CSID 1046

WORKSHEET 1
SUMMARY SCORE SHEET

Site Name/Location (Street, City, County, Section/Township/Range, TCP ID Number):

Little Squalicum Creek
Off Marine Drive
Bellingham, WA 98226

T38/R02E/Section 23
Latitude:48°46'00",Longitude:122°30'56"
Facility Site I.D.# 7551533

Site assessed/ranked for February 24, 2004 Update.

Site Description (Include management areas, substances of concern, and quantities):
Little Squalicum Creek: A Brief Summary of Events

The Little Squalicum Creek property is owned by the City of Bellingham Parks & Recreation, and Whatcom County Parks & Recreation. The portion of the property owned by Whatcom County has been leased to the City of Bellingham for development as a park. The site is located off Marine Drive, west of the Eldridge neighborhood in Bellingham WA, at latitude 48°45'57", and longitude 122°30'54". Surrounding properties in the vicinity of Little Squalicum Creek include the Oeser Company immediately adjacent to the north bank of the creek, residential neighborhoods to the north and south, Morse Industrial Park to the east, Burlington Northern Railroad to the northwest and crossing the southern end of the creek, plus an old railroad grade along the creek's west bank. Also located west of Little Squalicum Creek are heavy industrial facilities including steel fabrication and fiberglass manufacturing facilities, warehouses, electrical repair shops, storage facilities, and the Tilbury Cement Company.

The Little Squalicum Creek property was listed on the WA State Department of Ecology's (Ecology) Confirmed and Suspected Contaminated Sites List on January 14, 2004. It had been listed earlier as part of the Oeser Company site, located upstream from the proposed Little Squalicum Park. The Oeser Company property is now a federal Environmental Protection Agency (EPA) Superfund site. Based on earlier information, the Little Squalicum Creek site was listed for confirmed contamination of sediments and soils by pesticides, phenolic compounds, base/neutral organics and polyaromatic hydrocarbons.

Data used for this report regarding contamination of the Little Squalicum Creek ravine was collected as part of EPA's Remedial Investigation/Feasibility Study (RI/FS) of the Oeser Company Superfund site (June 2002), and an earlier investigation, an expanded site inspection (ESI) conducted by Ecology and Environment, Inc., for the EPA in 1996. The Department of Ecology also recently completed limited sampling of the sediments of Little Squalicum Creek (September 2003). The results from these efforts were used in this site's scoring and ranking under the Washington Ranking Method of the Model Toxics Control Act (MTCA). Further investigation of the ravine portion (16 acres) of the proposed Little Squalicum Creek Park will be conducted by the City of Bellingham as part of a Brownfield Assessment Project, scheduled to take place over a one and a half year period.

The Little Squalicum Creek headwaters are in the Birchwood neighborhood to the northeast of the site. Water enters the creek via storm drains from this neighborhood and properties adjoining Little Squalicum Creek. Water from the Birchwood neighborhood and the Oeser Company facility storm drains is released to the creek via the Oeser and Birchwood outfalls. An outfall from the Marine Drive area south and west of the Oeser facility flows into the creek above the Marine Drive bridge. The creek is also fed by springs.

Contamination found along the Little Squalicum Creek ravine and in the creek itself during the EPA's and Ecology's investigations of the park property includes contamination by petroleum hydrocarbons, polyaromatic hydrocarbons (PAHs), pentachlorophenol, priority pollutant metals, and dioxins. Some or all of these contaminants were found at levels exceeding MTCA Method A or B cleanup levels in surface water, shallow ground water, sediments, and soils. A partial summary of these contaminants can be found in Table 1 on the following page. Relevant MTCA cleanup levels are summarized in Table 2.

For sample locations please refer to maps taken from the Oeser Company Superfund Site RI/FS report, Ecology and Environment's ESI, and Ecology's sediment sampling map included at the end of this report.

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 Oeser Company and its surrounding properties have been investigated extensively over the past ten or more years. An attempt was made to include the most relevant information available in the scoring of this site; however, given the enormous amount of information available on these properties, some data could have been inadvertently missed.

