Lower Duwamish Waterway
Slip 4 Early Action Area

Appendix B
Summary of City of Seattle and King County Source Control Activities in the Slip 4 Drainage Basin

1 INTRODUCTION

The source control strategy for the Lower Duwamish Waterway (LDW) is to minimize the potential for chemicals in sediments to exceed the Washington State Sediment Management Standards (SMS) and LDW cleanup goals by identifying and managing pollutant sources. Washington Department of Ecology (Ecology) is working in concert with the members of the LDW Source Control Work Group (City of Seattle, King County, the Port of Seattle, the City of Tukwila, and the U.S Environmental Protection Agency) to achieve this goal. Controlling sources within the early action areas in the LDW is a top priority since these areas will be cleaned up first. Information in this appendix was provided by Seattle Public Utilities (SPU) (Schmoyer 2006a,b, pers. comm.; King County and SPU 2004, 2005a,b).

This appendix includes the latest available information as of this writing. King County and SPU will continue to update this information in progress reports to the agencies every 6 months.

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2 CITY OF SEATTLE AND KING COUNTY SOURCE CONTROL ACTIVITIES

The City of Seattle owns and operates the municipal separated storm drain system that collects stormwater runoff from upland areas and discharges to Slip 4 and the small sanitary/combined sewer system that collects municipal and industrial wastewater within the City service area. King County owns and operates the larger interceptor system that conveys wastewater to the treatment plant at West Point. The City and King County each own and operate sewer pump stations that in an emergency would discharge overflow to Slip 4.

City and County source control activities focus on reducing the amount of chemicals discharged to publicly owned storm drains and sanitary/combined sewers through business inspections and source identification/tracing work. Because there are no combined sewer overflows (CSOs) into Slip 4 and pump station emergency overflows occur infrequently, source control activities have focused on stormwater discharges. The City and County provide progress reports to the agencies every 6 months. Detailed information is available in the June 2004, January 2005, and June 2005 reports (King County and SPU 2004, 2005a,b).

2.1 BUSINESS INSPECTIONS

King County Industrial Waste and SPU are leading the joint King County-Seattle business inspection program in the LDW. Inspections are conducted under existing code authorities. Since June 2004, a total of 55 businesses (all of the airport tenants and waterfront facilities, except Boeing-owned or lease facilities) have been inspected in the Slip 4 drainage basin (46 full inspections and 9 screening inspections). Boeing facilities have not been inspected because inspectors were not granted access to these facilities.

Of the 46 sites receiving full inspections, 35 required some type of corrective action. Most of the problems found in the Slip 4 drainage were related to spill prevention and cleanup (e.g., lack of proper spill prevention and cleanup plans or inadequate employee training in spill prevention and cleanup practices). Other common problems included lack of adequate spill control materials onsite and need for cleaning of onsite drainage facilities. Inspectors requested a total of 103 corrective actions in the Slip 4 basin. Corrective actions requested are summarized in Table B-1.

As of December 2005, 88 percent of the sites that were requested to make corrective actions have completed the required changes (King County and SPU 2005b). Inspectors are working with the three remaining facilities to obtain compliance.

2.2 SOURCE TRACING AND IDENTIFICATION

SPU and King County are conducting source tracing and identification sampling activities to support the source control efforts. Source tracing is designed to identify sources by strategically collecting samples at key locations within the drainage system. Source identification sampling focuses on product testing to determine whether specific products contain chemicals that are a concern for waterway sediment.

The following types of source samples have been collected within the Slip 4 drainage basin:

- In-line sediment traps installed in the storm drain system (10 stations)
- Catch basin and other sediment samples from upland sites (9 samples)
- In-line sediment collected from maintenance holes on the storm drain trunk lines (5 samples with duplicate analyses)
- Sediment samples from the Georgetown flume (11 samples).

Source sediment sample results are reported in Tables B-2 through B-4. The results are compared to the SMS to provide a rough indication of overall quality. The SMS establishes the sediment quality standards (SQS), which identify surface sediments that have no adverse effects on biological resources, and the cleanup screening level (CSL), which is the "minor adverse effects" level used as an upper regulatory threshold for making decisions about cleanup. It should be emphasized that the SMS do not apply to storm drain sediments. It is important to note that any comparison of this kind is most likely conservative given that sediments discharged from storm drains are highly dispersed in the receiving environment and mixed with the natural sedimentation taking place in the waterway.

2.2.1 Storm Drain Sediment Traps

In March 2005, SPU installed sediment traps at the following 10 stations in the publicly owned storm drains that discharge to Slip 4 (Figure B-1):

- SL4-T1 (MH422): 60-inch King County Airport SD #3/PS44 EOF at the downstream end of the north and central laterals.
- SL4-T2 and SL4-T2A (MH356 and MH482): 60-inch King County Airport SD #3/PS44 EOF, south lateral (downstream and upstream of the Boeing lease property).
- SL4-T3 and SL4-T3A (MH364 and MH19C): 60-inch King County Airport SD #3/PS44 EOF, central lateral#1 (downstream and upstream of the Boeing lease property).

- SL4-T4 and SL4-T4A (MH221A and MH229A): 60-inch King County Airport SD #3/PS44 EOF, central lateral #2 (downstream and upstream of the Boeing lease property).
- SL4-T5 and SL4-T5A (MH363 and MH178): King County Airport SD #3/PS44 EOF, north lateral (downstream and upstream of the Boeing lease property).
- SL4-T6: 72-inch I-5 SD at the intersection of S. Hardy Street and Airport Way S.

Traps are installed for a 4- to 6-month period to passively collect samples of suspended sediment present in the stormwater runoff. In August 2005, SPU and Boeing removed and redeployed the traps for the winter wet season.

Results from the first round of samples are provided in Tables B-2a and B-2b. Chemicals that exceeded SMS include mercury, zinc, BEHP, and PCBs. Mercury concentrations (0.1–1.12 mg/kg DW) exceeded the CSL in three traps (SL4-T1, SL4-T5, and SL4-T5A) and zinc (220–553 mg/kg DW) exceeded the SQS in 3 traps (SL4-T4A, SL4-T5, and SL4-T6). TOC was not analyzed in all samples because of low sample volumes and so comparisons with SMS for organic compounds could only be performed on three of the sediment trap samples (SL4-T1, SL4-T4A, and SL4-T6). BEHP (49–189 mg/kg OC) exceeded the SMS in all three samples (two SQS exceedances and one CSL exceedance).

PCBs were detected in all 10 traps at concentrations ranging from 0.04 to 24 mg/kg DW and exceeded the MTCA Method A cleanup level for residential soil of 1 mg/kg DW in five traps. Due to limited sample volume, TOC analysis was performed in only three samples, and therefore only these samples could be compared to the SMS. Two of the three samples (SL4-T1 and SL4-T6, 233 and 246 mg/kg OC PCBs, respectively) exceeded the CSL for PCBs.

2.2.2 Inline Sediment Samples

In addition to the sediment trap samples, SPU collected inline sediment samples at four of the stations where traps were deployed and one additional maintenance hole at the downstream end of the flume (MH100). Duplicate samples were collected at each site and split with Boeing. Inline samples are grab samples collected from sediment that has deposited in the storm drain line, typically at maintenance holes or other areas where sediment accumulates. Inline sediment data are provided in Tables B-3a and B-3b. Sampling locations are shown on Figure B-1.

Chemicals exceeding SMS included mercury, zinc, acenaphthene, fluorene, phenanthrene, benzo [b+k]fluoranthene, benzo[g,h,i]perylene, fluoranthene, , indeno[1,2,3-c,d]pyrene, BEHP, and PCBs. Mercury (0.48/0.7 mg/kg DW) exceeded the CSL in split samples at MH363, while zinc (411 and 572 mg/kg DW) exceeded the SQS at MH100 and MH221A and the CSL (699/1,130 mg/kg DW) in split samples at MH229A.

Concentrations of PAH compounds exceeded the SQS in only one of the two split samples at MH229A and MH221A

BEHP concentrations in the Slip 4 inline sediment samples (180–2,200 µg/kg DW) were relatively low compared to other source sediment samples collected in the Lower Duwamish Waterway (<20–26,000 µg/kg DW). However, samples from three of the five locations (MH221A, MH363, and MH229A) exceeded the SQS.

