FSID - 412
CSID 4720

WORKSHEET 1
SUMMARY SCORE SHEET

Note: This document currently has no provision for sediment route scoring.

Site Name/Location (City, County, Section/Township/Range):

Alder Mill
Twisp

Township 33 North, Range 22 East Willamette Meridian, Section 17 & 18

Site Description (Include management areas, compounds of concern, and quantities):

This site is an abandoned floatation mill for processing copper ore from the Alder Mine, located about 5 miles north and west of the site. The mill is situated on the side of a hill to take advantage of gravity for feeding the materials through the floatation process. processed tailings flowed into a pond below the mill and were then pumped back up the hill to a pond formed by damming a creak bed. Current concerns with the site are the potential environmental effects of metals in the mine tailing now existing in the two pond . The main tailings pond contains an estimated 33,100 m^3 of materials. The lower ponmd has not had its depths plumbed to determine the volume of amterials it may hold.

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):

One special consideration for this site is that it remains a study area for the U.S. Bureau of Mines, Mining Reasearch Center in Spokane. The site's size, environmental isolation and accessability make it an ideal field laboratory for the research into mine tailing characteristics and potential corrective actions. Current site monitoring by the Bureau of Mines shows no significant off site impacts to the ground water at this time.

ROUTE SCORES: 27.6 (MJ) 50.8 (MJ)

Surface Water/Human Health:	~~20.4~~	(5)	Surface Water/Environ.:	~~41.2~~	(5)
Air/Human Health:	21.2	(3)	Air/Environmental:	N/S	(6)
Ground Water/Human Health:	46.8	(4)			

08/28/01

( ) indicate quintile score based on ~~August 1991~~ quintile breakdown. ~~Scores may change at August 1992 quintile breakdown.~~

OVERALL RANK: 1

WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE

List substances to be considered for scoring: Source: A

1. Cadmium
2. Barium
3. Copper
4. lead
5. Zinc
6.

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

Cadmium, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While these metals occur naturally in the vicinity of the site, the characteristics of the processed mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of metal have been documented in the ground water on this site.

List management units to be considered in scoring: Source: 10

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

Explain basis for choice of unit used in scoring. Source: 10

The tailings ponds are the accumulation of processed tailings and provide the release mechinisms for the metals from the processed materials.

WORKSHEET 2 (CONTINUED)
ROUTE DOCUMENTATION

2. AIR ROUTE

List substances to be considered for scoring: Source: 6

1. Mercury	3. Copper	5. Zinc
2. Silver	4. lead	6.

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

Mercury, silver, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While they occur naturally in the vicinity of the site, the processed characteristics of the mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of the scored metals have been documented on the site.

List management units to be considered in scoring: Source: 6

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

Explain basis for choice of unit used in scoring. Source: 6

The tailings ponds are the accumulation of processed tailings and the fine grained nature of the waste tailings provide the release mechinisms for the contaminants.

WORKSHEET 2 (CONTINUED)
ROUTE DOCUMENTATION

3. GROUND WATER ROUTE

List substances to be considered for scoring: Source: 10

1. Cadmium
2. Barium
3. Copper
4. lead
5. Zinc
6.

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

Cadmium, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While they occur naturally in the vicinity of the site, the processed characteristics of the mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of metals have been documented in the ground water on site.

List management units to be considered in scoring: Source: 10

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

1. Tailings ponds

Explain basis for choice of unit used in scoring. Source: 10

The tailings ponds are the accumulation of processed tailings and provide the release mechinisms for the metals from the natural materials.

