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June 15, 2010

Greg Weigel, On-Scene Coordinator
United States Environmental Protection Agency, Region 10
1435 North Orchard Street
Boise, Idaho 83706

RE: Contract No. EP-S7-06-02; Technical Direction Document No. 09-05-0006
Final Technical Memorandum: *Monitoring Well Installation at the Stubblefield Salvage Yard, Walla Walla, Washington*

Dear Mr. Weigel:

Enclosed please find the final technical memorandum summarizing the field event and analytical results associated with the installation of monitoring wells and investigative boreholes at the Stubblefield Salvage Yard in Walla Walla, Washington. If you have any questions or comments, please contact Josh Hancock at (206) 624-9537 or me at (206) 920-1739.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Steven G. Hall
START-3 Project Leader

enclosure

cc: Joshua Hancock, E & E, START-3 Project Manager, Seattle, WA

Technical Memorandum

DATE: June 15, 2010

TO: Greg Weigel, On-Scene Coordinator, EPA Region 10, Boise, ID

FROM: Josh Hancock, START-3 Project Manager, E & E, Seattle, Washington

THRU: Steven G. Hall, START-3 Project Leader, E & E, Seattle, Washington

SUBJ: Monitoring Well Installation at the Stubblefield Salvage Yard, Walla Walla, Washington

Background

The United States Environmental Protection Agency (EPA) has tasked Ecology and Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START)-3 contract number EP-S7-06-02, Technical Direction Document (TDD) 09-05-0006, to install monitoring wells and investigative boreholes at the Stubblefield Salvage Yard site, to sample these wells, and to provide a deliverable summarizing the field event and sampling results.

The Stubblefield Salvage Yard is an operational metal recycling and salvage yard facility located in Walla Walla, Washington. The site location is shown on Figure 1. As shown on Figure 2, the site is located to the east of the Myra Road site, which was the subject of a separate EPA investigation. Also shown on Figure 2 are notable site features including the office building, shop building, retaining wall, and the locations of fixed equipment used at the facility. Photographs collected during this mobilization are included as Attachment A to this report.

EPA has previously investigated the nature and extent of contamination at the site in May and September 2009. EPA also performed an initial removal action in October 2009. The results from these investigations demonstrated that surface and subsurface soil are contaminated with compounds at concentrations that exceed the Washington State Model Toxics Control Act (MTCA) and/or EPA Regional Screening Level (RSL) screening criteria. The results from these investigations are presented and discussed in the August 2009 Technical Memorandum (E & E 2009) and the March 2010 Alternatives Evaluation Technical Memorandum (Alternatives Evaluation; E & E 2010). Surface, subsurface, and groundwater sampling locations from the May 2009, September 2009, and the March 2010 mobilizations are shown on Figure 3. Compounds detected in soil and subsurface soil at concentrations that exceeded screening criteria are summarized on Figures 4 – 6 and the compounds detected in groundwater at concentrations exceeding screening criteria are summarized on Figure 7.

The purpose of the March 2010 mobilization was to install four monitoring wells to investigate the potential for impacts to the groundwater underlying the site, and to determine the direction of groundwater flow. Potential impacts to groundwater were identified as a concern based on the soil contamination that has been observed in the area of the site known as the "Source Area" as discussed in the Alternatives Evaluation. To perform this work, E & E obtained the services of a drilling company, a professional land surveyor, and a private utility locater.

Field Activities

On Monday March 22, 2010, EPA On-Scene Coordinator (OSC) Greg Weigel and START arrived at the Stubblefield Salvage Yard and met with the property owners. Proposed monitoring well locations were identified and marked using a Global Positioning System (GPS) device and marking paint. After identifying the proposed locations, EPA discussed the locations with the property owner to ensure that the wells would not interfere with business operations. The private utility locater then surveyed these areas prior to drilling to reduce the risk of damaging underground utilities (E & E also called the public "one call" utility number before mobilization).

The four monitoring wells were installed to observe the direction of groundwater flow and to collect representative samples of the groundwater underlying the site. One background well was installed upgradient of the source area (MW-1). Two wells (MW-2 and MW-3) were installed downgradient of the source area, and one well (MW-4) was installed cross-gradient of the source area. The monitoring well locations are shown on Figures 3, and the GPS coordinates, well elevations, depth to groundwater and other properties are summarized in Table 1.

Two investigative boreholes were also installed to further delineate the source area and to evaluate whether contamination extends beneath the building housing the bailer's hydraulic oil tank. One soil boring (SB-1) was drilled and sampled directly west of the source area to evaluate how far the source area extends in that direction, addressing a data gap identified in the Alternatives Evaluation. The second soil boring (SB-2) was installed at approximately a 40° angle under the building that houses the hydraulic oil used in the bailer, which is the assumed source of the contamination observed in the source area. The locations of the boreholes are shown on Figure 3, and GPS coordinates are provided in Table 1.

During the installation of the investigative boreholes and monitoring wells, soil samples were collected continuously using split spoon samplers. Each sample was screened for total metals using an Innov-X x-ray fluorescence (XRF) instrument and for volatiles and semivolaties using a TVA-1000 photoionization and flame ionization detector (PID/FID). From each of the six boreholes, E & E generally selected one to two soil samples to send to the off-site laboratory. One laboratory sample was generally collected near the groundwater interface, and a second laboratory sample was collected from the split spoon sample that had the highest results indicated by the XRF and TVA monitoring. The total depth of the boreholes ranged from approximately 7 feet below ground surface (bgs) to 30 feet bgs. Groundwater was encountered at approximately 8 feet in the northern portion of the site and at 17 feet in the southern portion of the site where the ground elevation is higher. Total borehole depths and groundwater elevations are provided in Table 1.

After the monitoring wells had been installed and developed, they were surveyed to determine the locations and top-of-casing elevations. E & E then recorded the depth to groundwater in each well from the top of the well casing. E & E used a water quality meter to verify that water quality parameters were stable (temperature, turbidity, conductivity, etc.) prior to sample collection, and collected groundwater samples from the middle of the screened interval using low flow water sampling techniques.

E & E collected a total of 11 soil samples from the boreholes and four groundwater samples from the newly completed and developed monitoring wells. Samples were analyzed by OnSite Environmental, Inc., of Redmond, Washington, for polychlorinated biphenyls (PCBs) by EPA method 8082, semivolatile organic compounds (SVOCs) by EPA method 827-D/SIM, and target analyte list (TAL) metals by EPA 6000/7000 series methods.

Results and Discussion

Groundwater Elevations
After the monitoring wells had been installed, surveyed, and gauged, a groundwater gradient map was constructed to estimate the direction of groundwater flow. The monitoring well elevations are shown on Figure 8 and are summarized in Table 1. The direction of groundwater flow was estimated to be generally to the west-northwest, moving towards and slightly parallel to Mill Creek, as shown on Figure 8.

Soil Conditions and Observations
Soil conditions were observed to be very similar at all four monitoring well locations and at soil boring SB-1. Surface soils were a mixture of fill and debris which gave way to native soils consisting of grayish- to brown-colored silt with fine sands. The sands became coarser as the depth increased, eventually giving way to cemented gravels and sandstones at greater depth. At soil boring SB-2, the soil was heavily impacted by hydrocarbons and was a dark, smoky-grey color.

Screening Criteria
Analytical results were compared to screening criteria to help evaluate the significance of the data. EPA determined that soil analytical results should be compared to both EPA RSLs for residential properties and Washington MTCA cleanup levels for unrestricted properties.