PCBs were detected at four of the five inline sample locations (0.31–31 mg/kg DW), exceeding the SQS at one location (MH100) and the CSL at three locations (MH221A, MH363, and MH229A). MH363 contained the highest concentration of PCBs (31 mg/kg DW or 2,793 mg/kg OC), consisting of Aroclor 1254, although the detection limits for other Arcolors in this sample were relatively high (0.47–3.8 mg/kg DW or 42–342 mg/kg OC). Aroclors 1254 (0.15–3.7 mg/kg DW, 3–96 mg/kg OC) and 1260 (0.16–1.9 mg/kg DW, 4–53 mg/kg OC) were present in the other three locations where PCBs were detected.

2.2.3 Catch Basins and Other Source Sediment Samples

SPU has collected sediment samples from eight catch basins and one upland site drainage ditch in the Slip 4 drainage basin (Figure B-1):

- **CB37**: Located on the Crowley property and drains directly to Slip 4
- **CB44**: Located in a parking area on S. Myrtle Street that drains to the Georgetown flume
- **CB45 and CB46**: Located at the King County maintenance facility on the north end of the airport. CB45 drains to the I-5 SD, and CB46 drains to the King County Airport SD #3/PS44 EOF
- **CB48**: Located on the west side of the Georgetown Steam Plant and drains to the Georgetown flume
- **CB79 and CB80:** Oil/water separator and catch basin, respectively. Both are located on Emerald Services property at head of Slip 4. CB79 drains directly to Slip 4, and CB80 drains to the combined sewer on E. Marginal Way South.
- **RCB49**: Located on S. Webster Street on the east side of Slip 4 and drains to the combined sewer on E. Marginal Way South.
- **S1**: Drainage ditch on Emerald Services property and drains to Slip 4. Results for this soil sample are discussed in Section 2.3.2.2 of the main text.

The catch basin sampling results are summarized in Tables B-4a and B-4b. Chemicals exceeding SMS include copper, lead, zinc, fluorene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b+k)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno[1,2,3-c,d]pyrene, BEHP, butylbenzylphthalate, dimethylphthalate, di-n-octylphthalate, and PCBs.

Zinc exceeded the CSL in the two catch basins at the King County maintenance facility (3,420–3,530 mg/kg) and the Crowley catch basin (1,220 mg/kg DW). Zinc also exceeded the SQS in the samples collected from the S. Myrtle Street drain (524 mg/kg DW), the steam plant catch basin (657 mg/kg DW), and the oil/water separator (CB79) on the Emerald Services site (758 mg/kg DW). The highest concentrations were found in the two King County Airport catch basins, which are on a drain line that receives runoff from a metal finishing facility. Copper (5,660–6,320 mg/kg DW) also exceeded the CSL in these two catch basins, and lead (481 mg/kg DW) exceeded the SQS in one catch basin (CB45). The airport has since cleaned these catch basins and is planning to install outlet traps on appropriate catch basins (King County and SPU 2005b).

PAH concentrations were also elevated in the two catch basins at the King County maintenance facility, with exceedances of the SQS or CSL for several HPAH compounds and exceedances of SQS for two LPAH compounds. CB48 at the Georgetown Steam Plant also contained elevated concentrations of PAH (one LPAH and five HPAH compounds exceeded the SQS).

The highest BEHP concentrations (exceeding CSL) were found in samples collected on the Emerald Services site (5,500–120,000 µg/kg DW, 177–1,869 mg/kg OC) and the two catch basins at the King County maintenance facility (8,800–30,000 µg/kg DW, 90–288 mg/kg DW). CB79, also on the Emerald Services site, exceeded the SQS for di-n-octylphthalate (62 mg/kg OC). In addition, CB80 exceeded the CSL for butylbenzylphthalate (1,800 µg/kg DW, 67 mg/kg OC) and dimethylphthalate (1,900 µg/kg DW, 71 mg/kg OC), as well as the SQS for di-n-octylphthalate (1,800 µg/kg DW, 67 mg/kg OC).

Concentrations of PCBs (<0.1–0.68 mg/kg DW) in all nine samples were below the MTCA Method A limit (1 mg/kg DW). However, CB48 at the Georgetown Steam Plant (0.25 mg/kg DW, 15.9 mg/kg OC) exceeded the SQS.

2.2.4 Georgetown Flume

SPU also investigated the Georgetown flume in 2005 (HEC 2005). As part of the investigation, the flume was surveyed and inspected and illicit connections identified. In addition, sediment samples were collected from the flume at five evenly spaced transects and adjacent to five pipe connections (see Figure B-1). Duplicate samples (T2 and T5) were obtained at the S. Myrtle Street sampling location. Sample results are presented in Tables B-3a and B-3b.

Lead (590J mg/kg DW), mercury (1.7 mg/kg DW), and zinc (1,130 mg/kg DW) exceeded the CSL at the steam plant (uppermost end of the flume). Lead (501 mg/kg DW) and zinc (766 mg/kg DW) concentrations exceeded the SQS and mercury (1 mg/kg DW) exceeded the CSL at the downstream end of the tunnel section (below the steam plant). TPH-oil was elevated at the steam plant (9,700 mg/kg DW) and in the drainage ditch that runs along the north side of S. Myrtle Street (3,000 mg/kg DW). In addition, TPH-diesel (2,300 mg/kg DW) was elevated at the steam plant.

BEHP concentrations were generally low in the flume samples (120–3,800 μg/kg DW, 2–75 mg/kg OC), with only 3 of the 11 samples exceeding the SQS.

PCB concentrations exceeded the SMS at multiple locations along the flume, ranging from 5 to 1,746 mg/kg OC (0.038–92 mg/kg DW). Of the 10 flume sediment samples, two samples exceeded the CSL for PCBs (T3 and P3), and four samples exceeded the SQS for PCBs (T4, T6, P1, and P2). In addition, the sample collected from the ditch entering the flume at S. Myrtle Street (P5) also exceeded the SQS for PCBs (1.5 mg/kg DW, 22 mg/kg OC). PCB concentrations (0.78–92 mg/kg DW) were generally higher at the upper end of the flume (above S. Willow Street) compared to the downstream end (0.065–0.4 mg/kg DW). The highest concentration (92 mg/kg DW/1,746 mg/kg OC) was observed adjacent to the 15-inch storm drain (P3) that enters just downstream of the tunnel section. This storm drain is now plugged. The P3 sample contained only Aroclor 1254. Other samples generally contained a mixture of Aroclor 1254 and 1260, with some samples also containing Aroclor 1248.

Inspectors found six unplugged pipes entering the flume during the field investigation. Four pipes, ranging in size from 3 to 8 inches, enter along the west side of the flume and appear to be private outfalls from adjacent properties. One 4-inch PVC pipe is an illicit connection from a motel's laundry system. The laundry cannot be replumbed to the motel's existing septic system because it is not capable of handling the additional flow from the laundry. There are no sanitary sewer lines near the property. Consequently, the motel has since stopped using this system and now sends all laundry offsite for washing. Another pipe (8-inch concrete) is a storm drain that serves the properties along the south side of S. Myrtle Street. The source of the remaining four pipes is unknown.

Two pipes (6–8 inches) enter the flume from the east side. One of these pipes enters along the piped section located between about S. Willow Street and the tunnel, and the other enters in the concrete-lined section about 100 feet upstream of S. Willow Street. The source of these two pipes is unknown.

Seattle City Light and SPU are currently investigating options for removing the PCB-contaminated material, as well as long-term operation of the flume. Options being considered include permanently closing the flume and rerouting drainage to other nearby storm drain systems or installing a new piped storm drain along the flume alignment and backfilling the flume. The City intends to complete this work in 2007-2008.

