

FINAL VERSION
SITE HAZARD ASSESSMENT
WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Sasse Property

277A Haygood Cutoff Rd.
Tonasket, Okanogan County, WA 98855

Section/Township/Range: S17 – T36N - R26E

Latitude: 46.62203

Longitude: -119.59532

Ecology Facility Site ID No.: 1804

Site scored/ranked for the February, 2013 update: August, 2012

SITE DESCRIPTION (management areas, substances of concern, and quantities):

This property is located in the Pine Creek area, approximately nine miles northwest of Riverside, Washington, in Okanogan County. The site is located on a level bench west of the North Fork Pine Creek, which flows south through the property. The property is part of a family-owned hay ranch, and includes the primary residence of the owners. A house and large shop building sit on the upper bench, overlooking the creek and the county road, and are accessed by a dirt driveway that enters from both north and south.

A complaint to the Washington State Department of Ecology stated that oil had been dumped, spilled, or applied to the surface of this access road. During an Initial Investigation by Douglas Hale, of Okanogan County Public Health, on July 22nd, 2011, dark staining of the native soil road surface was observed in a pattern that seemed to confirm the complaint. The property owner initially stated that the oil was from a leaking hydraulic hose on a tractor. After using a backhoe bucket loader to scrape the surface of the driveway south of the house, the property owner gave permission to collect soil samples in that area.

Two soil samples were collected on August 4th, 2011, and were analyzed for Total Petroleum Hydrocarbons (TPH) #2 Diesel and motor oil. Permission was also requested to collect soil samples on the driveway to the north of the house, which exhibited similar oil staining and which had not yet been disturbed by the owner. At this request, the owner became very irate and ordered the investigator off the property, denying access for any further testing. It was presumed that this was because the owner had not known that the investigator was aware of the staining in this area, and had not made any attempt to conceal or redistribute the contaminated soil. Although samples were not collected in this area, photographs clearly show the staining that was present on that portion of the driveway. Also observed but not photographed were areas of very blackened soil around several 55-gallon drums, presumably of waste oil, near the doors of the shop building to the west of the house.

One of the samples indicated that motor oil concentrations are in excess of the Model Toxics Control Act (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. Motor oil-range petroleum was measured at 12,000 mg/kg in the most contaminated sample.

FINAL VERSION

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 owner of this property halted sampling activities before complete assessment of the site could be made. Because visual evidence of oil contamination existed and was documented on the property, and the presence of waste motor oil was confirmed in one soil sample, the property is being ranked with the assumption that compounds associated with waste motor oil are present in the soil. Further testing would be necessary to confirm or deny this assumption, and could result in a ranking that differs substantially from the scored values shown below. Assumed contaminants include naphthalene, cadmium, and lead, which scientific studies have shown to be present in waste motor oil.

The Toxicology Database, cited as Reference 5, does not include values for TPH as Motor Oil. Values for TPH as Diesel were substituted, due to the possibility of the presence of naphthalene.

ROUTE SCORES:

Surface Water/Human Health:	<u>17.7</u>	Surface Water/Environmental.:	<u>38.1</u>
Air/Human Health:	<u>11.3</u>	Air/Environmental:	<u>59.6</u>
Groundwater/Human Health:	<u>33.6</u>		

OVERALL RANK: 1

FINAL VERSION

WORKSHEET 2

Route Documentation

1. SURFACE WATER ROUTE

- a. List those substances to be considered for scoring: Source: 1,2,15,16

Waste oil (naphthalene), lead, cadmium.

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

Soil sample analysis shows motor oil contamination of on-site soils.

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

Contaminated on-site surface and subsurface soils.

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

Analytical confirmation of motor oil in on-site soils.

2. AIR ROUTE

- a. List those substances to be considered for scoring: Source: 1,2,15,16

Waste oil (naphthalene), lead, cadmium.

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

Soil sample analysis shows motor oil contamination of on-site soils.

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

Contaminated on-site surface and subsurface soils.

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

Analytical confirmation of motor oil in on-site soils.

3. GROUNDWATER ROUTE

- a. List those substances to be considered for scoring: Source: 1,2,15,16

Waste oil (naphthalene), lead, cadmium.

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

Soil sample analysis shows motor oil contamination of on-site soils.

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

Contaminated on-site surface and subsurface soils.

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

Analytical confirmation of motor oil in on-site soils.