Soil Analytical Results

Total Metals
A number of metals were detected in soil from the March 2010 boreholes, including aluminum, barium, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, silver, vanadium and zinc, although only chromium, iron and vanadium were present at concentrations that exceeded the screening levels (Table 3 and Figures 5 and 6). Vanadium exceeded the RSL, but not the MTCA cleanup level, at all sampling locations. Chromium was detected at all sampling locations at concentrations that exceeded the RSL for hexavalent chromium. However, note that the chromium results are for total chromium, and the proportion of hexavalent chromium relative to total chromium is unknown.

PCBs
PCBs were not detected in any of the monitoring well boreholes (Table 4 and Figures 5 and 6). Aroclor 1242 was detected at a concentration of 0.22 milligrams per kilogram (mg/kg) in soil boring SB-2 at 4 feet bgs (sample 10030010) which was installed under the building housing the hydraulic bailer. This analytical result is equal to the RSL for Aroclor 1242 at residential properties and is less than the MTCA screening criteria for unrestricted properties.

SVOCs
A number of SVOCs were detected from 0-7 feet bgs in the boreholes associated with MW-2 and MW-3 (Table 5); however, only benzo(a)pyrene was present at a concentration that exceeded the RSL. Benzo(a)pyrene exceeded the RSL at sample locations 10030003 and 10030004 which were both collected from the borehole associated with MW-2 at 5 and 7 feet bgs, respectively. These results are summarized on Figures 5 and 6. No SVOCs were observed that exceeded the MTCA unrestricted cleanup values.

Groundwater Analytical Results

Total Metals
Calcium, iron, magnesium, manganese, potassium and sodium were detected in all four monitoring wells at concentrations that did not exceed the RSLs or the MTCA Method B groundwater cleanup levels (Table 6). Aluminum, barium and vanadium were also detected in monitoring well MW-1, with only vanadium exceeding the RSL but not the MTCA Method B groundwater cleanup level (Figure 7). MW-1 is located upgradient from the Source Area .

PCBs
PCBs were only detected at a single sampling location in groundwater (Table 7 and Figure 7). Aroclor 1242 was detected at 0.088 micrograms per liter (µg/L) at MW-2, which is downgradient from the Source Area. This concentration exceeds the RSL, but does not exceed the MTCA Method B groundwater cleanup level.

SVOCs
Bis(2-ethylhexyl)phthalate was the only SVOC detected in groundwater (Table 8 and Figure 7). It was observed at a concentration of 6.5 micrograms per liter (µg/L) which exceeds the RSL but is less than the MTCA Method B groundwater cleanup level. Phthalates are often associated with plastics such as the polyvinyl chloride (PVC) used to construct the well casing and are also common laboratory contaminants.

Conclusions

None of the constituents that were analyzed for as a part of this investigation were present at levels that exceeded the MTCA screening criteria for the applicable media, although PCBs, heavy metals and SVOCs were observed in soil and groundwater at concentrations that exceed the generally more conservative RSLs.

The analytical results for the new boreholes support the areal extent of the Source Area identified in the Alternatives Evaluation (March 2010). Based on the additional boreholes installed during this phase of the investigation, no evidence was found to suggest that the organic contamination (SVOCs and PCBs) consistent with the Source Area extends beyond the service road to the west (SB-1) and to the north of the shop building (MW-3). The polycyclic aromatic hydrocarbon (PAH) benzo(a)pyrene was detected above the RSL in the borehole for MW-2, which is downgradient from the Source Area. The soil boring collected from under the bailer hydraulic oil building (SB-2) contained Aroclor 1242 at a concentration above the RSL, which is consistent with previous subsurface soil samples from the Source Area.

The analytical results for the groundwater sample downgradient from the Source Area (MW-2) indicate that only Aroclor 1242 was detected above screening criteria (the RSLs). Therefore, it appears that the impacts to shallow groundwater from the Source Area are minimal. Additionally bis(2-ethylhexyl)phthalate and vanadium were detected above RSLs in MW-1, which is upgradient from the source area. Due to the potential for seasonal variations in groundwater elevation and contaminant concentrations, additional sampling events under different hydrological conditions may be necessary to fully characterize the groundwater pathway and the mobility of the contamination present in the Source Area.

References

Ecology and Environment, Inc. (E & E), August 2009, Technical Memorandum, Walla Walla, Washington, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract EP-S7-06-02, Technical Direction Document 09-05-0006.

_____, March 2010, Revised Technical Memorandum: Alternatives Evaluation, Walla Walla, Washington, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract EP-S7-06-02, Technical Direction Document 09-09-0010.

Table 1
Monitoring Well Summary Table, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Description	Latitude	Longitude	Ground Elevevation (Feet)	Inner Casing Elevevation	Outer Casing Elevevation	Total Depth	Water Elevevation	Depth to Water
Investigative Borehole 1	46.064853	-118.369699	867.2	N/A	N/A	14	-	-
Investigative Borehole 2	46.065044	-118.368960	863.4	N/A	N/A	7	-	-
Monitoring Well 1	46.064698	-118.368598	875.9	875.88	N/A	27	858.62	17.26
Monitoring Well 2	46.065114	-118.369540	866.4	866.33	866.77	26	856.98	9.35
Monitoring Well 3	46.065412	-118.369132	865.0	864.98	864.91	24	857.02	7.96
Monitoring Well 4	46.065623	-118.367924	866.8	867.55	N/A	24	859.11	8.44

Key:
N/A = Not Applicable or Not Available

Note: All Depths are given in Feet below Ground Surface and all elevations are given in Feet Above Mean Sea Level

Table 2
Summary of Samples and Analyses, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Sample Number	Sample Location	Sample Description	Matrix	Analyses
10030001	SB07MW04	Soil Sample, Monitoring Well 4 at 7' BGS	Soil	PCBs, Total Metals and SVOCs
10030002	SB05MW03	Soil Sample, Monitoring Well 3 at 5' BGs	Soil	PCBs, Total Metals and SVOCs
10030003	SB05MW02	Soil Sample, Monitoring Well 2 at 5' BGS	Soil	PCBs, Total Metals and SVOCs
10030004	SB07MW02	Soil Sample, Monitoring Well 2 at 7' BGS	Soil	PCBs, Total Metals and SVOCs
10030005	SB03MW01	Soil Sample, Monitoring Well 1 at 3' BGS	Soil	PCBs, Total Metals and SVOCs
10030006	SB06MW01	Soil Sample, Monitoring Well 1 at 6' BGS	Soil	PCBs, Total Metals and SVOCs
10030007	SB12MW01	Soil Sample, Monitoring Well 1 at 12' BGS	Soil	PCBs, Total Metals and SVOCs
10030008	SB01SD05	Soil Sample, Soil Boring 1 at 5' BGS	Soil	PCBs, Total Metals and SVOCs
10030009	SB01SD14	Soil Sample, Soil Boring 1 at 14' BGS	Soil	PCBs, Total Metals and SVOCs
10030010	SB02SD04	Soil Sample, Soil Boring 2 at 4' BGS	Soil	PCBs, Total Metals and SVOCs
10030011	SB02SD06	Soil Sample, Soil Boring 2 at 6' BGS	Soil	PCBs, Total Metals and SVOCs
10030012	MW04GW15	Groundwater Sample, Monitoring Well 4	Groundwater	PCBs, Total Metals and SVOCs
10030013	MW02GW20	Groundwater Sample, Monitoring Well 2	Groundwater	PCBs, Total Metals and SVOCs
10030014	MW01GW20	Groundwater Sample, Monitoring Well 1	Groundwater	PCBs, Total Metals and SVOCs
10030015	MW03GW15	Groundwater Sample, Monitoring Well 3	Groundwater	PCBs, Total Metals and SVOCs