WORKSHEET 3
SUBSTANCE CHARACTERISTICS WORKSHEET
FOR MULTIPLE UNIT/SUBSTANCE SITES

	Combination 1	Combination 2	Combination 3
Unit:			
Substance:			

SURFACE WATER ROUTE

Human Toxicity Value:			
Environ. Toxicity Value:			
Containment Value:			
Surface Water Human Subscore:			
Surface Water Environ. Subscore:			

AIR ROUTE

Human Toxicity/Mobility Value:			
Environ. Toxicity/ Mobility Value:			
Containment Value:			
Air Human Subscore:			
Air Environ. Subscore:			

GROUND WATER ROUTE

Human Toxicity/ Mobility Value:			
Containment Value:			
Ground Water Subscore:			

WORKSHEET 4
SURFACE WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. Cadmium	5	8	225	5	0.0005	5	X	-	-
2. Barium	X	-	X	-	X	-	X	-	-
3. Copper	1300	2	X	-	0.037	1	X	-	-
4. lead	5	8	X	-	X	-	X	-	-
5. Zinc	4000	2	X	-	0.2	1	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 8
+2 Bonus Points? yes
Final Toxicity Value 10

1.2 Environmental Toxicity

Substance	Acute Criteria (ug/l)	Value	Non-human Mammalian Acute Toxicity (mg/kg)	Value
1. Cadmium	3.9	8	X	-
2. Barium	X	-	X	-
3. Copper	18	6	X	-
4. lead	82	6	X	-
5. Zinc	120	4	X	-
6.				

Source: 1 **Value:** 8

1.3 Substance Quantity: 43,300 cu yds Source: 10 **Value:** 9
Explain basis: Calculated volume of upper tailings pond. volume of lower tailings pond not included as it would be insufficient to rais quantity to next scoring bracket.

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

2.0 MIGRATION POTENTIAL

2.1 Containment — Source: 11 **Value:** 10
Explain basis: No run-on run-off control, waste pile located outside.

2.2 Surface Soil Permeability: well graded sands/fines — Source: 6 **Value:** 3

2.3 Total Annual Precipitation: 10.4 inches — Source: 6 **Value:** 1

2.4 Max. 2-Yr/24-hour Precipitation: 1.5 inches — Source: 12 **Value:** 2

2.5 Flood Plain: is not in flood plain — Source: 15 **Value:** 0

2.6 Terrain Slope: 15% — Source: 6 **Value:** 5

3.0 TARGETS

3.1 Distance to Surface Water: Pond adjacent — Source: 10 **Value:** 10

3.2 Population Served within 2 miles: √pop.= 0 — Source: 4 **Value:** 0

3.3 Area Irrigated within 2 miles: 0 — Source: 3,4 **Value:** 0

3.4 Distance to nearest Fishery Resource: Methow>2 mi. — Source: 9 **Value:** 0

3.5 Distance to, and Name(s) of, Nearest Sensitive Environment(s) Wetland and pond adjacent to site on the north end of the upper tailings pond. see site photos. — Source: 11 **Value:** ~~10~~ 12

Corr. 02/07/02 mjd

4.0 RELEASE

Explain basis for scoring a release to surface water: ~~no~~ Release was scored to surface water, water samples from adjacent pond have ~~not~~ shown levels significantly above background, also at toe of impoundment (Sediment samples). — Source: 6 **Value:** ~~0~~ 5

Corr. 02/07/02 mjd

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 (ug/m^3)	Val.	Acute Toxicity (mg/m^3)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. Mercury	0.3	10	X	-	0.0003	8	X	-	-
2. Silver	0.3	10	X	-	X	-	X	-	-
3. Copper	3.3	9	X	-	X	-	X	-	-
4. lead	0.5	10	X	-	X	-	X	-	-
5. Zinc	X	-	X	-	X	-	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 10
+2 Bonus Points? Yes
Final Toxicity Value: 12

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility

Vapor Pressure(s): 1= ; 2= ; 3= ; 4= ; 5= ; 6= Source: Value:

1.3.2 Particulate Mobility

Soil type: Processed materials/very fine Source: 13
Erodibility: 220 tons/year Value: 3
Climatic Factor: 1 - 10

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7) equals **Final Matrix Value:** 18

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Acute Inhal. Toxicity (mg/m^3)	Value	Mobility	Value	(Table A-7) Matrix Value
1. Mercury	X	-	-	-	0
2. Silver	X	-	-	-	0
3. Copper	X	-	-	-	0
4. lead	X	-	-	-	0
5. Zinc	X	-	-	-	0
6.					

