SITE HAZARD ASSESSMENT

WORKSHEET 1

Summary Score Sheet

SITE INFORMATION:

Site Name: Shelton Yacht Club
Address: 659 E Pine St
Ecology Facility Site ID No.: 4867529
Section/Township/Range: 20/20/3
Latitude: 47.21384 Longitude: -123.08820

Site scored/ranked for the August, 2013 update
Today's date: May 21, 2013

SITE DESCRIPTION:

The subject site consists of an irregularly-shaped parcel, which lies within the Puget Sound Initiative area of concern. The parcel is approximately 1.3 acres and is zoned as commercial for lumber and wood. Oakland Bay provides the southern and eastern boundaries for this parcel. The site is owned by the Simpson Timber Company but is the site of the Shelton Yacht Club. Currently the site has a boat maintenance building on it.

In 1999 a Reconnaissance Survey of Inner Shelton Harbor Sediments was conducted by the Washington State Department of Ecology, (Ecology). The results of the survey showed potential contamination of the sediments by copper, zinc, and tributyltin, an antifouling agent for boats In 2005 an initial investigation was conducted by Ecology. Two sediment samples were taken from the boat yard on the property in the intertidal zone. The sample results showed Benzo(a)pyrene contamination above its respective MTCA Method A Cleanup Level of 0.1 mg/Kg. Tributyltin, several priority metals of concern (MTCA table 749-2), and other semi-volatile components, while present, were lower than their MTCA Cleanup Levels. The contamination is likely a result of improperly administered boat maintenance on site.

In 2005 Ecology added the subject site to the Confirmed or Suspected Contaminated Sites List as a state cleanup site awaiting a Site Hazard Assessment

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 scope of this Site Hazard Assessment did not include a hydrogeologic survey of the subject site and surrounding area. The groundwater contamination documented or inferred at the subject site is therefore considered to have the potential to impact any well located within the prescribed 2-mile radius and all such wells were used in the scoring process.

The sediment management standards were exceeded for Copper and Zinc. One of the samples taken was three times the sediment cleanup standard for Copper of 390 mg/Kg (ppm). Zinc was also above the sediment screening level.

The samples confirming contamination were taken from sediment in the boat yard an area within the intertidal zone. The sample results were used to score the surface water, ground water and air pathways; sediments are not presently being ranked.

Substance quantity was determined using aerial photography of the subject site and estimating the contaminated area. A depth of one foot was used to estimate cubic yards of contaminated soil.

Aerial photography was used to estimate substance quantity and area irrigated. A depth of one foot was used to estimate cubic yards of contaminated soil.

ROUTE SCORES:

Surface Water/Human Health: 5
Air/Human Health: 5
Groundwater/Human Health: 5
Surface Water/Environmental.: 5
Air/Environmental: 5

OVERALL RANK: 1

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**

   a. List those substances to be considered for scoring: Source: 1,2,3

      Arsenic, Benzo(a)pyrene

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

Arsenic and Benzo(a)pyrene are present in both samples and provide a high toxicity value for scoring.

   c. List those management units to be considered for scoring: Source: 1,2,3

      Primary metals of concern, Tributyltin, and several semivolatiles present in the samples.

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

Arsenic and Benzo(a)pyrene are present in both samples and provide a high toxicity value for scoring.

2. **AIR ROUTE**

   a. List those substances to be considered for scoring: Source: 1,2,3

      Arsenic, Benzo(a)pyrene, Pyrene

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

      Arsenic, Benzo(a)pyrene, and Pyrene are present in both samples and provide a high toxicity value for scoring.

   c. List those management units to be considered for scoring: Source: 1,2,3

      Primary metals of concern, Tributyltin, and several semivolatiles present in the samples.

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

      Arsenic, Benzo(a)pyrene, and Pyrene are present in both samples and provide a high toxicity value for scoring.

3. **GROUNDWATER ROUTE**

   a. List those substances to be considered for scoring: Source: 1,2,3

      Arsenic, Benzo(a)pyrene

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

      Arsenic and Benzo(a)pyrene are present in both samples and provide a high toxicity value for scoring.

   c. List those management units to be considered for scoring: Source: 1,2,3

Primary metals of concern, Tributyltin, and several semivolatiles present in the samples.

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

Arsenic and Benzo(a)pyrene are present in both samples and provide a high toxicity value for scoring.

