



American Crossarm and Conduit Monitoring Results November 2000 and April 2001

Abstract

This document is one in a series describing the results of groundwater and surface water monitoring at the American Crossarm and Conduit site. Groundwater and surface water downgradient of the facility are being monitored to determine if the selected remedy of off-site disposal and containment of contaminated soil and sediment from the facility property has been an effective form of remediation. Ecology has conducted twice yearly monitoring at this site since 1997.

Results of samples collected in November 2000 and April 2001 from two downgradient wells (MW-25 and MW-26) and two on-site surface water stations (ACCSW1 and ACCSW2) are discussed. All samples collected were analyzed for polynuclear aromatic hydrocarbons (PAHs) and chlorinated phenolics.

In both sampling periods, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene were the primary PAHs detected in the downgradient monitoring wells. Mean concentrations were 0.028 ug/L for naphthalene, 0.027 ug/L for 2-methylnaphthalene, and 0.017 ug/L for 1-methylnaphthalene. None of the PAH constituents exceeded applicable standards. Chlorinated phenolics were not detected in either of the wells during these two rounds of sampling.

Most of the PAHs analyzed for were detected at both surface water stations. Pentachlorophenol was tentatively identified at station ACCSW1 in September 1999 but has not been detected since. All detected analytes in the surface water samples were far below established water quality criteria for freshwater (EPA, 1992).

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Background

American Crossarm and Conduit (ACC) of Chehalis, Washington (Figure 1) conducted woodcutting, milling, and treatment of electrical utility poles from the early 1930s to 1985. In 1988 ACC was added to EPA's National Priorities List due to noncompliance of waste handling requirements, which resulted in the contamination of both on- and off-site soil, groundwater, and surface water. Pentachlorophenol (PCP), polynuclear aromatic hydrocarbons (PAHs), and dioxins/furans were the primary contaminants identified. Remedial action at the ACC site, conducted by the U. S. Environmental Protection Agency (EPA), consisted of the reduction of floating product on groundwater beneath the facility, off-site disposal of facility structures and the most contaminated soil, and containment of the remaining contaminated soil on the facility property.

After EPA's cleanup activities were completed in the mid-1990s, the operation and maintenance responsibilities for the site were transferred to the Washington State Department of Ecology (Ecology). In 1997 Ecology initiated semi-annual sampling of downgradient monitoring wells and surface water to assess the effectiveness of the remedial action. As of April 2001, five years of monitoring have been completed. The effectiveness of the remedial action will be reviewed by the project manager and staff and a decision will be made by the fall of 2001 if long-term monitoring should be continued or concluded.

Methods

Groundwater Sampling

On November 17, 2000 and again on April 27, 2001, groundwater and surface water samples were collected from two downgradient wells, MW-25 and MW-26, and two on-site surface water stations, ACCSW1 and ACCSW2 (Figure 2). Various site conditions (ground subsidence, and site filling and grading) have rendered monitoring wells MW-22, MW-23, and MW-24 unusable. MW-23 was decommissioned in the fall of 1998. MW-22 and MW-24 were decommissioned in the fall of 2000.

Sampling methods were consistent with those previously used on this project. Static water levels were recorded prior to well purging. All wells were purged and sampled using a stainless steel submersible pump with a pump rate of about 0.5-gpm. Samples were collected when pH, specific conductance, and temperature readings stabilized (changes of 10% or less between measurements).

Surface Water Sampling

Two surface water samples were collected to determine if adjacent wetlands are receiving contaminants from the ACC site. Samples were collected from two areas considered representative of the site. Surface water samples were collected using decontaminated stainless

