

SITE HAZARD ASSESSMENT  
WORKSHEET 1  
Summary Score Sheet

**SITE INFORMATION:**

**Site Name:** Port Longview  
**Address:** 10 Port Way, Longview  
**Ecology Facility Site ID No.:** 42978181  
**Township/Range/Section:** 07 N/02 W/08 W.M.  
**Latitude:** 46.10845    **Longitude:** -122.95723

*Site scored/ranked for the February 2014 update  
Today's date: December 10, 2013*

**SITE DESCRIPTION:**

The subject site consists of an irregularly shaped 88.15 acre parcel, designated as “Longview Industrial” in an area of Longview zoned for industrial, commercial, and residential uses. The site lies approximately 31 feet above mean sea level. The Columbia River, a salmon-bearing river, borders the property to the south and Oregon Way provides the western boundary for the site.

Currently the subject site houses the Port of Longview and several buildings associated with port operations. The subject site is almost entirely paved and provides storage for various vehicles and heavy machinery.

Five underground pipelines run parallel to Port Way, historically these pipelines carried fuel to and from the Chevron terminal, north of the site. The pipelines have since been abandoned.

In October of 1984, the Washington State Department of Ecology (Ecology) conducted an inspection at the subject site. A large pile of lead/beet pellets were discovered, uncovered, at the site.

In February of 1991, Petroleum Services Unlimited Inc., decommissioned and removed an UST from the subject site. The UST was a 750 gallon gasoline tank. Petroleum odors were noted from the tank excavation, and groundwater seepage appeared to have free floating product. Sample results, for a soil sample taken from beneath the UST, returned above 2,000 mg/kg, the MTCA Method A Cleanup Level for diesel. The excavation was backfilled. A monitoring well and three soil borings were completed in the vicinity of the UST. Soil sample results from these activities confirmed contamination beyond the immediate area of the former UST. Seven additional borings were completed at the site. Sample results from the borings returned with gasoline and diesel contamination. Additional monitoring wells, bringing the total to five, were constructed at the site. Water sample results from the monitoring wells returned with total petroleum hydrocarbons, benzene, and toluene above their respective MTCA Method A Cleanup Levels. The Port of Longview believed the contamination originated from another, offsite, source.

Restoration activities began in 1992, as part of an Independent Cleanup Action regarding an 80,000 gallon AST housed at the subject site. During the use of the AST oil was reportedly added to the sand

below the tank, so as to prevent rusting on the tank. Gasoline was discovered, at depths below the groundwater table, on the southwest side of the AST. Diesel and Bunker C fuel were discovered between 1.5-8 feet below ground surface on the east and south side of the tank. The highest concentrations of petroleum returned from surface soils beneath the AST. Soil samples were collected during the construction of a monitoring well. The soil sample results returned with volatile organic compounds (VOCs) at approximately nine feet below ground surface. The soil in the vicinity of the AST was excavated to a depth of approximately six feet below ground surface, the soil and water interface. Confirmation samples, taken from the excavation, returned with diesel above its MTCA Method A Clean up Level of 2,000 mg/kg. Further excavation was limited by high groundwater, sandy soils, and the proximity to the railroad.

In March of 1993, Golder Associates collected ten surface soil samples from the vicinity of the AST. The samples returned with diesel and other petroleum as high as 150,000 mg/kg.

