SITE HAZARD ASSESSMENT

WORKSHEET 1

Summary Score Sheet

SITE INFORMATION:

Aluminum Recycling Trentwood
2317 N Sullivan Rd.
Spokane, WA 99216

Section/Township/Range: Sec 11/T25N/R44E
Latitude: 47° 40' 40.00"
Longitude: 117° 12' 4.00'
Ecology Facility Site ID No.: 628

Site scored/ranked for the February 20, 2008 update
February 15, 2008

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

The Aluminum Recycling Corporation (ARC) site is located within the incorporated boundary of the City of Spokane Valley, Spokane County, Washington. The site is situated within 1500 feet north east of the north bank of the Spokane River with Sullivan Road to the east and Kaiser Trentwood Rolling Mill to the north. The ARC site real property belongs to Union Pacific Railroad who leased the property to ARC and another aluminum recycling operation Imperial Chemical.

Beginning around 1979 the site operations involved recycling of aluminum cans and aluminum dross. An adjacent company, Imperial West Chemical, also stored and processed aluminum dross at this site. It is assumed for public and environmental risk considerations that the product "black dross" which characteristically is very high in potassium and sodium chloride salts (high salt dross) comprises the majority percentage of the waste deposit.

In late 1982 and early 1983 violations of air emissions were cited as well as releases of high salt content pollutants resulting in the first of many orders and notices of violation from Washington Department of Ecology (Ecology) and the Spokane Air Pollution Control Authority. In May of 1984 the company filed for reorganization under Chapter 11. The Union Pacific Railroad removed a mound of black dross situated on what was called the Trentwood site in August of 1986 for transport to Mica Landfill. Since then to present day site operations and redeposit quantities are unknown as well as the characteristic of the waste.

Excerpts from an Ecology Site Inspection Report for Aluminum Recycling Corp Trentwood dated 1987 state:

"It is unknown exactly how much high-salt dross is located on-site. Generally, the blacker the material, the saltier it is. Both types, low and high salt occur on site. The total amount is in the thousands of tons, a significant amount of material."

In 1983 Ecology requested an analysis from ARC and the following results were received (percent by weight):

- Calcium, (Ca) 0.06
- Sodium, (Na) 14.15
- Potassium, (K) 13.35
- Aluminum, (Al).....21.4
- Oxides, (as Al_2O_3) 40.4
- Chloride, (Cl) 43.0
- Fluoride, (F) 0.13
- Nitrides, (as NH_3-N).....1.4
- pH, ...10.14
- Soluble Material,.....64.60

Ecology lab results on samples collected on August 26, 1983, show the following for metals in parts per billion (micrograms per liter):

Metal	Fresh Dross	Aged Dross
Silver, (Ag)	10	10
Barium, (Ba)	3300	750
Chrome, (Cr)	20	20
Cadmium, (Cd)	40	50
Lead, (Pb)	260	260
Mercury, (Hg)	0.2	1.1
Arsenic, (As)	106.0	136.0
Selenium, (Se)	434.0	158.0

Fish bioassays done on three other dross samples collected at the time showed that in one sample fresh dross killed 100% of the salmon at 100 ppm and aged dross killed none at 1000 ppm. Several fish (7%) were killed by another fresh dross sample at 100 ppm. In a third sample, of aged dross, no mortality was observed.
Another fish bioassay taken in July of 1984 for baghouse dust showed 100% mortality at 1000ppm
Well sampling from the ARC well (unknown location at this time) on October 3, 1985 showed chloride levels at 2.8 mg/l, sodium 3.7 mg/l, potassium 3.6 mg/l, and conductivity at 250 micromhos/cm.

Various values displayed at these investigations determined that the waste material still designated as a state dangerous waste based on salt content.

During a September 2007 Site Hazard Assessment (SHA) site inspection very large deposits of aluminum dross were observed outdoors and uncovered. The total quantity of waste dross material is unknown due to the very large size of the deposit(s) however it is estimated to cover approximately two acres of surface area by visual estimation. Site investigations determined a high probability of surface runoff of the waste material into the adjacent Spokane River. The surface elevation terrain and slope vary from the waste piles to the river but is estimated to be 80-100' fall in 600-1000' hence an approximate 10% slope. Reviews of parcel taxpayer records show three potential property impacts, Union Pacific Railroad, Pentzer Venture Holdings II, and Washington State Department of Parks and Recreation. Due to the vast and undefined nature of the site and the offsite migration due to waste pile erosion these properties are considered potentially impacted by the waste.