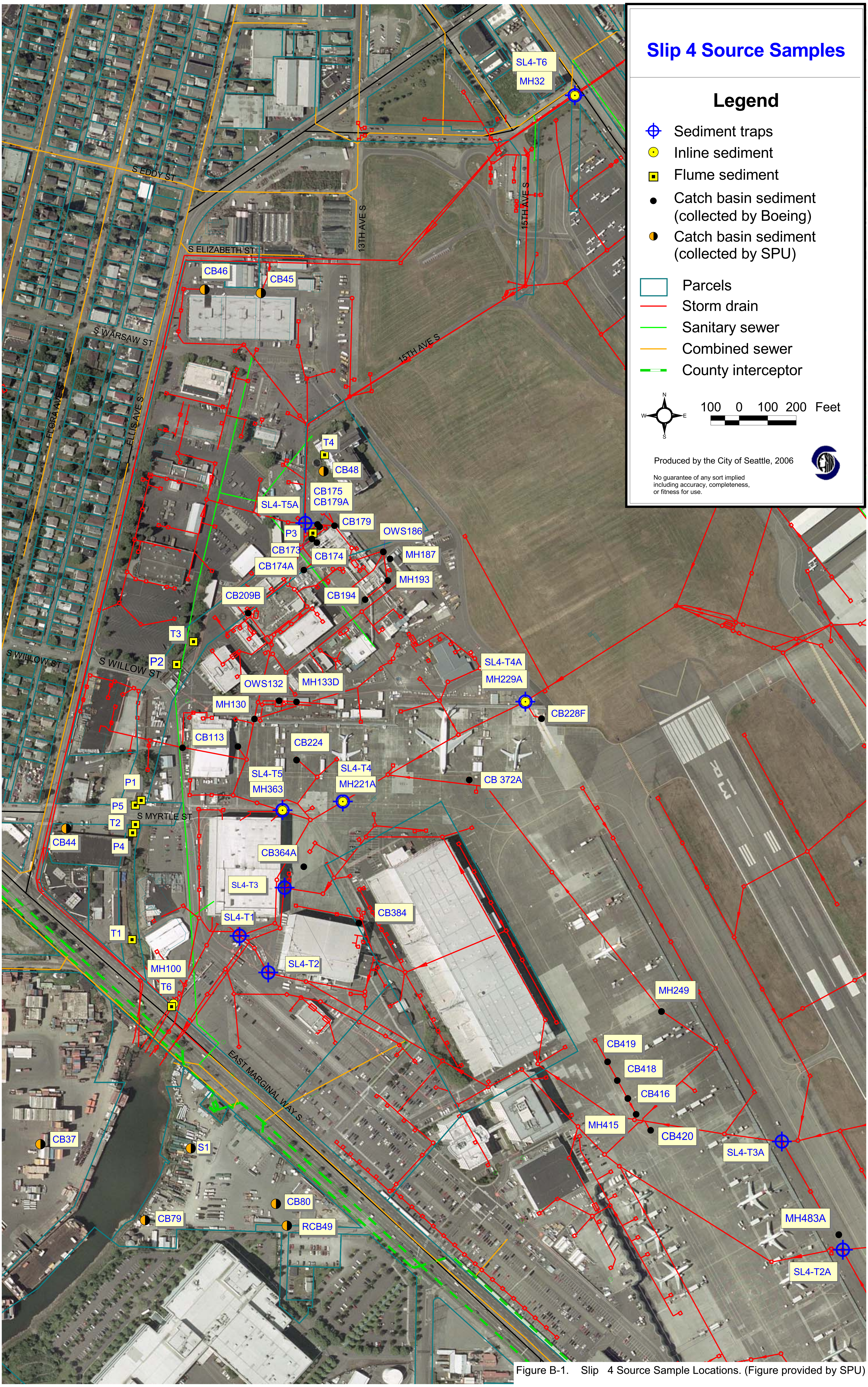

Figure B-1. Slip 4 Source Sample Locations. (Figure provided by SPU)

Table B-1. Corrective Actions Requested of Businesses in Slip 4 Basin (June 2004—December 2005).

Corrective Action	Percentage of Sites[a]
Facility lacks proper spill prevention/cleanup plan/procedures	24
Inadequate employee training on spill prevention/cleanup practices	21
Inadequate spill cleanup materials available onsite	15
Drainage facility needs cleaning	13
Improper storage of hazardous products and waste materials	6
Improper hazardous waste disposal	6
Improper outdoor storage of nonhazardous materials/products	5

[a] Reported as percentage of total sites inspected. Note that not all sites had corrective actions and some sites had multiple corrective actions; therefore, percentages do not total 100%.

Table B-2a: Slip 4 Drainage Basin Sediment Trap Results (mg/kg DW).

Seattle Public Utilities ID King County/Boeing MH#	SL4-T1 MH422 KC Airport SD, north + central #1 lat	SL4-T2A MH482 KC Airport SD, south lat, d/s runway	SL4-T2 MW356 KC Airport SD, south lat, d/s Boeing Field	SL4-T3A MH19C KC Airport SD, central lat #2, d/s runway	SL4-T3 MH364 KC Airport SD, central lat #2, d/s Boeing Field	SL4-T4A MH229A KC Airport SD, central lat #1, d/s runway	SL4-T4 MH221A KC Airport SD, central lat #1, d/s Boeing Field	SL4-T5A MH178 KC Airport SD, north lat, d/s Steamplant	SL4-T5 MH363 KC Airport SD, north lat, d/s Boeing Field	SL4-T6 NA I-5 SD at Airport Way S
	Round 1	Round1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1
Date deployed		03/10/05	03/07/05	03/10/05	03/07/05	03/08/05	03/08/05	03/08/05	03/07/05	
Date removed	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05	08/11/05
Sample collected by	Boeing	SPU	Boeing	SPU	Boeing	Boeing	Boeing	Boeing	Boeing	SPU
TOC (percent)	4.29	NA	NA	NA	NA	5.35	NA	NA	NA	3.17
Metals (mg/kg DW)										
As	**11**	NA	NA	NA	NA	**16**	NA	**14**	**21**	**11**
Cu	**83.6**	NA	NA	NA	NA	**94.3**	NA	**113**	**148**	**84.5**
Pb	**140**	NA	NA	NA	NA	**144**	NA	**962**	**109**	**110**
Hg	**1.10**	NA	NA	NA	NA	**0.19**	NA	**0.86**	**1.12**	**0.10**
Zn	**368**	NA	NA	NA	NA	**460**	NA	**220**	**553**	**422**
LPAH (ug/kg DW)										
Acenaphthene	**210**	NA	NA	NA	NA	160 U	**1,300**	110 U	130 U	79 U
Acenaphthylene	100 U	NA	NA	NA	NA	160 U	210 U	110 U	130 U	79 U
Anthracene	**360**	NA	NA	NA	NA	**180**	**1,500**	**150**	**210**	**98**
Fluorene	**190**	NA	NA	NA	NA	160 U	**1,000**	110 U	130 U	79 U
Naphthalene	100 U	NA	NA	NA	NA	160 U	**670**	110 U	130 U	79 U
Phenanthrene	**2,800**	NA	NA	NA	NA	**1,700**	**8,600**	**1,300**	**1,600**	**570**
HPAH (ug/kg DW)										
Benzo(a)anthracene	**1,400**	NA	NA	NA	NA	**860**	**3,000**	**840**	**940**	**270**
Benzo(a)pyrene	**1,700**	NA	NA	NA	NA	**1,400**	**3,400**	**1,100**	**1,200**	**250**
Benzo(b)fluoranthene	**2,400**	NA	NA	NA	NA	**2,100**	**4,600**	**1,600**	**1,700**	**380**
Benzo(k)fluoranthene	**1,300**	NA	NA	NA	NA	**1,300**	**2,600**	**800**	**970**	**220**
Benzo(g,h,i)perylene	**720**	NA	NA	NA	NA	**710**	**1,600**	**450**	**600**	79 U
Chrysene	**1,900**	NA	NA	NA	NA	**1,700**	**4,100**	**1,200**	**1,400**	**370**
Dibenzo(a,h)anthracene	**260**	NA	NA	NA	NA	160 U	**730**	110 U	130 U	79 U
Fluoranthene	**4,100**	NA	NA	NA	NA	**3,100**	**8,900**	**2,400**	**2,900**	**880**
Indeno(1,2,3-c,d)pyrene	**810**	NA	NA	NA	NA	**780**	**1,900**	**520**	**680**	**84**
Pyrene	**3,000**	NA	NA	NA	NA	**2,100**	**6,800**	**1,700**	**2,000**	**630**
Phthalates (ug/kg DW)										
Bis(2-ethylhexyl)phthalate	**2,400**	NA	NA	NA	NA	**2,600**	**6,000**	**1,800**	**2,700**	**6,000**
Butylbenzylphthalate	**120**	NA	NA	NA	NA	160 U	210 U	110 U	**140**	**420**
Diethylphthalate	100 U	NA	NA	NA	NA	160 U	210 U	110 U	130 U	79 U
Dimethylphthalate	100 U	NA	NA	NA	NA	160 U	210 U	110 U	130 U	79 U
Di-n-butylphthalate	**130**	NA	NA	NA	NA	**350**	**260**	**150**	130 U	**460**
Di-n-octylphthalate	**440**	NA	NA	NA	NA	**4,300**	**3,700**	**220**	**1,200**	**430**
PCBs (ug/kg DW)										
Aroclor 1016	29 U	48 U	21 U	34 U	20 U	9.8 U	9.8 U	9.6 U	49 U	1,800 U
Aroclor 1242	29 U	48 U	21 U	34 U	20 U	9.8 U	9.8 U	9.6 U	49 U	1,800 U
Aroclor 1248	29 U	48 U	21 U	34 U	20 U	9.8 U	9.8 U	9.6 U	49 U	1,800 U
Aroclor 1254	**10,000**	**67**	**500** P	**38** JP	**1,400**	**290** P	**1,900** P	**72**	**24,000**	1,800 U
Aroclor 1260	1,200 U	**110**	**340**	34 U	380 U	**160**	**850**	**34**	2,400 U	**7,800**
Aroclor 1221	29 U	48 U	21 U	34 U	20 U	9.8 U	9.8 U	9.6 U	49 U	1,800 U
Aroclor 1232	29 U	48 U	21 U	34 U	20 U	9.8 U	9.8 U	9.6 U	49 U	1,800 U
Total PCBs	**10,000**	**177**	**840** P	**38** JP	**1,400**	**450** P	**2,750** P	**106**	**24,000**	**7,800**
TPH (mg/kg)										
Diesel	**230**	NA	NA	NA	NA	**100**	NA	**160**	**390**	**310**
Motor Oil	**970**	NA	NA	NA	NA	**410**	NA	**570**	**1,400**	**800**

