORGANICS, GASOLINE RANGE ORGANICS & BTEX IN SOIL BY METHOD NWTPH DxDx EXTENDED AND METHOD NWTPH-Gx/8260										
SAMPLE NUMBER	SAMPLE DATE	DEPTH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	GASOLINE RANGE ORGANICS			
S1-6	1/27/2017	6'	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
S2-6	1/27/2017	6'	ND	ND	ND	ND	ND			
			ND	ND	ND	ND	ND			

FLINTSTONE FUEL

TOTAL METALS IN WATER BY EPA METHOD 6020									
SAMPLE NUMBER	SAMPLE DATE	SAMPLE DEPTH	LEAD (Pb) ug/L	CADMIUM (Cd) ug/L	CHROMIUM (Cr) ug/L	ARSENIC (As) ug/L	Mercury (Hg) ug/L		
W1	1/27/2017	5'	4.2	2.1	9.7	3.2	ND		
PW1	1/27/2017	5'	ND	NA	NA	NA	NA		
PW2	1/27/2017	5.5'	ND	NA	NA	NA	NA		
PW3	1/27/2017	2.5'	ND	NA	NA	NA	NA		
PW4	1/27/2017	5'	ND	NA	NA	NA	NA		
NA - NOT ANALYZED									
METHOD DETECTION LEVEL			5	1	5	5	0.5		
METHOD A CLEAN UP LEVEL			14	15	50	5	2		



FLINTSTONE FUEL

ANALYSIS OF POLYNUCLEAR AROMATIC HYDROCARBONS IN SOIL BY METHOD 8270

SAMPLE-NUMBER		S1-6	S2-6
DATE		1/27/2017	1/27/2017
DEPTHS	REPORT LIMITS	6'	6'
		mg/kg	mg/kg
Naphthalene	0.02	ND	ND
2-Methylnaphthalene	0.02	ND	ND
1-Methylnaphthalene	0.02	ND	ND
Acenaphthylene	0.02	ND	ND
Acenaphthene	0.02	ND	ND
Fluorene	0.02	ND	ND
Phenanthrene	0.02	ND	ND
Anthracene	0.02	ND	ND
Fluoranthene	0.02	ND	ND
Pyrene	0.02	ND	ND
Benzo(a)anthracene	0.02	ND	ND
Chrysene	0.02	ND	ND
Benzo(b)fluoranthene	0.02	ND	ND
Benzo(k)fluoranthene	0.02	ND	ND
Benzo(a)pyrene	0.02	ND	ND
Indeno(1,2,3-cd)pyrene	0.02	ND	ND
Dibenzo(a,h)anthracene	0.02	ND	ND
Benzo(ghi)perylene	0.02	ND	ND

ANALYSIS OF POLYNUCLEAR AROMATIC HYDROCARBONS IN WATER BY METHOD 8270

SAMPLE-NUMBER		W1
DATE		1/27/2017
DEPTHS	REPORT LIMITS	5'
		ug/L
Naphthalene	0.1	ND
2-Methylnaphthalene	0.1	ND
1-Methylnaphthalene	0.1	ND
Acenaphthylene	0.1	ND
Acenaphthene	0.1	ND
Fluorene	0.1	ND
Phenanthrene	0.1	ND
Anthracene	0.1	ND
Fluoranthene	0.1	ND
Pyrene	0.1	ND
Benzo(a)anthracene	0.1	ND
Chrysene	0.1	ND
Benzo(b)fluoranthene	0.1	ND
Benzo(k)fluoranthene	0.1	ND
Benzo(a)pyrene	0.1	ND
Indeno(1,2,3-cd)pyrene	0.1	ND
Dibenzo(a,h)anthracene	0.1	ND
Benzo(ghi)perylene	0.1	ND