FINAL VERSION

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	Cadmium	5	8	225 (rat)	5	0.0005	5	0.8	ND	--
2	Lead	5	8	ND	--	<0.001 NOAEL	10	0.8	ND	--
3	TPH – Diesel	160	4	490 (rat)	5	0.004	3	ND	ND	--

*Potency Factor

Source: 1, 2, 5

Highest Value: 10

(Max = 10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12

(Max = 12)

1.2 Environmental Toxicity					
Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity		
	(µg/L)	Value	(mg/kg)	Value	
1	Cadmium	3.9	8	NS	--
2	Lead	82	6	NS	--
3	TPH – Diesel	2300	2	NS	--

Source: 1, 2, 5

Highest Value: 8

(Max = 10)

1.3 Substance Quantity	
<p>Explain Basis: Substance quantity is estimated from photos of the site: South driveway: approx.. 8' x 20' = 160 s.f. North driveway: approx..10' x 40' = 400 s.f. Total square footage = 560 s.f.</p>	<p>Source: <u>1, 6</u> Value: <u>5</u> (Max = 10)</p>

FINAL VERSION

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	Containment: Management unit scored as a spills/discharges/contaminated soil at the surface, with no run-on/run-off control. Explain basis: Driveway drains to ditch line of county road, and potentially to Pine Creek.	<u>1, 6</u>	<u>10</u> (Max = 10)
2.2	Surface Soil Permeability: Sands/gravels/gravelly sandy loam	<u>1, 3, 6</u>	<u>1</u> (Max = 7)
2.3	Total Annual Precipitation: 11.3 inches (based on Omak station)	<u>6, 7</u>	<u>1</u> (Max = 5)
2.4	Max 2yr/24hr Precipitation: 0.88 in	<u>6, 14</u>	<u>1</u> (Max = 5)
2.5	Flood Plain: Not in a flood plain	<u>8, 11</u>	<u>0</u> (Max = 2)
2.6	Terrain Slope: Approximately 10-12% down south driveway slope to ditch line.	<u>11</u>	<u>5</u> (Max = 5)

3.0 TARGETS

		Source	Value
3.1	Overland Distance to Down-Gradient Surface Water: ~325' to county road ditch line. North Fork Pine Creek is within 500'.	<u>11</u>	<u>10</u> (Max = 10)
3.2	Population Served within 2 miles (see WARM Scoring Manual Regarding Direction): $\sqrt{0} = 0$	<u>10</u>	<u>0</u> (Max = 75)
3.3	Area Irrigated by surface water within 2 miles downstream: $0.75 \times \sqrt{\text{acres}} = 0.75 \times \sqrt{0} = 0$	<u>10</u>	<u>0</u> (Max = 30)
3.4	Distance to Nearest Down-Gradient Fishery Resource: >10,000 feet to Okanogan River.	<u>11</u>	<u>0</u> (Max = 12)
3.5	Distance to, and Name(s) of, Nearest Down-Gradient Sensitive Environment(s): ~400 to wetlands along Pine Creek.	<u>11</u>	<u>12</u> (Max = 12)

4.0 RELEASE

Explain Basis: None documented by analytical evidence.	Source: <u>1, 6</u> Value: <u>0</u> (Max = 5)
---	---

FINAL VERSION

WORKSHEET 5

Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction – Review WARM Scoring Manual before scoring

1.2 Human Toxicity										
	Substance	Amb. Air Standard (µg/m ³)	Value	Acute Toxicity (mg/ m ³)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Cadmium	0.00056	10	25 (rat)	10	ND	--	0.8	6.1	7
2	Lead	0.5	10	ND	--	ND	--	0.8	ND	--
3	TPH – Diesel	166.5	4	ND	--	ND	--	ND	ND	--

* Potency Factor

Source: 5, 6

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	0.082			

Source: 5, 6

Value: 3

(Max = 4)

Source: NA

Value: NS

(Max = 4)

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

Final Matrix Value: 18

(Max = 24)

FINAL VERSION

1.5 Environmental Toxicity/Mobility						
Substance		Non-human Mammalian Inhalation Toxicity (mg/m ³)	Acute Value	Mobility (mmHg) Or (particulate)	Value	Final Matrix Value
1	Cadmium	25 (rat)	10	(particulate)	3	15
2	Lead	ND	--	ND	--	--
3	TPH - Diesel	ND	--	ND	--	--

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

Final Matrix Value: 15
(Max = 24)