Highest Environmental Toxicity/Mobility Matrix Value 0
(From Table A-7) equals **Final Matrix Value:** 0

WORKSHEET 5 (CONTINUED)
AIR ROUTE

1.6 Substance Quantity: 97500 sqr feet surface area. Source: 10 **Value:** 7
Explain basis: Measurements of the surface area of the impoundment is the available material to air pathway.

2.0 MIGRATION POTENTIAL

2.1 Containment: Tailings in impoundment are dry and are scored as a waste pile, outdoors and uncovered. Source: 10 **Value:** 10

3.0 TARGETS

3.1 Nearest Population: aproximately 600 ft east Source: 13 **Value:** 10

3.2 Distance to, and Name(s) of, Nearest Sensitive Environment(s) Wetlands adjacent to the upper tailings ponds. Source: 9 **Value:** ~~10~~ 7

3.3 Population within 0.5 miles: $\sqrt{pop} = \sqrt{264} = 16.24$ population scored is 30 % of the population of the city of Twisp. Source: 14 **Value:** 16

4.0 RELEASE

Explain basis for scoring a release to air: No quantitative data is available for air release, no release scored. Source: _____ **Value:** 0

WORKSHEET 6
GROUND WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. Cadmium	5	8	225	5	0.0005	5	X	-	-
2. Barium	X	-	X	-	X	-	X	-	-
3. Copper	1300	2	X	-	0.037	1	X	-	-
4. lead	5	8	X	-	X	-	X	-	-
5. Zinc	4000	2	X	-	0.2	1	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 8
+2 Bonus Points? yes
Final Toxicity Value: 10

1.2 Mobility (Use numbers to refer to above listed substances)
Cations/Anions 1 = 3; 2 = 2; 3 = 2; 4 = 2; 5 = 3. Source: 1 **Value:** 3

OR
Solubility(mg/l) _____

1.3 Substance Quantity: 43,300 cu yards Source: 10 **Value:** 5
Explain basis: Estimated quantity contained in the upper tailings pond.

2.0 MIGRATION POTENTIAL

2.1 Containment Source: 6 **Value:** 10
Explain basis: Waste pile, no liner, no cover no leachate collection, no run on/ run of control

2.2 Net Precipitation: 3.3 inches Source: 5 **Value:** 1

2.3 Subsurface Hydraulic Conductivity: fines and sand Source: 10 **Value:** 4

2.4 Vertical Depth to Ground Water: <25 feet Source: 11 **Value:** 8

WORKSHEET 6 (CONTINUED)
GROUND WATER ROUTE

3.0 TARGETS

3.1 Ground Water Usage: Private supply, No alternative Source: 3,4 **Value:** 5

3.2 Distance to Nearest Drinking Water Well: 1700 ft Source: 4 **Value:** 3

3.3 Population Served within 2 Miles: √pop.=√932 = 30.5 Source: 3,4 **Value:** 31

3.4 Area Irrigated by (Groundwater) Wells within 2 miles: 0.75√no.acres= 6.45 Source: 3 **Value:** 6

4.0 RELEASE

Explain basis for scoring a release to ground water: Source of information documents contamination of the ground water with metals. Source: 6 **Value:** 5

SOURCES USED IN SCORING

1. Toxicology Database for Use in WARM Scoring, Washington Department of Ecology (SAIC.) January, 1992.

3. Recorded Water rights of the Department of Ecology, Region 4, August 16, 1990

4. State of Washington Public Water Supply System Listing, November 8, 1989

5. Washington Climate, Cooperative Extension Service, Washington State University, May 1979.

6. Site Inspection Report, Alder Mill, Twisp, Washington, Michael Spencer, Washington Department of Ecology, March 1986

9. TWISP Quadrangle Map, USGS 7.5 Minute Topographic Series

10. Determining Heavy Metal Leaching and Transport From Abandoned Mine Wastes., B.C. Williams, et al. U.S Bureau of Mines, Spokane WA, March 1989.

