Site Hazard Assessment
Worksheet 1
Summary Score Sheet

Name: Eddon Boat Park
Address: 3711 and 3805 Harborview Dr.
City: Gig Harbor, **County:** Pierce **State:** WA **Zip:** 98332
Section/Township/Range: 05/21N/02E
Latitude: 47° 20' 2.45"N **Longitude:** 122° 35' 18.96"W
Facility Site ID Number: 1301959

Site assessed/ranked for August 20, 2008 update

July 11, 2008

Site Description (Include management areas, substances of concern, and quantities):

The Eddon boat Park site consists of two (2) tax parcels (APN's: 0221053074 and 0221053050), totaling approximately three (3) acres, and is located along the shoreline of downtown Gig Harbor, Washington. A boat manufacturing and repair facility operated on the northern parcel from the 1940's until the City of Gig Harbor purchased the property in 2004. A majority of the site lies in tidal and sub-tidal lands, with approximately one-acre residing "upland".

The property is located on a terraced slope on the west side of Gig Harbor. A marina and commercial development is located to the north, shoreline to the east, residential property to the west (across Harborview Drive), and undeveloped land to the south. Slope gradients range from 15% to 25%, 25%-40%, and 40% to near vertical slope gradients[1].

The subsurface soil consists of fill material to a depth of approximately seven to eight feet below ground surface (7'-8' bgs). The fill material was found to be poorly graded sand with silt and silty sand. Dense poorly graded sand with silt was encountered below the fill with dense glacial till beyond. Groundwater seeps were encountered from approximately three feet to seven and one half feet (3'-7.5') bgs[2].

Several structures currently exist on the property. A 6,562 ft^2, two-story boat repair/manufacturing building with an add-on shed, two (2) boat haul out marine railways, a one-hundred twenty foot (120') pier with an attached floating dock, and an older house are located on the northern parcel. Both marine railways extend into the inter-tidal marine portion of the property to an elevation of approximately zero feet mean lower low water tidal level (0' MLLW). The floating dock rests at an elevation of approximately –4' to –6' MLLW.

The southern parcel contained two (2) structures, several concrete retaining walls, and a gravel-loading crane until they were all demolished in 2006. One of the structures was described as a concrete block

[1,2] July 21, 2003 Geotechnical Engineering Phase II Environmental Investigation, Kranzan & Associates, Inc.

structure that operated as City maintenance shop and later an antique shop named "Pandora's". The second building located on the southern parcel is believed to have been a gravel loading facility, but was later used as a retail shop named "Wild Birds Unlimited". Two (2) old creosote wood bulkheads still remain along the shoreline of the southern parcel.

The City of Gig Harbor purchased the site in March 2005 and entered it into the Washington State Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP). Several site investigations were conducted while enrolled in VCP, and ten (10) "areas of concern" were identified. These site investigations were summarized in ten Technical Memorandums developed between 2005 and 2008. In early 2008 The City of Gig Harbor and Ecology entered into an Agreed Order pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050(1). The site was removed from VCP and due to its proximity to Puget Sound, was listed as a Puget Sound Initiative site.

Of the ten areas of concern identified by Ecology's review of the technical memorandums, Ecology has determined that three (3) of the initial ten (10) areas of concern will require further action. These areas are referred to as "Area AHA-1", "Area AG-9" and "Sediments". This Site Hazard Assessment (SHA) will discuss these remaining three areas of concern, include the area of concern referred to as "Site Groundwater", and discuss the surface sample results (obtained within the vicinity of the marine railway) presented in the July 21, 2003, Geotechnical Engineering Phase II Environmental Investigation, prepared by Krazan & Associates, Inc.

Material reviewed for this SHA includes the Draft Agreed Order (open for public comment until July 23, 2008), the pertinent technical memorandums, Ecology's Eddon Boat Park web page, and the Geotechnical Engineering Phase II Environmental Investigation prepared by Krazen & Associates, Inc. Copies of pertinent information contained within these sources are now incorporated into the Tacoma-Pierce County Health Department's (TPCHD) SHA file.

A Site diagram depicting the areas of concern, sample, boring, and monitoring well locations, reproduced from Ecology's Eddon Boat Park web page, prepared by Anchor Environmental, LLC, is included below in "Figure 1", for convenience.