ROUTE SCORES:

Surface Water/Human Health: 30.1

Surface Water/Environ: 72.9

Air/Human Health: 19.46

Air/Environmental: NS

Ground Water/Human Health: 46.3

OVERALL RANK: 1

WORKSHEET 1 (CONTINUED)
SUMMARY SCORE SHEET

Table 1: The following table summarizes the highest detections of contaminants in samples collected along Little Squalicum Creek (Ecology & Environment, April 1996, Oeser Company Superfund Site Remedial Investigation Report, June 2002, Department of Ecology, September 2003):

Date	Matrix	Sample I.D.	Petroleum Products	Carcinogenic Polyaromatic Hydrocarbons (cPAH as B(a)P)	Pentachlorophenol	2,3,7,8 TCDD-TEQ (dioxin)	Priority Pollutant Metals
04/96	**Surface Water** (µg/L)	OS01	Not tested	**0.144**	10 UJF – what's F?	Not tested	Low levels, all below MTCA
07/99	**Surface water** (µg/L)	SW01 SW02 SW03	ND ND C8-C10ar.= 7.9JQ	**0.036**	0.055 0.063	**1.086 x 10-6** **1.481 x 10-6** **2.276 x 10-6**	Data not available
12/99	**Surface Water** (µg/L)	SW01 SW02 SW04 SW05 SW08	ND EPH = 110 EPH = 58 EPH = 121J EPH = 112J	 **0.0357** **0.187** **0.317**	**14** **21**	**24.588 x 10-6** **27.295 x 10-6** **50.707 x 10-6** **71.729 x 10-6** **14.202 x 10-6**	Data not available
04/96	**Sediment** (mg/Kg)	OS03/04 OS05 OS06	Not tested	 **12.48**	 0.140JF what's F?	Not tested	**Zn 224, Cu 104** **Zn 234** **Zn 279**
07/99	**Sediment** (mg/Kg)	SD02 SD03 SD06 SD09 SD10	EPH = 278 EPH = 137 EPH = 1393 EPH = 161J EPH = 170J	3.104 0.141 1.641 2.58	0.033 2J 0.46 1.1 2.9	161.997 x 10 –6	 **Zn 320** **Zn 360** **Zn 190** **Zn 170**
9/25/03 (Ecology)	**Sediment** (mg/Kg)	LSC02 LSC03	Not tested	**3.6156** **29.403**	1.37J 1.15	Not tested	No tested
8/6/99	**Surface Soil** (mg/Kg)	SP01 SP02 SP03 SP05 SP06 SP07	**EPH = 5533** VPH = 87	**8.322** **44.84** **4.78** **1.65** **2.327** **5.238**	**1.1** **1.8** ND **1.2** **1.4J** **2.2J**	**156.61 x 10-6** **1101.593 x 10-6** **867.571 x 10-6** **312.126 x 10-6** **265.227 x10-6** **1560.985 x 10-6**	Low levels, all below MTCA
8/11/99	**Shallow ground water** (µg/L)	WP1 WP2	**Diesel = 53000** **Motor oil = 9200** **Diesel = 1900** **Motor Oil 2400-J**	**219.5** **1.538**	**2.7 U** **0.84**	Not tested	Not tested

J= Estimate; JQ= estimate, bias unknown; U = undetected; **Bold** = exceeds MTCA Methods A or B cleanup standards

Table 2: MTCA Cleanup Levels, Methods A & B

Matrix	Petroleum Products	Carcinogenic Polyaromatic Hydrocarbons (cPAH as B(a)P)	Pentachlorophenol	2,3,7,8 TCDD-TEQ	Priority Pollutant Metals
Surface water	No data	0.0296 µg/L	4.91 µg/L	8.64 E-09µg/L	various
Sediment* **	No data	3.300 mg/Kg	No data	No data	Zn 140 mg/Kg Cu 80 mg/Kg
Soil	Diesel 2000 mg/Kg Heavy Oils 2000 mg/Kg	0.137 mg/Kg	2.4×10^{3} mg/Kg	6.67×10^{-6} mg/Kg	various
Ground Water	Diesel 500 µg/L ** Motor Oil 500 µg/L **	0.012 µg/L	0.729 µg/L	N/A	N/A

** Method A

***Values taken from "Development of Freshwater Sediment Quality Values for Use in Washington State", September 2003, WA Dept. of Ecology Publication Number 03-09-088

N/A = not applicable

WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE

List those substances to be considered for scoring: Source:12-14
Petroleum products, polyaromatic hydrocarbons, pentachlorophenol, Dioxins and priority pollutant metals.