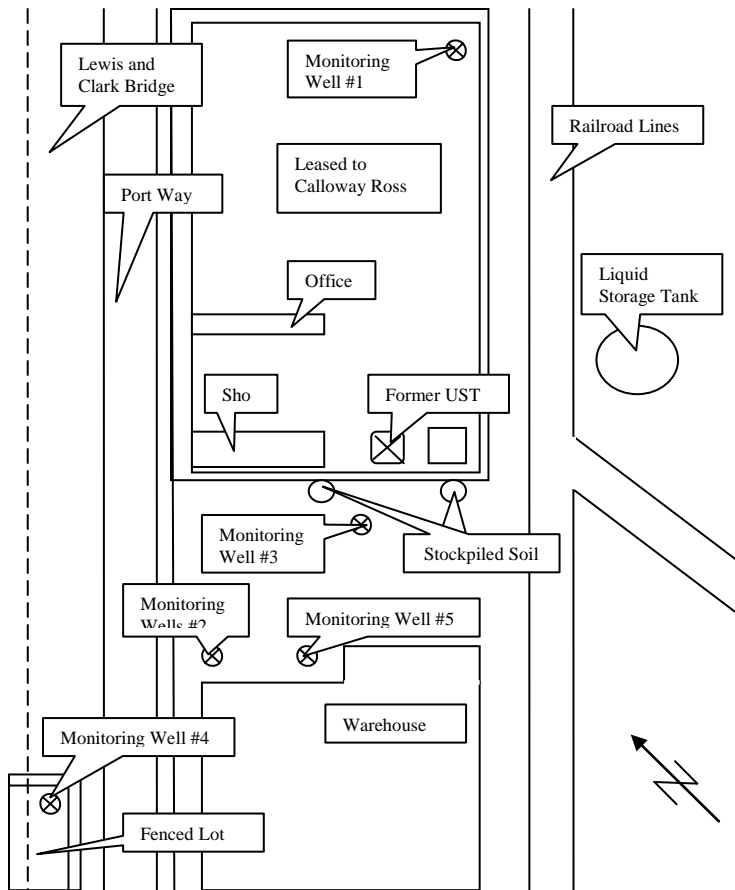
In June of 1993, two USTs, a 4,000 gallon gasoline tank and a 8,000 gallon gasoline tank, were removed from the vicinity of a mechanic's shop due to their potentially compromised integrity, based on failure of a tightness test. Approximately 15 cubic yards of soil were removed from the excavation, to a depth of eleven feet below ground surface. Six soil samples, collected from the excavation, returned confirming gasoline contamination. Further excavation was restricted due to proximity to buildings. Groundwater was measured between 18-23 feet below ground surface.

In July of 1993, Golder Associates completed four boreholes to a depth between 21-29 feet below ground surface. A monitoring well was constructed from the fourth borehole. Groundwater and soil samples were collected from each bore hole. No petroleum was detected in the soil sample results, but groundwater sample results returned with gasoline, heavy oil, and benzene above their respective MTCA Method A Cleanup Levels.

In March and June of 1994, Golder Associates performed a Phase IV investigation to expand the study area southward in order to provide additional details on the: underground pipelines, potential sources of contamination, and groundwater impacts on the southern portion of the site. A total of eight new monitoring wells were installed. Water sample results, collected from these new monitoring wells, returned with no petroleum detected. These wells establish a portion of the perimeter wells for the site.

In 1998, Golder Associates continued their site investigation and resumed groundwater monitoring. All perimeter and interior wells, a total of 32 wells, were sampled. The groundwater sample results established that while contamination remained in the groundwater, the plume was not migrating.

From 1999 through 2003, eight perimeter wells and two interior wells were selected for annual monitoring.



**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.

There are three separate and distinct plumes of contamination in the vicinity of the Port of Longview. The plume associated with the underground storage tanks (USTs) and the above ground storage tank (AST) lies in the southwest corner of the property near the Lewis and Clark Bridge. This plume has been confirmed to be separate from the International Paper and Chevron Station plumes, through routine groundwater monitoring of all plumes.

**ROUTE SCORES:**

Surface Water/Human Health: 25.9

Air/Human Health: 27.6

Groundwater/Human Health: 47.4

Surface Water/Environmental.: 44.6

Air/Environmental: 30.9

**OVERALL RANK: 2**

WORKSHEET 2  
Route Documentation

**1. SURFACE WATER ROUTE**

- a. List those substances to be considered for scoring: Source: 1,2,3,11  
TPH as gasoline (from benzene), TPH as diesel (from naphthalene), toluene, ethyl benzene, xylene, 1-2 dibromoethane, 1-2 dichloroethane, methyl tertiary butyl ether, lead, and carcinogenic PAHs
- b. Explain basis for choice of substance(s) to be used in scoring.  
TPH as gasoline (from benzene) and TPH as diesel (from naphthalene) will be used due to their presence in the subsurface soil and groundwater, confirmed through samples analysis.
- c. List those management units to be considered for scoring: Source: 1,2  
Spills, discharges, and contaminated soil
- d. Explain basis for choice of unit to be used in scoring:  
Spills, discharges, and contaminated soils will be the management units used for scoring due to contaminated subsurface soils, verified through sampling and analysis