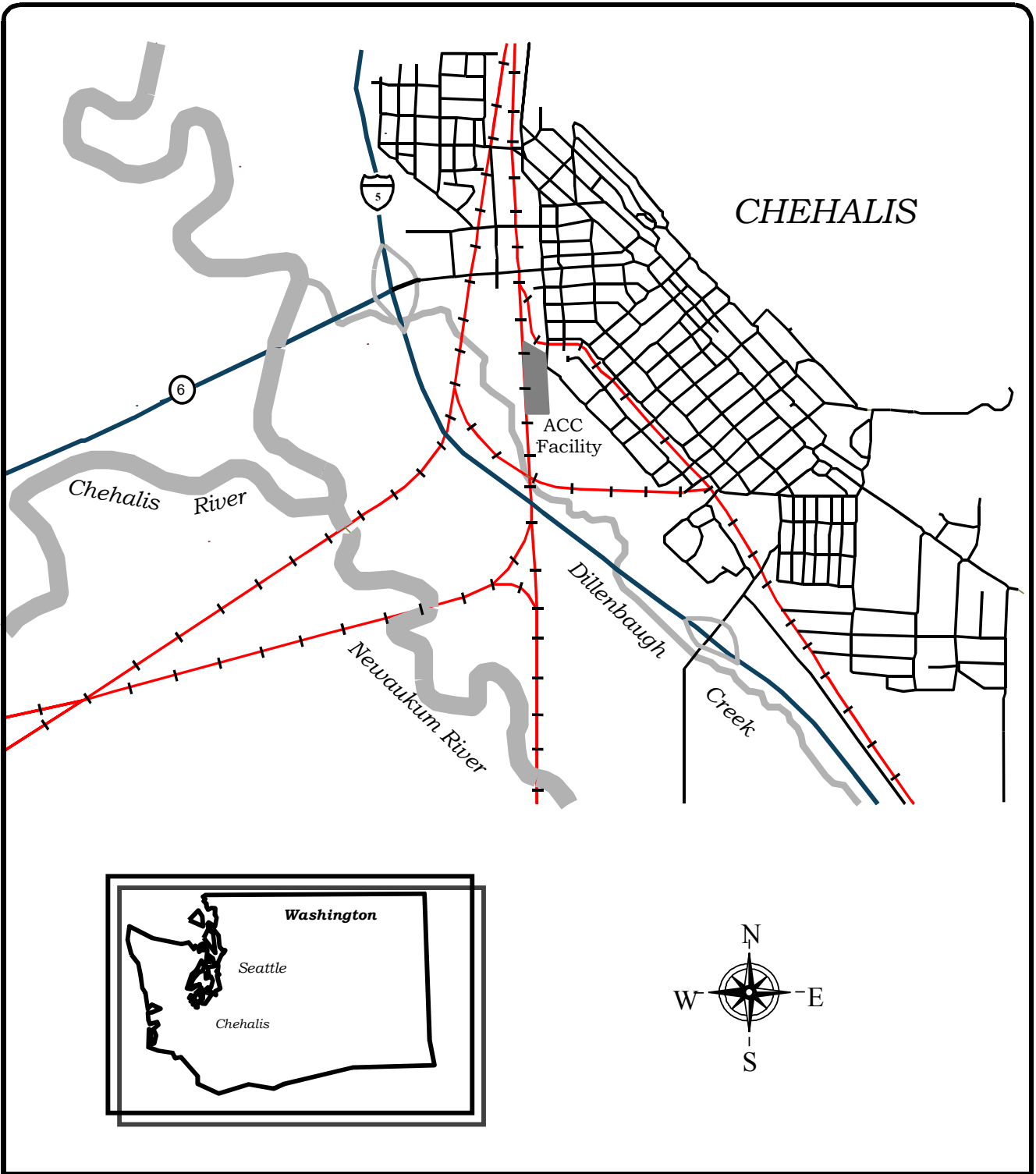


Figure 1: American Crossarm & Conduit Site Location

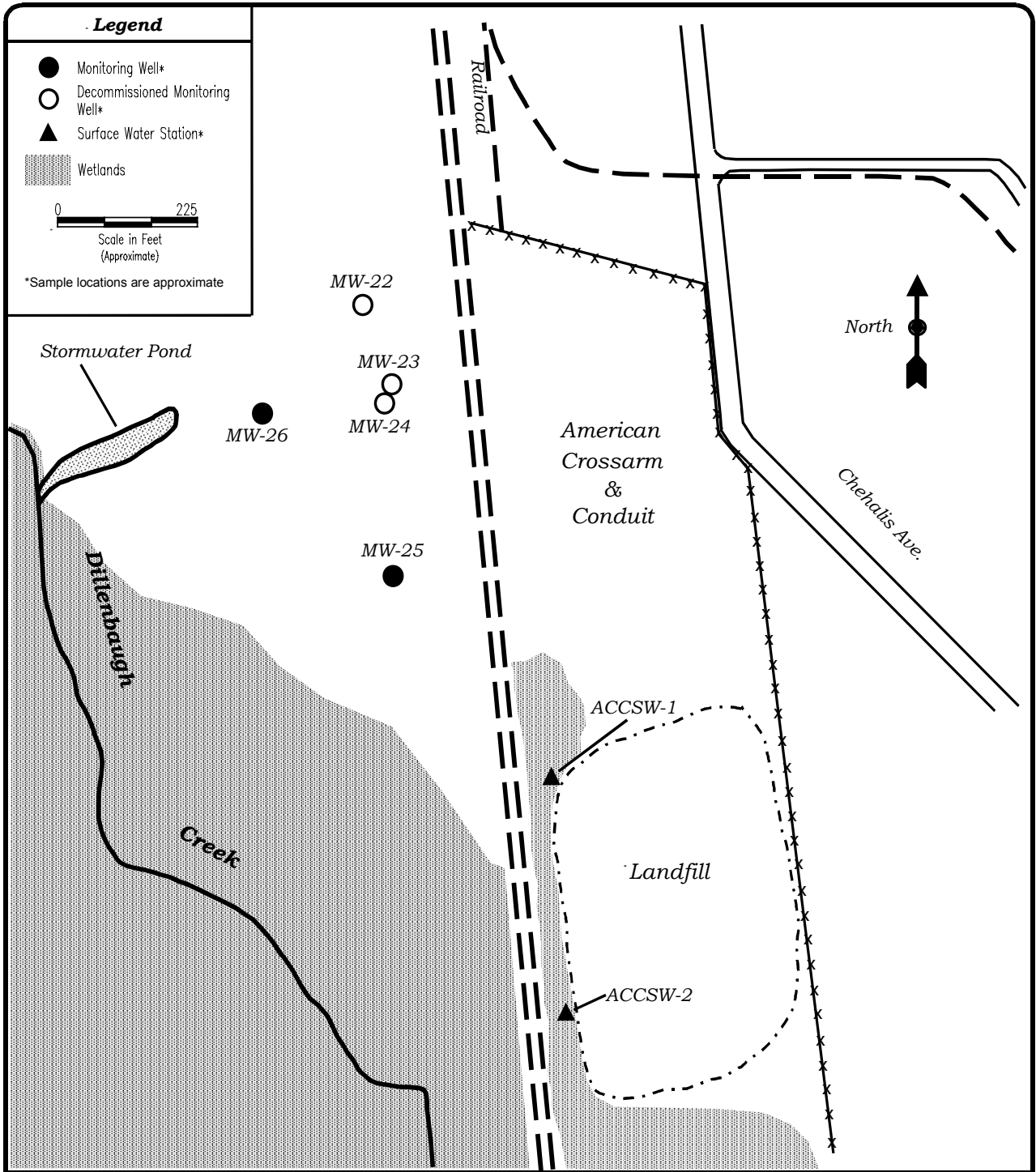


Figure 2: American Crossarm & Conduit Sample Locations

steel beakers, and transferred to one-gallon sample jars. The surface water was assumed to be fully mixed, and the sample was collected at mid-depth and as close to the center of flowing water as could be reached from the bank. Temperature, pH, and specific conductance were measured in the field.

Sampling procedures are discussed in greater detail in Appendix A.

Analysis

Target analytes, analytical method, and detection limits are listed in Table 1.

Table 1: Analytical Methods for November 2000 and April 2001 Samples

Analytes	Method	Reference	Target Detection Limit	Achieved Detection Limit
Field				
Water Level	Solinst Well Probe	NA	0.01 feet	0.01 feet
pH	Orion 25A Field Meter	NA	0.1 Std. Units	0.1 Std. Units
Temperature	Orion 25A Field Meter	NA	0.1°C	0.1°C
Specific Conductance	Beckman Conductivity Bridge	NA	10 umhos/cm	10 umhos/cm
Laboratory				
PAHs	SW-846 Method 8270 (SIM)	EPA 1984	0.1 ug/L	0.007-0.01 ug/L
Chlorinated Phenolics	SW-846 Method 8085 (Draft)	EPA 1999	0.01-1.0 ug/L	0.046-0.11 ug/L

The detection limits achieved for PAHs and chlorinated phenolics are generally lower than the stated method detection limit which is required for this project to meet cleanup standards.

In general, the quality of the data is acceptable. Quality control samples collected in the field consisted of blind field duplicate samples which were obtained from well MW-25. The numeric comparison of duplicate results is expressed as relative percent difference (RPD). The RPDs for PAH results were within 13% for November and within 10% for April. In addition to field quality control samples, laboratory blanks, duplicate matrix spikes, and surrogate compound recoveries were performed in the laboratory. Due to the low detection levels achieved with the SIM mode analysis for PAHs, low levels of some target compounds were detected in the laboratory blanks. Compounds that were found in the sample and in the blank were considered native to the sample if the area counts in the sample are greater than or equal to five times the area counts in the associated method blanks. Results for these samples are considered real and do not require qualification. Surrogate compound recoveries, as well as matrix spike results, were within acceptable limits. Further discussion of quality assurance is presented in Appendix B. Laboratory reporting sheets are available upon request.

Results

Field Observations

Depth-to-water measurements and purge volume, as well as pH, specific conductance, and temperature readings, at the time of sampling are listed in Table 2. All field parameters were within expected ranges.

Table 2: Summary of Field Parameters Results for November 17, 2000 and April 27, 2001

Monitoring Well	Total Depth (feet) ¹	Depth to Water (feet) ²	pH (standard units)	Specific Conductance (umhos/cm)	Temperature (°C)	Purge Volume (gallons)
November						
MW-25	39.43	4.30	6.9	425	16.8	15
MW-26	45.85	6.78	7.1	435	15.3	13
ACCSW1	--	--	--	279	8.2	--
ACCSW2	--	--	--	296	6.3	--
April						
MW-25	39.43	4.14	7.0	405	16.4	13
MW-26	45.85	6.91	6.9	425	15.0	16
ACCSW1	--	--	6.6	348	17.1	--
ACCSW2	--	--	6.9	308	15.1	--

¹ As measured from top of the PVC casing.