Area AHA-1

The August 2005 Data Assessment and Conceptual Cleanup Plan addresses samples collected at boring AHA-1. The samples obtained from the soil boring were collected at a depth of one and one half feet to three feet (1.5' – 3') bgs. Sample results indicate that the total toxic equivalent carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentration of 0.284 mg/kg exceeds the MTCA Method A Cleanup Level for Unrestricted Landuse – Soil (MTCA Method A – Soil) of 0.1 mg/kg. This area is located just outside the north side door of the boat shed. The "Cleanup Action Plan", prepared by Anchor Environmental, L.L.C, (CAP) states that the area is to be excavated to a depth of three feet (3 ft) over an area of one hundred square feet ($100ft^2$), and then confirmation samples are to be obtained. Due to the proximity to the surface, and no available analytical evidence to indicate that cPAH contamination isn't present at the surface, cPAH will be scored for both surface water and air routes.

The ground surface of area AHA-1 is soil and grass on a relatively slight incline, which becomes more pronounced with proximity to the shoreline. The general area around AHA-1 is moderately wooded with second growth vegetation.

Area AG-9

An initial boring (AG-9) presented in the August 2005 "Data Assessment and Conceptual Cleanup Plan", indicated a total toxic equivalent cPAH concentration of 0.378 mg/kg at a depth of eight to ten feet (8' – 10') bgs. Further investigation was conducted in August 2006, and consisted of the development of a monitoring well (MW-3) in AG-9, and two additional borings (GP-2 and GP-3).
The borings were located twenty feet (20') north and south of the MW-3, respectively. Boring logs from GP-2 and GP-3 indicate that a layer of "charred wood, black, greasy texture" was encountered at a depth of eight to ten feet (8' – 10') bgs. "Technical Memorandum No. 7 –Upland Data Results" contains the sample results and boring logs for various subsurface investigations including the two borings and monitoring well described above. GP-2, GP-3 and MW-3 (formerly AG-9) had soil samples collected and analyzed for total petroleum hydrocarbons (HCID) and PAHs. GP-2 had a sample collected at eight – ten feet (8' – 10') bgs and another at eleven to thirteen feet (11' - 13') bgs. GP-3 and MW-3 had a soil sample collected at eight to ten feet (8' – 10') bgs. All samples collected from these locations at the eight to ten feet (8' – 10') depth contained toxic equivalent cPAH concentrations greater than MTCA Method A – Soil.

cPAH Results for Soil Samples Collected at 8' – 10' bgs – August 2006	
Sample ID	**Concentration (mg/kg)**
GP-2	0.181
GP-3	0.252
MW-3	0.109
MTCA Method A - Soil	0.1

Sample GP-2 at eleven to thirteen feet (11' – 13') bgs had toxic equivalent cPAH concentrations lower (0.062 mg/kg) than MTCA Method A – Soil.

Three groundwater-sampling events occurred at MW-3 on August 4, 2006, February 20, 2007, and May 24, 2007. Samples were analyzed for total Petroleum Hydrocarbons, Metals, PAHs, and Semi Volatile Compounds (SVOCs). Concentrations for all analytes were below Model Toxics Control Act Method A Cleanup Levels – Groundwater (MTCA Method A – Groundwater) and Water Quality Standards for Surface Waters of the State of Washington for Marine Water Exposure[3], with the exception of dissolved copper. Concentrations of dissolved copper in MW-3 (5.9 ug/l) exceeded the Water Quality Standards for Surface Waters of the State of Washington for Acute (4.8 ug/l) and Chronic (3.1 ug/l) Marine Water Exposure in the February 20, 2007 sample. Dissolved copper was not detected above the laboratory-reporting limit (0.5 ug/l) in the May 24, 2007 sample(s).

The ground surface in the area of AG-9 is soil with grass and is open to the environment. The topography slopes moderately towards the creosote wood bulkheads. MW-3 could not be located during a June 2008 site visit, although a wooden stake was located in the general vicinity of the estimated location. Two additional groundwater-monitoring wells (MW-1 and MW-2) were also developed and are discussed below in "Site Groundwater". The locations of all three groundwater-monitoring wells were chosen after

[3] WAC 173-201A-240

consultation with Ecology staff. Groundwater was encountered at a depth of approximately thirteen feet (13') bgs in MW-3.