11. Site visit for Site Hazard Assessment, Mark Peterschmidt, WA Department of Ecology, August 7, 1992.

12. WARM Scoring Manual, Washington Department of Ecology, Toxics Cleanup Program. April 1992.

13. Personal Communication with Bill Stewart, November 1992.

14. 1991 Population trends for Washington State, Office of Financial Management, August 1991.

15. Flood Boundary and Floodway Map, Community-Panel Number 530117 0875B, FEMA.

WORKSHEET 1
SUMMARY SCORE SHEET

Note: This document currently has no provision for sediment route scoring.

Site Name/Location (City, County, Section/Township/Range):

Alder Mill
Twisp

Township 33 North, Range 22 East Willamette Meridian, Section 17 & 18

Site Description (Include management areas, compounds of concern, and quantities):

This site is an abandoned floatation mill for processing copper ore from the Alder Mine, located about 5 miles north and west of the site. The mill is situated on the side of a hill to take advantage of gravity for feeding the materials through the floatation process. processed tailings flowed into a pond below the mill and were then pumped back up the hill to a pond formed by damming a creak bed. Current concerns with the site are the potential environmental effects of metals in the mine tailing now existing in the two pond . The main tailings pond contains an estimated 33,100 m^3 of materials. The lower ponmd has not had its depths plumbed to determine the volume of amterials it may hold.

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):

One special consideration for this site is that it remains a study area for the U.S. Bureau of Mines, Mining Reasearch Center in Spokane. The site's size, environmental isolation and accessability make it an ideal field laboratory for the research into mine tailing characteristics and potential corrective actions. Current site monitoring by the Bureau of Mines shows no significant off site impacts to the ground water at this time.

ROUTE SCORES:

8/01 Quint. 27.6 = (5) 4

Surface Water/Human Health: 20.4 (4)

25 + 8 + 3 36/8 = 4.5 56.8 (5)

Surface Water/Environ.: 41.2 (4)

Air/Human Health: ✓ 21.2 (3)

Air/Environmental: N/S (0)

Ground Water/Human Health: ✓ 46.8 (4)

( ) indicate quintile score based on August 1991 quintile breakdown. Scores may change at August 1992 quintile breakdown.

1) As is: $\frac{16+8+3}{8} = \frac{27}{8} = 3.4 \approx 4$

$\frac{16}{7} = 2.3 = 3$ 4 3 2

OVERALL RANK: 2

Rev. 4/3/92

2) Use GW pop = 12, GW score = 41.8 (3) 1

16 + 6 + 3 25/8 = 3.1 ≈ 4 (R = 2)

3) Using SW cont. = 4

13.4 9.9 = 2 20.7 = 2 4/2 = 1

21.3 = 3

41.8 = 3 17/8 = 2.1 ≈ 3 1 4

9 + 6 + 2

WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE

List substances to be considered for scoring: Source: **A**

1. Cadmium
2. Barium
3. Copper
4. lead
5. Zinc
6.

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

Cadmium, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While these metals occur naturally in the vicinity of the site, the characteristics of the processed mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of metal have been documented in the ground water on this site.

List management units to be considered in scoring: Source: 10

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

Explain basis for choice of unit used in scoring. Source: 10

The tailings ponds are the accumulation of processed tailings and provide the release mechinisms for the metals from the processed materials.

WORKSHEET 2 (CONTINUED)
ROUTE DOCUMENTATION

2. AIR ROUTE

List substances to be considered for scoring: Source: 6

1. Mercury	3. Copper	5. Zinc
2. Silver	4. lead	6.

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

Mercury, silver, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While they occur naturally in the vicinity of the site, the processed characteristics of the mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of the scored metals have been documented on the site.

List management units to be considered in scoring: Source: 6

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

Explain basis for choice of unit used in scoring. Source: 6

The tailings ponds are the accumulation of processed tailings and the fine grained nature of the waste tailings provide the release mechinisms for the contaminants.