**2. AIR ROUTE**

- a. List those substances to be considered for scoring: Source: 1,2,3,11  
TPH as gasoline (from benzene), TPH as diesel (from naphthalene), toluene, ethyl benzene, xylene, 1-2 dibromoethane, 1-2 dichloroethane, methyl tertiary butyl ether, lead, and carcinogenic PAHs
- b. Explain basis for choice of substance(s) to be used in scoring:  
TPH as gasoline (from benzene) and TPH as diesel (from naphthalene) will be used due to their presence in the subsurface soil and groundwater, confirmed through samples analysis.
- c. List those management units to be considered for scoring: Source: 1,2  
Spills, discharges, and contaminated soil
- d. Explain basis for choice of unit to be used in scoring:  
Spills, discharges, and contaminated soils will be the management units used for scoring due to contaminated soils verified through sampling and visual observations.

**3. GROUNDWATER ROUTE**

- a. List those substances to be considered for scoring: Source: 1,2,3,11  
TPH as gasoline (from benzene), TPH as diesel (from naphthalene), toluene, ethyl benzene, xylene, 1-2 dibromoethane, 1-2 dichloroethane, methyl tertiary butyl ether, lead, and carcinogenic PAHs

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

TPH as gasoline (from benzene) and TPH as diesel (from naphthalene) will be used due to their presence in the subsurface soil and groundwater, confirmed through samples analysis.

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

Spills, discharges, and contaminated soil

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

Spills, discharges, and contaminated soils will be the management units used for scoring due to contaminated subsurface soils, verified through sampling and analysis

WORKSHEET 4  
Surface Water Route

**1.0 SUBSTANCE CHARACTERISTICS**

<b>1.1 Human Toxicity</b>										
	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	TPH as gasoline (from benzene)	5	8	3306	3	--	ND	A	.029	5
2	TPH as diesel (from naphthalene)	20	6	490	5	.004	3	--	--	ND
3										
4										
5										
6										

\* Potency Factor

Source: 1,2,3,11

**Highest Value: 8**

(Max = 10)

**Plus 2 Bonus Points? 2**

**Final Toxicity Value: 10**

(Max = 12)

<b>1.2 Environmental Toxicity (X) Freshwater ( ) Marine</b>					
	Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity	
		(µg/L)	Value	(mg/kg)	Value
1	TPH as gasoline (from benzene)	5300	2	3306	3
2	TPH as diesel (from naphthalene)	2300	2	5	5

3					
4					
5					
6					

Source: 2,3  
**Highest Value: 5**  
(Max = 10)

<b>1.3 Substance Quantity</b>	
<b>Explain Basis:</b> The substance quantity was estimated using the total volume of all tanks documented to have been on site. A volume of 92,750 gallons was used for this calculation	Source: 1,2 <b>Value: 6</b> (Max = 10)

**2.0 MIGRATION POTENTIAL**

		Source	Value
2.1	<b>Containment; Explain basis:</b> Spill, discharge, or contaminated soil at the surface with unknown run-on/off controls	1,2	<u>10</u> (Max = 10)
2.2	<b>Surface Soil Permeability:</b> Pilchuck loamy fine sand	2,8	<u>3</u> (Max = 7)
2.3	<b>Total Annual Precipitation:</b> 50.1-60 inches	2,4	<u>4</u> (Max = 5)
2.4	<b>Max 2yr/24hr Precipitation:</b> 2.57 inches	2,15	<u>3</u> (Max = 5)
2.5	<b>Flood Plain:</b> Part of the site lies within the 500 year flood plain	2,14	<u>1</u> (Max = 2)
2.6	<b>Terrain Slope:</b> The elevation changes approximately 21 feet over a 530 ft distance, slope of approximately 3.96%	2,7,16	<u>2</u> (Max = 5)