² Measured from top of casing.

Since monitoring began in 1997, the condition of the monitoring well network (MW-22 to MW-25) has declined. These four wells were installed in 1991. The well logs describe the upper five to 12 feet of surface material as loose fill composed of wood chips and bark, with variable gravel content, which is very soft with limited bearing capacity. It appears that this layer is compressing and/or decomposing, causing the wells' protective outer casings and concrete pads to sink below the top of the well casings. The uneven subsidence of the protective casing and concrete pad for well MW-22 caused the well casing to bend. Since the well casing may have been cracked, this well was eliminated from the monitoring network in June 1999 since the reliability of the data collected was unknown. Well MW-24 was also eliminated from the monitoring program in June 2000 for similar reasons. Both wells were decommissioned in the fall of 2000. In addition, the property where the wells are located has been filled and graded. In 1998 well MW-23 was damaged while the property was cleared, and the well subsequently has been decommissioned.

Analytical Results

Analytical results of PAH and chlorinated phenolics analysis for November 2000 are summarized in Table 3.

Table 3: Summary of Analytical Results (ug/L) for November 17, 2000

Sample Station	Groundwater				Surface Water			
	MW-25		MW-26		ACCSW1		ACCSW2	
<u>Polynuclear Aromatic Hydrocarbons</u>								
Naphthalene	0.014		0.018		0.028		0.012	J
Acenaphthylene	0.01	U	0.01	U	0.02	U	0.01	U
Acenaphthene	0.01	U	0.01	U	0.074		0.03	
Fluorene	0.01	U	0.01	U	0.028		0.025	
Phenanthrene	0.01	U	0.01	U	0.028		0.028	
Anthracene	0.01	U	0.01	U	0.04		0.025	
Sum LPAH	0.014		0.018		0.198		0.12	J
Fluoranthene	0.01	U	0.01	U	0.10		0.056	
Pyrene	0.01	U	0.01	U	0.071		0.034	
Benzo(a)anthracene	0.01	U	0.01	U	0.013		0.007	
Chrysene	0.01	U	0.01	U	0.03		0.013	
Benzo(b)fluoranthene	0.01	U	0.01	U	0.018		0.01	U
Benzo(k)fluoranthene	0.01	U	0.01	U	0.011		0.009	J
Benzo(a)pyrene	0.01	U	0.01	U	0.009		0.01	U
Ideno(1,2,3-cd)pyrene	0.01	U	0.01	U	0.01		0.01	U
Dibenzo(a,h)anthracene	0.01	U	0.01	U	0.01	U	0.01	U
Benzo(ghi)perylene	0.01	U	0.01	U	0.005	J	0.01	U
Sum HPAH	0.01	U	0.01	U	0.267	J	0.119	J
2-Methylnaphthalene	0.009		0.011		0.02		0.008	J
1-Methylnaphthalene	0.01	U	0.01	U	0.016		0.008	J
Dibenzofuran	0.01	U	0.01	U	0.01	U	0.01	U
Retene	0.01	U	0.01	U	0.05		0.01	U
<u>Chlorinated Phenolics</u>								
2,4,6-Trichlorophenol	0.056	U	0.056	U	0.058	U	0.057	U
2,4,5-Trichlorophenol	0.056	U	0.056	U	0.058	U	0.057	U
2,3,4,6-Tetrachlorophenol	0.051	U	0.051	U	0.053	U	0.053	U
2,3,4,5-Tetrachlorophenol	0.051	U	0.051	U	0.053	U	0.053	U
Pentachlorophenol	0.047	U	0.046	U	0.048	U	0.048	U

U : The analyte was not detected at or above the reported value.

J : The analyte was positively identified. The associated numerical result is an estimate.

Bold: Detected value.

In November, naphthalene and 2-methylnaphthalene were the only PAHs detected in the wells monitored. Concentrations for naphthalene ranged from 0.014 to 0.018, while 2-methylnaphthalene ranged from 0.009 to 0.011 ug/L. Chlorinated phenolics were not detected in either of the wells during this round of sampling.

Most of the target PAHs were detected at both surface water stations.

Results of organics analysis of samples collected in April 2001 are summarized in Table 4.

Table 4: Summary of Analytical Results (ug/L) for April 27, 2001

Sample Station	Groundwater				Surface Water			
	MW-25		MW-26		ACCSW1		ACCSW2	
<u>Polynuclear Aromatic Hydrocarbons</u>								
Naphthalene	0.044		0.038		0.15		0.11	
Acenaphthylene	0.007	U	0.007	U	0.007	U	0.006	U
Acenaphthene	0.007	U	0.007	U	0.65		0.079	
Fluorene	0.007	U	0.007	U	0.30		0.059	
Phenanthrene	0.007	U	0.007	U	0.15		0.035	
Anthracene	0.007	U	0.007	U	0.14		0.057	
Sum LPAH	0.044		0.038		1.39		0.34	
Fluoranthene	0.007	U	0.007	U	0.44		0.04	
Pyrene	0.007	U	0.007	U	0.34		0.006	J
Benzo(a)anthracene	0.007	U	0.007	U	0.06		0.006	U
Chrysene	0.007	U	0.007	U	0.08		0.006	U
Benzo(b)fluoranthene	0.007	U	0.007	U	0.04		0.006	U
Benzo(k)fluoranthene	0.007	U	0.007	U	0.19	J	0.006	U
Benzo(a)pyrene	0.007	U	0.007	U	0.16		0.006	U
Ideno(1,2,3-cd)pyrene	0.007	U	0.007	U	0.18		0.006	U
Dibenzo(a,h)anthracene	0.007	U	0.007	U	0.066	U	0.006	U
Benzo(ghi)perylene	0.007	U	0.007	U	0.009	J	0.006	U
Sum HPAH	0.007	U	0.007	U	1.499	J	0.046	J
2-Methylnaphthalene	0.036		0.051		0.20		0.028	
1-Methylnaphthalene	0.014		0.02		0.18		0.024	
Dibenzofuran	0.007	U	0.007	U	0.14		0.032	
Retene	0.007	U	0.012	J	0.09		0.006	U
<u>Chlorinated Phenolics</u>								
2,4,6-Trichlorophenol	0.10	U	0.10	U	0.098	U	0.11	U
2,4,5-Trichlorophenol	0.10	U	0.10	U	0.098	U	0.11	U
2,3,4,6-Tetrachlorophenol	0.092	U	0.092	U	0.090	U	0.097	U
2,3,4,5-Tetrachlorophenol	0.092	U	0.092	U	0.090	U	0.097	U
Pentachlorophenol	0.084	U	0.084	U	0.082	U	0.088	U

U : The analyte was not detected at or above the reported value.

J : The analyte was positively identified. The associated numerical result is an estimate.

Bold: Detected value.