Key:
BGS = Below Ground Surface
PCBs = Polychlorinated Biphenyls

Table 3
Total Metals in Soils Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS #	Units	EPA RSL Soil - Residential	Washington State MTCA Soil Cleanup Levels for Unrestricted Properties	10030001 MW-4 7' BGS Mar-2010		10030002 MW-3 5' BGS Mar-2010		10030003 MW-2 5' BGS Mar-2010		10030004 MW-2 7' BGS Mar-2010		10030005 MW-1 3' BGS Mar-2010		10030006 MW-1 6' BGS Mar-2010		10030007 MW-1 12' BGS Mar-2010		10030008 SB-1 5' BGS Mar-2010		10030009 SB-1 14' BGS Mar-2010		10030010 SB-2 4' BGS Mar-2010		10030011 SB-2 6' BGS Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Metals	Aluminum	7429-90-5	mg/kg	77,000	NA	**8700**		**3900**		**9700**		**12000**		**7500**		**10000**		**9500**		**8600**		**11000**		**8600**		**12000**	
Metals	Antimony	7440-36-0	mg/kg	31	32	6.8	U	5.4	U	6.5	U	9.3	U	6.1	U	6.7	U	7.7	U	6.6	U	6.7	U	7.3	U	7.6	U
Metals	Arsenic	7440-38-2	mg/kg	0.39	20	14	U	11	U	13	U	19	U	12	U	13	U	15	U	13	U	13	U	15	U	15	U
Metals	Barium	7440-39-3	mg/kg	15,000	16,000	**100**		**67**		**120**		**130**		**110**		**120**		**110**		**89**		**130**		**100**		**120**	
Metals	Beryllium	7440-41-7	mg/kg	160	160	0.68	U	0.54	U	0.65	U	0.93	U	0.61	U	0.67	U	0.77	U	0.66	U	0.67	U	0.73	U	0.76	U
Metals	Cadmium	7440-43-9	mg/kg	70	2	0.68	U	0.54	U	0.65	U	0.93	U	0.61	U	0.67	U	0.77	U	0.66	U	0.67	U	0.73	U	0.76	U
Metals	Calcium	7440-70-2	mg/kg	NA	NA	**4400**		**3200**		**5200**		**4700**		**8800**		**8100**		**3000**		**3500**		**4900**		**5000**		**5400**	
Metals	Chromium (1)	7440-47-3	mg/kg	0.29	19	**7.5**		**4.5**		**9.4**		**11**		**6.2**		**7.2**		**6.0**		**7.7**		**11**		**9.2**		**11**	
Metals	Cobalt	7440-48-4	mg/kg	23	NA	**15**		**6.0**		**10**		**9.1**		**9.4**		**12**		**4.6**		**8.6**		**15**		**10**		**15**	
Metals	Copper	7440-50-8	mg/kg	3,100	2,960	**16**		**11**		**730**		**39**		**16**		**17**		**12**		**13**		**17**		**21**		**21**	
Metals	Iron	7439-89-6	mg/kg	55,000	NA	**64000**		**54000**		**47000**		**57000**		**46000**		**56000**		**18000**		**51000**		**72000**		**67000**		**76000**	
Metals	Lead	7439-92-1	mg/kg	400	250	**9.4**		**36**		**46**		**17**		**20**		**8.1**		7.7	U	6.6	U	**11**		7.3	U	**7.7**	
Metals	Magnesium	7439-95-4	mg/kg	NA	NA	**2100**		**1000**		**2400**		**2500**		**4100**		**4200**		**1800**		**3200**		**3400**		**2700**		**3600**	
Metals	Manganese	7439-96-5	mg/kg	1,800	11,200	**670**		**510**		**660**		**330**		**610**		**590**		**150**		**300**		**560**		**390**		**620**	
Metals	Mercury	7439-97-6	mg/kg	5.6	2	0.34	U	0.27	U	0.32	U	0.46	U	0.30	U	0.33	U	0.39	U	0.33	U	0.33	U	0.36	U	0.38	U
Metals	Nickel	7440-02-0	mg/kg	1,500	1,600	**5.9**		**3.4**		**12**		**7.2**		**6.1**		**6.8**		**5.2**		**5.2**		**8.0**		**5.2**		**8.2**	
Metals	Potassium	7440-09-7	mg/kg	NA	NA	**1000**		**460**		**1900**		**1300**		**2800**		**1900**		**900**		**1100**		**1100**		**1300**		**1300**	
Metals	Selenium	7782-49-2	mg/kg	390	400	14	UJ	11	UJ	13	UJ	19	UJ	12	UJ	13	UJ	15	UJ	13	UJ	13	UJ	15	UJ	15	UJ
Metals	Silver	7440-22-4	mg/kg	390	400	0.68	U	0.54	U	0.65	U	0.93	U	0.61	U	0.67	U	0.77	U	0.66	U	0.67	U	0.73	U	0.76	U
Metals	Sodium	7440-23-5	mg/kg	NA	NA	**240**		**170**		**280**		**260**		**250**		**450**		**640**		**940**		**260**		**270**		**360**	
Metals	Thallium	7440-28-0	mg/kg	NA	5.6	6.8	U	5.4	U	6.5	U	9.3	U	6.1	U	6.7	U	7.7	U	6.6	U	6.7	U	7.3	U	7.6	U
Metals	Vanadium	7440-62-2	mg/kg	5.5	560	**97**		**38**		**68**		**140**		**57**		**90**		**30**		**81**		**63**		**69**		**97**	
Metals	Zinc	7440-66-6	mg/kg	23,000	24,000	**56**		**28**		**110**		**91**		**66**		**57**		**24**		**47**		**57**		**100**		**80**	

Notes: (1) - Cleanup levels for chromium are for hexavalent chromium, while sample results are total chromium.
A **BOLD** result indicates a detected compound.
A highlighted result indicates the result exceeds one of the cleanup levels.

Key:
CAS =Chemical Abstracts Service
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
RSL = Regional Screening Level
U = not detected at indicated reporting limit
J = estimated value
UJ = not detected, reporting limit is estimated

Table 4
PCBs in Soils Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS #	Units	EPA RSL Soil - Residential	Washington State MTCA Soil Cleanup Levels for Unrestricted Properties (1)	10030001		10030002		10030003		10030004		10030005		10030006		10030007		10030008		10030009		10030010		10030011	
						MW-4		MW-3		MW-2		MW-2		MW-1		MW-1		MW-1		SB-1		SB-1		SB-2		SB-2	
						7' BGS		5' BGS		5' BGS		7' BGS		3' BGS		6' BGS		12' BGS		5' BGS		14' BGS		4' BGS		6' BGS	
						Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
PCB	Aroclor-1016	12674-11-2	mg/kg	3.9	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U
PCB	Aroclor-1221	11104-28-2	mg/kg	0.14	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U
PCB	Aroclor-1232	11141-16-5	mg/kg	0.14	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U
PCB	Aroclor-1242	53469-21-9	mg/kg	0.22	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	**0.22**		0.076	U
PCB	Aroclor-1248	12672-29-6	mg/kg	0.22	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U
PCB	Aroclor-1254	11097-69-1	mg/kg	0.22	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U
PCB	Aroclor-1260	11096-82-5	mg/kg	0.22	1	0.068	U	0.054	U	0.065	U	0.093	U	0.061	U	0.067	U	0.077	U	0.067	U	0.067	U	0.072	U	0.076	U

Notes: A **BOLD** result indicates a detected compound.
A highlighted result indicates the result exceeds one of the cleanup levels.
(1) MTCA cleanup level for PCBs is for the total of all PCBs.

