WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: **Former Ram Auto Wrecking**
Address: **8048 Martin Way E**
City: **Olympia** County: **Thurston** State: **WA** Zip: **98516**
Section/Township/Range: **S25/ T13N/ R18E**
Latitude: **47.05666 N** Longitude: **122.76875 W**
TCP ID #: **63563665**
Date Scored: August 18, 2010

SITE DESCRIPTION

Ram Auto Wrecking (Ram) is located on the northwest corner of Galaxy Drive and Martin Way in Lacey, Washington. The business occupied the 2.95-acre site from approximately 1960 to 2006. Surrounding land use includes a variety of recently redeveloped commercial properties. In 2006, the site was purchased by a developer and all associated structures were demolished. As of July 2008, the vacant site was pending redevelopment.

In the summer of 2007, Sound Environmental Strategies Corporation (SES), a consultant for the new property owner, contacted Thurston County Environmental Health (TCEH) for assistance regarding the disposal of petroleum-contaminated soil from the site. When TCEH inquired further, SES stated that the site was being sold and several soil samples were collected to assess the level of contamination. Initial soil analysis confirmed the presence of petroleum-related contamination in excess of the Washington Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method A cleanup level for unrestricted land uses (Figure 1).

A subsequent site visit by TCEH staff found that the main building had been demolished and the entire surface of the property had been cleared and/or graded. SES indicated that areas with known soil contamination had been excavated and the soil was stockpiled at the north end of the property. Initially the pile was covered, but by 2009, the cover had ripped and blown away leaving the soil exposed. Additionally, two monitoring wells were installed on site. SES stated that they were performing independent cleanup and intended to enter the Ecology's Voluntary Cleanup Program (VCP) upon completion.

In the fall of 2007, TCEH staff observed several 300-gallon portable tanks at the site. The plastic tanks, which cumulatively contained approximately 2,000 gallons of oxidizing liquid, were being stored without secondary containment as required by Thurston County Sanitary Code. After contacting SES, it was learned that the tanks contained hydrogen peroxide, and that over 600 gallons had been injected into groundwater to remediate gasoline-related contamination. Recent groundwater analysis (Figure 2) confirmed the presence of gasoline-range hydrocarbons and benzene, toluene, ethylbenzene, xylene (BTEX) at concentrations exceeding MTCA Method A cleanup levels.

TCEH contacted Ecology's Water Quality Program to verify that appropriate permits were obtained for the groundwater injection project. Ecology stated that an Underground Injection Control (UIC) permit application was received, but no UIC permit was issued at that time. It is believed that Ecology contacted SES and informed them that the site must enter the VCP and have an approved work plan prior to any further groundwater injection. As of July 2008, records indicated that the site was enrolled in VCP. However, in June 2009, Ecology staff removed the site from the VCP due to inactivity.

CONCLUSION

Subsurface contamination resulting from a former auto recycling operation has been confirmed at site. The past practices that are likely responsible for contamination include:

1) Removal of vehicle fluids, both under cover and outdoors.
2) Storage of thousands of gallons of automotive fluids, both with and without adequate secondary containment.
3) Incidental leaks from damaged vehicles in the yard.
4) Incidental spills from customers and employees removing parts from vehicles.
5) Crushing of thousands of vehicles over bare soil.
6) Allegation of on-site automotive fluid disposal into a pit (beneath concrete slab directly behind office).
7) Stockpiling of contaminated soils without adequate containment.

ROUTE SCORES:

Surface Water/Human Health: **36.4**
Surface Water/Environmental: **16.9**
Air/Human Health: **80.7**
Air/Environmental: **28.7**
Groundwater/Human Health: **77.9**

OVERALL RANK: 1

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1
      Benzene, Toluene, Ethylbenzene, Xylene, TPH-Diesel, TPH-Gasoline
   b. Explain basis for choice of substance(s) to be used in scoring.
      Contaminated soils are currently stockpiled on site without adequate cover or containment.
   c. List those management units to be considered for scoring: Source: 1
      Benzene, Ethylbenzene, Toluene, Xylene
   d. Explain basis for choice of unit to be used in scoring:
      Benzene, Toluene, Ethylbenzene, and Xylene have been confirmed in soil.