Section 4.1.1 of the CAP outlines four (4) methods of remediating the two foot (2') thick lens of charred wood debris, but does not discuss further monitoring of the groundwater in this area.

Site Groundwater

In addition to the groundwater monitoring that occurred at MW-3, two additional groundwater-monitoring wells were sampled on the same dates, and for the same analytes. MW-1 is located in a concrete driveway that approaches the wooden pier, south of the marine railway. MW-2 is located approximately sixty to seventy feet (60' -70') southwest of MW-1, in the same concrete driveway. Groundwater was encountered at approximately three feet (3') bgs in MW-1, and at approximately two feet (2') bgs in MW-2.

Sample results indicated that dissolved arsenic was present in MW-2, above MTCA Method A – Groundwater, in all three sample events and duplicate samples but below the Water Quality Standards for Surface Waters of the State of Washington for Marine Water Exposure. Concentrations for all other analytes, in both monitoring wells, were below MTCA Method A – Groundwater and Water Quality Standards for Surface Waters of the State of Washington for Marine Water Exposure.

The CAP addresses the groundwater contamination at this site as follows; "Site investigations showed that groundwater is not a pathway of concern on this Site for human health risk or for the potential to affect the marine waters. Therefore, no groundwater cleanup standards have been set". Due to the fact that arsenic contamination was present in the site's groundwater above MTCA Method A – Groundwater during all three sample-events, it will be scored as a release to groundwater for the groundwater pathway.

Arsenic Groundwater Concentrations (ug/l)					
Sample ID	August 4, 2006	August 4, 2006 (Duplicate)	February 20, 2007	February 20, 2007 (Duplicate)	May 24, 2007
MW-2	5.9	5.1	6.2	6.7	6.8
MTCA Method A Cleanup Level - Groundwater				5	

Marine Railway - Surface Sample Results

In May 2003, Krazan & Associates, Inc. conducted an investigation, which included six (6) test pits and eight (8) soil borings. Samples for TPH analysis were collected from four (4) borings (HB3, HB4, HB5, HB8) and one (1) test pit (TP3). The sample depths ranged from surface to nine feet (0.0' – 9') bgs. Sample analysis did not indicate TPH contamination above MTCA Method A – Soil for any of the samples collected. Samples for Metals analysis were collected from four (4) borings (HB2, HB4, HB5, HB6) and one (1) test pit (TP3). The sample depths ranged from surface to nine feet (0.0' – 9') bgs. Laboratory results indicated that cadmium contamination, exceeding MTCA Method A – Soil, was present in HB4 at surface to four inches (0.0'' – 4'') bgs and lead contamination was present, exceeding MTCA Method A – Soil, in three borings (HB4, HB5, and HB6) at depths ranging from surface to eight inches (0.0'' – 8'') bgs. Borings HB4 and HB 6 were both located above the mean higher water line and HB5 was located above the mean high water line. Borings HB4, HB5, and HB6

were located on the east side of the boat manufacturing/repair facility, under or adjacent to the marine railways. The general area is uncovered shoreline, moderately sloped towards Gig Harbor.

May 2003 Concentration Metals Surface Soil Krazan & Associates, Inc.			
Sample ID	Sample Depth (Inches)	Cd (mg/kg)	Pb (mg/kg)
HB4-S1	0-4	2.1	7,300
HB5-S1	0.5 - 8	<0.52	870
HB6-S1	0 - 4	<0.42	350
MTCA Method A - Soil		2	250

Due to the documented surface contamination exceeding MTCA Method A Cleanup Levels – Soil and the proximity to surface water, cadmium and lead will be scored for both the air and surface water routes.

The sediment remediation outlined in the CAP is likely to remove the contaminated soil in this area.