FLINTSTONE FUEL

POLYCHLORINATED BIPHENYLS IN SOIL BY EPA 8082A/3550C					
SAMPLE-NUMBER		S1-6	S2-6		
DATE		1/27/2017	1/27/2017		
	REPORT				
DEPTHS	LIMITS	6'	6'		
		mg/Kg	mg/Kg		
A1016	0.1	ND	ND		
A1221	0.1	ND	ND		
A1232	0.1	ND	ND		
A1242	0.1	ND	ND		
A1248	0.1	ND	ND		
A1254	0.1	ND	ND		
A1260	0.1	ND	ND		
A1262	0.1	ND	ND		

# Flintstone Fuel Site



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## LEGEND

	Major Roads		Flood Zones
	Roads		Water Bodies
	Streams		Zoning
	Contours		Cities
	Wetlands		Parcels
	Wetland Buffers		



## UST SITE



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## LEGEND

	Major Roads		Flood Zones
	Roads		Water Bodies
	Streams		Zoning
	Contours		Cities
	Wetlands		Parcels
	Wetland Buffers		



# AST EXCAVATION AREA



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## LEGEND

- |                 |              |
|-----------------|--------------|
| Major Roads     | Flood Zones  |
| Roads           | Water Bodies |
| Streams         | Zoning       |
| Contours        | Cities       |
| Wetlands        | Parcels      |
| Wetland Buffers |              |



February 7, 2017

Paul Stemen  
Stemen Environmental  
P.O. Box 3644  
Lacey, WA 98509

Dear Mr. Stemen:

Please find enclosed the analytical data report for the Flintstone's Project in Tumwater, Washington. Probe services were conducted on January 27, 2017. Soil and water samples were analyzed for Diesel & Oil by NWTPH-Dx/Dx Extended, Gasoline by NWTPH-Gx, BTEX by Method 8260, PAH's by Method 8270, PCB's by Method 8082, and MTCA 5 Metals by Method 6020 on January 30 – February 3, 2017.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services to Stemen Environmental 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 look forward to the next opportunity to work together.

Sincerely,



Michael A. Korosec  
President

## ESN NORTHWEST CHEMISTRY LABORATORY

Stemen Environmental  
PROJECT FLINTSTONE FUEL  
Tumwater, Washington

ESN Northwest  
1210 Eastside Street SE Suite 200  
Olympia, WA 98501  
(360) 459-4670 (360) 459-3432 Fax  
lab@esnnw.com

### Analysis of Diesel Range Organics & Lube Oil Range Organics in Water by Method NWTPH-Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (ug/L)	Lube Oil Range Organics (ug/L)
Method Blank	1/31/2017	1/31/2017	106	nd	nd
LCS	1/31/2017	1/31/2017	109	84%	---
PW1	1/31/2017	1/31/2017	91	nd	nd
PW2	1/31/2017	1/31/2017	111	nd	nd
PW3	1/31/2017	1/31/2017	84	nd	nd
PW4	1/31/2017	1/31/2017	93	nd	nd
W1	1/31/2017	2/1/2017	90	nd	nd
Reporting Limits				250	500

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%



# ESN NORTHWEST CHEMISTRY LABORATORY

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Tumwater, Washington

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lab@esnw.com

## Analysis of Gasoline Range Organics & BTEX in Soil by Method NWTPH-Gx/8260

Sample Number	Date Prepared	Date Analyzed	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Gasoline Range Organics (mg/kg)	Surrogate Recovery (%)
Method Blank	1/31/2017	1/31/2017	nd	nd	nd	nd	nd	108
LCS	1/31/2017	1/31/2017	115%	88%	99%	91%	104%	101
LCSD	1/31/2017	1/31/2017	121%	88%	102%	91%	---	101
S1-6	1/27/2017	1/31/2017	nd	nd	nd	nd	nd	109
S2-6	1/27/2017	1/31/2017	nd	nd	nd	nd	nd	110
Reporting Limits			0.02	0.05	0.05	0.15	10	

"---" Indicates not tested for component.