In June, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene were detected in monitoring wells MW-25 and MW-26. Concentrations of these PAHs ranged from 0.038 to 0.044 ug/L for naphthalene, 0.036 to 0.051 ug/L for 2-methylnaphthalene, and 0.014 to 0.02 ug/L for 1-methylnaphthalene. Retene was detected in MW-26 at an estimated concentration of 0.012 ug/L. Chlorinated phenolics were not detected in either monitoring well during this round of sampling.

As in the November sampling, most of the PAHs analyzed for were detected at both surface water stations. Concentrations of LPAH and HPAH were higher in the November sampling than in the April results. Chlorinated phenolics were not detected at either surface water station during this round of sampling.

Discussion

Groundwater and surface water downgradient of the facility are being monitored to determine if the selected remedy of off-site disposal and containment of the contaminated soil and sediment from the facility property has been an effective form of remediation. At the completion of remediation, long distance transport of PAHs in groundwater was considered very unlikely due to the location of the remaining contaminant plumes, the physical properties of PAHs, and the tight hydrogeologic setting. It was anticipated that remaining PAHs on the ACC property would either become bound to soil particles, microbiologically degrade, or be resolubilized into the water column.

Because large volumes of low level contaminated soils that exceeded cleanup standards at all depths were present on site, Model Toxic Control Act (MTCA) Method B cleanup standards were established for areas of contamination within the facility boundary. MTCA Method B cleanup standards for groundwater within the facility boundary are 0.012 ug/L for carcinogenic PAHs (CPAHs) and 0.729 ug/L for pentachlorophenol (PCP). The facility boundary is the point of compliance for groundwater for MTCA Method A cleanup standards and Safe Drinking Water Act (SDWA) MCLs. Groundwater beneath the site is not expected to be used as a source of drinking water due to the low permeability of the site, expected low well yield, and deed restrictions. SDWA MCLs will be met at the facility boundary. MTCA Method A cleanup standards of 0.1 ug/L for CPAHs in groundwater would also be met at the facility boundary due to the hydrogeologic setting and the physical properties of PAHs.

In November 2000 and April 2001, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene were again the primary PAHs detected in the downgradient monitoring wells. These PAHs are not classified as carcinogens and, therefore, do not exceed any of the standards that are applicable to this project. Since beginning the monitoring program in 1997, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene have been the primary PAHs detected in the downgradient wells (as shown in Appendix C). The monitoring does indicate that PAHs are migrating beyond the facility boundary, even though concentrations have been below applicable

standards. Naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene have a greater solubility due to their lower molecular weights. Water solubility is a direct function of molecular weight, with the lighter weight compounds having greater solubility. In general, however, water solubility is relatively low for all PAHs due to their high octanol/water partition coefficients.

Chlorinated phenolics were not detected in either well during November or April; however, PCP was detected in well MW-22 in 1998. PCP was expected to undergo a fate similar to PAHs, such as absorption to soil particles and organic materials in the subsurface. Long-distance transport in groundwater was considered unlikely.

Most of the PAHs analyzed for were detected at both surface water stations during both sample events. Considering that these samples are collected adjacent to the landfill in which contaminated site debris was placed and a railroad track, the occurrence of PAHs in the surface water samples is not unexpected. In November and April the sum of both the LPAH and HPAH decreased from station ACCSW1 to station ACCSW2. Overall, PAH concentrations typically decrease from the upstream station to the downstream station. In the environment PAHs can volatilize, become fixed to sediments, biodegrade, or be photo-oxidized.

Table 5 is a summary of ambient water quality criteria for freshwater established for select PAHs and chlorinated phenolics. All detected analytes in the surface water samples were far below the freshwater quality criteria (EPA, 1992). For comparison, human health criteria for freshwater have also been included in Table 5. Over the monitoring period, HPAH concentrations have exceeded some of these criteria. However, access to the area where the surface water samples are collected is restricted with fencing and posted warning signs.

Table 5: Summary of Surface Water Quality and Human Health Criteria for Freshwater (ug/L)

	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Human Health Criteria
<u>PAHs</u>					
Naphthalene	Y	N	2300	620	
2-Chloronaphthalene	Y	N	1,600		
Acenaphthene	Y	N	1,700*	520*	
Fluorene	Y	N			1,300
Anthracene	Y	N			9,600
Fluoranthene	Y	N	3,980		300
Pyrene	Y	N			960
Benzo(a)anthracene	Y	Y			0.0028
Chrysene	Y	Y			0.0028
Benzo(b)fluoranthene	Y	Y			0.0028
Benzo(k)fluoranthene	Y	Y			0.0028
Benzo(a)pyrene	Y	Y			0.0028
Dibenzo(a,h)anthracene	Y	Y			0.0028
Indeno(1,2,3-cd)pyrene	Y	Y			0.0028
<u>Chlorinated Phenolics</u>					
2,4,6-Trichlorophenol	Y	Y		970	2.10
2,4,5-Trichlorophenol	N	N			
Pentachlorophenol (for a pH of 6.5)	Y	Y	5.49	3.46	0.28

* Insufficient data to develop criteria value.

(EPA, 1992. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; State Compliance Final Rule.)

Conclusions and Recommendations

- In November 2000 and April 2001, naphthalene, 2-methylnaphthalene, and 1-methylnaphthalene were the primary PAHs detected in the downgradient monitoring wells. Although monitoring since 1997 indicates that PAHs are migrating beyond the facility boundary, none of the PAHs detected exceeds MTCA Method A cleanup standards or Safe Drinking Water Act MCLs for groundwater.
- Most of the PAHs analyzed for were detected at both surface water stations during both sample events. Considering that these samples are collected adjacent to the landfill in which contaminated site debris was placed and a railroad track, the occurrence of PAHs in the surface water samples is not unexpected. All detected analytes in the surface water samples were far below established water quality criteria for freshwater.
- The condition of the downgradient monitoring wells has declined. Since monitoring began in 1997, wells MW-22, MW-23, and MW-24 have been decommissioned. The reliability of data collected from these wells was unknown, due to the uneven subsidence of the wells' protective casings and concrete pads that were bending the well casings. At this time, only one of the original wells (MW-25) is suitable to be sampled. Well MW-26 has been added to the sampling network for the remainder of the monitoring period.
- As of April 2001, five years of monitoring have been completed. The effectiveness of the remedial action will be reviewed by the project manager and staff, and a decision will be made by the fall of 2001 to determine if long-term monitoring should be continued or concluded. The condition of the downgradient monitoring network should be considered in this determination. As stated previously, three of the four original wells had to be decommissioned due to problems related to the compression and/or decomposition of the upper five to 12 feet of surface material which is loose fill composed of wood chips, bark, and gravel. If new wells are installed to continue long-term monitoring, possible subsidence of the protective casings and concrete pads will need to be addressed or access needs to be obtained to install wells on the adjoining property.

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Appendix A
Groundwater and Surface Water Sampling

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Appendix A

Groundwater and Surface Water Sampling

Groundwater and surface water samples were collected on November 17, 2000 and again on April 27, 2001 from two downgradient monitoring wells, MW-25 and MW-26, and two on-site surface water stations, ACCSW1 and ACCSW2. Various site conditions (ground subsidence, and site filling and grading) have rendered wells MW-22, MW-23, and MW-24 unusable. MW-23 was decommissioned in the fall of 1998. MW-22 and MW-24 were decommissioned in the fall of 2000.