Sediments

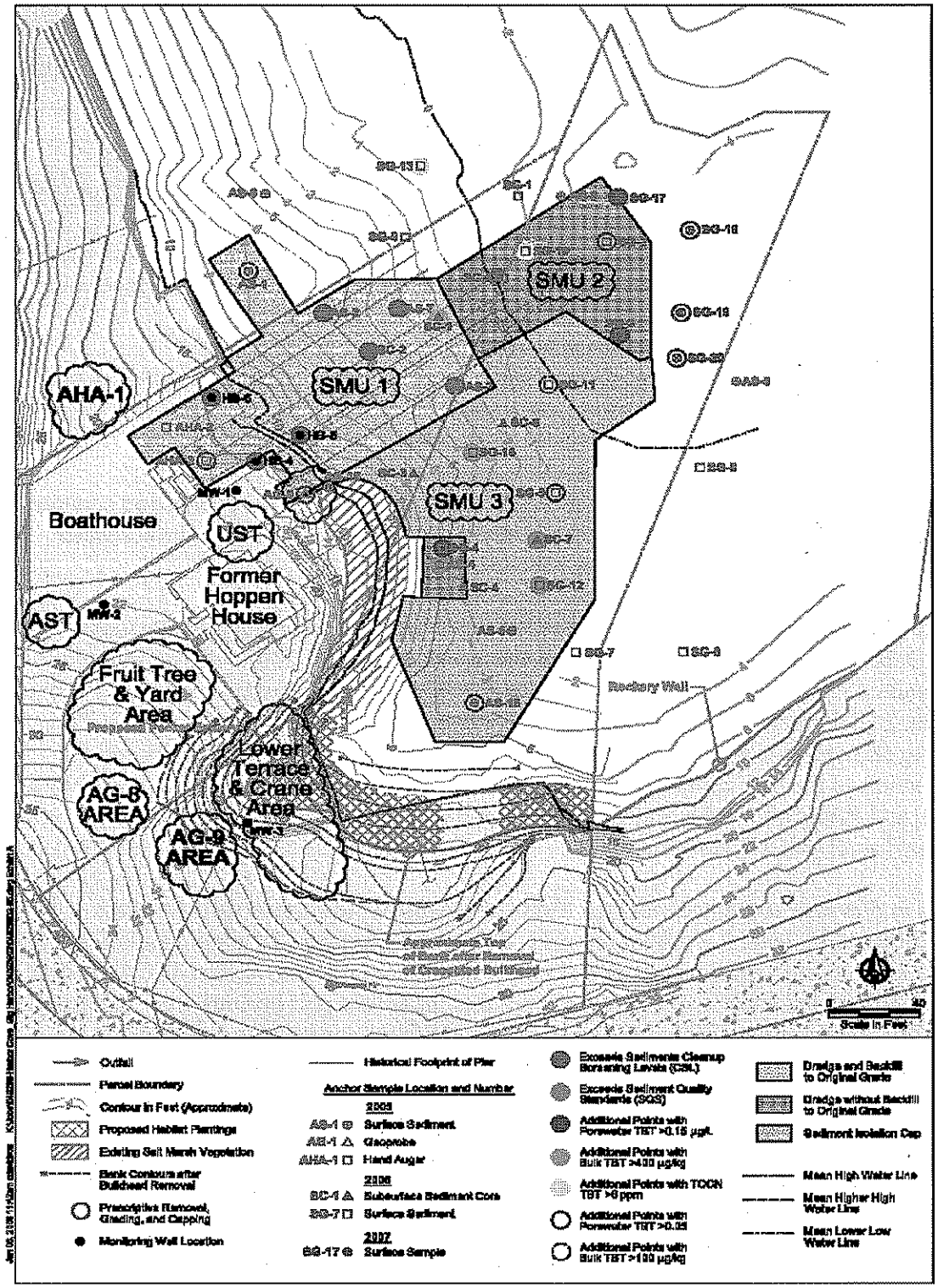
A brief discussion of sediment contamination is presented here to draw a potential connection between upland contamination, the historical use of the marine railway system, and a release to surface water sediments.

The Draft Agreed Order reviews the following findings; "Initial sediment sampling results were presented in the Data Assessment and Conceptual Cleanup Plan (August, 2005). Additional sediment samples were obtained in October of 2006 and in July of 2007, and are presented in Revised Technical Memorandum No. 2 (February 2007) and in Technical Memorandum No. 9 (August, 2007). The sediment sampling showed that the sediments in the vicinity of the marine haul out rails and the sediments to the south of the pier contained levels of mercury, copper, lead, phthalates, polychlorinated biphenyls (PCB), and PAHs above the State of Washington Sediment Quality Standards (SQS) and Minimum Cleanup Level (MCUL) criteria.