Key:
CAS =Chemical Abstracts Service
J = estimated value
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
PCB =Polychlorinated Biphenyls
RSL = Regional Screening Level
U = not detected at indicated reporting limit
UJ = not detected, reporting limit is estimated

Table 5
SVOCs in Soils Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS #	Units	EPA RSL Soil - Residential	Washington State MTCA Soil Cleanup Levels for Unrestricted Properties	10030001		10030002		10030003		10030004		10030005		10030006		10030007		10030008		10030009		10030010		10030011	
						MW-4		MW-3		MW-2		MW-2		MW-1		MW-1		MW-1		SB-1		SB-1		SB-2		SB-2	
						7' BGS		5' BGS		5' BGS		7' BGS		3' BGS		6' BGS		12' BGS		5' BGS		14' BGS		4' BGS		6' BGS	
						Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010		Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SVOCs	N-Nitrosodimethylamine	62-75-9	mg/kg	0.0023	0.020	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Pyridine	110-86-1	mg/kg	78	80	0.46	U	0.36	U	0.43	U	0.62	U	0.41	U	0.44	U	0.51	U	0.44	U	0.44	U	0.48	U	0.51	U
SVOCs	Phenol	108-95-2	mg/kg	18,000	48,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Aniline	62-53-3	mg/kg	85.0000	175.4386	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Bis(2-Chloroethyl)ether	111-44-4	mg/kg	0.2100	0.9091	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Chlorophenol	95-57-8	mg/kg	390	400	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,3-Dichlorobenzene	541-73-1	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,4-Dichlorobenzene	106-46-7	mg/kg	2	42	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Benzyl alcohol	100-51-6	mg/kg	6,100	24,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,2-Dichlorobenzene	95-50-1	mg/kg	1,900	7,200	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Methylphenol	95-48-7	mg/kg	3,100	4,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Bis(2-chloroisopropyl)ether	108-60-1	mg/kg	5	14	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	3 & 4-Methylphenol	108-39-4/106	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	N-Nitroso-di-n-propylamine	621-64-7	mg/kg	0	0	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Hexachloroethane	67-72-1	mg/kg	35	71	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Nitrobenzene	98-95-3	mg/kg	5	40	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Isophorone	78-59-1	mg/kg	510	1,053	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Nitrophenol	88-75-5	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,4-Dimethylphenol	105-67-9	mg/kg	1,200	1,600	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Bis(2-chloroethoxy)methane	111-91-1	mg/kg	180	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,4-Dichlorophenol	120-83-2	mg/kg	180	240	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,2,4-Trichlorobenzene	120-82-1	mg/kg	22	800	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Naphthalene	91-20-3	mg/kg	3.6	5	0.0091	U	0.0072	U	0.0087	U	0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.012**		0.01	U
SVOCs	4-Chloroaniline	106-47-8	mg/kg	2.4	320	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Hexachlorobutadiene	87-68-3	mg/kg	6.2	12.82	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	4-Chloro-3-methylphenol	59-50-7	mg/kg	6,100	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Methylnaphthalene	91-57-6	mg/kg	310	5	0.0091	U	0.0072	U	0.0087	U	0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.097**		0.01	U
SVOCs	1-Methylnaphthalene	90-12-0	mg/kg	22	5	0.0091	U	0.01	U	0.0087	U	0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.070**		**0.013**	
SVOCs	Hexachlorocyclopentadiene	77-47-4	mg/kg	370	480	0.046	UJ	0.036	UJ	0.043	UJ	0.062	UJ	0.041	UJ	0.044	UJ	0.051	UJ	0.044	UJ	0.044	UJ	0.048	UJ	0.051	UJ
SVOCs	2,4,6-Trichlorophenol	88-06-2	mg/kg	44	90.91	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,3-Dichloroaniline	608-27-5	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,4,5-Trichlorophenol	95-95-4	mg/kg	6,100	8,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Chloronaphthalene	91-58-7	mg/kg	6,300	6,400	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2-Nitroaniline	88-74-4	mg/kg	610	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,4-Dinitrobenzene	100-25-4	mg/kg	6.1	32	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Dimethylphthalate	131-11-3	mg/kg	NA	80,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,3-Dinitrobenzene	99-65-0	mg/kg	6.1	8	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,6-Dinitrotoluene	606-20-2	mg/kg	61	80	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	1,2-Dinitrobenzene	528-29-0	mg/kg	6.1	32	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Acenaphthylene	208-96-8	mg/kg	NA	NA	0.0091	U	0.0072	U	**0.011**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	3-Nitroaniline	99-09-2	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,4-Dinitrophenol	51-28-5	mg/kg	120	160	0.23	U	0.18	UJ	0.22	UJ	0.31	UJ	0.2	UJ	0.22	UJ	0.26	UJ	0.22	UJ	0.22	UJ	0.24	UJ	0.25	UJ
SVOCs	Acenaphthene	83-32-9	mg/kg	3,400	4,800	0.0091	U	0.0072	U	0.0087	U	0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.016**		0.01	U
SVOCs	4-Nitrophenol	100-02-7	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,4-Dinitrotoluene	121-14-2	mg/kg	1.6	160	0.046	UJ	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Dibenzofuran	132-64-9	mg/kg	78	160	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,3,5,6-Tetrachlorophenol	935-95-5	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	1,800	2,400	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Diethylphthalate	84-66-2	mg/kg	49,000	64,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	4-Chlorophenyl-phenylether	7005-72-3	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	4-Nitroaniline	100-01-6	mg/kg	24	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Fluorene	86-73-7	mg/kg	2,300	3,200	0.0091	U	0.0072	U	0.0087	U	0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.017**		**0.013**	
SVOCs	4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	6.1	NA	0.23	U	0.18	U	0.22	U	0.31	U	0.2	U	0.22	U	0.26	U	0.22	U	0.22	U	0.24	U	0.25	U
SVOCs	N-Nitrosodiphenylamine	86-30-6	mg/kg	99	204.08	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	**0.070**		**0.054**	
SVOCs	1,2-Diphenylhydrazine	122-66-7	mg/kg	0.61	1.25	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	4-Bromophenyl-phenyl ether	101-55-3	mg/kg	NA	NA	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Hexachlorobenzene	118-74-1	mg/kg	0.3	0.625	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Pentachlorophenol	87-86-5	mg/kg	3	8.3	0.23	U	0.18	U	0.22	U	0.31	U	0.2	U	0.22	U	0.26	U	0.22	U	0.22	U	0.24	U	0.25	U
SVOCs	Phenanthrene	85-01-8	mg/kg	NA	NA	0.0091	U	0.0072	U	**0.055**		0.012	U	**0.011**		0.0089	U	0.01	U	0.0089	U	0.0089	U	**0.061**		**0.034**	
SVOCs	Anthracene	120-12-7	mg/kg	17,000	24,000	0.0091	U	0.0072	U	**0.023**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Carbazole	86-74-8	mg/kg	NA	50	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Di-n-butylphthalate	84-74-2	mg/kg	6,100	8,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Fluoranthene	206-44-0	mg/kg	2,300	3,200	0.0091	U	**0.010**		**0.15**		**0.013**		**0.016**		0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Benzidine	92-87-5	mg/kg	0.0005	0.0043	0.46	U	0.36	U	0.43	U	0.62	U	0.41	U	0.44	U	0.51	U	0.44	U	0.44	U	0.48	U	0.51	U
SVOCs	Pyrene	129-00-0	mg/kg	1,700	2,400	0.0091	U	**0.013**		**0.16**		**0.017**		**0.018**		0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Butylbenzylphthalate	85-68-7	mg/kg	260	16,000	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	**1.4**	J	**0.72**	J
SVOCs	bis-2-Ethylhexyladipate	103-23-1	mg/kg	400	833	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	3,3'-Dichlorobenzidine	91-94-1	mg/kg	1.1	2.2	0.46	U	0.36	U	0.43	U	0.62	U	0.41	U	0.44	U	0.51	U	0.44	U	0.44	U	0.48	U	0.51	U
SVOCs	Benzo(a)anthracene	56-55-3	mg/kg	0.15	NA	0.0091	U	**0.0072**		**0.093**		**0.015**		**0.0097**		0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Chrysene	218-01-9	mg/kg	15	NA	0.0091	U	**0.0075**		**0.090**		**0.015**		**0.012**		0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Bis(2-ethylhexyl)phthalate	117-81-7	mg/kg	35	71	0.046	U	**2.5**		0.043	U	0.062	U	**0.14**		**0.11**		0.051	U	0.044	U	**0.047**		**0.32**		**0.15**	
SVOCs	Di-n-octylphthalate	117-84-0	mg/kg	NA	1,600	0.046	U	0.036	U	0.043	U	0.062	U	0.041	U	0.044	U	0.051	U	0.044	U	0.044	U	0.048	U	0.051	U
SVOCs	Benzo(b)fluoranthene	205-99-2	mg/kg	0.15	NA	0.0091	U	0.0072	U	**0.055**		0.012	U	**0.0098**		0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Benzo(k)fluoranthene	207-08-9	mg/kg	1.5	NA	0.0091	U	0.0072	U	**0.071**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Benzo(a)pyrene	50-32-8	mg/kg	0.015	0.1	0.0091	U	0.0072	U	**0.094**		**0.016**		0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.15	NA	0.0091	U	0.0072	U	**0.048**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.015	NA	0.0091	U	0.0072	U	**0.015**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U
SVOCs	Benzo(g,h,i)perylene	191-24-2	mg/kg	NA	NA	0.0091	U	0.0072	U	**0.051**		0.012	U	0.0081	U	0.0089	U	0.01	U	0.0089	U	0.0089	U	0.0097	U	0.01	U