2. **AIR ROUTE**
   a. List those substances to be considered for scoring: Source: 1
      Benzene, Toluene, Ethylbenzene, Xylene, TPH-Diesel, TPH-Gasoline
   b. Explain basis for choice of substance(s) to be used in scoring:
      Contaminated soils are currently stockpiled on site without adequate cover or containment.
   c. List those management units to be considered for scoring: Source: 1
      Benzene, Ethylbenzene, Toluene, Xylene
   d. Explain basis for choice of unit to be used in scoring:
      Benzene, Toluene, Ethylbenzene, and Xylene have been confirmed in soil.

3. **GROUNDWATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1
      Benzene, Toluene, Ethylbenzene, Xylene, TPH-Diesel, TPH-Gasoline
   b. Explain basis for choice of substance(s) to be used in scoring:
      The substances listed above have been confirmed in subsurface soil and/or groundwater.
   c. List those management units to be considered for scoring: Source: 1
      Benzene, Ethylbenzene, Toluene, Xylene
   d. Explain basis for choice of unit to be used in scoring:
      Benzene, Toluene, Ethylbenzene, and Xylene have been confirmed in groundwater.

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	Benzene	5	8	3306 rat	3	ND	-	1.0	.029	3
2	Ethylbenzene	700	4	3500 rat	3	0.1	1	ND	ND	-
3	Toluene	2000	2	5000 rat	3	0.2	1	ND	ND	-
4	Xylene	10000	2	50 hmn	10	2.0	1	ND	ND	-

****Potency Factor***

Source: 2, 3

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? Yes

Final Toxicity Value: 12
(Max = 12)

1.2 Environmental Toxicity (X) Freshwater ( ) Marine

	Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity	
		(µg/L)	Value	(mg/kg)	Value
1	Benzene	5,300	2		
2	Ethylbenzene	32,000	2		
3	Toluene	17,000	2		
4	Xylene	ND	-	ND	-

Source: 2, 3

Highest Value: 2
(Max = 10)

1.3 Substance Quantity (areal extent)

Explain Basis: Soil stockpile is estimated to contain a minimum of 50 cubic yards.

Source: 6

Value: 5
(Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** No run-on/runoff control; waste pile located outdoors **Explain basis:** Documented contamination of stockpiled soils	1	**10** (Max = 10)
2.2	**Surface Soil Permeability:** Sandy gravel	6	**1** (Max = 7)
2.3	**Total Annual Precipitation:** 50.81 inches	4	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 3 inches	4	**3** (Max = 5)
2.5	**Flood Plain:** Not in a flood plain	6	**0** (Max = 2)
2.6	**Terrain Slope:** 0-2%	6	**1** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:** 2,700 feet	6	**4** (Max = 10)
3.2	**Population Served within 2 miles:** 53 domestic single intakes (53 x 4 per household = 210 people est. 1 domestic multiple intake (5 households x 4 people each = 20 people est.) Total population = 230. $\sqrt{230}=15.2$	7	**15** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles:** 265 acres. $0.75\sqrt{265}=12.2$	7	**12** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** 8,000 feet	6	**3** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** 2,700 feet – freshwater wetland	6	**6** (Max = 12)

4.0 RELEASE

Explain Basis: Documented release	Source: 1 **Value: 5** (Max = 5)

WORKSHEET 5
Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1. Introduction

1.2 Human Toxicity

	Substance	Air Standard (µg/m^3)	Value	Acute Toxicity (mg/ m^3)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Benzene	0.12	10	31,947 rat	3	ND	-	1.0	.029	3
2	Ethylbenzene	1448.6	1	ND	-	ND	-	ND	ND	-
3	Toluene	1248.8	1	ND	-	0.57	1	ND	ND	-
4	Xylene	1448.6	1	21,714 rat	3	0.085	1	ND	ND	-