WORKSHEET 2 (CONTINUED)
ROUTE DOCUMENTATION

3. GROUND WATER ROUTE

List substances to be considered for scoring: Source: 10

1. Cadmium
2. Barium
3. Copper
4. lead
5. Zinc
6.

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

Cadmium, copper, lead and zinc were judged to be representative of the contaminants of concern on site. While they occur naturally in the vicinity of the site, the processed characteristics of the mine tailings make them more available to transport at higher than normal consentrations. Elevated levels of metals have been documented in the ground water on site.

List management units to be considered in scoring: Source: 10

1. Tailings ponds; scored as a waste pile due to the contents of the impoundment being solids.

1. Tailings ponds

Explain basis for choice of unit used in scoring. Source: 10

The tailings ponds are the accumulation of processed tailings and provide the release mechinisms for the metals from the natural materials.

WORKSHEET 3
SUBSTANCE CHARACTERISTICS WORKSHEET
FOR MULTIPLE UNIT/SUBSTANCE SITES

	Combination 1	Combination 2	Combination 3
Unit:			
Substance:			

SURFACE WATER ROUTE

Human Toxicity Value:

Environ. Toxicity Value:

Containment Value:

Surface Water Human Subscore:

Surface Water Environ. Subscore:

AIR ROUTE

Human Toxicity/Mobility Value:

Environ. Toxicity/ Mobility Value:

Containment Value:

Air Human Subscore:

Air Environ. Subscore:

GROUND WATER ROUTE

Human Toxicity/ Mobility Value:

Containment Value:

Ground Water Subscore:

WORKSHEET 4
SURFACE WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcino-genicity WOE	PF*	Val.
1. Cadmium	5	8	225	5	0.0005	5	X	-	-
2. Barium	X	-	X	-	X	-	X	-	-
3. Copper	1300	2	X	-	0.037	1	X	-	-
4. lead	5	8	X	-	X	-	X	-	-
5. Zinc	4000	2	X	-	0.2	1	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 8
+2 Bonus Points? yes
Final Toxicity Value 10

1.2 Environmental Toxicity

Substance	Acute Criteria (ug/l)	Value	Non-human Mammalian Acute Toxicity (mg/kg)	Value
1. Cadmium	3.9	8	X	-
2. Barium	X	-	X	-
3. Copper	18	6	X	-
4. lead	82	6	X	-
5. Zinc	120	4	X	-
6.				

Source: 1 **Value:** 8

1.3 Substance Quantity: 43,300 cu yds Source: 10 **Value:** 9
Explain basis: Calculated volume of upper tailings pond. volume of lower tailings pond not included as it would be insufficient to rais quantity to next scoring bracket.

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

2.0 MIGRATION POTENTIAL

2.1 Containment — Source: 11 **Value:** 10
Explain basis: No run-on run-off control, waste pile located outside.

2.2 Surface Soil Permeability: well graded sands/fines — Source: 6 **Value:** 3

2.3 Total Annual Precipitation: 10.4 inches — Source: 6 **Value:** 1

2.4 Max. 2-Yr/24-hour Precipitation: 1.5 inches — Source: 12 **Value:** 2

2.5 Flood Plain: is not in flood plain — Source: 15 **Value:** 0

2.6 Terrain Slope: 15% — Source: 6 **Value:** 5

3.0 TARGETS

3.1 Distance to Surface Water: Pond adjacent — Source: 10 **Value:** 10

3.2 Population Served within 2 miles: √pop.= 0 — Source: 4 **Value:** 0

3.3 Area Irrigated within 2 miles: 0 — Source: 3,4 **Value:** 0

3.4 Distance to nearest Fishery Resource: Methow>2 mi. — Source: 9 **Value:** 0

3.5 Distance to, and Name(s) of, Nearest Sensitive Environment(s) Wetland and pond adjacent to site on the north end of the upper tailings pond. see site photos. — Source: 11 **Value:** ~~10~~ 12