A **BOLD** result indicates a detected compound.

A highlighted result indicates the result exceeds one of the cleanup levels.

Key:

CAS =Chemical Abstracts Service
J = estimated value
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
RSL = Regional Screening Level
SVOC = Semivolatile Organic Compounds
U = not detected at indicated reporting limit
UJ = not detected, reporting limit is estimated

Table 6
Total Metals in Groundwater Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS#	Units	EPA RSL Tap Water	Washington State MTCA Method B Groundwater Cleanup Levels	10030012		10030013		10030014		10030015	
						MW-4		MW-2		MW-1		MW-3	
						Mar-2010		Mar-2010		Mar-2010		Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
TAL Metals	Aluminum	7429-90-5	µg/L	37,000	NA	56	U	56	U	**1300**		56	U
TAL Metals	Antimony	7440-36-0	µg/L	15	6.4	5.6	U	5.6	U	5.6	U	5.6	U
TAL Metals	Arsenic	7440-38-2	µg/L	0.045	5	3.3	U	3.3	U	3.3	U	3.3	U
TAL Metals	Barium	7440-39-3	µg/L	7300	3,200	28	U	28	U	**51**		28	U
TAL Metals	Beryllium	7440-41-7	µg/L	73	32	11	U	11	U	11	U	11	U
TAL Metals	Cadmium	7440-43-9	µg/L	NA	5.0	4.4	U	4.4	U	4.4	U	4.4	U
TAL Metals	Calcium	7440-70-2	µg/L	NA	NA	**17000**		**21000**		**31000**		**16000**	
TAL Metals	Chromium	7440-47-3	µg/L	NA	50	11	U	11	U	11	U	11	U
TAL Metals	Cobalt	7440-48-4	µg/L	11	NA	11	U	11	U	11	U	11	U
TAL Metals	Copper	7440-50-8	µg/L	1,500	592	11	U	11	U	11	U	11	U
TAL Metals	Iron	7439-89-6	µg/L	26,000	NA	**88**		**160**		**2900**		**59**	
TAL Metals	Lead	7439-92-1	µg/L	15	15	1.1	U	1.1	U	1.1	U	1.1	U
TAL Metals	Magnesium	7439-95-4	µg/L	NA	NA	**6600**		**8300**		**12000**		**6100**	
TAL Metals	Manganese	7439-96-5	µg/L	NA	2,240	**45**		**34**		**91**		11	U
TAL Metals	Mercury	7439-97-6	µg/L	0.57	2	0.5	U	0.5	U	0.5	U	0.5	U
TAL Metals	Nickel	7440-02-0	µg/L	730	320	22	U	22	U	22	U	22	U
TAL Metals	Potassium	7440-09-7	µg/L	NA	NA	**3800**		**4100**		**6200**		**3300**	
TAL Metals	Selenium	7782-49-2	µg/L	180	80	5.6	U	5.6	U	5.6	U	5.6	U
TAL Metals	Silver	7440-22-4	µg/L	180	80	11	U	11	U	11	U	11	U
TAL Metals	Sodium	7440-23-5	µg/L	NA	NA	**12000**		**9300**		**28000**		**5900**	
TAL Metals	Thallium	7440-28-0	µg/L	NA	1.12	5.6	U	5.6	U	5.6	U	5.6	U
TAL Metals	Vanadium	7440-62-2	µg/L	2.6	112	11	U	11	U	**14**		11	U
TAL Metals	Zinc	7440-66-6	µg/L	11,000	4,800	56	U	56	U	56	U	56	U

Notes:
- A **BOLD** result indicates a detected compound.
- A highlighted result indicates the result exceeds one of the cleanup levels.
- MCL for chromium used as EPA RSL total chromium.
- MCL for lead used as EPA RSL and MTCA CUL for lead.
- MCL for thallium used as EPA RSL for thallium.
- EPA RSL for inorganic mercury salts used for mercury.
- MTCA CUL for chromium-III used for total chromium.

Key:
- CAS =Chemical Abstracts Service
- J = estimated value
- µg/L = micrograms per liter
- MTCA = Model Toxics Control Act
- RSL = Regional Screening Level
- TAL = Target Analyte List
- U = not detected at indicated reporting limit
- UJ = not detected, reporting limit is estimated

Table 7
PCBs in Groundwater Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS #	Units	EPA RSL Tap Water	Washington State MTCA Method B Groundwater Clean Up Levels	10030012		10030013		10030014		10030015	
						MW-4		MW-2		MW-1		MW-3	
						Mar-2010		Mar-2010		Mar-2010		Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
PCBs	Aroclor 1016	12674-11-2	µg/L	0.96	1.12	0.047	U	0.047	U	0.048	U	0.047	U
PCBs	Aroclor 1221	11104-28-2	µg/L	0.0068	0.1	0.047	U	0.047	U	0.048	U	0.047	U
PCBs	Aroclor 1232	11141-16-5	µg/L	0.0068	0.1	0.047	U	0.047	U	0.048	U	0.047	U
PCBs	Aroclor 1242	53469-21-9	µg/L	0.034	0.1	0.047	U	**0.088**		0.048	U	0.047	U
PCBs	Aroclor 1248	12672-29-6	µg/L	0.034	0.1	0.047	U	0.047	U	0.048	U	0.047	U
PCBs	Aroclor 1254	11097-69-1	µg/L	0.034	0.32	0.047	U	0.047	U	0.048	U	0.047	U
PCBs	Aroclor 1260	11096-82-5	µg/L	0.034	0.1	0.047	U	0.047	U	0.048	U	0.047	U

Notes: A **BOLD** result indicates a detected compound.
A highlighted result indicates the result exceeds one of the cleanup levels.
MTCA Method A Clean Up Level for PCBs (CAS 1336-36-3) used for Aroclors 1221, 1232, 1242, 1248, 1260.