Detected values shown in bold type.
NA = not analyzed
U = Chemical not detected at reported concentration
J = Chemical concentration is reported as estimate.
P = Chemical detected on both chromatographic columns, but values differ by >40% RPD with no obvious interference.
[grey shading] Exceeds SQS (0.41 mg/kg mercury, 410 mg/kg zinc) or MTCA Method A soil cleanup level for unrestricted use (1 mg/kg PCBs)
[black shading] Exceeds CSL (0.59 mg/kg mercury) or MTCA Method A soil cleanup level for industrial use (10 mg/kg PCBs)

Table B-2b: Slip 4 Drainage Basin Sediment Trap Results Compared to Sediment Management Standards.

Seattle Public Utilities ID King County/Boeing MH#	SQS	CSL	SL4-T1 MH422 KC Airport SD, north + central #1 lat	SL4-T4A MH229A KC Airport SD, central lat #1, d/s runway	Slip4-T6 NA I-5 SD at Airport Way S
			Round 1	**Round1**	**Round 1**
Date deployed				03/08/05	
Date removed			08/11/05	08/11/05	08/11/05
Sampled by			Boeing	Boeing	SPU
TOC (percent)			4.29	5.35	3.17
Metals (mg/kg DW)					
As	57	93	**11**	**16**	**11**
Cu	390	390	**83.6**	**94.3**	**84.5**
Pb	450	530	**140**	**144**	**110**
Hg	0.41	0.59	**1.10**	**0.19**	**0.1**
Zn	410	960	**368**	**460**	**422**
LPAH (mg/kg OC)					
Acenaphthene	16	57	**5**	3 U	2.5 U
Acenaphthylene	66	66	2 U	3 U	2.5 U
Anthracene	220	1,200	**8**	**3**	**3.1**
Fluorene	23	79	**4**	3 U	2.5 U
Naphthalene	99	170	2 U	3 U	2.5 U
Phenanthrene	100	480	**65**	**32**	**18**
HPAH (mg/kg OC)					
Benzo(a)anthracene	110	270	**33**	**16**	**8.5**
Benzo(a)pyrene	99	210	**40**	**26**	**7.9**
Benzo(b+k)fluoranthene	230	450	**86**	**64**	**12.0**
Benzo(g,h,i)perylene	31	78	**17**	**13**	**6.9**
Chrysene	110	460	**44**	**32**	**11.7**
Dibenzo(a,h)anthracene	12	33	**6**	3 U	2.5 U
Fluoranthene	160	1,200	**96**	**58**	**27.8**
Indeno(1,2,3-c,d)pyrene	34	88	**19**	**15**	**2.6**
Pyrene	1,000	1,400	**70**	**39**	**19.9**
Phthalates (mg/kg OC)					
Bis(2-ethylhexyl)phthalate	47	78	**56**	**49**	**189**
Butylbenzylphthalate	4.9	64	**3**	3 U	**13**
Diethylphthalate	61	110	2 U	3 U	2 U
Dimethylphthalate	53	53	2 U	3 U	2 U
Di-n-butylphthalate	220	1,700	**3**	**7**	**15**
Di-n-octylphthalate	58	4,500	**10**	**80**	**14**
PCBs (mg/kg OC)					
Aroclor 1016			1 U	0.2 U	57 U
Aroclor 1242			1 U	0.2 U	57 U
Aroclor 1248			1 U	0.2 U	57 U
Aroclor 1254			**233**	**5.4** P	57 U
Aroclor 1260			28 U	**3.0**	**246**
Aroclor 1221			1 U	0.2 U	57 U
Aroclor 1232			1 U	0.2 U	57 U
Total PCBs	12	65	**233**	**8.4** P	**246**
TPH (mg/kg)					
Diesel		2000[a]		**100**	**310**
Motor Oil		2000[a]		**410**	**800**

Detected values shown in bold type.

[a]MTCA Method A soil cleanup level for unrestricted and industrial use.

U = Chemical not detected at reported concentration

P = Chemical detected on both chromatographic columns, but values differ by >40% RPD with no obvious interference.

Exceeds SQS

Exceeds CSL or MTCA Method A soil cleanup level.

Table B-3a: Slip 4 Drainage Basin inline sediment sample results (dry weight).