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):

Due to the vast size of the waste deposit and potentially inconsistent nature of the waste characteristics, this site and its waste will be conservatively scored on the inherent potential hazards of aluminum dross characteristics. The waste is situated to potentially impact a sensitive environment (Spokane River) and is located over a federally designated sole source aquifer. For this SHA the site will be score on the possibility of containing the most hazardous substances associated with aluminum dross until such time a comprehensive study of the vast waste pile deposit can be presented to Ecology.

ROUTE SCORES:

Surface Water/Human Health:	**12.0**	Surface Water/Environmental.:	**42.7**
Air/Human Health:	**4.1**	Air/Environmental:	**45.7**
Groundwater/Human Health:	**35.4**		

OVERALL RANK: 2

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**

   a. List those substances to be considered for scoring: Source: 1a. 1b.

      Ammonia, fluoride, nitrate, nitrite

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

      These substances are typically found in the compound make up of black aluminum dross waste piles which have accumulated over a many year period from various processes.

   c. List those management units to be considered for scoring: Source 1a. 1b.

      Surface and subsurface soils and groundwater.

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

      The contaminating substances are deposited in very large uncovered waste piles adjacent to the Spokane River

2. **AIR ROUTE**

   a. List those substances to be considered for scoring: Source: 1a. 1b.

      Ammonia, fluoride, nitrate, nitrite

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

      These substances are typically found in the compound make up of black aluminum dross waste piles which have accumulated over a many year period from various processes.

   c. List those management units to be considered for scoring: Source: 1a. 1b.

      Surface and subsurface soils and groundwater.

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

      The contaminating substances are deposited in very large uncovered waste piles adjacent to the Spokane River

3. **GROUNDWATER ROUTE**

a. List those substances to be considered for scoring: Source: 1a. 1b.

Ammonia, fluoride, nitrate, nitrite, chromium

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

These substances are typically found in the compound make up of black aluminum dross waste piles which have accumulated over a many year period from various processes.

c. List those management units to be considered for scoring: Source: 1a. 1b.

Surface and subsurface soils and groundwater.

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

The contaminating substances are deposited in very large uncovered waste piles adjacent to the Spokane River

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	Ammonia	30,000	2	350 (rat)	5	0.97	1	ND	ND	-
2	Fluoride	700	2	3500	5	0.1	1	ND	ND	-
3	Nitrate	10,000	2	ND	-	ND	-	ND	ND	-
4	Nitrite	1000	2	ND	-	ND	-	ND	ND	-

* *Potency Factor*

Source: 1b. 2, 3.

Highest Value: 5
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 5
(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	Ammonia	ND	-	350	5
2	Fluoride	ND	-	ND	-
3	Nitrate	ND	-	ND	-
4	Nitrate	ND	-	ND	-

Source: 1b. 2, 3.

Highest Value: 5
(Max = 10)

1.3 Substance Quantity (aerial extent)	
Explain Basis: Approx. 2 acres	Source: 1a. 3 **Value: 9** (Max = 10)

2.0 Migration Potential

		Source	Value
2.1	**Containment:** Management unit scored as a waste pile: No run-on/runoff control system or cover **Explain basis:** Contaminant wastes piled on ground and not covered	1A. 3	**10** (Max = 10)
2.2	**Surface Soil Permeability:** the site consists of both cobble fine sandy loam and fine sandy loam	1A. 5	**1** (Max = 7)
2.3	**Total Annual Precipitation:** the average total precipitation for Spokane, WA = 14 inches	4	**2** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 1 – 2 inches	4	**2** (Max = 5)
2.5	**Flood Plain:** Not in flood plain	10	**0** (Max = 2)
2.6	**Terrain Slope:** > 8% in spots with visible erosion	5,11	**5** (Max = 5)

3.0 Targets

		Source	Value
3.1	**Distance to Surface Water:** <1000 feet (Spokane River)	11	**10** (Max = 10)
3.2	**Population Served within 2 miles (see WARM Scoring Manual Regarding Direction):** 0	8	**0** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles : (0.75)*√ # acres =** 0.75 * √0 = 0	9	**0** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** <1000 feet	5,11	**12** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** fishery resource <1000 feet	11	**12** (Max = 12)

4.0 Release

Explain Basis: Visual observation detected (faint) with high potential during snow melt and wet weather events , no analytical data so no score.	Source: 1a **Value: 0** (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 WOE	Carcinogenicity PF*	Value
1	Ammonia	59.9	7	1394 (rat)	5	0.2	1	ND	ND	-
2	Fluoride	5.3	9	ND	-	ND	-	ND	ND	-

* *Potency Factor*

Source: 1b. 3.