1.6 Substance Quantity	
Explain Basis: Estimated extent of surface soil contamination = approx. 560 s.f.	Source: <u>1, 6</u> Value: 4 (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	Containment: Surface spill/discharge and no vapor collection system.	<u>1, 6</u>	10 (Max = 10)

3.0 TARGETS

		Source	Value
3.1	Nearest Population: Approximately 80 ft.	<u>1, 6, 11</u>	10 (Max = 10)
3.2	Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]: About 400' to wetlands along Pine Creek.	<u>6, 11</u>	7 (Max = 7)
3.3	Population within 0.5 miles: $\sqrt{\text{pop.}} = 5 \text{ homes} \times 3 \text{ residents} = 15. \sqrt{15} = 3.9$	<u>6, 11</u>	4 (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: None documented	Source: <u>6</u> Value: 0 (Max = 5)
--	--

FINAL VERSION

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	Cadmium	5	8	225 (rat)	5	0.0005	5	0.8	ND	--
2	Lead	5	8	ND	--	<0.001 NOAEL	10	0.8	ND	--
3	TPH – Diesel	160	4	490 (rat)	5	0.004	3	ND	ND	--

* Potency Factor

Source: 1, 2, 5

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 Cadmium >1.0 = 3	
2 Lead 0.1 – 1.0 = 2	
3	TPH – Diesel = 30 mg/L = 1

Source: 5, 6

Value: 3
(Max = 3)

1.3 Substance Quantity:	
Explain basis: Estimated quantity of oil dumped is likely much less than 200 gallons.	Source: <u>1, 6</u> Value: <u>1</u> (Max=10)

FINAL VERSION

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	Containment (explain basis): Spill to ground surface with no containment.	<u>3</u>	<u>10</u> (Max = 10)
2.2	Net precipitation: $6.8'' - 2.7'' = 4.1''$	<u>7</u>	<u>1</u> (Max = 5)
2.3	Subsurface hydraulic conductivity: Sands/gravels/gravelly sandy loam	<u>1, 3</u>	<u>4</u> (Max = 4)
2.4	Vertical depth to groundwater: The nearest recorded well has a static water level of 1'. Approximately 40' elevation difference from spill site to well.	<u>3, 6</u>	<u>6</u> (Max = 8)

3.0 TARGETS

		Source	Value
3.1	Groundwater usage: Private supply, no alternates available	<u>1, 9</u>	<u>5</u> (Max = 10)
3.2	Distance to nearest drinking water well: <u>~500</u> feet (estimated from verbal description).	<u>1, 4, 6</u>	<u>5</u> (Max = 5)
3.3	Population served within 2 miles: $\sqrt{\text{pop.}} = 23 \text{ homes} \times 3 = 69$; $\sqrt{69} = 8.31$	<u>6, 11</u>	<u>8</u> (Max = 100)
3.4	Area irrigated by wells within 2 miles: $0.75 \times \sqrt{\text{acres}} = 0.75 \times \sqrt{137} = 8.78$	<u>4, 6</u>	<u>9</u> (Max = 50)

4.0 RELEASE

		Source	Value
	Explain basis for scoring a release to groundwater: None documented	<u>6</u>	<u>0</u> (Max = 5)

FINAL VERSION

SOURCES USED IN SCORING

1. Site Hazard Assessment initial visits by Douglas Hale, July 22, 2011 and August 4, 2011.
2. Soil sample analysis reports by TestAmerica Laboratories.
3. Soil log(s) on file at Okanogan County Health District.
4. Water Well Reports on file at Okanogan County Health District.
5. Washington Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992.
6. Washington Department of Ecology, WARM Scoring Manual, April 1992.
7. See attached table identified as Reference 7.
8. Flood Insurance Rate Maps (FIRM).
9. Ecology Water Rights Information System (WRIS).
10. Washington Department of Fish & Wildlife StreamNet database.
11. GIS data layers provided by Okanogan County Planning Department, composite map is attached as Reference 11.
12. US Census 2000 data.
13. SENTRY Public Water system data from Washington Department of Health.
14. NOAA Atlas II Precipitation Frequency Data Output, site specific estimate.
15. Used Motor Oil Analysis, Federal Register Vol 56, No. 184, September 23, 1991.
16. Concentrations of heavy metals in soil and water receiving used engine oil in Port Harcourt, Nigeria, A.G. Warmate, et al., Journal of Ecology and the Natural Environment, Vol. 3(2), pp. 54-57, February, 2011.