Four soil borings in this area contained elevated levels of metals in the surface soils (highest concentrations: 7300 mg/kg lead, 1.2 mg/kg mercury, 2030 mg/kg copper, 2.1 mg/kg cadmium, 442 mg/kg zinc). One sample from this area contained cPAH in surface soils above the MTCA Method A cleanup level for unrestricted soils". It should be noted that these four soil borings were not analyzed for phthalates, PCBs, or buytltins. Elevated concentrations of these constituents are likely to be present due to the documented concentrations in the east and southern sediments.

A release to surface water will be scored due to the documented upland surface soil contamination of cPAHs in the area of AHA-1, the documented surface soil contamination of cPAHs, cadmium, and lead within the marine railway area, and the documented presence of sediment contamination of these three constituents within the marine railway area and the area south of the pier.

Figure 1 (Site Diagram)



ANCHOR

Notes:
1. Base map prepared from survey provided by David Evans and Associates dated May 2006.
2. Horizontal Datum: NAD 83 WA South.
3. Vertical Datum: Mean Lower Low Water (MLLW).

Exhibit A
Site Map
Eddon Boatyard Sediment Remediation Project

Special Considerations (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

The Eddon Boat Park Site is under an Agreed Order between Ecology and the City of Gig Harbor. Permit acquisition and project contractor selection have already been completed. Remedial activities are scheduled to end by November 10, 2008. Future site development should mitigate a majority of the environmental impact.

Although a release to groundwater has been scored (documented arsenic contaminated above MTCA Method A –Groundwater) and the population served within a two-mile radius is greater than ten thousand (10,000), it should be noted that all of the drinking water wells lie upland/up-gradient of this site. It is unlikely that contaminated groundwater at this site is connected to the upland drinking water aquifer. The shallowest, hydraulically continuous, drinking water well within a two-mile radius is sixty feet (60') deep, the deepest is nine hundred nine feet (909') deep. The median well depth is two hundred eleven feet (211') deep.

ROUTE SCORES:

Surface Water/Human Health: 48.0

Surface Water/Environ: 65.1

Air/Human Health: 20.7

Air/ Environmental: 30.3

Ground Water/Human Health: 77.8

OVERALL RANK: 1

Worksheet 2--Route Documentation

1. SURFACE WATER ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2**

cPAHs (Benzo[a]pyrene), Lead, Cadmium

b. Explain basis for choice of substances(s) to be used in scoring:

The substance listed above will be scored for the surface water route due to levels detected in contaminated surface soil, and because it was available to the surface water route through less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2**

Spills, discharges, and soil contamination.

d. Explain basis for choice of unit to be used in scoring:

Contaminated surface soil verified by sampling and analysis.

2. AIR ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2**

cPAHs (Benzo[a]pyrene), Lead, Cadmium

b. Explain basis for choice of substances(s) to be used in scoring:

cPAHs (Benzo[a]pyrene), Lead, and Cadmium will be scored for the air route due to concentrations detected in surface soil and because all substances are available to the air route through less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2**

Contaminated soil, discharges, spill with no vapor collection system.

d. Explain basis for choice of unit to be used in scoring:

Contaminated surface soil verified by sampling and analysis.

3. GROUND WATER ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2**

Arsenic, Cadmium, cPAHs (Benzo[a]pyrene), Lead

b. Explain basis for choice of substances(s) to be used in scoring:

Arsenic will be scored for the groundwater route due to concentrations detected in groundwater, verified through sample analysis

Cadmium, cPAHs, and lead will be scored for the groundwater route due to concentrations detected in soil and because it was available to the groundwater route through less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2**

Spills, discharges, and soil contamination.

d. Explain basis for choice of unit to be used in scoring:

Contaminated, uncapped subsurface soil verified by sampling and analysis.