Highest Value: 9
(Max = 10)

Plus 2 Bonus Points? NA

Final Toxicity Value: 9
(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	7600 = 4			
2		Sandy loam, gravels	86	1-10
3		Sandy loam, gravels	86	1-10

Source: 1

Value: 4
(Max = 4)

Source: 3

Value: 1
(Max = 4)

1.4 Highest Human Health Toxicity/ Mobility Matrix Value (from Table A-7)
Compare 7/4=14 and 9/1=5 therefore the final matrix score is 14

Final Matrix Value: 14
(Max = 24)

1.5 Environmental Toxicity/Mobility						
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
1	Ammonia	1394	5	7600	4	10
2						

Highest Environmental Toxicity/Mobility Matrix Value (Table A-7) = **Final Matrix Value: 10**
(Max = 24)

1.6 Substance Quantity	
Explain Basis: Estimated 2 acres	Source: 1a. 3 **Value: 7** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Waste pile, outdoors, uncovered	1A. 3	**10** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** < 2000-3000'	1a. 3	**6** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s):** Spokane River fresh water wetlands/state park < 1000'	1a. 3, 11	**7** (Max = 7)
3.3	**Residential population within 0.5 miles:** $\sqrt{0} = 0$	12	**0** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air:	Source: 1a.
No analytical data	**Value: 0** (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	Ammonia	30,000	2	350 (rat)	5	ND	-	ND	ND	-
2	Fluoride	700	2	3500	5	0.1	1	ND	ND	-
3	Nitrate	1000	2	ND	-	ND	-	ND	ND	-
4	Nitrite	1000	2	ND	-	ND	-	ND	ND	-

* *Potency Factor*

Source: 1a. 2, 3.
Highest Value: 5
(Max = 10)
Plus 2 Bonus Points? 0
Final Toxicity Value: 5
(Max = 12)

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

Cations/Anions	OR	Solubility (mg/L)
1=		1= $1.8 \times 10^3 = 3$
2=		2= $1.5 \times 10^2 = 2$
3 =		3 = $2.0 \times 10^2 = 2$
4=		4= $3.0 \times 10^1 = 1$

Source: 3
Value: 3
(Max = 3)

1.3 Substance Quantity:	
Explain basis: Estimated to be > 5,000 cubic yards	Source: 1a. 3 **Value: 5** (Max=10)

5.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Contaminated area scored as a waste pile: 1) No liner = 3; 2) no cover = 2; 3) No leachate collection system = 2; 4) none. =3	3	**10** (Max = 10)
2.2	**Net precipitation:** 7.2" (14" annual total precipitatin with a net evaporation of 6.8")	4	**1** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Silts/sands/gravels	5	**3** (Max = 4)
2.4	**Vertical depth to groundwater:** >50 - 100' (based on static levels in area wells)	6, 7	**4** (Max = 8)

6.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Fed. Designated sole source aquifer	7	**10** (Max = 10)
3.2	**Distance to nearest drinking water well:** ~ 2000'	1a. 11	**3** (Max = 5)
3.3	**Population served within 2 miles:** √ 8,300 (Irvin water dist.) = 91	8	**91** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles: (0.75)*√0 acres = √1000 = 32 x .75 = 24** (adjusted for actual human health risk potential with additional acreage located in industrial zone)	9	**24** (Max = 50)

7.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: No analytical data	1a. 1b.	**0** (Max = 5)

SOURCES USED IN SCORING

1a. Site investigations Spokane Regional Health District Summer 2007

1b. Site Inspection Report and accompanying correspondence;
Aluminum Recycling Corp Trentwood
Spokane County Washington WAD980722979
Hazardous Waste Cleanup Program. Department of Ecology 1987

2. Toxicology Database WARM

3. WARM Scoring Manual

4. Washington Climate, Spokane Co. WSU Dept. of Agriculture

5. Soil Survey of Spokane Co. Washington, USDA Soil Conservation Svc.

6. Washington Department of Ecology Well Logs

7. Aquifer Sensitive Area Overlay Zone Map, Spokane Co. Washington

8. Washington Dept. of Health, Drinking Water Information Network

9. Water Rights Application Tracking System (WRATS) Ecology

10. FEMA Flood Insurance Maps

11. Quadrangle Maps of Washington, NE Spokane Regional Health District

12. Spokane County Census Information