	Slip 4 Storm Drains								
	MH100 North+ central lat #2	MH100 North+ central lat #2	MH221A Central lat #1, d/s Boeing Field	MH221A Central lat #1, d/s Boeing Field	MH363 North lat, d/s Steamplt	MH363 North lat, d/s Steamplt	MH229A Central lat #1, d/s runway	MH229A Central lat #1, d/s runway	MH32 I-5 SD at Airport Wy
Date	2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	8/11/05 S
TOC (percent)	6.11	6.6	1.09	1	1.11	0.76	4.34	3.88	0.739
Metals (mg/kg DW)									
As	**20**	**20**	**40**	**12**	**9**	**8**	**30**	**30**	10 U
Cu	88.9	**102**	**126**	**38.5**	**64.1**	**45.1**	**69.7**	**85.5**	**61.2**
Pb	134	**142**	**94**	**50**	**51**	**110**	**120**	**155**	**207**
Hg	0.2	**0.2**	**0.09**	**0.09**	**0.48**	**0.7**	**0.07**	**0.07**	0.05 U
Zn	377	**411**	**572**	**332**	**208**	**272**	**699**	**1,130**	**186**
LPAH (ug/kg DW)									
Acenaphthene	100 U	59 U	180 U	58 U	59 U	59 U	**800**	**930**	20 U
Acenaphthylene	100 U	59 U	180 U	58 U	59 U	59 U	**86**	220 U	20 U
Anthracene	100 U	**140**	180 U	**71**	**65**	59 U	**770**	**1,200**	20 U
Fluorene	100 U	59 U	180 U	**73**	59 U	59 U	**810**	**1,100**	20 U
Naphthalene	100 U	59 U	59 U	58 U	59 U	59 U	**76**	220 U	22 U
Phenanthrene	**500**	**250**	**440**	**300**	**400**	**260**	**6,100**	**8,900**	**22**
HPAH (ug/kg DW)									
Benzo(a)anthracene	**320**	**380**	**330**	**280**	**340**	**280**	**1,900**	**3,000**	20 U
Benzo(a)pyrene	**290**	**480**	**470**	**400**	**330**	**300**	**2,000**	**3,400**	**26**
Benzo(b)fluoranthene	**500**	**760**	**740**	**710**	**520**	**450**	**3,300**	**5,400**	**34**
Benzo(g,h,i)perylene	**210**	**200**	**310**	**230**	**170**	**170**	**840**	**1,300**	20 U
Benzo(k)fluoranthene	**280**	**460**	**370**	**400**	**280**	**310**	**2,000**	**3,600**	20 U
Chrysene	**570**	**620**	**600**	**490**	**500**	**400**	**2,600**	**4,200**	**31**
Dibenzo(a,h)anthracene	100 U	59 U	180 U	58 U	59 U	59 U	**370**	220 U	20 U
Fluoranthene	**980**	**880**	**1,100**	**920**	**840**	**750**	**6,700**	**11,000**	**44**
Indeno(1,2,3-c,d)pyrene	**240**	**180**	**380**	**260**	**190**	**180**	**980**	**1,500**	20 U
Pyrene	**750**	**810**	**800**	**870**	**630**	**660**	**4,900**	**7,600**	**50**
Phthalates (ug/kg DW)									
Bis(2-ethylhexyl)phthalate	**1,500**	**2,000**	**800**	**760**	**430**	**500**	**1,200**	**2,200**	**180**
Butylbenzylphthalate	**140**	**86**	180 U	58 U	59 U	59 U	**62**	220 U	20 U
Diethylphthalate	100 U	59 U	180 U	58 U	59 U	59 U	61 U	220 U	20 U
Dimethylphthalate	100 U	59 U	180 U	58 U	59 U	59 U	61 U	220 U	20 U
Di-n-butylphthalate	100 U	59 U	180 U	58 U	59 U	59 U	**110**	220 U	20 U
Di-n-octylphthalate	100 U	**71**	180 U	**120**	**59**	**69**	**130**	**240**	20 U
PCBs (ug/kg DW)									
Aroclor 1016	220 U	95 U	120 U	120 U	1,200 Y	950 U	19 U	140 U	19 U
Aroclor 1242	220 U	95 U	120 U	120 U	940 Y	950 U	19 U	140 U	19 U
Aroclor 1248	220 U	95 U	120 U	120 U	2,400 Y	1,900 U	19 U	140 U	19 U
Aroclor 1254	**1,000**	**1,600**	**590**	**960**	**31,000**	**7,000**	**150**	**3,700**	19 U
Aroclor 1260	**820** P	**380** P	**410**	**530**	3,800 Y	950 U	**160** P	**1,900**	19 U
Aroclor 1221	220 U	95 U	120 U	120 U	470 U	480 U	19 U	140 U	19 U
Aroclor 1232	220 U	95 U	120 U	120 U	1,400 Y	1,400 U	19 U	140 U	19 U
Total PCBs	**1,820** P	**1,980** P	**1,000**	**1,490**	**31,000**	**7,000**	**310** P	**5,600**	19 U
TPH (mg/kg)									
Diesel	**88**	**40**	**120**	**120**	**120**	**47**	**110**	**200**	120 U
Motor Oil	**380**	**190**	**270**	**210**	**680**	**190**	**380**	**1,000**	**290**

Detected values shown in bold type.

U = Chemical not detected at reported concentration

Y = Chemical not detected at the reported concentration. Reporting limit raised due to chromatographic interference.

P = Chemical detected on both chromatographic columns, but values differ by >40% RPD with no obvious interference.

J = Chemical concentration is reported as estimate.

[grey] Exceeds SQS (450 mg/kg lead, 0.41 mg/kg mercury, 410 mg/kg zinc) or MTCA Method A soil cleanup level for unrestricted use (1 mg/kg PCBs)

[black] Exceeds CSL (530 mg/kg lead, 0.59 mg/kg mercury, 960 mg/kg zinc) or MTCA Method A soil cleanup level for industrial use (10 mg/kg PCBs)

Table B-3a: Slip 4 Drainage Basin inline sediment sample results (dry weight).

	Georgetown Flume Samples										
	T1 Flume 15' u/s of box culvert	T2 Flume at S Myrtle St	T5[1] Flume at S Myrtle St	T3 Flume upstream of S Willow St	T4 Head of flume	T6 MH100 u/s of E Marginal Wy S	P1 Flume off of 8" plugged pipe	P2 Flume off of 8" pipe near S Willow St	P3 Flume off of 15" plugged pipe	P4 Flume off of 8" pipe at S Myrtle St	P5 Ditch at S Myrtle St
Date	3/24/05 S	3/24/05 S	3/24/05 S	3/25/05 S	3/24/05 S	3/25/05 S	3/25/05 S	3/25/05 S	3/25/05 S	3/24/05 S	3/24/05 S
TOC (percent)	3.92	1.43	1.17	2.25	8.71	2.68	0.711	2.47	5.27	0.773	6.86
Metals (mg/kg DW)											
As	11	7 U	7 U	7 U	40	7 U	7 U	13	20	6 U	10 U
Cu	63.2	18.5	20.2	54.6	314 J	79.6	18	56.6	133	12.8	95.1
Pb	99	14	15	263	590 J	61	16	69	501	10	73
Hg	0.1	0.05 U	0.05 U	0.41	1.7	0.08	0.05 U	0.18	1	0.06 U	0.08
Zn	218	53.8	61.3	180	1,130	240	60.8	238	766	52.7	195
LPAH (ug/kg DW)											
Acenaphthene	270	20 U	24	380	660	67	20 U	58 U	120 U	19 U	1,600 U
Acenaphthylene	150	20 U	21	230	2,700	34 J	28	92	120 U	19	1,600 U
Anthracene	640	53	91	590	2,500	220	97	270	130	69	1,600 U
Fluorene	240	20 U	20 U	530	1,900	66	20 U	42 J	120 U	19 U	1,600 U
Naphthalene	310	20 U	20 U	97	2,400	59 U	20 U	58 U	120 U	19 U	1,600 U
Phenanthrene	4,500	44	67	6,200	11,000	740	96	250	510	140	1,600 U
HPAH (ug/kg DW)											
Benzo(a)anthracene	1,300	100	150	1,400	7,900	520	150	370	370	73	1,600 U
Benzo(a)pyrene	1,300	240	310	490	8,600	560	130	290	450	83	1,600 U
Benzo(b)fluoranthene	1,600	240	350	850	11,000	640	140	520	640	100	1,600 U
Benzo(g,h,i)perylene	570	92	130	200	2,500	210	52	120	190	33	1,600 U
Benzo(k)fluoranthene	1,600	270	290	1,000	9,400	790	230	540	500	140	1,600 U
Chrysene	2,300	160	210	1,500	8,400	750	230	650	540	160	810 J
Dibenzo(a,h)anthracene	230	34	41	45 J	1,000	54 J	20 U	33 J	120 U	19 U	1,600 U
Fluoranthene	6,300	200	260	6,100	18,000	1,600	530	1,200	1,100	490	1,000
Indeno(1,2,3-c,d)pyrene	660	91	120	220	3,000	210	57	120	210	32	1,600 U
Pyrene	3,200	130	180	3,300	14,000	1,200	300	850	960	230	1,200
Phthalates (ug/kg DW)											
Bis(2-ethylhexyl)phthalate	2,000	140	140	580	210	2,000	120	560	2,100	140	3,800
Butylbenzylphthalate	110	20 U	20 U	59 U	200 U	100	20 U	58 U	160	19 U	1,600 U
Diethylphthalate	60 U	20 U	20 U	59 U	200 U	59 U	20 U	58 U	120 U	19 U	1,600 U
Dimethylphthalate	60 U	20 U	20 U	59 U	200 U	59 U	20 U	58 U	120 U	19 U	1,600 U
Di-n-butylphthalate	87	20 U	20 U	60	200 U	59 U	24	69	140	19 U	1,600 U
Di-n-octylphthalate	60 U	20 U	20 U	59 U	200 U	64	20 U	230	140	19 U	1,600 U
PCBs (ug/kg DW)											
Aroclor 1016	59 U	7.8 U	4.0 U	2,800 U	240 U	40 U	12 U	79 U	26,000 U	3.9 U	240 U
Aroclor 1242	59 U	7.8 U	4.0 U	2,800 U	240 U	40 U	12 U	79 U	26,000 U	3.9 U	240 U
Aroclor 1248	59 U	12	12 J	2,800 U	1,500 J	79 U	28	210	26,000 U	6.3	240 U
Aroclor 1254	190	26 J	29 J	3,900	1,700	240	56 J	450	92,000	14 J	470 U
Aroclor 1260	140	28	24	2,800 U	540	160	36	120	26,000 U	18	1,500
Aroclor 1221	59 U	7.8 U	4.0 U	2,800 U	240 U	40 U	12 U	79 U	26,000 U	7.8 U	240 U
Aroclor 1232	59 U	16 U	4.0 U	2,800 U	240 U	40 U	12 U	79 U	26,000 U	7.8 U	240 U
Total PCBs	330	66 J	65 J	3,900	3,740 J	400	120 J	780	92,000	38.3 J	1,500
TPH (mg/kg)											
Diesel	36	21	19	84	2,300	120	14	63	250	8.9	1,600
Motor Oil	140	99	70	460	9,700	670	66	360	1,100	61	3,000

[1]T5 is duplicate of T2.
S = Seattle field split
B = Boeing field split

Table B-3b: Slip 4 drainage basin inline sediment sample results compared to Sediment Management Standards.