Key:

CAS	=Chemical Abstracts Service
J	= estimated value
µg/L	= micrograms per liter
MTCA	= Model Toxics Control Act
PCBs	= polychlorinated biphenyls
RSL	= Regional Screening Level
U	= not detected at indicated reporting limit
UJ	= not detected, reporting limit is estimated

Table 8
SVOCs in Groundwater Results, March 2010
Technical Memorandum
Stubblefield Salvage Yard Site, Walla Walla, WA

Analysis	Compound Name	CAS#	Units	EPA RSL Tap Water	Washington State MTCA Method B Groundwater Clean Up Levels	10030012		10030013		10030014		10030015	
						MW-4		MW-2		MW-1		MW-3	
						Mar-2010		Mar-2010		Mar-2010		Mar-2010	
						Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SVOCs	(3+4)-Methylphenol (m,p-Cresol)	NA	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,2,4-Trichlorobenzene	120-82-1	µg/L	2.3	80	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,2-Dichlorobenzene	95-50-1	µg/L	370	720	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,2-Dinitrobenzene	528-29-0	µg/L	3.7	6.4	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,2-Diphenylhydrazine	122-66-7	µg/L	0.084	0.11	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,3-Dichlorobenzene	541-73-1	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,3-Dinitrobenzene	99-65-0	µg/L	3.7	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,4-Dichlorobenzene	106-46-7	µg/L	0.43	1.8	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1,4-Dinitrobenzene	100-25-4	µg/L	3.7	6.4	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	1-Methylnaphthalene	90-12-0	µg/L	2.3	160	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	2,3,4,6-Tetrachlorophenol	58-90-2	µg/L	1,100	480	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,3,5,6-Tetrachlorophenol	935-95-5	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,3-Dichloroaniline	608-27-5	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,4,5-Trichlorophenol	95-95-4	µg/L	3,700	800	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,4,6-Trichlorophenol	88-06-2	µg/L	6.1	4.0	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,4-Dichlorophenol	120-83-2	µg/L	110	24	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,4-Dimethylphenol	105-67-9	µg/L	730	160	0.94	UJ	0.94	UJ	0.95	UJ	0.94	UJ
SVOCs	2,4-Dinitrophenol	51-28-5	µg/L	73	32	9.4	U	9.4	U	9.5	U	9.4	U
SVOCs	2,4-Dinitrotoluene	121-14-2	µg/L	0.22	32	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2,6-Dinitrotoluene	606-20-2	µg/L	37	16	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2-Chloronaphthalene	91-58-7	µg/L	2,900	640	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2-Chlorophenol	95-57-8	µg/L	180	40	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2-Methylnaphthalene	91-57-6	µg/L	150	32	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	2-Methylphenol (o-Cresol)	95-48-7	µg/L	1,800	400	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2-Nitroaniline	88-74-4	µg/L	370	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	2-Nitrophenol	88-75-5	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	3,3'-Dichlorobenzidine	91-94-1	µg/L	0.15	0.19	9.4	U	9.4	U	9.5	U	9.4	U
SVOCs	3-Nitroaniline	99-09-2	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	3.7	NA	4.7	U	4.7	U	4.8	U	4.7	U
SVOCs	4-Bromophenyl-phenylether	101-55-3	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	4-Chloro-3-methylphenol	59-50-7	µg/L	3,700	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	4-Chloroaniline	106-47-8	µg/L	0.34	32	9.4	U	9.4	U	9.5	U	9.4	U
SVOCs	4-Chlorophenyl-phenylether	7005-72-3	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	4-Nitroaniline	100-01-6	µg/L	3.4	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	4-Nitrophenol	100-02-7	µg/L	NA	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Acenaphthene	83-32-9	µg/L	2,200	960	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Acenaphthylene	208-96-8	µg/L	NA	NA	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Aniline	62-53-3	µg/L	12	7.7	4.7	U	4.7	U	4.8	U	4.7	U
SVOCs	Anthracene	120-12-7	µg/L	11,000	4,800	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Benzidine	92-87-5	µg/L	0.000094	0.00038	9.4	U	9.4	U	9.5	U	9.4	U
SVOCs	Benzo[a]anthracene	56-55-3	µg/L	0.029	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Benzo[a]pyrene	50-32-8	µg/L	0.0029	0.100	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Benzo[b]fluoranthene	205-99-2	µg/L	0.029	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Benzo[g,h,i]perylene	191-24-2	µg/L	1,100	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Benzo[k]fluoranthene	207-08-9	µg/L	0.29	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Benzyl alcohol	100-51-6	µg/L	3,700	2,400	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	bis(2-Chloroethoxy)methane	111-91-1	µg/L	110	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	bis(2-Chloroethyl)ether	111-44-4	µg/L	0.012	0.040	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	bis(2-Chloroisopropyl)ether	108-60-1	µg/L	0.32	0.625	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	bis(2-Ethylhexyl)phthalate	117-81-7	µg/L	4.8	6.3	0.94	U	0.94	U	**6.5**		0.94	U
SVOCs	bis-2-Ethylhexyladipate	103-23-1	µg/L	56	73	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Butylbenzylphthalate	85-68-7	µg/L	35	3,200	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Carbazole	86-74-8	µg/L	NA	4.4	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Chrysene	218-01-9	µg/L	2.9	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Dibenz[a,h]anthracene	132-64-9	µg/L	37	32	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Dibenzofuran	132-64-9	µg/L	37	32	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Diethylphthalate	84-66-2	µg/L	29,000	12,800	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Dimethylphthalate	131-11-3	µg/L	NA	16,000	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Di-n-butylphthalate	84-74-2	µg/L	3,700	1,600	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Di-n-octylphthalate	117-84-0	µg/L	NA	320	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Fluoranthene	206-44-0	µg/L	1,500	640	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Fluorene	86-73-7	µg/L	1,500	640	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Hexachlorobenzene	118-74-1	µg/L	0.042	0.055	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Hexachlorobutadiene	87-68-3	µg/L	0.86	0.56	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Hexachlorocyclopentadiene	77-47-4	µg/L	220	48	0.94	UJ	0.94	UJ	0.95	UJ	0.94	UJ
SVOCs	Hexachloroethane	67-72-1	µg/L	4.8	3.1	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Indeno[1,2,3-cd]pyrene	193-39-5	µg/L	0.029	NA	0.0094	U	0.0094	U	0.0095	U	0.0094	U
SVOCs	Isophorone	78-59-1	µg/L	71	46	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Naphthalene	91-20-3	µg/L	0.14	160	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Nitrobenzene	98-95-3	µg/L	0.12	4.0	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	N-Nitrosodimethylamine	62-75-9	µg/L	0.00042	0.0009	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	N-Nitroso-di-n-propylamine	621-64-7	µg/L	0.0096	NA	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	N-Nitrosodiphenylamine	86-30-6	µg/L	14	NA	9.4	U	9.4	U	9.5	U	9.4	U
SVOCs	Pentachlorophenol	87-86-5	µg/L	0.56	0.73	4.7	U	4.7	U	4.8	U	4.7	U
SVOCs	Phenanthrene	85-01-8	µg/L	NA	NA	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Phenol	108-95-2	µg/L	11,000	4,800	0.94	U	0.94	U	0.95	U	0.94	U
SVOCs	Pyrene	129-00-0	µg/L	1,100	480	0.094	U	0.094	U	0.095	U	0.094	U
SVOCs	Pyridine	110-86-1	µg/L	37	8.0	9.4	U	9.4	U	9.5	U	9.4	U

Notes: A **BOLD** result indicates a detected compound.
A highlighted result indicates the result exceeds one of the cleanup levels.
EPA RSL for m-Cresol (CAS 108-39-4) used for (3+4)-Methylphenol (m,p-Cresol).
EPA RSL for anthracene (CAS 120-12-7) used for phenanthrene.
EPA RSL for pyrene (CAS 129-00-0) used for benzo(g,h,i)pyrylene, acenaphthylene.