Corrected MJ 02/07/02

4.0 RELEASE
Explain basis for scoring a release to surface water: no release was scored to surface water, water samples from adjacent pond have not shown levels significantly above background. — Source: 6 **Value:** ~~0~~ 5

Does Data MJ 02/07/02

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 (ug/m^3)	Val.	Acute Toxicity (mg/m^3)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. Mercury	0.3	10	X	-	0.0003	8	X	-	-
2. Silver	0.3	10	X	-	X	-	X	-	-
3. Copper	3.3	9	X	-	X	-	X	-	-
4. lead	0.5	10	X	-	X	-	X	-	-
5. Zinc	X	-	X	-	X	-	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 10
+2 Bonus Points? Yes
Final Toxicity Value: 12

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility

Vapor Pressure(s): 1= ; 2= ; 3= ; 4= ; 5= ; 6= Source:
Value:

1.3.2 Particulate Mobility

Soil type: Processed materials/very fine Source: 13
Erodibility: 220 tons/year Value: 3
Climatic Factor: 1 - 10

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7) equals **Final Matrix Value: 18**

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Acute Inhal. Toxicity (mg/m^3)	Value	Mobility	Value	(Table A-7) Matrix Value
1. Mercury	X	-	-	-	0
2. Silver	X	-	-	-	0
3. Copper	X	-	-	-	0
4. lead	X	-	-	-	0
5. Zinc	X	-	-	-	0
6.					

Highest Environmental Toxicity/Mobility Matrix Value 0
(From Table A-7) equals **Final Matrix Value: 0**

WORKSHEET 5 (CONTINUED)
AIR ROUTE

1.6 Substance Quantity: 97500 sqr feet surface area. Source: 10 **Value:** 7
Explain basis: Measurements of the surface area of the impoundment is the available material to air pathway.

2.0 **MIGRATION POTENTIAL**

2.1 Containment: Tailings in impoundment are dry and are scored as a waste pile, outdoors and uncovered. Source: 10 **Value:** 10

3.0 TARGETS

3.1 Nearest Population: aproximately 600 ft east Source: 13 **Value:** 10

3.2 Distance to, and Name(s) of, Nearest Sensitive Environment(s) Wetlands adjacent to the upper tailings ponds. Source: 9 **Value:** ~~10~~ 7 N/A

3.3 Population within 0.5 miles: $\sqrt{pop} = \sqrt{264} = 16.24$ population scored is 30 % of the population of the city of Twisp. Source: 14 **Value:** 16

4.0 RELEASE

Explain basis for scoring a release to air: No quantitative data is available for air release, no release scored. Source: _____ **Value:** 0

WORKSHEET 6
GROUND WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg/day)	Val.	Carcino-genicity WOE	PF*	Val.
1. Cadmium	5	8	225	5	0.0005	5	X	-	-
2. Barium	X	-	X	-	X	-	X	-	-
3. Copper	1300	2	X	-	0.037	1	X	-	-
4. lead	5	8	X	-	X	-	X	-	-
5. Zinc	4000	2	X	-	0.2	1	X	-	-
6.									

*Potency Factor

Source: 1
Highest Value: 8
+2 Bonus Points? yes
Final Toxicity Value: 10

1.2 Mobility (Use numbers to refer to above listed substances)
Cations/Anions 1 = 3; 2 = 2; 3 = 2; 4 = 2; 5 = 3. Source: 1 **Value:** 3

OR
Solubility(mg/l) _____

1.3 Substance Quantity: 43,300 cu yards Source: 10 **Value:** 5
Explain basis: Estimated quantity contained in the upper tailings pond.