	SQS	CSL	Slip 4 Storm Drains MH100 North+ central lat #2	MH100 North+ central lat #2	MH221A Central lat #1, d/s Boeing Field	MH221A Central lat #1, d/s Boeing Field	MH363 North lat, d/s Steamplt	MH363 North lat, d/s Steamplt	MH229A Central lat #1, d/s runway	MH229A Central lat #1, d/s runway	MH32 I-5 SD at Airport Wy
Date			2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	2/16/05 S	2/16/05 B	8/11/05 S
TOC (percent)			6.11	6.6	1.09	1	1.11	0.76	4.34	3.88	0.739
Metals (mg/kg DW)											
As	57	93	**20**	**20**	**40**	**12**	**9**	**8**	**30**	**30**	10 U
Cu	390	390	88.9	**102**	**126**	**38.5**	**64.1**	**45.1**	**69.7**	**85.5**	**61.2**
Pb	450	530	134	**142**	**94**	**50**	**51**	**110**	**120**	**155**	**207**
Hg	0.41	0.59	0.2	**0.2**	**0.09**	**0.09**	**0.48**	**0.7**	**0.07**	**0.07**	0.05 U
Zn	410	960	377	**411**	**572**	**332**	**208**	**272**	**699**	**1,130**	**186**
LPAH (mg/kg OC)											
Acenaphthene	16	57	2 U	2.7 U	17 U	6 U	5 U	8 U	**18**	**24**	3 U
Acenaphthylene	66	66	2 U	2.7 U	17 U	6 U	5 U	8 U	**2**	**6** U	3 U
Anthracene	220	1,200	2 U	**2.7**	17 U	**7**	**6**	8 U	**18**	**31**	3 U
Fluorene	23	79	2 U	2.7 U	**17**	**7**	5 U	8 U	**19**	**28**	3 U
Naphthalene	99	170	2 U	0.9 U	5 U	6 U	5 U	8 U	**2**	**6** U	**3**
Phenanthrene	100	480	**8**	**6.7**	**40**	**30**	**36**	**34**	**141**	**229**	3 U
HPAH (mg/kg OC)											
Benzo(a)anthracene	110	270	**5**	**6**	**30**	**28**	**31**	**37**	**44**	**77**	3 U
Benzo(a)pyrene	99	210	**5**	**7**	**43**	**40**	**30**	**39**	**46**	**88**	**4**
Benzo (b+k)fluoranthene	230	450	**13**	**18**	**102**	**111**	**72**	**100**	**122**	**232**	**7**
Benzo(g,h,i)perylene	31	78	**3**	**3**	**28**	**23**	**15**	**22**	**19**	**34**	3 U
Chrysene	110	460	**9**	**9**	**55**	**49**	**45**	**53**	**60**	**108**	**4**
Dibenzo(a,h)anthracene	12	33	2 U	1 U	17 U	6 U	5 U	8 U	**9**	6 U	3 U
Fluoranthene	160	1,200	**16**	**13**	**101**	**92**	**76**	**99**	**154**	**284**	**6**
Indeno(1,2,3-c,d)pyrene	34	88	**4**	**3**	**35**	**26**	**17**	**24**	**23**	**39**	3 U
Pyrene	1,000	1,400	**12**	**12**	**73**	**87**	**57**	**87**	**113**	**196**	**7**
Phthalates (mg/kg OC)											
Bis(2-ethylhexyl)phthalate	47	78	**25**	**30**	**73**	**76**	**39**	**66**	**28**	**57**	**24**
Butylbenzylphthalate	4.9	64	**2**	**1.3**	17 U	6 U	5 U	8 U	**1**	6 U	3 U
Diethylphthalate	61	110	2 U	0.9 U	17 U	6 U	5 U	8 U	1 U	6 U	3 U
Dimethylphthalate	53	53	2 U	0.9 U	17 U	6 U	5 U	8 U	1 U	6 U	3 U
Di-n-butylphthalate	220	1,700	2 U	0.9 U	17 U	6 U	5 U	8 U	**3**	6 U	3 U
Di-n-octylphthalate	58	4,500	2 U	**1.1**	**17**	**12**	**5**	**9**	**3**	**6**	3 U
PCBs (mg/kg OC)											
Aroclor 1016			4 U	1.4 U	11 U	12 U	108 Y	125 U	0.4 U	3.6 U	3 U
Aroclor 1242			4 U	1.4 U	11 U	12 U	85 Y	125 U	0.4 U	3.6 U	3 U
Aroclor 1248			4 U	1.4 U	11 U	12 U	216 Y	250 U	0.4 U	3.6 U	3 U
Aroclor 1254			**16**	**24**	**54**	**96**	**2,793**	**921**	**3**	**95**	3 U
Aroclor 1260			**13** P	**6** P	**38**	**53**	342 Y	125 U	**4** P	**49**	3 U
Aroclor 1221			4 U	1.4 U	11 U	12 U	42 U	63 U	0.4 U	3.6 U	3 U
Aroclor 1232			4 U	1.4 U	11 U	12 U	126 Y	184 U	0.4 U	3.6 U	3 U
Total PCBs	12	65	**30** P	**30** P	**92**	**149**	**2,793**	**921**	**7** P	**144**	3 U
TPH (mg/kg)											
Diesel		2,000[a]	**88**	**40**	**120**	**120**	**120**	**47**	**110**	**200**	120 U
Motor Oil		2,000[a]	**380**	**190**	**270**	**210**	**680**	**190**	**380**	**1,000**	**290**

Detected values shown in bold type.

[a]MTCA Method A soil cleanup level for industrial use.

U = Chemical not detected at reported concentration

Y = Chemical not detected at the reported concentration. Reporting limit raised due to chromatographic interference.

J = Chemical concentration is reported as estimate.

P = Chemical detected on both chromatographic columns, but values differ by >40% RPD with no obvious interference.

Exceeds SQS

Exceeds CSL or MTCA Method A soil cleanup level for industrial use.

Table B-3b: Slip 4 drainage basin inline sediment sample results compared to Sediment Management Standards.