The two monitoring wells were sampled using standard sampling techniques. Prior to sample collection, static water level measurements were recorded to 0.01 feet using an electronic water level probe. The probe was rinsed with deionized water after each use. Both wells were purged and sampled using a stainless steel submersible pump with a pump rate of about 0.5-gpm. Samples were collected when pH, temperature and specific conductance readings stabilized (changes of 10% or less between measurements). The pump was decontaminated between wells by circulating laboratory grade detergent/water through the pump for 5-minutes, followed by a clean water rinse. Purge water was discharged to the ground near each well. All samples for PAHs and chlorinated phenolics were collected in 1-gallon jars with Teflon lined lids.

Two surface water samples were collected to determine if on-site wetlands are receiving any contaminants from the former facility. The samples were collected from two areas considered representative of the site. The first sample location was at the outlet of a small seasonal pond which received surface runoff from the north half of the site. The second sample location was at a wetland area at the south end of the site, adjacent to the landfill. This station should represent runoff from most of the site, which would include possible leachate from the landfill. Surface water samples were collected using decontaminated stainless steel beakers, and transferred to 1-gallon sample jars. The surface water was assumed to be fully mixed and the sample collected at mid-depth and as close to the center of flowing water as could be reached from the bank. Temperature, pH, and specific conductance were measured at the time each sample was collected.

Upon sample collection and proper labeling, samples were stored in an ice-filled cooler. Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Ecology, 2000). The Ecology/EPA Laboratory in Manchester analyzed all samples.

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Appendix B
Laboratory Reporting Sheets

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MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive E, Port Orchard Washington 98366

CASE NARRATIVE

December 26, 2000

Subject: American Crossarm & Conduit

Samples: 00-468015 to -468019

Case No. 4436-00

Officer: Pam Marti

By: Dickey D. Huntamer
Organics Analysis Unit

POLYNUCLEAR AROMATIC HYDROCARBONS

ANALYTICAL METHODS

The semivolatile water samples were solvent extracted with methylene chloride following the Manchester modification of the EPA SW 846 8270 with capillary GC/MS analysis of the sample extracts.

HOLDING TIMES

All analysis-holding times were within the recommended limits.

BLANKS

Low levels of some target compounds were detected in the laboratory blanks. Compounds that were found in the sample and in the blank were considered native to the sample if the area counts in the sample are greater than or equal to five times the area counts in the associated method blank.

SURROGATES

The surrogate compound recoveries were within acceptable limits.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

Matrix spikes recoveries and relative percent differences were within acceptable limits.

ANALYTICAL COMMENTS

No significant problems were encountered in the analysis. The data is acceptable as qualified

DATA QUALIFIER CODES

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- Bold** - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

CN-American Crossarm & Conduit PAH.DOC

MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

December 19, 2000

Subject: American Crossarm and Conduit Project

Sample(s): 00468015-19

Officer(s): Pam Marti

By: Bob Carrell
Organics Analysis Unit

CHLORINATED PHENOLICS ANALYSIS

ANALYTICAL METHOD(S): (Draft EPA Method 8085)

The water samples for acid herbicides were extracted following Manchester Laboratory's standard operating procedure for the extraction of phenolic compounds. The samples were extracted with methylene chloride at pH < 2, solvent exchanged and derivatized along with two method blanks. These extracts were analyzed by capillary Gas Chromatography and Atomic Emission Detection (GC/AED). Confirmation of herbicides is performed by Gas Chromatography and Ion-Trap mass spectrometry (GC/ITD) or comparisons of elemental ratios of hetero-atoms to empirical formulas.

The method utilizes compound independent calibration (CIC) for quantitation of detected compounds. A calibration validation is performed each time CIC is used for target compounds. This is done by comparison of CIC to a single point calibration (SPC) of the target analyte being quantitated.

All analytes have a respective practical quantitation limit (PQL) that is higher than the corresponding method detection limit (MDL). If a target analyte is detected and its identification is unambiguously confirmed at a concentration below its PQL, the reported concentration is qualified as an estimate, 'J' qualifier.

HOLDING TIMES

All samples were extracted and analyzed within the method holding times.

BLANKS

No target compounds were detected in the laboratory blanks, demonstrating the system was free from contamination.

SURROGATES

The 2,4,6-tribromophenol surrogate recoveries were acceptable, ranging from 46% to 98%.

MATRIX SPIKING

The recoveries of the analytes for the matrix spike and matrix spike duplicate were acceptable. The relative percent differences (RPD's) between the matrix spike and matrix spike recoveries were also acceptable.

COMMENTS

The data is useable as qualified.

DATA QUALIFIER CODES

- U - The analyte was not detected at or above the reported result.
- J - The analyte was positively identified. The associated numerical result is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- NC - Not Calculated
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.

MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive E, Port Orchard Washington 98366

CASE NARRATIVE

May 23, 2001

Subject: American Crossarm & Conduit

Samples: 01-17823- 178027

Case No. 1474-01

Officer: Pam Marti

By: Dickey D. Huntamer
Organics Analysis Unit

POLYNUCLEAR AROMATIC HYDROCARBONS

ANALYTICAL METHODS

The semivolatile water samples were solvent extracted with methylene chloride following the Manchester modification of the EPA SW 846 8270 with capillary GC/MS SIM analysis of the sample extracts.

HOLDING TIMES

All analysis-holding times were within the recommended limits.

BLANKS

Low levels of some target compounds were detected in the laboratory blanks. Compounds that were found in the sample and in the blank were considered native to the sample if the area counts in the sample are greater than or equal to five times the area counts in the associated method blank.

SURROGATES

The surrogate compound recoveries were within acceptable limits for all samples except, d-10 pyrene in sample -178027, which was low. Since the other surrogates in that sample were acceptable no additional qualifiers were added to the results.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

Matrix spikes recoveries and relative percent differences were within acceptable limits except for benzo(k)fluoranthene which was 10% low in one spike and right at the limit of 75% in the other. A “J” qualifier was added to the benzo(k)fluoranthene results.

ANALYTICAL COMMENTS

No significant problems were encountered in the analysis. The data is acceptable as qualified

DATA QUALIFIER CODES

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- Bold** - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

CN-American Crossarm & Conduit PAH 2.DOC

MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

May 9, 2001

Subject: American Crossarm and Conduit Project

Sample(s): 01178023-27

Officer(s): Pam Marti

By: Bob Carrell
Organics Analysis Unit

CHLORINATED PHENOLS ANALYSIS

ANALYTICAL METHOD(S): (Draft EPA Method 8085)

These water samples for chlorinated phenols were extracted following Manchester Laboratory's standard operating procedure for the extraction of phenolic compounds (EPA method 8041 modified). The samples (and two method blanks) were first acidified to a pH of less than 2, then extracted with methylene chloride and solvent exchanged to hexane followed by derivatization. These extracts were then analyzed by capillary Gas Chromatography and Atomic Emission Detection (GC/AED). Confirmation of chlorinated phenols was performed by Gas Chromatography and Ion-Trap mass spectrometry (GC/ITD) or comparisons of elemental ratios of hetero-atoms to empirical formulas.