Worksheet 4 - Surface Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg-bw)	Val.	Carcinogenicity WOE	Carcinogenicity PF*	Val.
1	Benzo[a]pyrene	0.2	10	50 (rat)	10	--	--	B2	12	7
2	Cadmium	5	8	225 (rat)	5	0.0005	5	--	--	ND
3	Lead	5	8	--	ND	0.001	10	--	--	ND
4										
5										
6										

*Potency Factor

Source: 2,3

Highest Value: 10 (Max=10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12 (Max=12)

1.2 Environmental Toxicity

	Substance	☐ Freshwater ☒ Marine Acute Water Quality Criteria	Value	Non-human Mammalian Acute Toxicity (mg/kg)	Value
1	Benzo[a]pyrene	300 ug/l	4		
2	Cadmium	43 ug/l	6		
3	Lead	140 ug/l	4	--	ND
4					
5					
6					

Source: 2,3

Value: 6 (Max 10)

1.3 Substance Quantity

Substance Quantity: 2216 ft^2

Source: 1.2

Value: 6 (Max 10)

Explain Basis: Estimated minimum areal extent of surface soil impacting surface water

Worksheet 4 (cont'd)

2.0 MIGRATION POTENTIAL

		SOURCE	VALUE
2.1	**Containment:** Contaminated soil, spill, or discharge **Explain Basis:** Contaminated surface soil verified by sample analysis. No run-on/runoff control.	1, 2, 8	**10** (Max = 10)
2.2	**Surface Soil Permeability:** Adjacent to surface water.	1, 2	**7** (Max = 7)
2.3	**Total Annual Precipitation:** 52.63''	2, 6	**4** (Max = 5)
2.4	**Max. 2-Yr/24-hour Precipitation:** 2.5 inches	2	**3** (Max = 5)
2.5	**Flood Plain:** Zone A1 on FIRM	2, 8	**2** (Max = 2)
2.6	**Terrain Slope:** 25% slope	1, 2	**5** (Max = 5)

3.0 TARGETS

		SOURCE	VALUE
3.1	**Distance to Surface Water:** Adjacent to site, < 1,000 ft	1, 2, 7	**10** (Max = 10)
3.2	**Population served within 2 miles (See WARM Scoring Manu regarding direction): √ pop.= √ 0 = 0**	2, 5, 7	**0** (Max = 75)
3.3	**Area irrigated within 2 miles: (0.75) √ no. acres (39) = 4.68 (Refer to note in 3.2.) : (0.75) √ 0 = 0**	2, 4	**0** (Max = 30)
3.4	**Distance to nearest fishery resource:** Adjacent near-shore salmon feeder bluffs.	2, 7	**12** (Max = 12)
3.5	**Distance to, and name(s) of, nearest sensitive environment(s)** Adjacent near-shore salmon feeder bluffs.	2, 7	**12** (Max = 12)

4.0 RELEASE	Source	Value
Explain basis for scoring a release to surface water: Contamination, verified by sampling and analysis, present in both surface soil and sediment.	1, 2	**5** (Max = 5)

Worksheet 5 – Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring

1.2 Human Toxicity

	Substance	Drinking Water Standard (ug/1)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg-bw)	Val.	Carcinogenicity WOE	Carcinogenicity PF*	Val.
1	Benzo[a]pyrene	0.2	10	50 (rat)	10	--	--	B2	12	7
2	Cadmium	5	8	225 (rat)	5	0.0005	5	--	--	ND
3	Lead	5	8	--	ND	0.001	10	--	--	ND
4										
5										
6										

***Potency Factor**

Source: 1,2,3
Highest Value: 10 (Max=10)
Plus 2 Bonus Points? 2
Final Toxicity Value: 12 (Max=12)

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility	1.3.2 Particulate Mobility
Vapor Pressure(s) (mmHg):	**Soil Type:** Silty Sand
1=	**Erodibility:** 73
2=	**Climatic Factor:** 1-10
3=	**Particulate Mobility Potential:** 1
4=	
5=	

Source: 2, 3
Value: 1 (Max = 4)

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7)

Source: 2, 3
Final Matrix Value: 6 (Max = 24)

Worksheet 5 (cont'd)

1.5 Environmental Toxicity/Mobility

	Substance	Non-Human Mammalian Inhal. Toxicity (mg/ m^3)	Acute Value	Mobility (mmHg)	Value
1	Benzo[a]pyrene	--	ND	5.9×10^{-9}	1
2	Cadmium	25 (rat)	10	0.0 x 10	1
3	Lead	--	ND	0.0 x 10	1
4					
5					

Highest Environmental Toxicity/Mobility Matrix Value (From Table A-7) equals

Final Matrix Value: 5
(Max= 24)

1.6	**Substance Quantity**: 2116 ft^2 **Explain basis:** Estimated minimum areal extent of contaminated surface soil available to the air route.	**Source:** 1, 2, 7	**Value: 4** (Max=10)