			Georgetown Flume Samples										
	SQS	CSL	T1	T2	T5[1]	T3	T4	T6	P1	P2	P3	P4	P5
			Flume 15' u/s of box culvert	Flume at S Myrtle St	Flume at S Myrtle St	Flume upstream of S Willow St	Head of flume	MH100 u/s of E Marginal Wy S	Flume off of 8" plugged pipe	Flume off of 8" pipe near S Willow St	Flume off of 15" plugged pipe	Flume off of 8" pipe at S Myrtle St	Ditch at S Myrtle St
Date			3/24/05 S	3/24/05 S	3/24/05 S	3/25/05 S	3/24/05 S	3/25/05 S	3/25/05 S	3/25/05 S	3/25/05 S	3/24/05 S	3/24/05 S
TOC (percent)			3.92	1.43	1.17	2.25	8.71	2.68	0.711	2.47	5.27	0.773	6.86
Metals (mg/kg DW)													
As	57	93	11	7 U	7 U	7 U	40	7 U	7 U	13	20	6 U	10 U
Cu	390	390	63.2	18.5	20.2	54.6	314 J	79.6	18	56.6	133	12.8	95.1
Pb	450	530	99	14	15	263	590 J	61	16	69	501	10	73
Hg	0.41	0.59	0.1	0.05 U	0.05 U	0.41	1.7	0.08	0.05 U	0.18	1	0.06 U	0.08
Zn	410	960	218	53.8	61.3	180	1,130	240	60.8	238	766	52.7	195
LPAH (mg/kg OC)													
Acenaphthene	16	57	7	1 U	2	17	8	3	3 U	2 U	2 U	2 U	23 U
Acenaphthylene	66	66	4	1 U	2	10	31	1 J	4	4	2 U	2	23 U
Anthracene	220	1,200	16	4	8	26	29	8	14	11	2	9	23 U
Fluorene	23	79	6	1 U	2 U	24	22	2	3 U	2 J	2 U	2 U	23 U
Naphthalene	99	170	8	1 U	2 U	4	28	2 U	3 U	2 U	2 U	2 U	23 U
Phenanthrene	100	480	115	3	6	276	126	28	14	10	10	18	23 U
HPAH (mg/kg OC)													
Benzo(a)anthracene	110	270	33	7	13	62	91	19	21	15	7	9	23 U
Benzo(a)pyrene	99	210	33	17	26	22	99	21	18	12	9	11	23 U
Benzo (b+k)fluoranthene	230	450	82	36	55	82	234	53	52	43	22	31	47 U
Benzo(g,h,i)perylene	31	78	15	6	11	9	29	8	7	5	4	4	23 U
Chrysene	110	460	59	11	18	67	96	28	32	26	10	21	12 J
Dibenzo(a,h)anthracene	12	33	6	2	4	2 J	11	2 J	3 U	1 J	2 U	2 U	23 U
Fluoranthene	160	1,200	161	14	22	271	207	60	75	49	21	63	15
Indeno(1,2,3-c,d)pyrene	34	88	17	6	10	10	34	8	8	5	4	4	23 U
Pyrene	1,000	1,400	82	9	15	147	161	45	42	34	18	30	17
Phthalates (mg/kg OC)													
Bis(2-ethylhexyl)phthalate	47	78	51	10	12	26	2	75	17	23	40	18	55
Butylbenzylphthalate	4.9	64	3	1 U	2 U	3 U	2 U	4	3 U	2 U	3	2 U	23 U
Diethylphthalate	61	110	2 U	1 U	2 U	3 U	2 U	2 U	3 U	2 U	2 U	2 U	23 U
Dimethylphthalate	53	53	2 U	1 U	2 U	3 U	2 U	2 U	3 U	2 U	2 U	2 U	23 U
Di-n-butylphthalate	220	1,700	2	1 U	2 U	3	2 U	2 U	3	3	3	2 U	23 U
Di-n-octylphthalate	58	4,500	2 U	1 U	2 U	3 U	2 U	2	3 U	9	3	2 U	23 U
PCBs (mg/kg OC)													
Aroclor 1016			2 U	1 U	0 U	124 U	3 U	1 U	2 U	3 U	493 U	1 U	3 U
Aroclor 1242			2 U	1 U	0 U	124 U	3 U	1 U	2 U	3 U	493 U	1 U	3 U
Aroclor 1248			2 U	1	1 J	124 U	17 J	3 U	4	9	493 U	1	3 U
Aroclor 1254			5	2 J	2 J	173	20	9	8 J	18	1,746	2 J	7 U
Aroclor 1260			4	2	2	124 U	6	6	5	5	493 U	2	22
Aroclor 1221			2 U	1 U	0 U	124 U	3 U	1 U	2 U	3 U	493 U	1 U	3 U
Aroclor 1232			2 U	1 U	0 U	124 U	3 U	1 U	2 U	3 U	493 U	1 U	3 U
Total PCBs	12	65	8	5	6	173	43	15	17	32	1,746	5	22
TPH (mg/kg)													
Diesel		2,000[a]	36	21	19	84	2,300	120	14	63	250	8.9	1,600
Motor Oil		2,000[a]	140	99	70	460	9,700	670	66	360	1,100	61	3,000

[1]T5 is duplicate of T2.
S = Seattle field split
B = Boeing field split

Table B-4a: Slip 4 drainage basin catch basin and sediment sample results (dry weight).

	SQS	CSL	CB37	CB44	CB45	CB46	CB48	CB79	CB80	RCB49	S1
Date			6/22/04	12/8/04	12/22/04	12/22/04	2/20/05	11/9/05	11/9/05	11/8/05	11/9/05
TOC (percent)			4.74	24.6	9.74	10.4	1.57	6.42	2.68	4.06	3.1
Metals (mg/kg DW)											
As	57	93	20 U	**12**	**20**	**20**	**12**	**30**	6 U	20 U	**11**
Cu	390	390	**173**	**142**	**6,320**	**5,660**	**51.5**	**207**	**85.2**	**85**	**69.9**
Pb	450	530	**250**	**123**	**481**	**396**	**343**	**114**	**29**	**79**	**73**
Hg	0.41	0.59	**0.08**	**0.12**	**0.30**	**0.20**	**0.32**	**0.2**	0.05 U	0.05 U	**0.14**
Zn	410	960	**1,220**	**524**	**3,420**	**3,530**	**657**	**758**	**268**	**357**	**172**
LPAH (ug/kg DW)											
Acenaphthene			**170**	140 U	**760**	1,600 U	**130**	90 U	**66**	20 U	35 U
Acenaphthylene			140 U	140 U	390 U	1,600 U	59 U	90 U	42 U	20 U	35 U
Anthracene			**820**	140 U	**2,100**	**5,000**	**110**	**6,400**	**67** M	**16** J	**21** J
Fluorene			**350**	140 U	**1,300**	**3,000**	**130**	**1,300**	**340**	20 U	35 U
Naphthalene			140 U	140 U	390 U	1,600 U	**470**	**160**	**89**	20 U	35 U
Phenanthrene			**3,000**	**220**	**17,000**	**35,000**	**3,100**	**1,700**	**1,100**	**68**	**78**
HPAH (ug/kg DW)											
Benzo(a)anthracene			**610**	140 U	**13,000**	**27,000**	**1,300**	**730**	**160**	**60**	**81**
Benzo(a)pyrene			**200**	140 U	**15,000**	**32,000**	**1,400**	**830**	**170**	**120**	**140**
Benzo(b)fluoranthene			**480**	**180**	**15,000**	**34,000**	**3,100**	**1,200**	**250** M	**200**	**250**
Benzo(k)fluoranthene			**320**	**180**	**15,000**	**34,000**	**1,500**	**1,300**	**240** M	**170**	**190**
Benzofluoranthenes			**800**	**360**	**30,000**	**68,000**	**4,600**	**2,500**	**490** M	**370**	**440**
Benzo(g,h,i)perylene			140 U	140 U	**7,300**	**16,000**	**660**	**570**	**140**	**110**	**87**
Chrysene			**1,000**	**290**	**20,000**	**43,000**	**2,100**	**1,800**	**400**	**120**	**160**
Dibenzo(a,h)anthracene			140 U	140 U	**2,700**	**5,400**	**99**	**150**	42 U	**14** J	**35**
Fluoranthene			**3,600**	**410**	**31,000**	**85,000**	**4,700**	**1,700**	**360**	**180**	**190**
Indeno(1,2,3-c,d)pyrene			140 U	140 U	**8,600**	**19,000**	**940**	**410**	**62**	**41**	**61**
Pyrene			2,600	**290**	**23,000**	**49,000**	**3,100**	**5,300**	**1,000**	**180**	**290**
Phthalates (ug/kg DW)											
Bis(2-ethylhexyl)phthalate			**1,600**	**3,910**	**8,800**	**30,000**	**88**	**120,000**	**38,000**	**1,400**	**5,500**
Butylbenzylphthalate			**1,300**	**430**	**490**	1,600 U	59 U	90 U	**1,800**	**1,100**	**140**
Diethylphthalate			140 U	140 U	390 U	1,600 U	59 U	90 U	42 U	20 U	35 U
Dimethylphthalate			**280**	**850**	**620**	1,600 U	59 U	90 U	**1,900**	**44**	35 U
Di-n-butylphthalate			140 U	140 U	**1,200**	1,600 U	59 U	90 U	360 B	54 B	63 B
Di-n-octylphthalate			140 U	140 U	1,200	1,600 U	59 U	**4,000**	**1,800**	**79**	35 U
PCBs (ug/kg DW)											
Aroclor 1016			20 U	20 U	58 U	47 U	19 U	99 U	98 U	98 U	99 U
Aroclor 1242			20 U	20 U	58 U	47 U	19 U	99 U	98 U	98 U	99 U
Aroclor 1248			20 U	20 U	58 U	47 U	19 U	99 U	98 U	98 U	99 U
Aroclor 1254			20 U	49 Y	**170**	**250**	**250**	**160**	98 U	98 U	99 U
Aroclor 1260			20 U	**180**	**300**	**430**	77 Y	**140**	98 U	98 U	99 U
Aroclor 1221			20 U	20 U	58 U	47 U	19 U	99 U	98 U	98 U	99 U
Aroclor 1232			20 U	20 U	58 U	47 U	19 U	99 U	98 U	98 U	99 U
Total PCBs			20 U	**180**	**470**	**680**	**250**	**300**	98 U	98 U	99 U
TPH (mg/kg)											

Table B-4a: Slip 4 drainage basin catch basin and sediment sample results (dry weight).