Explain basis for choice of substance(s) to be used in scoring. Source:12-14
All of the above substances have been identified in either surface water, shallow ground water, soils and sediment samples at levels above the MTCA Methods A and B cleanup levels.

List those management units to be considered for scoring: Source:12-14
Fresh water sediments and soil.

Explain basis for choice of unit to be used in scoring. Source:12-14
Contamination confirmed by sampling. Results summarized in report.

2. AIR ROUTE

List those substances to be considered for scoring: Source:12-14
Petroleum products, polyaromatic hydrocarbons, pentachlorophenol, Dioxins and priority pollutant metals.

Explain basis for choice of substance(s) to be used in scoring. Source:12-14
All of the above substances have been identified in either surface water, shallow ground water, soils and sediment samples at levels above the MTCA Methods A and B cleanup levels.

List those management units to be considered for scoring: Source:12-14
Fresh water sediments and soil.

Explain basis for choice of unit to be used in scoring. Source:12-14
Contamination confirmed by sampling. Results summarized in report.

3. GROUND WATER ROUTE

List those substances to be considered for scoring: Source:12-14
Petroleum products, polyaromatic hydrocarbons, pentachlorophenol, dioxins and priority pollutant metals.

Explain basis for choice of substance(s) to be used in scoring. Source:12-14
All of the above substances have been identified in either surface water, shallow ground water, soils and sediment samples at levels above the MTCA Methods A and B cleanup levels.

List those management units to be considered for scoring: Source:12-14
Fresh water sediments and soil.

Explain basis for choice of unit to be used in scoring. Source:12-14
Contamination confirmed by sampling. Results summarized in report.

WORKSHEET 4
SURFACE WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Val.	AcuteToxicity (mg/kg-bw)	Val.	ChronicToxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. TPH Diesel	20	6	490	5	0.004	3	-	-	ND
2. Benzo(a)pyrene	0.2	10	50(rat)	10	ND	-	0.8	9	7
3. Pentachlorophenol	0.1	10	ND	ND	0.03	1	0.8	5	4
4. 2,3,7,8 – TCDD-TEQ	5 E-5	10	ND	ND	150000	-	0.8	10	8
5. Copper	1300	2	ND	ND	0.037	1	-	-	ND
6. Zinc	4000	2	ND	ND	0.2	1	-	-	ND

*Potency Factor

Source: 12-14,2

Highest Value: 10 (Max.=10)

+2 Bonus Points? 2

Final Toxicity Value: 12 (Max.=12)

1.2 Environmental Toxicity

(x) Freshwater
( ) Marine

Substance	Acute Water Quality Criteria (ug/l)	Value	Non-human Mammalian Acute Toxicity (mg/kg)	Value
1. TPH Diesel	2300	2	-	-
2. Benzo(a)pyrene	ND	ND	50rat	10
3. Pentachlorophenol	20	6	-	-
4. 2,3,7,8 – TCDD-TEQ	0.1	10	-	-
5. Copper	18	6	-	-
6. Zinc	120	4	-	-

Source: 12-14,2 **Value: 10** (max.=10)

1.3 Substance Quantity: unknown, use default = 1

Explain basis: _____

Source: 1,2 **Value: 1** (Max.=10)

2.0 MIGRATION POTENTIAL

2.1 Containment: cont. soil with no runon/runoff controls

Source: 1,2 **Value: 10** (Max.=10)