Key:
CAS =Chemical Abstracts Service
J = estimated value
µg/L = micrograms per liter
MTCA = Model Toxics Control Act
RSL = Regional Screening Level
SVOCs = semivolatile organic compounds
U = not detected at indicated reporting limit
UJ = not detected, reporting limit is estimated

R:\3 START 3\Stubblefield\march 2010\figure 1 site map.mxd 1/14/2009

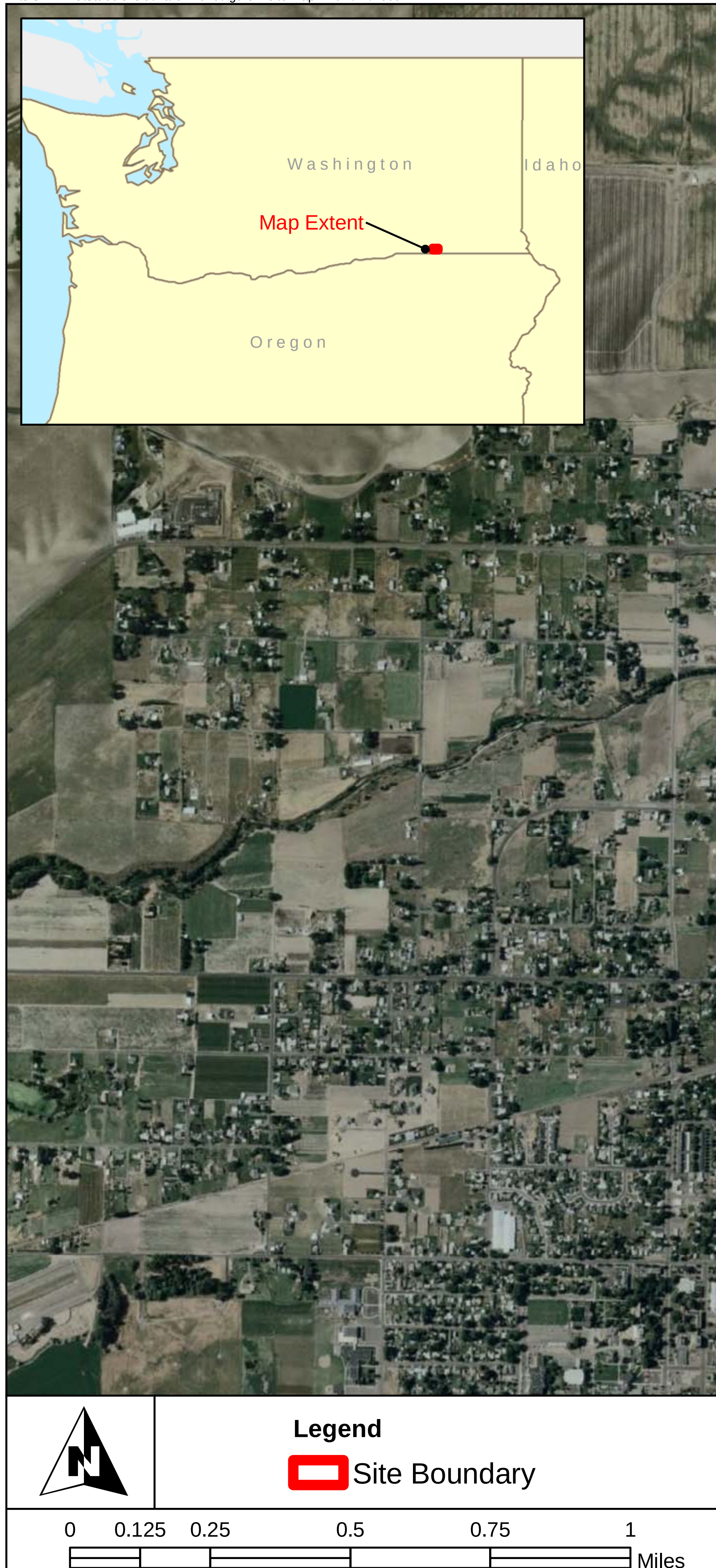

Figure 1: Site Location

Stubblefield Salvage Yard Site

Walla Walla, Washington

Time Critical Removal Assessment

ecology and environment, inc.

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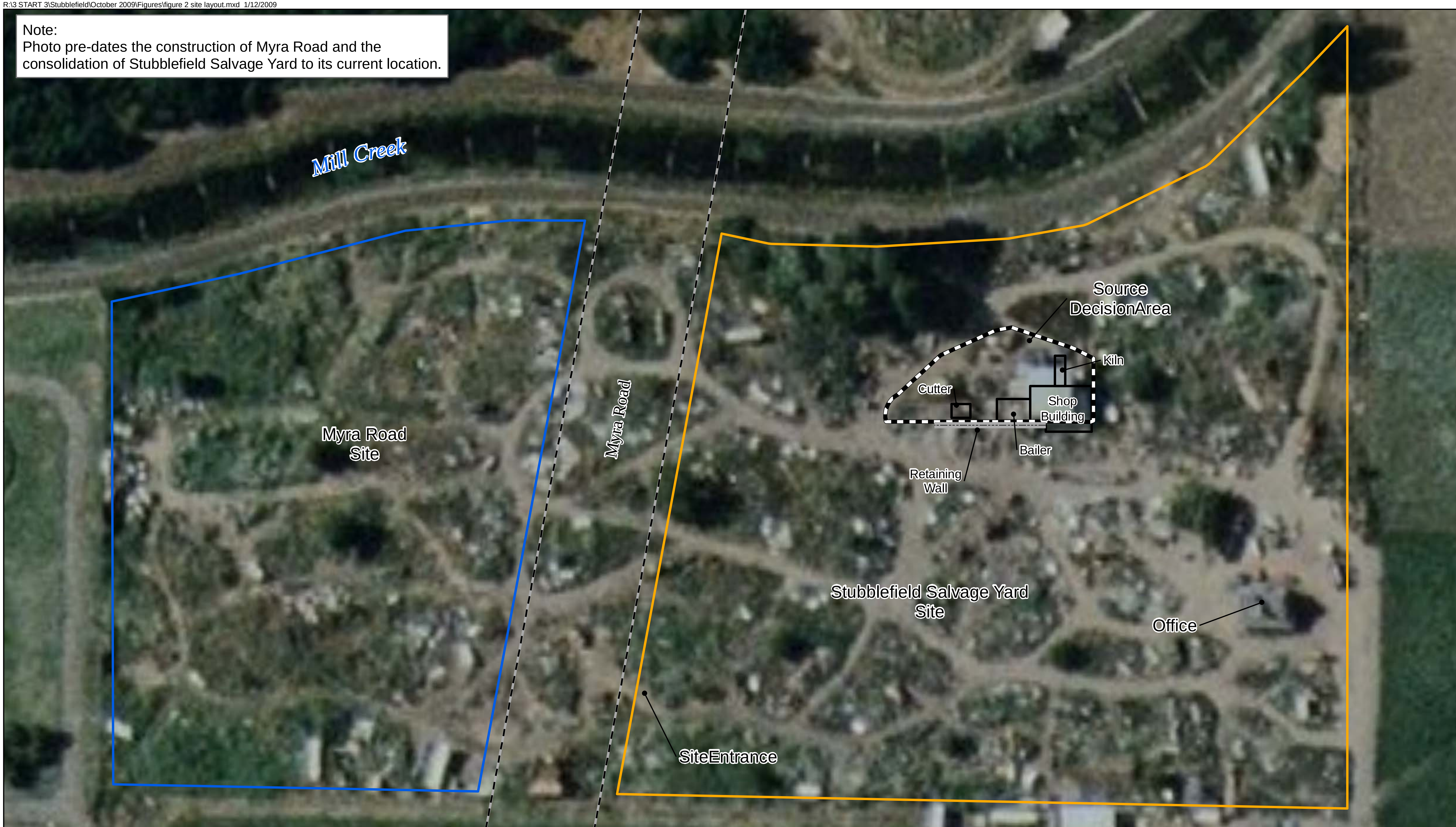
Seattle, Washington