**3.0 TARGETS**

		Source	Value
3.1	<b>Distance to Surface Water:</b> The Columbia River lies adjacent to the subject site	2,7	<u>10</u> (Max = 10)
3.2	<b>Population Served within 2 miles (see WARM Scoring Manual Regarding Direction ):</b> No residents documented to be served by surface water within two miles of the subject site	2,7,9,10	<u>0</u> (Max = 75)
3.3	<b>Area Irrigated by surface water within 2 miles : (0.75)*√ # acres =</b> Approximately 127 acres irrigated by surface water within two miles of the subject site	2,7,9,10	<u>8</u> (Max = 30)
3.4	<b>Distance to Nearest Fishery Resource:</b> The Columbia River, a salmon-bearing river, lies adjacent to the subject site	2,7	<u>12</u> (Max = 12)

<b>3.5</b>	Distance to, and Name(s) of, Nearest Sensitive Environment(s): The Columbia River, a salmon-bearing river, lies adjacent to the subject site	2,7	<b>12</b> (Max = 12)
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**4.0 RELEASE**

<b>Explain Basis:</b> Substances of concern were released to both surface and subsurface soils, making them available to the surface water route. Confirmation of a release to surface water was not documented	Source: 1,2 <b>Value: 0</b> (Max = 5)
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WORKSHEET 5  
Air Route

**1.0 SUBSTANCE CHARACTERISTICS**

1.1. Introduction (WARM Scoring Manual) – Please review before scoring

<b>1.2 Human Toxicity</b>										
	Substance	Air Standard (µg/m <sup>3</sup> )	Value	Acute Toxicity (mg/ m <sup>3</sup> )	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	TPH as gasoline (from benzene)	.003	10	31947	3	--	ND	A	.029	5
2	TPH as diesel (from naphthalene)	.12	4	--	ND	--	ND	--	--	ND
3										
4										
5										

\* Potency Factor

Source: 1,2,3,11

**Highest Value: 10**  
(Max = 10)

**Plus 2 Bonus Points? 0**

**Final Toxicity Value: 10**  
(Max = 12)

<b>1.3 Mobility (Use numbers to refer to above listed substances)</b>			
<b>1.3.1 Gaseous Mobility</b>		<b>1.3.2 Particulate Mobility</b>	
Vapor Pressure(s) (mmHg)		Soil Type	Erodibility
			Climatic Factor



1	9.5E+01 = 3	loamy fine sand	220	<1
2	8.2E-02 = 1	loamy fine sand	220	<1
3				

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

Source: 2,8  
**Value: 2**  
(Max = 4)

**1.4** Highest Human Health Toxicity/ Mobility Matrix Value (from Table A-7)  
(Use highest of: )

**Final Matrix Value: 15**  
(Max = 24)

<b>1.5 Environmental Toxicity/Mobility –</b>						
	<b>Substance</b>	<b>Non-human Mammalian Inhalation Toxicity (mg/m<sup>3</sup>)</b>	<b>Acute Value</b>	<b>Mobility (mmHg)</b>	<b>Value</b>	<b>Matrix Value</b>
2	TPH as gasoline (from benzene)	31947	3	9.5E+01	3	5
6						

Highest Environmental Toxicity/Mobility Matrix Value (Table A-7) = **Final Matrix Value: 5**  
(Max = 24)

<b>1.6 Substance Quantity</b>	
<b>Explain Basis:</b> The substance quantity was estimated using the total volume of all tanks documented to have been on site. A volume of 92,750 gallons was used for this calculation	Source: 1,2 <b>Value: 6</b> (Max = 10)

**2.0 MIGRATION POTENTIAL**

**Source Value**

<b>2.1</b>	<b>Containment:</b> No cover, discharge/spill directly to surface soil with no known vapor collections system	1,2	<b>10</b> (Max = 10)
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**3.0 TARGETS**

**Source Value**

<b>3.1</b>	<b>Nearest Population:</b> The nearest residence is located approximately 2,590 feet north of the subject site	2,7	<b>6</b> (Max = 10)
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3.2	<b>Distance to [and name(s) of] nearest sensitive environment(s):</b> The subject site lies adjacent to the Columbia River, a Critical Habitat for Chum, Steelhead, and Chinook Salmon and for Bull Trout	2,17	<b>7</b> (Max = 7)
3.3	<b>Population within 0.5 miles:</b> Approximately 1,093 residents within a half mile of the subject site.	2,7	<b>33</b> (Max = 75)