* *Potency Factor*

Source: 2, 3

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? No

Final Toxicity Value: 10
(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	Benzene, 9.5E+01, Value 4			
2	Ethylbenzene, 7.0E+00, Value 3			
3	Toluene, 2.8E+01, Value 4			
4	Xylene, 1.0E+01, Value 3			

Source: 2, 3

Value: 4
(Max = 4)

Source:

Value:
(Max = 4)

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

Final Matrix Value: 20
(Max = 24)

1.5 Environmental Toxicity/Mobility						
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
1	Benzene	31,947 rat	3	9.5E+01	4	6
2	Ethylbenzene	ND	-	7.0E+00	3	-
3	Toluene	ND	-	2.8E+01	4	-
4	Xylene	21,714 rat	3	1.0E+01	3	5

Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7) = **Final Matrix Value: 6**
(Max = 24)

1.6 Substance Quantity (areal extent)	
Explain Basis: Soil stockpile is estimated to contain a minimum of 50 cubic yards.	Source: 6 **Value: 5** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	**Value**
2.1	**Containment:** Waste pile outdoors, no cover	6	**10** (Max = 10)

3.0 TARGETS

		Source	**Value**
3.1	**Nearest Population:** Less than 1,000 feet	6	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** 2,700 feet – freshwater wetland	6	**5** (Max = 7)
3.3	**Population served within 0.5 miles:** √4,857 = 69.6	6	**70** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: Documented release	Source: 1, 6 **Value: 5** (Max = 5)

Worksheet 6

Groundwater Route

1.0 SUBSTANCE CHARACTERISTICS

1.2 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	Benzene	5	8	3306 rat	3	ND	-	1.0	.029	3
2	Ethylbenzene	700	4	3500 rat	3	0.1	1	ND	ND	-
3	Toluene	2000	2	5000 rat	3	0.2	1	ND	ND	-
4	Xylene	10000	2	50 hmn	10	2.0	1	ND	ND	-

* *Potency Factor*

Source: 2, 3
Highest Value: 10
(Max = 10)
Plus 2 Bonus Points? Yes
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=** Benzene, 1.8+03, Value 3
2=	**2=** Ethylbenzene, 1.5E+02, Value 2
	3= Toluene, 5.4E+02, Value 2
	4= Xylene, 2.0E+02, Value 2

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

1.3 Substance Quantity (volume):

Explain basis: Unknown. Use default value = 1

Source: 1
Value: 1
(Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Spills	1	**10** (Max = 10)
2.2	**Net precipitation:** Nov-Apr (inches): 38.54" total precipitation, 11.74" evapotranspiration rate, 38.54-11.74 = 26.80 net precip.	4, 5	**3** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Poorly sorted sand and gravel	6	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** 13 feet (perched zone)	8	**8** (Max = 8)

3.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Private supply, alternate sources available	6	**4** (Max = 10)
3.2	**Distance to nearest drinking water well: 0 feet.** Private well adjacent to former building	6	**5** (Max = 5)
3.3	**Population served within 2 miles: √ pop. = >10,000 = 100 max**	7	**100** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles: (0.75)*√# acres** 501 acres. 0.75√501 = 16.8	7	**17** (Max = 50)

4.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Documented release	1	**5** (Max = 5)

SOURCES USED IN SCORING

1. Sound Environmental Strategies Corporation, groundwater analysis data, September 2007.
2. Washington Department of Ecology, *Toxicology Database for Use in Washington Ranking Method Scoring*, January 1992.
3. Washington Department of Ecology, *WARM Scoring Manual*, April 1992.
4. Western Regional Climate Center, Precipitation data from the Olympia, Washington Airport, June 1948 to September 2005.
5. "Table 16 – Estimated Evapotranspiration, EM .2462, p.42" for Thurston County at Olympia Airport.
6. Thurston Geodata Center, Roads and Transportation Division, August 2010.
7. Washington Department of Ecology, Water Resources Program, Water Right Tracking System (WRTS), May 2008.
8. Sound Environmental Strategies Corporation, *Washington Department of Ecology Underground Injection Control (IUC) Well Registration Form for Voluntary Cleanup Sites*, October 2007.