R:\3 START 3\Stubblefield\October 2009\Figures\figure 2 site layout.mxd 1/12/2009



Legend

Site Boundary

Myra Road Site

Stubblefield Salvage Yard Site

Myra Road ROW

250 125 0 Feet

Figure 2: Site Layout

Stubblefield Salvage Yard Site

Walla Walla, Washington

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R:\3 START 3\Stubblefield\march 2010\figure 3 source area sample locs.mxd 6/2/2010

250 125 0 Feet

Figure 3: Source Area Sample Locations

Stubblefield Salvage Yard Site

Walla Walla, Washington

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Seattle, Washington

R:\3 START 3\Stubblefield\march 2010\figure 4 sufrace resutls.mxd 1/14/2010

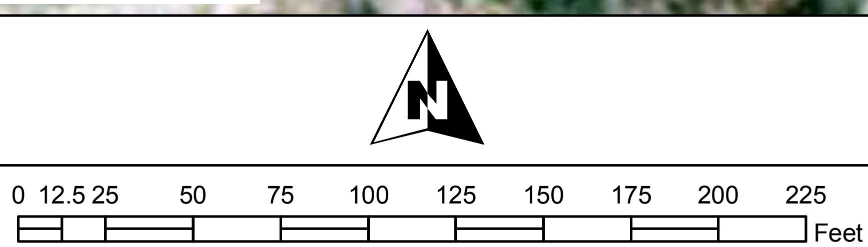

Figure 4: Surface Sample Data
September 2009 - March 2010
Stubblefield Salvage Yard Site
Walla Walla, Washington
Time Critical Removal Assessment

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

R:\3 START 3\Stubblefield\March 2010\Figures\figure 5 3-6 ft sub-surface results.mxd 5/28/2010

N

25 12.5 0 25 50 75 100 125 150 175 200 Feet

Figure 5: 3 - 6 Feet Sub-Surface Sample Data
September 2009 - March 2010

Stubblefield Salvage Yard Site

Walla Walla, Washington
Time Critical Removal Assessment

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

N

25 12.5 0 25 50 75 100 125 150 175 200 Feet

Figure 6: 7 - 14 Feet Sub-Surface Sample Data
September 2009 - March 2010
Stubblefield Salvage Yard Site
Walla Walla, Washington
Time Critical Removal Assessment

ecology and environment, inc.
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Seattle, Washington

R:\3 START 3\Stubblefield\march 2010\figure 7 groundwater results.mxd 5/10/2010

N

0 20 40 80 120 160 200
Feet
Scale: 1:600

Figure 7: Groundwater Results
March 2010
Stubblefield Salvage Yard Site
Walla Walla, Washington
Time Critical Removal Assessment

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

N

0 50 100 200 300 400 500
Feet

Figure 8: Groundwater Elevation and Contours
March 2010
Stubblefield Salvage Yard Site
Walla Walla, Washington
Time Critical Removal Assessment

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

Attachment A: Photographs

Photo 1 Drilling MW-4 with Cascade Drilling Company.

Direction: East Date: 3/16/10 Time: 09:40

Photo 2 PID meter and first sample core from MW-4.

Direction: East/Down Date: 3/16/10 Time: 09:40

Photo 3 Drilling MW-3 with Cascade Drilling Company.

Direction: Southwest Date: 3/16/10 Time: 13:49

Photo 4 Set-up for MW-1 installation.

Direction: Southwest Date: 3/17/10 Time: 08:14

Photo 5 Drill core at 10 feet, water table barrier.

Direction: Down Date: 3/17/10 Time: 08:45

Photo 6 Soil boring #1.

Direction: Northeast Date: 3/17/10 Time: 11:49

Photo 7 Setting up for SB-02.

Direction: Southeast Date: 3/17/10 Time: 13:45

Photo 8 Drilling SB-02 at 45° angle.

Direction: East Date: 3/17/10 Time: 14:09

Photo 9 XRF gun and SB samples.

Direction: East *Date: 3/17/10* *Time: 15:32*

Photo 10 Sampling MW-4, duplicate and MS/MSD.

Direction: North *Date: 3/17/10* *Time: 09:48*

Photo 11 Low flow water sampling set up MW-2.

Direction: Down *Date: 3/17/10* *Time: 11:50*

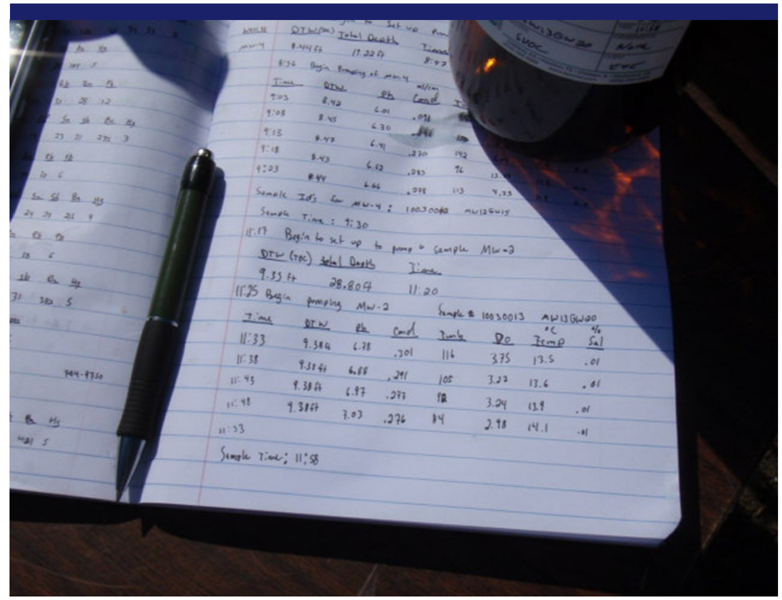

Photo 12 Field notebook with parameters.

Direction: Down *Date: 3/17/10* *Time: 11:50*

Photo 13 Total metals taken at MW-1.

Direction: *Down* *Date: 3/19/10* *Time: 08:24*

Photo 14 Set-up for MW-2 sampling.

Direction: *South* *Date: 3/19/10* *Time: 09:02*

Photo 15 Set-up for MW-3 sampling.

Direction: *North* *Date: 3/19/10* *Time: 09:47*