2.0 MIGRATION POTENTIAL

2.1 Containment Source: 6 **Value:** 10
Explain basis: Waste pile, no liner, no cover no leachate collection, no run on/ run of control

2.2 Net Precipitation: 3.3 inches Source: 5 **Value:** 1

2.3 Subsurface Hydraulic Conductivity: fines and sand Source: 10 **Value:** 4

2.4 Vertical Depth to Ground Water: <25 feet Source: 11 **Value:** 8

WORKSHEET 6 (CONTINUED)
GROUND WATER ROUTE

3.0 TARGETS

3.1 Ground Water Usage: Private supply, No alternative Source: 3,4 **Value:** 5

3.2 Distance to Nearest Drinking Water Well: 1700 ft Source: 4 **Value:** 3

3.3 Population Served within 2 Miles: √pop.=√932 = 30.5 Source: 3,4 **Value:** 31

3.4 Area Irrigated by (Groundwater) Wells within 2 miles: 0.75√no.acres= 6.45 Source: 3 **Value:** 6

4.0 RELEASE

Explain basis for scoring a release to ground water: Source of information documents contamination of the ground water with metals. Source: 6 **Value:** 5

SOURCES USED IN SCORING

1. Toxicology Database for Use in WARM Scoring, Washington Department of Ecology (SAIC.) January, 1992.

3. Recorded Water rights of the Department of Ecology, Region 4, August 16, 1990

4. State of Washington Public Water Supply System Listing, November 8, 1989

5. Washington Climate, Cooperative Extension Service, Washington State University, May 1979.

6. Site Inspection Report, Alder Mill, Twisp, Washington, Michael Spencer, Washington Department of Ecology, March 1986

9. TWISP Quadrangle Map, USGS 7.5 Minute Topographic Series

10. Determining Heavy Metal Leaching and Transport From Abandoned Mine Wastes., B.C. Williams, et al. U.S Bureau of Mines, Spokane WA, March 1989.

11. Site visit for Site Hazard Assessment, Mark Peterschmidt, WA Department of Ecology, August 7, 1992.

12. WARM Scoring Manual, Washington Department of Ecology, Toxics Cleanup Program. April 1992.

13. Personal Communication with Bill Stewart, November 1992.

14. 1991 Population trends for Washington State, Office of Financial Management, August 1991.

15. Flood Boundary and Floodway Map, Community-Panel Number 530117 0875B, FEMA.

October 2, 2001

TO: Richard Roeder
Ecology Toxics Cleanup Program
Central Regional Office

FROM: Michael Spencer
Ecology Toxics Cleanup Program
Headquarters

SUBJECT: Alder Mill WARM Ranking Review by HydroSolutions Associates

I reviewed the HydroSolutions Associates review/comments on the Ecology Washington Ranking Method (WARM) scoring and ranking of the Alder Mill site (rank = "2"), as detailed in a September 8, 2001 letter to you from Robert Lambeth.

I was astonished that it was quite apparent that they had reviewed a plainly obvious DRAFT version of the scoring sheets, and a telephone call to Mr. Lambeth confirmed this. He had requested a copy of the site file from CRO files, and that was what they sent him. I asked him if it didn't seem like a draft version, rather than a final, by all the handwritten notes, question marks, obvious missing narrative detail, etc. and he said he thought Ecology was so busy at the time, that that was the best version we could come with under the circumstances!

The two apparent entry errors he specifically points out (Worksheet 5, Item 3.2 and Worksheet 6, Item 3.3) are inapplicable/inconsequential regarding the ranking of this site because:

1) The surface water environmental route was not scored for this site due to lack of non-human mammalian toxicity data, thus it didn't matter what the value was, the corrected value of "7" as Mr. Lambeth points out, or "10" as shown in the scoresheet.

2) The value of "31" for the square root of the drinking water population (Item 3.3) **was** used in the final version of the scoresheet. It is obvious in the draft scoresheet that "100" was a "typo", and the real value to be used was indeed "31".

Of the two parameter entries believed to be inappropriate by HydroSolutions:

1) Worksheet 4, Item 2.1, scoring containment at the site regarding surface water runoff. A value of "10" was used, for "Contaminated soil at the surface with no run-on/runoff control or unknown control". Mr. Lambeth states that runoff is controlled by a two-foot berm at the tailing impoundment, and instead a value of "4", per the WARM Scoring Manual, should be used. This change alone, were it to be the true situation, would result in a change in the site's ranking from a "2" to a "4".