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

2.2 Surface Soil Permeability: sand — Source: 1,8 — **Value: 1** (Max.=7)

2.3 Total Annual Precipitation: 33.6 — Source: 3 — **Value: 3** (Max.=5)

2.4 Max. 2-Yr/24-hour Precipitation: 2 inches — Source: 1 — **Value: 2** (Max.=5)

2.5 Flood Plain: no — Source: 9 — **Value: 0** (Max.=2)

2.6 Terrain Slope: immediately adjacent to creek — Source: 12 — **Value: 5** (Max.=5)

3.0 TARGETS

3.1 Distance to Surface Water: <1000' to Little Sq. Ck — Source: 12 — **Value: 10** (Max.=10)

3.2 Population Served within 2 miles (See WARM Scoring Manual Regarding Direction): $\sqrt{0} = 0$ — Source: 4 — **Value: 0** (Max.=75)

3.3 Area Irrigated within 2 miles 0.75√no. acres= (Refer to note in 3.2.): $0.75\sqrt{0} = 0$ — Source: 6 — **Value: 0** (Max.=30)

3.4 Distance to Nearest Fishery Resource: < 1000 ft — Source: 11 — **Value: 12** (Max.=12)

3.5 Distance to, and Name(s) of, Nearest Sensitive Environment(s) Little Squalicum Creek — Source: 12 — **Value: 12** (Max.=12)

4.0 RELEASE

Explain basis for scoring a release to surface water: contaminants found in surface water, soil & sediments — Source: 12-14 — **Value: 5** (Max.=5)

WORKSHEET 5
AIR ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring

1.2 Human Toxicity

	Air Standard		AcuteToxicity		ChronicToxicity		Carcinogenicity		
Substance	(ug/m^3)	Val.	(mg/m^3)	Val.	(mg/kg/day)	Val.	WOE	PF*	Val.
1. TPH Diesel	166.5	4	ND	ND	ND	ND	ND	ND	ND
2. Benzo(a)pyrene	0.0006	10	ND	ND	ND	ND	ND	ND	ND
3. Pentachlorophenol	1.7	9	ND	ND	ND	ND	ND	ND	ND
4. 2,3,7,8 – TCDD-TEQ	3 E -08	10	ND	ND	ND	ND	ND	ND	ND
5. Copper	3.3	9	ND	ND	ND	ND	ND	ND	ND

*Potency Factor

Source: 12-14

Highest Value: 10 (Max.=10)

+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

Vapor Pressure(s)(mmHg): _____ Source: _____ **Value: 0** (Max.=4)

1.3.2 Particulate Mobility – N/A

Soil type: fine to medium sand Source: 1 **Value: 3** (Max.=4)

Erodibility: 220

Climatic Factor: 1 - 10

1.4 Highest Human Health Toxicity/Mobility Matrix Value

(from Table A-7) equals **Final Matrix Value: 18** (Max.=24)

1.5 Environmental Toxicity/Mobility Source: 1,2

Substance	Non-human Mammalian Acute Inhal. Toxicity (mg/m^3)	Value	Mobility (mmHg)	Value	(Table A-7) Matrix Value
No data					

Highest Environmental Toxicity/Mobility Matrix Value (From Table A-7) equals **Final Matrix Value: NS** (Max.=24)

1.6 Substance Quantity: Unknown default = 1 Source: 1 **Value: 1** (Max.=10)

Explain basis:

WORKSHEET 5 (CONTINUED)
AIR ROUTE

2.0 MIGRATION POTENTIAL

2.1 Containment: uncontaminated soil cover <2 ft thick Source: 12 **Value: 5** (Max.=10)

3.0 TARGETS

3.1 Nearest Population: <1000' Source: 1 **Value: 10** (Max.=10)

3.2 Distance to, and Name(s) of, Nearest Sensitive Environment(s) < 1000' to Bellingham Bay Source: 9 **Value: 7** (Max.=7)

3.3 Population within 0.5 miles: √pop.=√(.25)4923=45 Source: 4 **Value: 35** (Max.=75)
(Note: am using one-quarter of the 0-1 mile population determined from the U.S. EPA SITEINFO database)

4.0 RELEASE

Explain basis for scoring a release to air: None documented. Source: 1 **Value: 0** (Max.=5)