All analytes have a respective practical quantitation limit (PQL) that is higher than the corresponding method detection limit (MDL). If a target analyte is detected and its identification is unambiguously confirmed at a concentration below its PQL, the reported concentration is qualified as an estimate, 'J' qualifier.

HOLDING TIMES

All samples were extracted and analyzed within the recommended method holding times.

BLANKS

No target compounds were detected in the laboratory blanks at or above the reported value, thus demonstrating that the system was free from contamination.

SURROGATES

The 2,4,6-tribromophenol surrogate recoveries were acceptable, ranging from 70% to 103%.

MATRIX SPIKING

The matrix spike recoveries were acceptable except for the 2,4,5-trichlorophenol recovery on 01178023-LMX2 (157%). This appears to be due to a chlorinated compound that interferes with this trichlorophenol and seems to be generated during the extraction procedure. The relative percent difference (RPD) between the two matrix spikes was also acceptable. No qualifiers were added due to matrix spike recoveries.

COMMENTS

The data is useable as qualified.

DATA QUALIFIER CODES

- U - The analyte was not detected at or above the reported result.
- J - The analyte was positively identified. The associated numerical result is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- NC - Not Calculated
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.

Appendix C

Historical Data

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Summary of Analytes Detected (ug/L) at American Crossarm and Conduit on January 1997

Sample Station	MW-22	MW-25	MW-23	MW-24	MW-24A (Duplicate)	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>							
Naphthalene	0.014 U	0.032	0.12	0.069	0.043	0.061	0.015
Acenaphthylene	0.0074 U	0.0078 U	0.0051 J	0.0077 U	0.0075 U	0.019	0.0057 J
Acenaphthene	0.0074 U	0.0078 U	0.0014 J	0.0077 U	0.00094 J	0.06	0.0058 J
Fluorene	0.0074 U	0.0037 J	0.014	0.0097	0.004 J	0.04	0.0055 J
Phenanthrene	0.0035 J	0.012	0.039	0.022	0.0099 J	0.03	0.0085
Anthracene	0.0074 U	0.0023 J	0.0032 J	0.0037 J	0.0028 J	0.035	0.016
Sum LPAH	0.0035 J	0.05 J	0.1827	0.1044 J	0.06064 J	0.245	0.0565 J
Fluoranthene	0.0074 U	0.0012 J	0.0068 J	0.0055 J	0.0021 J	0.042	0.012
Pyrene	0.0074 U	0.0078 U	0.0055 J	0.028	0.0075 U	0.041	0.012
Benzo(a)anthracene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0061 J	0.00067 J
Chrysene	0.0074 U	0.0078 U	0.0027 J	0.0025 J	0.0075 U	0.014	0.0037 J
Benzo(b)fluoranthene	0.0074 U	0.0078 U	0.019 U	0.019 U	0.019 U	0.0071 J	0.019 U
Benzo(k)fluoranthene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0078 U	0.0078 U
Benzo(a)pyrene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0024 J	0.0078 U
Indeno(1,2,3-cd)pyrene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0023 J	0.0078 U
Dibenzo(a,h)anthracene	0.018 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U
Benzo(g,h,i)perylene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0025 J	0.0078 U
Sum HPAH	0.0074 U	0.0012 J	0.015 J	0.036 J	0.0021 J	0.1174 J	0.02837 J
2-Methylnaphthalene	0.0097 J	0.017 J	0.029	0.007 J	0.0078 J	0.022	0.0053 U
1-Methylnaphthalene	0.0038 J	0.007 J	0.015 J	0.0094 J	0.0057 J	0.031	0.0034 J
2-Chloronaphthalene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0078 U	0.0078 U
Dibenzofuran	0.0074 U	0.0078 U	0.00095 U	0.0077 U	0.00033 U	0.021	0.0024 J
Retene	0.0074 U	0.0078 U	0.0076 U	0.0077 U	0.0075 U	0.0062 J	0.00086 J
<u>Chlorinated Phenolics</u>							
2,4,6-Trichlorophenol	0.029 U	0.031 U	0.031 U	0.031 U	0.030 U	0.031 U	0.031 U
2,4,5-Trichlorophenol	0.029 U	0.031 U	0.031 U	0.031 U	0.030 U	0.031 U	0.031 U
2,3,4,6-Tetrachlorophenol	0.029 U	0.031 U	0.031 U	0.031 U	0.030 U	0.13	0.071
2,3,4,5-Tetrachlorophenol	0.029 U	0.031 U	0.031 U	0.031 U	0.030 U	0.031 U	0.031 U
Pentachlorophenol	0.029 U	0.031 U	0.031 U	0.031 U	0.030 U	0.58	0.35

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit on September/December 1997

Sample Station	MW-22	MW-25	MW-23	MW-24	MW-24A (Duplicate)	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons¹</u>							
Naphthalene	0.0071 U	0.01	0.014	0.0067 U	0.0064 U	0.29	0.12
Acenaphthylene	0.0066 U	0.0063 U	0.00056 J	0.0067 U	0.0064 U	0.013	0.0053 J
Acenaphthene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.4	0.11
Fluorene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.18	0.051
Phenanthrene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.065	0.024
Anthracene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.11	0.029
Sum LPAH	0.0066 U	0.01	0.01456 J	0.0067 U	0.0064 U	1.058	0.3393 J
Fluoranthene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.23	0.031
Pyrene	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U	0.16	0.021
Benzo(a)anthracene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.021	0.0029 J
Chrysene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.031	0.0037 J
Benzo(b)fluoranthene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.018 J	0.0031 J
Benzo(k)fluoranthene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.0064 J	0.0011 J
Benzo(a)pyrene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.013	0.0018 J
Indeno(1,2,3-cd)pyrene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.0073	0.0012 J
Dibenzo(a,h)anthracene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.0012 J	0.0064 U
Benzo(ghi)perylene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.007	0.0016 J
Sum HPAH	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.4949 J	0.0674 J
2-Methylnaphthalene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.14	0.035
1-Methylnaphthalene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.16	0.043
2-Chloronaphthalene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.0064 U	0.0065 U
Dibenzofuran	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.1	0.026
Retene	0.0066 U	0.0063 U	0.0064 U	0.0067 U	0.0064 U	0.017	0.0024 J
<u>Chlorinated Phenolics²</u>							
2,4,6-Trichlorophenol	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
2,4,5-Trichlorophenol	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
2,3,4,6-Tetrachlorophenol	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.008	0.004
2,3,4,5-Tetrachlorophenol	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Pentachlorophenol (PCP)	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.007 J	0.005 J

¹ U = The analyte was not detected at or above the reported value.

¹ = PAH results from samples collected in December 1997.

J = The analyte was positively identified. The associated numerical value is an estimate.