#### 4.0 RELEASE

<p><b>Explain Basis for scoring a release to air:</b> Substances of concern were released to both surface and subsurface soils, making them available to the surface water route. Confirmation of a release to surface water was not documented.</p>	<p>Source: 1,2 <b>Value: 0</b> (Max = 5)</p>
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WORKSHEET 6  
Groundwater Route

**1.0 SUBSTANCE CHARACTERISTICS**

<b>1.1 Human Toxicity</b>										
Substance		Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	TPH as gasoline (from benzene)	5	8	3306	3	--	ND	A	.029	5
2	TPH as diesel (from naphthalene)	20	6	490	5	.004	3	--	--	ND
3										
4										
5										
6										

\* Potency Factor

Source: 1,2,3,11

**Highest Value: 8**

(Max = 10)

**Plus 2 Bonus Points? 2**

**Final Toxicity Value: 10**

(Max = 12)

<b>1.2 Mobility (use numbers to refer to above listed substances)</b>	
Cations/Anions [Coefficient of Aqueous Migration (K)]	OR Solubility (mg/L)
1=	1= 1.8E+03 = 3
2=	2= 3.0E+01 = 1
3=	3=
4=	4=
5=	5=
6=	6=

Source: 2,3

**Value: 3**

(Max = 3)

<b>1.3 Substance Quantity:</b>	
<b>Explain basis:</b> The substance quantity was estimated using the total volume of all tanks documented to have been on site. A volume of 92,750 gallons was used for this calculation	<b>Source:</b> 1,2 <b>Value: 6</b> (Max=10)

**2.0 MIGRATION POTENTIAL**

		<b>Source</b>	<b>Value</b>
<b>2.1</b>	<b>Containment (explain basis):</b> For all spills, discharges, and contaminated soil, a containment value of 10 is assigned	1,2	<b>10</b> (Max = 10)
<b>2.2</b>	<b>Net precipitation:</b> 50.1-60 inches	2,4	<b>5</b> (Max = 5)
<b>2.3</b>	<b>Subsurface hydraulic conductivity:</b> Pilchuck loamy fine sand	2,8	<b>3</b> (Max = 4)
<b>2.4</b>	<b>Vertical depth to groundwater:</b> Contamination confirmed in the groundwater through sampling and analysis	1,2	<b>8</b> (Max = 8)

**2.0 TARGETS**

		<b>Source</b>	<b>Value</b>
<b>3.1</b>	<b>Groundwater usage:</b> Private supply with no alternate unthreatened sources available	2,5,6	<b>5</b> (Max = 10)
<b>3.2</b>	<b>Distance to nearest drinking water well:</b> The nearest well is located within the subject site	2,5,7,12	<b>5</b> (Max = 5)
<b>3.3</b>	<b>Population served within 2 miles:</b> Approximately 12 residents served by groundwater within two miles of the subject site	2,5,6	<b>3</b> (Max = 100)
<b>3.4</b>	<b>Area irrigated by (groundwater) wells within 2 miles:</b> (0.75)*√ Approximately 144 acres irrigated by groundwater within two miles of the subject site	2,9,10	<b>9</b> (Max = 50)

**3.0 RELEASE**

		<b>Source</b>	<b>Value</b>
	<b>Explain basis for scoring a release to groundwater:</b> Documented release of substances of concern to the groundwater, confirmed through sample analysis	1,2	<b>5</b> (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. Cowlitz County GIS map
8. Washington State Department of Agriculture, soil maps
9. Washington State Department of Ecology Water Rights Tracking System
10. GeoCommunicator, Land Survey Information System
11. Model Toxics Control Act, Statue and Regulation, November 2007
12. Washington State Department of Ecology Well Log Viewer
13. Washington State Department of Ecology, Washington State Costal Atlas Map
14. Washington State Department of Ecology, Costal Atlas, Flood Hazard Maps
15. NOAA Atlas 2 Precipitation Frequency Estimates
16. Daft Logic, Google Maps Find Altitude
17. U.S. Fish & Wildlife Service, Critical Habitat Portal