	SQS	CSL	CB37	CB44	CB45	CB46	CB48	CB79	CB80	RCB49	S1
Diesel			**180**	**85**	**950**	**1,900**	**98**	**6,000**	**1,200**	**68**	**280**
Motor Oil			**650**	**790**	**4,700**	**4,600**	**210**	**13,000**	**2,300**	**450**	**1,500**

Detected values shown in bold type.

U = Chemical not detected at reported concentration

Y = Chemical not detected at the reported concentration. Reporting limit raised due to chromatograhic interference.

P = Chemical detected on both chromatographic columns, but values differ by >40% RPD with no obvious interference.

M = Estimated value. Analyte detected and confirmed by analyst, but spectral match patterns are low.

Exceeds SQS

Exceeds CSL or MTCA Method A soil cleanup level

Table B-4b: Slip 4 drainage basin catch basin and sediment samples compared to Sediment Management Standards.

	SQS	CSL	CB37	CB44	CB45	CB46	CB48	CB79	CB80	RCB49	S1
Date			6/22/04	12/8/04	12/22/04	12/22/04	2/20/05	11/9/05	11/9/05	11/8/05	11/9/05
TOC (percent)			4.74	24.6	9.74	10.4	1.57	6.42	2.68	4.06	3.1
Metals (mg/kg DW)											
As	57	93	20 U	**12**	**20**	**20**	**12**	**30**	6 U	20 U	**11**
Cu	390	390	**173**	**142**	**6,320**	**5,660**	**52**	**207**	**85.2**	**85**	**69.9**
Pb	450	530	**250**	**123**	**481**	**396**	**343**	**114**	**29**	**79**	**73**
Hg	0.41	0.59	**0.08**	**0.12**	**0.30**	**0.20**	**0.32**	**0.2**	0.05 U	0.05 U	**0.14**
Zn	410	960	**1,220**	**524**	**3,420**	**3,530**	**657**	**758**	**268**	**357**	**172**
LPAH (mg/kg OC)											
Acenaphthene	16	57	**4**	1 U	**8**	15 U	**8**	1 U	**2**	0.5 U	1 U
Acenaphthylene	66	66	**3** U	1 U	4 U	15 U	4 U	1 U	2 U	0.5 U	1 U
Anthracene	220	1,200	**17**	1 U	**22**	**48**	**7**	**100**	**3** M	**0.4** J	**1** J
Fluorene	23	79	**7**	1 U	**13**	**29**	**8**	**20**	**13**	0.5 U	1 U
Naphthalene	99	170	3 U	1 U	4 U	15 U	**30**	**2**	**3**	0.5 U	1 U
Phenanthrene	100	480	**63**	**1**	**175**	**337**	**197**	**26**	**41**	**2**	**3**
HPAH (mg/kg OC)											
Benzo(a)anthracene	110	270	**13**	1 U	**133**	**260**	**83**	**11**	**6**	**1**	**3**
Benzo(a)pyrene	99	210	**4**	1 U	**154**	**308**	**89**	**13**	**6**	**3**	**5**
Benzo(b)fluoranthene	---	---	**10**	**1**	**154**	**327**	**197**	**19**	**9** M	**5**	**8**
Benzo(k)fluoranthene	---	---	**7**	**1**	**154**	**327**	**96**	**20**	**9** M	**4**	**6**
Benzo(b+k)fluoranthenes	230	450	**17**	**1**	**308**	**654**	**293**	**39**	**18** M	**9**	**14**
Benzo(g,h,i)perylene	31	78	3 U	1 U	**75**	**154**	**42**	**9**	**5**	**3**	**3**
Chrysene	110	460	**21**	**1**	**205**	**413**	**134**	**28**	**15**	**3**	**5**
Dibenzo(a,h)anthracene	12	33	3 U	1 U	**28**	**52**	**6**	**2**	2 U	**0** J	**1**
Fluoranthene	160	1,200	**76**	**2**	**318**	**817**	**299**	**26**	**13**	**4**	**6**
Indeno(1,2,3-c,d)pyrene	34	88	3 U	1 U	**88**	**183**	**60**	**6**	**2**	**1**	**2**
Pyrene	1,000	1,400	**55**	**1**	**236**	**471**	**197**	**83**	**37**	**4**	**9**
Phthalates (mg/kg OC)											
Bis(2-ethylhexyl)phthalate	47	78	**34**	**16**	**90**	**288**	**6**	**1,869**	**1,418**	**34**	**177**
Butylbenzylphthalate	5	64	**27**	**2**	**5**	15 U	4 U	1 U	**67**	**27**	**5**
Diethylphthalate	61	110	3 U	1 U	4 U	15 U	4 U	1 U	2 U	0.5 U	1 U
Dimethylphthalate	53	53	**6**	**3**	**6**	15 U	4 U	1 U	**71**	**1**	1 U
Di-n-butylphthalate	220	1,700	3 U	1 U	**12**	15 U	4 U	1 U	13 B	1 B	2 B
Di-n-octylphthalate	58	4,500	**3**	**1**	**12**	**15**	**4**	**62**	**67**	**2**	1 U
PCBs (mg/kg OC)											
Aroclor 1016			0.4 U	0.1 U	0.6 U	0.5 U	1.2 U	1.5 U	3.7 U	2.4 U	3.2 U
Aroclor 1242			0.4 U	0.1 U	0.6 U	0.5 U	1.2 U	1.5 U	3.7 U	2.4 U	3.2 U
Aroclor 1248			0.4 U	0.1 U	0.6 U	0.5 U	1.2 U	1.5 U	3.7 U	2.4 U	3.2 U
Aroclor 1254			0.4 U	0.2 Y	**1.7**	**2.4**	**15.9**	**2.5**	3.7 U	2.4 U	3.2 U
Aroclor 1260			0.4 U	**0.7**	**3.1**	**4.1**	4.9 Y	**2.2**	3.7 U	2.4 U	3.2 U
Aroclor 1221			0.4 U	0.1 U	0.6 U	0.5 U	1.2 U	1.5 U	3.7 U	2.4 U	3.2 U
Aroclor 1232			0.4 U	0.1 U	0.6 U	0.5 U	1.2 U	1.5 U	3.7 U	2.4 U	3.2 U
Total Aroclor	12	65	0.4 U	**0.7**	**4.8**	**6.5**	**15.9**	**4.7**	3.7 U	2.4 U	3.2 U
TPH (mg/kg)											

Table B-4b: Slip 4 drainage basin catch basin and sediment samples compared to Sediment Management Standards.

	SQS	CSL	CB37	CB44	CB45	CB46	CB48	CB79	CB80	RCB49	S1
Diesel	2,000[a]		**180**	**85**	**950**	**1,900**	**98**	**6,000**	**1,200**	**68**	**280**
Motor Oil	2,000[a]		**650**	**790**	**4,700**	**4,600**	**210**	**13,000**	**2,300**	**450**	**1,500**

Detected values shown in bold type.

[a]MTCA Method A soil cleanup level for unrestricted use.

U = Chemical not detected at reported concentration

Y = Chemical not detected at the reported concentration. Reporting limit raised due to chromatograhic interference.

M = Estimated value. Analyte detected and confirmed by analyst, but spectral match patterns are low.

J = Chemical concentration is reported as estimate.

(grey) Exceeds SQS

(black) Exceeds CSL or MTCA Method A soil cleanup level