² = Chlorinated phenolic results from samples collected in September 1997.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit in May 1998

Sample Station	MW-22	MW-25	MW-23	MW-24	MW-24A (Duplicate)	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>							
Naphthalene	0.015 0.0066 U	0.017 0.0064 U	0.015 0.0068 U	0.012 0.0066 U	0.012 0.0066 U	0.21 0.0065 U	0.11 0.0065 U
Acenaphthylene	0.0026 J 0.0064 U	0.0064 U	0.0033 J 0.0068 U	0.0066 U	0.0066 U	0.22 0.0065 U	0.12 0.0065 U
Acenaphthene	0.0028 J 0.0064 U	0.0064 U	0.0033 J 0.0068 U	0.0066 U	0.0066 U	0.13 0.0065 U	0.096 0.0065 U
Fluorene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.16 0.0065 U	0.11 0.0065 U
Phenanthrene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.073 0.0065 U	0.036 0.0065 U
Sum LPAH	0.0204 J	0.017	0.0216 J	0.012	0.012	0.793	0.472
Fluoranthene	0.0033 U	0.0032 U	0.0034 U	0.0033 U	0.0033 U	0.24 0.0066 U	0.047 0.0066 U
Pyrene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.12 0.0066 U	0.024 0.0066 U
Benzo(a)anthracene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.019 0.0066 U	0.0057 J 0.0066 U
Chrysene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.026 0.0066 U	0.0062 J 0.0066 U
Benzo(b)fluoranthene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.02 0.0066 U	0.0073 J 0.0066 U
Benzo(k)fluoranthene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.0066 J 0.0066 U	0.0037 J 0.0066 U
Benzo(a)pyrene	0.0033 U	0.0032 U	0.0034 U	0.0033 U	0.0033 U	0.006 J 0.0033 U	0.0043 J 0.0033 U
Ideno(1,2,3-cd)pyrene	0.0033 U	0.0032 U	0.0034 U	0.0033 U	0.0033 U	0.0078 J 0.0033 U	0.0032 U
Dibenzo(a,h)anthracene	0.0033 U	0.0032 U	0.0034 U	0.0033 U	0.0033 U	0.0032 U	0.0032 U
Benzo(ghi)perylene	0.0033 U	0.0032 U	0.0034 U	0.0033 U	0.0033 U	0.0069 J 0.0033 U	0.0032 U
Sum HPAH	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.4523 J	0.0982 J
2-Methylnaphthalene	0.01 0.0054 U	0.012 0.0062 U	0.01 0.0054 U	0.0098 0.0049 U	0.01 0.0053 U	0.089 0.08 U	0.031 0.026 U
1-Methylnaphthalene	0.0066 U	0.0064 U	0.0068 U	0.0066 U	0.0066 U	0.0065 U	0.0065 U
2-Chloronaphthalene	0.0033 U	0.0032 U	0.0026 J 0.0068 U	0.0033 U	0.0033 U	0.082 0.024 U	0.066 0.021 U
Dibenzofuran	0.0034 J	0.0064 U	0.0068 U	0.0066 U	0.0066 U		
Retene	0.024 U	0.024 U	0.025 U	0.024 U	0.024 U	0.018 J 0.0065 U	0.013 J 0.0065 U
Chlorinated Phenolics							
2,4,6-Trichlorophenol	0.024 U	0.024 U	0.025 U	0.024 U	0.024 U	0.0065 J 0.0065 U	0.013 NJ 0.0065 U
2,4,5-Trichlorophenol	0.022 U	0.022 U	0.023 U	0.022 U	0.022 U	0.093 0.022 U	0.068 0.023 U
2,3,4,6-Tetrachlorophenol	0.022 U	0.022 U	0.023 U	0.022 U	0.022 U	0.022 U	0.023 U
2,3,4,5-Tetrachlorophenol	0.0033 J	0.02 U	0.021 U	0.02 U	0.02 U	0.02 U	0.021 U
Pentachlorophenol							

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.

NJ = There is evidence that the analyte is present. The associated numerical result is an estimate.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit in October 1998

Sample Station	MW-22	MW-22A (Duplicate)	MW-24	MW-25	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>						
Naphthalene	0.02 0.0062 U	0.015 0.0063 U	0.014 0.0063 U	0.027 0.0062 U	0.044 0.0063 U	0.24 0.0063 U
Acenaphthylene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.5	0.19
Acenaphthene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.044	0.15
Fluorene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.018	0.096
Phenanthrene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.11	0.029
Anthracene	0.0062 U	0.0063 U	0.0063 U	0.0062 U		
Sum LPAH	0.02	0.015	0.014	0.027	0.716	0.705
Fluoranthene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.46	0.039
Pyrene	0.012 U	0.012 U	0.012 U	0.012 U	0.36	0.022
Benzo(a)anthracene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.043	0.0042 J
Chrysene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.073	0.0072
Benzo(b)fluoranthene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.047	0.007
Benzo(k)fluoranthene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.014	0.0026
Benzo(a)pyrene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.02	0.0049
Ideno(1,2,3-cd)pyrene	0.012 U	0.012 U	0.012 U	0.012 U	0.015	0.0063 U
Dibenzo(a,h)anthracene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.0063 U	0.0063 U
Benzo(ghi)perylene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.014 J	0.0039 J
Sum HPAH	0.0062 U	0.0063 U	0.0063 U	0.0062 U	1.046 J	0.908 J
2-Methylnaphthalene	0.022	0.014	0.014	0.026	0.018	0.048
1-Methylnaphthalene	0.0097	0.0058 J	0.0063 U	0.011	0.043	0.046
Dibenzofuran	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.07	0.091
Retene	0.0062 U	0.0063 U	0.0063 U	0.0062 U	0.027	0.0063 U
<u>Chlorinated Phenolics</u>						
2,4,6-Trichlorophenol	0.047 U	0.047 U	0.048 U	0.047 U	0.049 U	0.047 U
2,4,5-Trichlorophenol	0.047 U	0.047 U	0.048 U	0.047 U	0.0016 NJ	0.047 U
2,3,4,6-Tetrachlorophenol	0.043 U	0.043 U	0.044 U	0.043 U	0.0049 NJ	0.016 NJ
2,3,4,5-Tetrachlorophenol	0.043 U	0.043 U	0.044 U	0.043 U	0.045 U	0.043 U
Pentachlorophenol	0.0031 J	0.0031 NJ	0.04 U	0.039 U	0.17	0.024 NJ

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.

NJ = There is evidence that the analyte is present. The associated numerical result is an estimate.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit in June 1999