WORKSHEET 4
Surface Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic		6		5		5			7
2	Benzo(a)pyrene		10		10		ND			7
3										
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 ( ) Freshwater (X) Marine

	Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity	
		(µg/L)	Value	(mg/kg)	Value
1	Arsenic		6	763	5
2	Benzo(a)pyrene		4	50	10
3					
4					
5					
6					

Source: 2,3

Highest Value: 10

(Max = 10)

1.3 Substance Quantity	
Explain Basis: approximated at 54,201 square feet of contaminated sediment using aerial photography	Source: 1,2,7 **Value: 8** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment** **Explain basis: contaminated soil at the surface with no run-on/runoff control**	1,2	**10** (Max = 10)
2.2	**Surface Soil Permeability: Shelton gravelly sandy loam**	2,10	**1** (Max = 7)
2.3	**Total Annual Precipitation: 60.1-70 inches**	2,4	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation: 3.96 inches**	2,8	**3** (Max = 5)
2.5	**Flood Plain:**	2,9	**2** (Max = 2)
2.6	**Terrain Slope:**	2,7	**1** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:**	2,7	**10** (Max = 10)
3.2	**Population Served within 2 miles (see WARM Scoring Manual Regarding Direction):** City of Shelton surface water intake serves 10,122	2,5,6	**75** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles : (0.75)*√# acres =** Approximately 550 acres irrigated by surface water	2,5,6,7	**18** (Max = 30)
3.4	**Distance to Nearest Fishery Resource: Parcel is on the shores of Oakland Bay**	2,7	**12** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s): Parcel is on the shores of Oakland Bay**	2,7	**12** (Max = 12)

4.0 RELEASE

Explain Basis: Samples confirm contamination at this site	Source: 1,2 **Value: 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	Air Standard ($\mu g/m^3$)	Value	Acute Toxicity (mg/m^3)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic		10		ND		ND			9
2	Benzo(a)pyrene		10		ND		ND			ND
3										
4										
5										

* *Potency Factor*

Source: 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	Erodibility	Climatic Factor
1	3	Gravely sandy loam	22	1
2	3	Gravely sandy loam	22	1
3				

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

Source: 2,3
Value:0
(Max = 4)

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

(Use highest of:)

Final Matrix Value: 18
(Max = 24)

1.5	Environmental Toxicity/Mobility –					
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
2	Pyrene	170	8	2.5E-6	2	8
6						

Highest Environmental Toxicity/Mobility Matrix Value (Table A-7) = **Final Matrix Value: 8**
(Max = 24)

1.6	Substance Quantity	
	Explain Basis: approximated at 54,201 square feet of contaminated sediment using aerial photography	Source: 1,2,7 **Value: 6** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	**Value**
2.1	**Containment:** surface spill with no cover and no vapor collection system	1,2	**10** (Max = 10)

3.0 TARGETS

		Source	**Value**
3.1	**Nearest Population: nearest residence is 670ft to the northwest**	2,7	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s): Acccess to Oakland Bay is on the parcel**	2,7	**7** (Max = 7)
3.3	**Population within 0.5 miles: approximately 2203 people within 0.5 miles**	2,7,11	**47** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: Samples confirm contamination at this site.	Source: 1,2 **Value: 5** (Max = 5)

WORKSHEET 6
Groundwater Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic		10		ND		ND			9
2	Benzo(a)pyrene		10		ND		ND			ND
3										
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 Mobility (use numbers to refer to above listed substances)

Cations/Anions [Coefficient of Aqueous Migration (K)] OR	Solubility (mg/L)
1=	1= 3
2=	2= 0
3=	3 =
4=	4=
5=	5=
6=	6=

Source: 2,3

Value: 3
(Max = 3)

1.3 Substance Quantity:

Explain basis: approximated at 2155 cubic yards of contaminated sediment using aerial photography an approximated 1 foot deep	Source: 1,2 **Value: 5** (Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Contaminated soil with no cover	1,2	**10** (Max = 10)
2.2	**Net precipitation:** 60.1-70 inches	2,4	**5** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Gravely Sandy Loam	2,10	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** well logs show 4-10 feet	2,5,6	**8** (Max = 8)

2.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Multiple public water wells in 2-mile radius	2,5,6	**9** (Max = 10)
3.2	**Distance to nearest drinking water well:** approximately 1440 ft	2,5,6,7	**3** (Max = 5)
3.3	**Population served within 2 miles:** Several City of Shelton wells each serving 10,122 people	2,5,6,7	**100** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** **(0.75)*√**approximately 1580 acres irrigated by groundwater	2,5,6,7	**30** (Max = 50)

3.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Samples confirm contamination at the site	1,2	**5** (Max = 5)

SOURCES USED IN SCORING

1. Washington State Department of Ecology Site Hazard Assessment File/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. U.S. Department of Interior Geological Survey Topographical Map
5. Washington State Department of Health, Public Water System Database
6. Washington State Department of Ecology, Water Resources Explorer
7. Mason County GIS map
8. Department of Commerce, NOAA Atlas 2, Volume IX
9. Washington State Department of Ecology DFIRM maps
10. Washington State Department of Agriculture, soil maps
11. United States Census 2010