CSID 2021

WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: Green Crow Property
Address: Lake Cavanaugh Road
City: **Arlington** County: **Snohomish** State: **WA** Zip: **98223**
Section/Township/Range: **N7 & 8/ T32N/ R7W**
Latitude: **48° 17' 385" N** Longitude: **121° 56' 912" W**
Latitude: **48° 17' 435" N** Longitude: **121° 56' 349" W**
Facility Site ID: **7250260**

ERTS #. **550230**

Site scored/ranked for the August 23, 2006 update.

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

The site is actually two separate locations within two continuous parcels of land owned by the same company, Green Crow LLC. The site is a very large tract of land, approx, 1000 acres. There are two sites that the Snohomish Health District (SHD) located within these parcels. The SHD collected soil samples from each of the sites. Results from the samples at each sampling location indicated the presence of high lead concentrations.

These sites are located at : Site N48 17.385 W121 56.912 which is also known as the Target Hill Site and N48 17.435 W121 56.349 which is refered to as the 8 mile site. Both sites had signifigant collections of garbage and shooting range debris.

The propery as a whole is undeveloped timber land with the exception of Lake Cavanaugh Road that winds through the property. Residential properties exist to the southeast of the property at roughly one mile from the 8 mile site.

There are two areas of confirmed contamination. Contamination in these areas is likely from the unregulated and uncontained discharge of various firearms over an extended period of time into the soils found along a target tragectory.

The contaminant of primary concern is lead. Six soil samples were collected around the two sites. At the eight mile site samples were collected from soils near the surface in intervals between the "beginning" of the range and the end of the range. The beginning of the range was observed to be the area with the greatest concenctration of spent casings, wasted shotgun shells and amunition boxes closest to Lake Cavanaugh Road. The end of the range was observed to be a stump approximately 100 yards down range or east of the beginning. The stump was had been pummeled by many many shots.

Soil samples were collected at the base of the target hill. The base was observed to be where the gravel and sand created a more horizontal plane rather than the 15-25 % slope of the hill. The uphill sample was collect approximately six vertical feet up the hill from the base sample site.

The Model Toxice Control Act (MTCA) Method A Residential Cleanup Standard for lead in soil is 250 mg/kg. The MTCA Metod A industrial clean up for soil standard is 1000 mg/kg. All of the six samples excced both the residential and industrial standards. Results varied between 2,630 mg/kg and 49,700 mg/kg. TCLP analysis for some of the samples greatly exceeded the Dangerous Waste Characteristic for toxicity for lead of 5 mg/L . See Table 1 for soil sampling results.

The site's history started in Februarly 23, 2004, when the SHD received a complaint regarding the illegal dumping of garbage along Lake Cavanaugh Road. Melissa Spencer from SHD investigated and confirmed a large volume of illegal dumping throughout the large property.

During the investigation it became apparent that several locations within the property were favorite sites for the discarge of firearms.

On May 11, 2005, Melissa Spencer and Geoffrey Crofoot conducted a site visit as a result of the origional garbage complaint. Melissa Spencer and Geoffrey Crofoot visted two locations within the property that appeard to have a heavy littering of shooting related litter such as spent casings, shot gun shells, shot up bulky goods and large volumes of lead on the surface of the soil. At the time of the site visit, samples were collected in the aformentioned manner.

The following table depicts the results of soil samples collected at the Green Crow Property on May 11, 2005.

Table 1
Soil Sampling Results
Green Crow Poperty
Collected by SHD
May 11, 2005

		Results (mg/kg)					
	MTCA Limit	8 mile site at first stump	8 mile site at midway	8 mile site at 3/4th to target	8 mile site at target	Target hill site @base	Target hill at 6 feet up hill
Lead (total)	250	**29900**	**4320**	**9180**	**2630**	**21900**	**49700**
TPH Heavy Oil	2000	**16000**	NS	NS	NS	NS	NS
Mercury	2.0	.10	NS	NS	NS	.02	NS

All results are noted in mg/kg
Bold indicates MTCA Exceedance

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 sites within the larger property represent two known locations for lead contamination. However, it worth noting that there may be other similarly contaminated areas on the properties in question as well as similarly rural properties in the area. The lead contamination found in these areas is due to unregulated shooting ranges that have no containment of lead or other contaminants formed from the discharge of weapons.

ROUTE SCORES:

Surface Water/Human Health:	**22.1**	Surface Water/Environmental.:	**38.8**
Air/Human Health:	**1.4**	Air/Environmental:	**NS**
Groundwater/Human Health:	**30.2**		

OVERALL RANK: 3

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**

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

   Lead and TPH Heavy Oils

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

   Analytical results from soil sampling indicate the presence of these hazardous substances at levels which exceed our current Method A cleanup levels.

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

   Surface and subsurface soils

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

   Spills/discharges caused soil contamination

2. **AIR ROUTE**

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

   Lead and TPH Heavy Oils

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

   Analytical results from soil sampling indicate the presence of these hazardous substances at levels which exceed our current Method A cleanup levels.

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

   Surface and subsurface soils

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

   Spills/discharges caused soil contamination

3. **GROUNDWATER ROUTE**

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

   Lead and TPH Heavy Oils

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

   Analytical results from soil sampling indicate the presence of these hazardous substances at levels which exceed our current Method A cleanup levels.

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

   Surface and subsurface soils

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

   Spills/discharges caused soil contamination

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	Lead	5	8	NA	ND	0.001	10	ND	ND	ND
2	TPH-Heavy Oil	-	-	NA	ND	0.001	1	ND	ND	x

***Potency Factor**

Source: 1, 2

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 10
(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	Lead	82	6	ND	--
2	TPH Heavy Oil				--

Source: 1, 2

Highest Value: 6
(Max = 10)

1.3 Substance Quantity (areal extent)

Explain Basis: Unknown quantity due to large are encompassed at each shooting site.