Sample Station	MW-24	MW-24A (Duplicate)	MW-25	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>					
Naphthalene	0.0063 U	0.0063 U	0.0063 U	0.088	0.099
Acenaphthylene	0.0032 U	0.0032 U	0.0032 U	0.0066	0.0051
Acenaphthene	0.0032 U	0.0032 U	0.00014 J	0.24	0.12
Fluorene	0.0032 U	0.0032 U	0.0032 U	0.15	0.086
Phenanthrene	0.0063 U	0.0063 U	0.0063 U	0.22	0.096
Anthracene	0.0063 U	0.0063 U	0.0063 U	0.074	0.035
Sum LPAH	0.0063 U	0.0063 U	0.00014 J	0.7786	0.4411
Fluoranthene	0.0063 U	0.0063 U	0.0063 U	0.18	0.041
Pyrene	0.0063 U	0.0063 U	0.0063 U	0.11	0.018
Benzo(a)anthracene	0.0063 U	0.0063 U	0.0063 U	0.017	0.0077
Chrysene	0.0063 U	0.0063 U	0.0063 U	0.024	0.0067
Benzo(b)fluoranthene	0.0063 U	0.0063 U	0.0063 U	0.012	0.0041 J
Benzo(k)fluoranthene	0.013 U	0.013 U	0.013 U	0.012 J	0.0084 J
Benzo(a)pyrene	0.0063 U	0.0063 U	0.0063 U	0.01	0.0076
Ideno(1,2,3-cd)pyrene	0.013 U	0.013 U	0.013 U	0.018	0.013 U
Dibenzo(a,h)anthracene	0.0063 U	0.0063 U	0.0063 U	0.0063 U	0.0063 U
Benzo(ghi)perylene	0.0063 U	0.0063 U	0.0063 U	0.014 J	0.0063 U
Sum HPAH	0.0063 U	0.0063 U	0.0063 U	0.397 J	0.0935 J
2-Methylnaphthalene	0.0063 U	0.0063 U	0.0063 U	0.1	0.03
1-Methylnaphthalene	0.0063 U	0.0063 U	0.0063 U	0.088	0.037
Dibenzofuran	0.0063 U	0.0063 U	0.0063 U	0.066	0.043
Retene	0.0063 U	0.0063 U	0.0063 U	0.018	0.0063 U
<u>Chlorinated Phenolics</u>					
2,4,6-Trichlorophenol	0.05 U	0.049 U	0.048 U	0.049 U	0.049 U
2,4,5-Trichlorophenol	0.05 U	0.049 U	0.048 U	0.049 U	0.049 U
2,3,4,6-Tetrachlorophenol	0.046 U	0.045 U	0.044 U	0.045 U	0.045 U
2,3,4,5-Tetrachlorophenol	0.046 U	0.045 U	0.044 U	0.045 U	0.045 U
Pentachlorophenol	0.041 U	0.041 U	0.04 U	0.04 U	0.041 U

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit in September 1999

Sample Station	MW-24	MW-25	MW-25A (Duplicate)	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>					
Naphthalene	0.016 U	0.016 U	0.016 U	0.058	0.62 J
Acenaphthylene	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
Acenaphthene	0.016 U	0.016 U	0.016 U	0.16	0.27
Fluorene	0.016 U	0.016 U	0.016 U	0.12	0.17
Phenanthrene	0.016 U	0.016 U	0.016 U	0.2	0.11
Anthracene	0.016 U	0.016 U	0.016 U	0.071	0.03
Sum LPAH	0.016 U	0.016 U	0.016 U	0.609	1.2 J
Fluoranthene	0.016 U	0.016 U	0.016 U	0.26	0.042
Pyrene	0.016 U	0.016 U	0.016 U	0.19	0.025
Benzo(a)anthracene	0.016 U	0.016 U	0.016 U	0.035	0.0041 J
Chrysene	0.016 U	0.016 U	0.016 U	0.079	0.0097 J
Benzo(b)fluoranthene	0.016 U	0.016 U	0.016 U	0.063	0.011 J
Benzo(k)fluoranthene	0.016 U	0.016 U	0.016 U	0.033	0.0051 J
Benzo(a)pyrene	0.016 U	0.016 U	0.016 U	0.012 J	0.005 J
Ideno(1,2,3-cd)pyrene	0.016 U	0.016 U	0.016 U	0.021	0.0044 J
Dibenzo(a,h)anthracene	0.016 U	0.016 U	0.016 U	0.0047 J	0.016 U
Benzo(ghi)perylene	0.016 U	0.016 U	0.016 U	0.016 J	0.0046 J
Sum HPAH	0.016 U	0.016 U	0.016 U	0.7137 J	0.1109 J
2-Methylnaphthalene	0.011 J	0.015 J	0.014 J	0.087	0.14
1-Methylnaphthalene	0.0051 J	0.0072 J	0.0073 J	0.064	0.11
Dibenzofuran	0.016 U	0.016 U	0.016 U	0.059	0.1
Retene	0.016 U	0.016 U	0.016 U	0.065	0.0035 J
<u>Chlorinated Phenolics</u>					
2,4,6-Trichlorophenol	0.048 U	0.046 U	0.048 U	0.049 U	0.054 U
2,4,5-Trichlorophenol	0.048 U	0.046 U	0.048 U	0.049 U	0.054 U
2,3,4,6-Tetrachlorophenol	0.044 U	0.042 U	0.044 U	0.045 U	0.049 U
2,3,4,5-Tetrachlorophenol	0.044 U	0.042 U	0.044 U	0.045 U	0.049 U
Pentachlorophenol	0.04 U	0.038 U	0.04 U	0.013 NJ	0.045 U

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.

NJ = There is evidence that the analyte is present. The associated numerical value is an estimate.

Summary of Analytes Detected (ug/L) at American Crossarm and Conduit in June 2000

Sample Station	MW-25	MW-25A (Duplicate)	ACCSW1	ACCSW2
<u>Polynuclear Aromatic Hydrocarbons</u>				
Naphthalene	0.022	0.019	0.037	0.016
Acenaphthylene	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Acenaphthene	0.0067 U	0.0067 U	0.1	0.058
Fluorene	0.0067 U	0.0067 U	0.057	0.039
Phenanthrene	0.0067 U	0.0067 U	0.068	0.047
Anthracene	0.0067 U	0.0067 U	0.026	0.018
Sum LPAH	0.022	0.019	0.288	0.178
Fluoranthene	0.0067 U	0.0067 U	0.055	0.046
Pyrene	0.0067 U	0.0067 U	0.026	0.021
Benzo(a)anthracene	0.0067 U	0.0067 U	0.0058 J	0.0051 J
Chrysene	0.0067 U	0.0067 U	0.0075	0.0041 J
Benzo(b)fluoranthene	0.0067 U	0.0067 U	0.0067	0.0046 J
Benzo(k)fluoranthene	0.0067 U	0.0067 U	0.006 J	0.0056 J
Benzo(a)pyrene	0.0067 U	0.0067 U	0.0085	0.0067 U
Ideno(1,2,3-cd)pyrene	0.0067 U	0.0067 U	0.0031 J	0.0067 U
Dibenzo(a,h)anthracene	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Benzo(ghi)perylene	0.0067 U	0.0067 U	0.003 J	0.0067 U
Sum HPAH	0.0067 U	0.0067 U	0.1216 J	0.0864 J
2-Methylnaphthalene	0.016	0.014	0.038	0.013
1-Methylnaphthalene	0.011	0.01	0.029	0.015
Dibenzofuran	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Retene	0.0067 U	0.0067 U	0.0067 U	0.0067 U
<u>Chlorinated Phenolics</u>				
2,4,6-Trichlorophenol	0.04 U	0.04 U	0.042 U	0.04 U
2,4,5-Trichlorophenol	0.04 U	0.04 U	0.042 U	0.04 U
2,3,4,6-Tetrachlorophenol	0.037 U	0.037 U	0.038 U	0.036 U
2,3,4,5-Tetrachlorophenol	0.037 U	0.037 U	0.038 U	0.036 U
Pentachlorophenol	0.033 U	0.033 U	0.035 U	0.033 U

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical value is an estimate.