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.	ChronicToxicity (mg/kg/day)	Val.	Carcinogenicity WOE	PF*	Val.
1. TPH Diesel	20	6	490	5	0.004	3	-	-	ND
2. Benzo(a)pyrene	0.2	10	50(rat)	10	ND	-	0.8	9	7
3. Pentachlorophenol	0.1	10	ND	ND	0.03	1	0.8	5	4
4. 2,3,7,8 – TCDD-TEQ	5 E-5	10	ND	ND	150000	-	0.8	10	8
5. Copper	1300	2	ND	ND	0.037	1	-	-	ND
6. Zinc	4000	2	ND	ND	0.2	1	-	-	ND

*Potency Factor

Source: 12-14

Highest Value: 10
(Max.=10)

+2 Bonus Points? 2

Final Toxicity Value: 12
(Max.=12)

1.2 Mobility (Use numbers to refer to above listed substances)
Cations/Anions: 5)2, 6)3 Source: 1 **Value: 3**
(Max.=3)

OR

Solubility(mg/l): 1)30=1, 2) 1.2E-03=0
3)14=1, 4)2.0E-04=0

1.3 Substance Quantity: Unknown = 1 Source: 1 **Value: 1**
(Max.=10)
Explain basis:

2.0 MIGRATION POTENTIAL

2.1 Containment Source: 1,12 **Value: 10**
(Max.=10)
Explain basis spills/ contaminated soil

2.2 Net Precipitation: 22.3 - 5.6 = 16.7 inches Source: 3 **Value: 2**
(Max.=5)

2.3 Subsurface Hydraulic Conductivity: sandy gravel Source: 12 **Value: 4**
(Max.=4)

2.4 Vertical Depth to Ground Water: shallow aquifer at 4-15' bgs, deep aquifer at 30-45' Source: 12 **Value: 8**
(Max.=8)

WORKSHEET 6 (CONTINUED)
GROUND WATER ROUTE

3.0 TARGETS

3.1 Ground Water Usage: private, alternate available — Source: 6,7 — **Value: 4** (Max.=10)

3.2 Dist. to Nearest Drinking Water Well: > 1 mile — Source: 6 — **Value: 1** (Max.=5)

3.3 Population Served within 2 Miles: $\sqrt{21} = 5$ — Source: 6,7 — **Value: 5** (Max.=100)

3.4 Area Irrigated by (Groundwater) Wells within 2 miles: $0.75\sqrt{\text{no.acres}} = 0.75\sqrt{156} = 9.4$ — Source: 6 — **Value: 9** (Max.=50)

4.0 RELEASE

Explain basis for scoring a release to ground water: Contaminants (TPH, PAHs and pentachlorophenol) found in ground water — Source: 12 — **Value: 5** (Max.=5)

SOURCES USED IN SCORING

1. Washington State Department of Ecology. WARM Scoring Manual. April 1992.
2. Washington State Department of Ecology. Toxicology Database for Use in Washington Ranking Method Scoring. January 1992.
3. Washington State University Cooperative Extension Service, Washington Climate.
4. U.S. EPA SITEINFO GIS Query for Little Squalicum Creek location.
5. Washington State Department of Ecology Well Logs.
6. Water Rights Application Tracking System, NWRO Ecology. List of Wells and Water Usage in Surrounding Area.
7. Washington State Department of Health Public Water Systems (list on file at Whatcom County Health Department Drinking Water Program).
8. Oldin, Alan. PhD. Soil Survey of Whatcom County Area, Washington. United States Department of Agriculture, Soil Conservation Service, 1985.
9. Whatcom County Planning & Development. CAO Articles III & IV (Geohaz. & Flooding) T38N – R2E. Map. 5/1/99.
10. Whatcom County Planning & Development. CAO Articles III & IV (Aquifer & Wetland) T38N – R2E. Map. 6/1/98.
11. Whatcom County Planning & Development. Fish Habitat. Map. 3/1/99.
12. Ecology and Environment, Inc. The Oser Company Superfund Site Remedial Investigation Report. June 1992.
13. Ecology and Environment, Inc. Expanded Site Investigation Report, Oeser Company Site, Bellingham Washington. April 1996.
14. Washington Department of Ecology. Results from 2003 Sediment Sampling. September 2003.