2) Worksheet 5, Item 3.3: Mr. Lambeth suggests that the correct value to use for drinking water population within two miles of the site is "12" (square root of 144), rather the value originally used, "31" (square root of 932). Were this value of "12" be used, and no change made to the surface water containment value, the site rank would remain a "2".

Were both suggested changes made, the site would rank a "4", as Mr. Lambeth indicates.

Reading further into HydroSolutions Associates October 2000 Review..... for Alder Copper-Gold Co., I see mention of a new acidic seep to the toe of the impoundment dam, with elevated levels of arsenic and lead. This information gives grounds for a request by CRO for a re-rank of the site, as previously a release to surface water was not scored at this site. This would result in a new rank for the site of a "1", assuming the containment value remains unchanged at a "10". Since this site has a status of "Awaiting Remedial Action", it is eligible under our established policy for re-scoring/re-ranking based on new information received. Please advise.

Cc: Curtis Dahlgren, TCP HQ

WASHINGTON RANKING METHOD

ROUTE SCORES SUMMARY AND RANKING CALCULATION SHEET

For Sites With No Sediment Route Migration Pathways

Site name: Alder Mill Region: CRO

Street, city, county: Twisp, Okanogan

This site was (XX) ranked, ( ) re-ranked, on February 5, 1993 based on quintile values from a total of 338 previously assessed/scored sites.

Pathway	Route Score(s)	Quintile Group number(s)
SW-HH	20.4 4	~~3~~ 4
Air-HH	21.2 4	3 ✓
GW-HH	46.8 4	4 ✓
SW-En	41.2 4	4 ✓
Air-En	N/S ✓	0

Priority scores:

$\frac{H^2 + 2M + L}{8}$ = $\frac{16 + 6 + 3}{8} = \frac{25}{8} = 3.13 \approx 4$

$\frac{H^2 + 2L}{7}$ = $\frac{16 + 0}{7} = \frac{16}{7} = 2.3 \approx 3$

Use the matrix presented to the right, along with the two priority scores, to determine the site ranking. N/A refers to where there is no applicable pathway.

Human Health	Environment 5	4	3 ↓	2	1	N/A
5	1	1	1	1	1	1
→ 4	1	2	(2)	2	3	4
3	1	2	3	4	4	5
2	2	3	4	4	5	5
1	2	3	4	5	5	5
N/A	3	4	5	5	5	NFA

DRAFT / (FINAL)

Matrix ("bin") Ranking: 2 ✓, or _____ No Further Action

CONFIDENCE LEVEL: The relative position of this site within this bin is:

_____ almost into the next higher bin.
X right in the middle, unlikely to ever change.
_____ almost into the next lower bin.

rev. 2/93

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

106 South 6th Ave. • Yakima, Washington 98902-3387 • (509) 575-2490

February 22, 1993

Mr. Eugene Feltz
Alder Gold-Copper Co.
Pack West Center, Suite 593
1211 S.W. 5th Avenue
Portland, OR 97204-3705

Dear Mr. Feltz:

RE: Alder Mill, Twisp

The Washington State Department of Ecology (Ecology) has recently completed a hazard ranking for the Alder Mill, Twisp, as required by the Model Toxics Control Act, (RCW 70.105D). This is a comparative estimate of the potential threat of this site to human health and the environment relative to other Washington State sites ranked at this time. A ranking of 2 has been calculated for your site, (1 = high, 5 = low).

For your information, Ecology will be publishing, as required, the ranking of this and other sites in the March 9, 1993 "Site Register." The rankings will be used in conjunction with other considerations in determining our priority for follow-up work.

A fact sheet on the ranking method is enclosed for your information.

For further information, please contact me at the Department of Ecology, Central Regional Office, 106 South 6th Avenue, WA 98902-3387, phone (509) 454-7840.

Sincerely,

Mark Peterschmidt
Toxics Cleanup Program

MP:JA:vw
g:sha.ltr

Enclosure