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromofluorobenzene) & LCS : 65% TO 135%

## ESN NORTHWEST CHEMISTRY LABORATORY

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lab@esnnw.com

### Analysis of Gasoline Range Organics & BTEX in Water by Method NWTPH-Gx/8260

Sample Number	Date Analyzed	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	2/1/2017	nd	nd	nd	nd	nd	104
LCS	2/1/2017	119%	81%	90%	84%	136%	94
LCSD	2/1/2017	113%	79%	85%	83%	---	96
PW1	2/1/2017	nd	nd	nd	nd	nd	106
PW1 Duplicate	2/1/2017	nd	nd	nd	nd	nd	105
PW2	2/1/2017	nd	<b>2.3</b>	nd	nd	nd	108
PW3	2/1/2017	nd	nd	nd	nd	nd	109
PW4	2/1/2017	nd	nd	nd	nd	nd	110
W1	2/1/2017	nd	nd	nd	nd	nd	106
Reporting Limits		1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromofluorobenzene) & LCS: 65% TO 135%



# ESN NORTHWEST CHEMISTRY LABORATORY

Stemen Environmental  
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Tumwater, Washington

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## Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

### Analytical Results

		MTH BLK	LCS	S1-6	S2-6
Date extracted	Reporting	01/30/17	01/30/17	01/30/17	01/30/17
Date analyzed	Limits	01/30/17	01/30/17	01/30/17	01/30/17
Moisture, %	(mg/kg)			21%	12%
Naphthalene	0.02	nd	80%	nd	nd
2-Methylnaphthalene	0.02	nd	79%	nd	nd
1-Methylnaphthalene	0.02	nd	ns	nd	nd
Acenaphthylene	0.02	nd	86%	nd	nd
Acenaphthene	0.02	nd	92%	nd	nd
Fluorene	0.02	nd	95%	nd	nd
Phenanthrene	0.02	nd	73%	nd	nd
Anthracene	0.02	nd	77%	nd	nd
Fluoranthene	0.02	nd	87%	nd	nd
Pyrene	0.02	nd	84%	nd	nd
Benzo(a)anthracene*	0.02	nd	71%	nd	nd
Chrysene*	0.02	nd	83%	nd	nd
Benzo(b)fluoranthene*	0.02	nd	95%	nd	nd
Benzo(k)fluoranthene*	0.02	nd	71%	nd	nd
Benzo(a)pyrene*	0.02	nd	80%	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	115%	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	97%	nd	nd
Benzo(ghi)perylene	0.02	nd	87%	nd	nd
Total Carcinogens				nd	nd
Surrogate recoveries:					
2-Fluorobiphenyl		93%	90%	66%	69%
p-Terphenyl-d14		129%	89%	99%	101%

### Data Qualifiers and Analytical Comments

\* - Carcinogenic Analyte

nd - not detected at listed reporting limits

ns - not spiked

Results reported on dry-weight basis

Acceptable Recovery limits: 50% TO 150%

Acceptable RPD limit: 35%

**ESN NORTHWEST CHEMISTRY LABORATORY**

Stemen Environmental  
PROJECT FLINTSTONE FUEL  
Tumwater, Washington

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lab@esnsw.com

**Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270****Analytical Results**

	Reporting	MTH BLK	LCS	W1
Date extracted	Limits	01/31/17	01/31/17	01/31/17
Date analyzed	(ug/L)	02/01/17	02/01/17	02/01/17
Naphthalene	0.1	nd	89%	nd
2-Methylnaphthalene	0.1	nd	92%	nd
1-Methylnaphthalene	0.1	nd	ns	nd
Acenaphthylene	0.1	nd	101%	nd
Acenaphthene	0.1	nd	100%	nd
Fluorene	0.1	nd	105%	nd
Phenanthrene	0.1	nd	70%	nd
Anthracene	0.1	nd	100%	nd
Fluoranthene	0.1	nd	98%	nd
Pyrene	0.1	nd	94%	nd
Benzo(a)anthracene*	0.1	nd	77%	nd
Chrysene*	0.1	nd	101%	nd
Benzo(b)fluoranthene*	0.1	nd	80%	nd
Benzo(k)fluoranthene*	0.1	nd	83%	nd
Benzo(a)pyrene*	0.1	nd	81%	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	98%	nd
Dibenzo(a,h)anthracene*	0.1	nd	88%	nd
Benzo(ghi)perylene	0.1	nd	73%	nd