2.0 MIGRATION POTENTIAL

Containment: Spill/discharge to soil surface, no cover, no vapor collection system	**Source:** 1, 2, 8	**Value: 10** (Max=10)

3.0 TARGETS

3.1	**Nearest Population:** Immediately adjacent properties	**Source:** 2, 7	**Value: 10** (Max=10)
3.2	**Distance to, and name(s) of, nearest sensitive environment(s):** Adjacent to near shore salmon feeder bluffs.	**Source:** 2, 7	**Value: 7** (Max=7)
3.3	**Population within 0.5 miles:** $\sqrt{}$ **pop.** $= \sqrt{1854} = 43$	**Source:** 2, 7	**Value: 43** (Max=75)

4.0 RELEASE

Explain basis for scoring a release to air: No confirmed release	**Source:** 1, 2	**Value: 0** (Max.=5)

Worksheet 6 – Ground Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (ug/1)	Val	Acute Toxicity (mg/kg-bw)	Val	Chronic Toxicity (mg/kg/day)	Val	Carcinogenicity		Val
								WOE	PF*	
1	Arsenic	10	8	763 (rat)	5	0.001 (RfD)	5	A	1.75	7
2	Benzo[a]pyrene	0.2	10	50 (rat)	10	--	--	B2	12	7
3	Cadmium	5	8	225 (rat)	5	0.0005	5	--	--	ND
4	Lead	5	8	--	ND	0.001	10	--	--	ND
5										
6										

***Potency Factor**

Source: 2, 3

Highest Value: 10 (Max=10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12 (Max=12)

1.2 Mobility (Use numbers to refer to above listed substances)

Cations/Anions:	OR	Solubility (mg/1):
1= Arsenic = 3		1=
2=		2= Benzo [a] pyrene = 0.001 mg/l = 0
3= Cadmium = 3		3=
4= Lead = 2		4=
5=		5=
6=		6=
		Source: 2, 3
		Value: 3 (Max=3)

1.3 Substance Quantity: 386 yd^3

Explain basis: Estimated volume of contaminated soil available to groundwater through less than perfect containment.

Source: 1, 2

Value: 3 (Max=10)

Worksheet 6 (cont'd)

2.0 MIGRATION POTENTIAL

2.1	**Containment:** spills, discharges, and contaminated soil. **Explain basis:** contaminated soil	**Source:** 1, 2, 8	**Value:** 10 (Max = 10)
2.2	**Net precipitation:** Nov – April precipitation (averaged) = 40.3 in for nearest weather station at Wauna; averaged PET of Pierce Co used (5.1 in.) as no area data available; 40.3-5.1= **35.2 inches**	**Source:** 2, 6	**Value:** 4 (Max = 5)
2.3	**Subsurface hydraulic conductivity:** silty sand	**Source:** 1, 2	**Value:** 3 (Max = 4)
2.4	**Vertical depth to ground water:** < 25 feet	**Source:** 1, 2	**Value:** 8 (Max = 8)

3.0 TARGETS

3.1	**Ground water usage:** Public supply; no alternate unthreatened sources available.	**Source:** 2, 7	**Value:** 9 (Max = 10)
3.2	**Distance to nearest drinking water well:** ~885 **feet** (Group B, PWSID 78367)	**Source:** 2, 7	**Value:** 4 (Max = 5)
3.3	**Population served within 2 miles: √ pop.** = √ 10,630 = 78.36	**Source:** 2, 5, 7	**Value:** 100 (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles: (0.75)** √ 26.5 **No. acres** = 3.86 = 4	**Source:** 2, 4	**Value:** 4 (Max = 50)

4.0 RELEASE

Explain basis for scoring a release to ground water: Release of arsenic confirmed through sampling and analysis.	**Source:** 1, 2	**Value:** 5 (Max = 5)

Sources Used in Scoring

1. Tacoma-Pierce County Health Department Site Hazard Assessment File/Ecology TCP File
2. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
3. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992.
4. Water Rights Application Tracking System (WRATS), Ecology
5. Washington State Department of Health Public Water Supply System
6. Washington Climate for Pierce County, National Weather Service Forecast Office
7. Pierce County Geographic Information System Countyview Database
8. July 1, 2008 SHA Site Visit