Source: 8

Value: 1
(Max = 10)

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/off control **Explain basis:** Samples were collected from the surface or near surface along a firing ling and at the end of a firing line.	1, 3, 10	**10** (Max = 10)
2.2	**Surface Soil Permeability:** Soil consists of sand and poorly graded sand, and gravelly sand	14	**1** (Max = 7)
2.3	**Total Annual Precipitation:** average annual precipitation for Arlington WSO AP, WA = 30-48 inches	9	**3** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 5.5 inch	9	**4** (Max = 5)
2.5	**Flood Plain:** not in a flood plain	10	**0** (Max = 2)
2.6	**Terrain Slope:** . 8% site is on the side of a mountain	10, 13	**5** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:** ~1070 feet southwest to Deer Creek	13, 17	**7** (Max = 10)
3.2	**Population Served within 2 miles (see WARM Scoring Manual Regarding Direction):** $\sqrt{12} = 3.464$	6, 17	**3** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles : (0.75)*$\sqrt{}$ # acres =** $0.75 * \sqrt{0} = 0$	6	**0** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** ~1070 feet to Deer Creek	10,17	**9** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** wetland ~1070 feet to Deer Creek	13	**9** (Max = 12)

4.0 RELEASE

Explain Basis: Not documented	Source: 1, 3, 10 **Value: 0** (Max = 5)

WORKSHEET 5
Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1. Introduction

1.2 Human Toxicity

	Substance	Air Standard (µg/m³)	Value	Acute Toxicity (mg/ m³)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity WOE	Carcinogenicity PF*	Value
1	Lead	0.5	10	ND	--	0.001	10	B2	ND	--
2										

* *Potency Factor*

Source: 1, 2, 3
Highest Value: 10
(Max = 10)
Plus 2 Bonus Points? 0
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		Gravelly/sandy loam	86	1-10

Source: NA
Value: NS
(Max = 4)

Source: 1, 2, 3
Value: 1
(Max = 4)

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

Final Matrix Value: 5
(Max = 24)

1.5 Environmental Toxicity/Mobility

	Substance	Non-human Mammalian Inhalation Toxicity (mg/m³)	Acute Value	Mobility (mmHg)	Value	Matrix Value
1	Lead	ND	--	ND	--	--
2						

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

1.6 Substance Quantity (areal extent)	
Explain Basis: ~Unknown Quantity use default of 1	Source: 3, 10 **Value: 1** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** No cover soils present	8, 10	**10** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** <3500 feet southeast to a residence	3, 17	**4** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** NA since not scoring environmental route	17	**NA** (Max = 7)
3.3	**Population within 0.5 miles:** √ pop. = √0 = 0	17	**0** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: Not documented	Source: 8 **Value: 0** (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	Lead	5	8	NA	ND	0.001	10	ND	ND	ND
2	TPH-Heavy Oil	-	-	NA	ND	0.001	1	ND	ND	x

* *Potency Factor*

Source: 1, 2

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 10
(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= K > 1.0 = 2	1=
2=	2= < or = 10 mg/l = value 0

Source: 3

Value: 3
(Max = 3)

1.3 Substance Quantity (volume):

Explain basis: Unknown Quantity, therefore, use the default of 1.	Source: 1, 3 **Value: 1** (Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Contamination at surface without cover`.	3, 10	**10** (Max = 10)
2.2	**Net precipitation:** 59.1" – 54.6" = 4.5"	4	**1** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Moderately permeable till	13	**2** (Max = 4)
2.4	**Vertical depth to groundwater:** water well reports nearby indicate the static water in wells within the vicinity of the site at 6-30 below grounds surface.	3, 5	**8** (Max = 8)

3.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Private Supply with no alternate unthreatened sources	3	**5** (Max = 10)
3.2	**Distance to nearest drinking water well:** ~4822 **feet**	3, 5, 17	**2** (Max = 5)
3.3	**Population served within 2 miles: √ pop.** = √462=21.49=21	3, 7, 17	**21** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles: (0.75)*√# acres** = 0.75 * √0 = 0	3, 6	**0** (Max = 50)

4.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Not documented	10	**0** (Max = 5)

SOURCES USED IN SCORING

1. Analytical results of soil sampling conducted on May 11, 2005, by the Snohomish Health District.
2. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992
3. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
4. Washington Climate – Net Rainfall Table
5. Washington State Department of Ecology, Water Well Reports
6. Washington State Department of Ecology, Water Rights Application System (WRATS) printouts
7. Washington State Department of Health, Office of Drinking Water Sentry website printout for public water supplies
8. Green Crow II file from the Ecology records at the NW Regional Office
9. Western Regional Climate Center's Historical Climate Information
10. Site visits conducted by Ecology and Snohomish Health District
11. USEPA On line Mapping Storefront @ http://www.epa.gov/enviro/html/em/index.html

12. Thomas Guide, Snohomish County, 2004
13. U.S.G.S. Topo. Map, West Edmonds Quad., 7.5 Min. Series, Photorev. 1973.
14. Department Of The Interior, US Geologic Survey, Geologic Map of the East Arlington, 7.5 Minute Quad, James P. Minard, 1985
15. Soil Conservation Service, Soil Survey of Snohomish County Area, July 1983.
16. Snohomish County Assessors/Treasurers On-line information page @ http://198.238.192.103/propsys/Asr-Tr-PropInq/PrpInq01-Entry.asp
17. Snohomish County Aerial Ortho Photos, 2003