Total Carcinogens nd

**Surrogate recoveries:**

2-Fluorobiphenyl	85%	74%	70%
p-Terphenyl-d14	112%	79%	91%

**Data Qualifiers and Analytical Comments**

\* - Carcinogenic Analyte

nd - not detected at listed reporting limits

ns - not spiked

Acceptable Recovery limits: 50% TO 150%

Acceptable RPD limit: 35%

## ESN NORTHWEST CHEMISTRY LABORATORY

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### Total Metals in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)	Cadmium (Cd) (ug/L)	Chromium (Cr) (ug/L)	Arsenic (As) (ug/L)	Mercury (Hg) (ug/L)
Method Blank	1/31/2017	nd	nd	nd	nd	nd
W1	1/31/2017	4.2	2.1	9.7	3.2	nd
Reporting Limits		2.0	2.0	10	2.0	1.0

"nd" Indicates not detected at listed detection limits.

### QA/QC Data - Total Metals EPA-6020

Laboratory Control Sample				Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	
Lead	20.0	19.4	97.0	20.0	20.9	105	7.44
Cadmium	20.0	22.5	113	20.0	20.2	101	10.8
Chromium	20.0	20.8	104	20.0	22.5	113	7.85
Arsenic	20.0	22.6	113	20.0	20.5	103	9.74
Mercury	2.00	2.17	109	2.00	2.04	102	6.18

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%  
ACCEPTABLE RPD IS 20%



## ESN NORTHWEST CHEMISTRY LABORATORY

Stemen Environmental  
PROJECT FLINTSTONE FUEL  
Tumwater, Washington

ESN Northwest  
1210 Eastside Street SE Suite 200  
Olympia, WA 98501  
(360) 459-4670 (360) 459-3432 Fax  
lab@esnnw.com

### Total Lead in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)
Method Blank	2/1/2017	nd
PW1	2/1/2017	nd
PW2	2/1/2017	nd
PW3	2/1/2017	nd
PW3 Duplicate	2/1/2017	nd
PW4	2/1/2017	nd

Reporting Limits	2.0
------------------	-----

"nd" Indicates not detected at listed detection limits.

### QA/QC Data - Total Metals EPA-6020

Laboratory Control Sample				Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	20.0	19.4	97.0	20.0	20.9	105	7.44

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%  
ACCEPTABLE RPD IS 20%



14204 NE 21st Street  
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## Analytical Report

Client	ESN NW, Inc 1210 Eastside Street SE, Suite #200 Olympia, WA 98501	Acculab WO#	17-AL0130-3
Project Manager	Steve Loague	Date Sampled	1/27/2017
Project Name	Flintstone	Date Received	1/30/2017
Project#		Date Reported	2/3/2017

## Polychlorinated Biphenyls in Water by EPA 8082A/3510C

Accu Lab Analytical Batch# AL020117-4

Client sample ID				W-1	
Lab ID	MRL	Unit	MTH BLK	LCS	17-AL0130-3-1
Matrix			Water	Water	Water
Date Extracted			2/1/2017	2/1/2017	2/1/2017
Date Analyzed			2/2/2017	2/2/2017	2/2/2017

A1016	0.1	ug/L	nd		nd
A1221	0.1	ug/L	nd		nd
A1232	0.1	ug/L	nd		nd
A1242	0.1	ug/L	nd		nd
A1248	0.1	ug/L	nd		nd
A1254	0.1	ug/L	nd		nd
A1260	0.1	ug/L	nd	114%	nd
A1262	0.1	ug/L	nd		nd

### Surrogate Recoveries

Decachlorobiphenyl	74%	77%	72%
Tetrachloro-m-xylene	87%	102%	78%

Acceptable Recovery Limits:

Surrogates 70-130%

LCS/ MS/MSD 65-135%

Acceptable RPD limit: 30%





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## Analytical Report

Client	ESN NW, Inc 1210 Eastside Street SE, Suite #200 Olympia, WA 98501	Acculab WO#	17-AL0130-3
Project Manager	Steve Loague	Date Sampled	1/27/2017
Project Name	Flintstone	Date Received	1/30/2017
Project#		Date Reported	2/3/2017

## Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL020117-3

Client sample ID	S1-6		S2-6		MS	MSD	RPD
Lab ID	MRL	Unit	MTH BLK	LCS	17-AL0130-3-2	17-AL0130-3-3	17-AL0130-3-3
Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted		2/1/2017	2/1/2017	2/1/2017	2/1/2017	2/1/2017	2/1/2017
Date Analyzed		2/2/2017	2/2/2017	2/2/2017	2/2/2017	2/2/2017	2/2/2017
Moisture (%)					17%	13%	13%

A1016	0.1	mg/Kg	nd		nd	nd	
A1221	0.1	mg/Kg	nd		nd	nd	
A1232	0.1	mg/Kg	nd		nd	nd	
A1242	0.1	mg/Kg	nd		nd	nd	
A1248	0.1	mg/Kg	nd		nd	nd	
A1254	0.1	mg/Kg	nd		nd	nd	
A1260	0.1	mg/Kg	nd	96%	nd	nd	91%
A1262	0.1	mg/Kg	nd		nd	nd	89%

### Surrogate Recoveries

Decachlorobiphenyl	128%	79%	91%	92%	76%	82%
Tetrachloro-m-xylene	124%	89%	97%	94%	95%	88%

Acceptable Recovery Limits:

Surrogates 70-130%

LCS/ MS/MSD 65-135%

Acceptable RPD limit: 30%



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### **Analytical Report**

Client	ESN NW, Inc 1210 Eastside Street SE, Suite #200 Olympia, WA 98501	Acculab WO#	17-AL0130-3
Project Manager	Steve Loague	Date Sampled	1/27/2017
Project Name	Flintstone	Date Received	1/30/2017
Project#		Date Reported	2/3/2017

#### **Data Qualifiers and Comments:**

##### ***Results reported on dry-weight basis for soil samples.***

- MRL-** Method Reporting Limit
- nd-** Indicates the analyte is not detected at the listing reporting limit.
- C-** Coelution with other compounds.
- M-** % Recovery of surrogate, matrix spike or matrix spike duplicate is out of the acceptable limit due to matrix effect.
- B-** Indicates the analyte is detected in the method blank associated with the sample.
- J-** The analyte is detected at below the reporting limit.
- E-** The result reported exceeds the calibration range, and is an estimate.
- D-** Sample required dilution due to matrix. Method Reporting Limits were elevated due to dilutions.
- H-** Sample was received or analyzed past holding time
- Q-** Sample was received with head space, improper preserved or above recommended temperature.



CLIENT:  
ADDRESS:  
PHONE:

DATE:    PAGE   OF

PROJECT NAME:  
LOCATION:  
COLLECTOR:

DATE OF  
COLLECTION:

ANALYSES

TPH - HClD

TPH - Diesel & Oil

BTEX

VOC 8260CL

Semivol 8270

PAH's 8270

PCE's 8082

RCA 8 Metals

NMCA 5 Metals

Pb

Asbestos - PLM

GRO Suite

DRO Suite

WO Suite

Notes

Total Number  
of Containers

Laboratory  
Note Number

Client Project #:

Project Manager:

FAX:

Sample Number

Depth

Time

Sample Type

Container Type

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

RELINQUISHED BY (Signature)

DATE/TIME

RECEIVED BY (Signature)

DATE/TIME

RELINQUISHED BY (Signature)

DATE/TIME

RECEIVED BY (Signature)

DATE/TIME

TOTAL NUMBER OF CONTAINERS

CHAIN OF CUSTODY SEALS Y/N/NA

SEALS INTACT? Y/N/NA

RECEIVED GOOD COND./COLD

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY