SITE HAZARD ASSESSMENT

WORKSHEET 1

Summary Score Sheet

SITE INFORMATION:

Site Name: Green Diamond Resource Company, Shelton Gun and Rifle Club
Address: 4050 E Mason Lake Rd, Shelton
Ecology Facility Site ID No.: 189457
Section/Township/Range: 24/21N/03W
Latitude: 47.29117 Longitude: -123.01336

Site scored/ranked for the February 2014 update
Today's date: August 8, 2013

SITE DESCRIPTION:

The subject site consists of a 40 acre, square-shaped, parcel designated as "Resource – Designated Forest Land" in an area of Shelton zoned for mixed resource and residential uses. This site rests at approximately 232 feet above mean sea level. Emerald Lake lies approximately 810 feet north of the subject site. Currently this site houses no structures.

In November of 2003, the Washington State Department of Ecology (Ecology) received a complaint through the Environmental Report Tracking System (ERTS) with regards to potential lead contamination in groundwater, as a result of the Shelton Rifle and Pistol Club (SRPC) operating at the site.

In January of 2004, Ecology requested access to the property. Access to the site was granted in February of 2004, and Ecology conducted a site visit. The area of concern, the pistol and gun range, is approximately three acres, and was built in the 1940s. The property was leased by the SRPC from Green Diamond Resource Company. Nine soil samples were collected, six of which exceeded the MTCA Method A Cleanup Level for lead, 250 mg/kg.

In May of 2005, Ecology added the subject site to the Confirmed or Suspected Contaminated Sites List (CSCSL), as a state cleanup site awaiting a Site Hazard Assessment.

In June of 2005, the property owner, Green Diamond Resource Company, became aware of the situation and asked the SRPC to address the contamination. In response to the request the SRPC conducted a lead mining operation in January of 2006, to sort the lead out of the soil at the site.

In March of 2006, Ecology received a letter from a nearby concerned landowner regarding lead contamination of residential drinking water wells.

In December of 2006, Green Diamond Resource Company did not renew the lease contract with SRPC and operations ceased.

In April of 2008, Green Diamond Resource Company notified Ecology of groundwater sampling conducted on the property. A groundwater sample was collected just outside the wetland on the property. The groundwater sample returned above the MTCA Method A Cleanup Level for lead in groundwater, 15 ug/L.

In January of 2009, Green Diamond Resource Company hired AMEC to collect two groundwater samples between the 100 yard berm and the wetland area, both samples returned above the MTCA Method A Cleanup Level for lead in groundwater.

In March of 2013, Ecology received a Cleanup Completion Report from the Green Diamond Resource Company, completed by AMEC. A total of 3,406 tons of soil was excavated from five locations at the site; a general area, a 100 yard berm, a 200 yard berm, pistol berm 1, and pistol berm 2. The soil was treated to convert leachable lead into nonleachable lead and disposed of at Waste Management's landfill in Oregon. Confirmation samples from the excavation locations documented lead concentrations below the MTCA Method A Cleanup Level for lead in soil. The documented groundwater contamination at the site was not addressed during these activities.

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 scope of this Site Hazard Assessment did not include a hydrogeologic survey of the subject site and surrounding area. The groundwater contamination documented or inferred at the subject site is therefore considered to have the potential to impact any well located within the prescribed 2-mile radius and all such wells were used in the scoring process.

The substance quantity could not be accurately estimated, a value of one was assigned in lieu of estimation.

Three water systems were not able to be included in the scoring for this site. Deer Creek Grocery and Green Diamond Park are transient non-community wells which are not included in the Washington Ranking Method. Pioneer School District is another water system that, due to the nature of a school and the periods of use and non-use, were not able to be included in the Washington Ranking Method. The Washington State Department of Health documents these water systems to be from shallow sources and are rated as highly susceptible to contamination.

ROUTE SCORES:

Surface Water/Human Health: **5**
Surface Water/Environmental.: **4**
Air/Human Health: **2**
Air/Environmental: **2**
Groundwater/Human Health: **3**

OVERALL RANK: 1

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1,2,3

      Lead

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

      Lead is confirmed, through sampling, to be present in the surrounding surface water.

   c. List those management units to be considered for scoring: Source: 1,2,3

      Spills, discharges, and contaminated soil

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

      Spills, discharges, and contaminated soil will be the management units used for scoring due to contaminated surface soils, verified through sampling and analysis

2. **AIR ROUTE**
   a. List those substances to be considered for scoring: Source: 1,2,3

      Lead

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

      Lead is confirmed, through sampling, to be present at this site.

   c. List those management units to be considered for scoring: Source: 1,2,3

      Spill, discharges, and contaminated soil

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

      Spills, discharges, and contaminated soil will be the management units used for scoring due to contaminated surface soils, verified through sampling and analysis

3. **GROUNDWATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1,2,3

      Lead

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

      Lead is confirmed, through sampling, to be present in the groundwater

   c. List those management units to be considered for scoring: Source: 1,2,3

      Spills, discharges, and contaminated soil

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

Spills, discharges, and contaminated soil will be the management units used for scoring due to contaminated surface soils, verified through sampling and analysis

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	--	ND	--	ND	--	--	NE
2										
3										
4										
5										
6										

* *Potency Factor*

Source: 1,2,3

Highest Value: 8
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 8
(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					
3					
4					
5					
6					

Source: 2,3

Highest Value: 6
(Max = 10)

1.3 Substance Quantity	
Explain Basis: Quantity of substance released could not be estimated, thus it was assigned a value of 1	Source: 1,2 **Value: 1** (Max = 10)

2.0 Migration Potential

		Source	Value
2.1	**Containment** **Explain basis:** Spill, discharge, and contaminated soil at the surface with unknown run-on/run-off controls	1,2	**10** (Max = 10)
2.2	**Surface Soil Permeability:** Alderwood gravelly sandy loam	2,8	**1** (Max = 7)
2.3	**Total Annual Precipitation:** 50.1-60 inches	2,4	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 3.94 inches	2,15	**3** (Max = 5)
2.5	**Flood Plain:** Not in a flood plain	2,14	**0** (Max = 2)
2.6	**Terrain Slope:** Approximately 8.5% slope between the site and Lake Limerick, the closes surface water location	2,4,7	**5** (Max = 5)

3.0 Targets

		Source	Value
3.1	**Distance to Surface Water:** Lake Limerick is approximately 700 ft north of this site	2,7	**10** (Max = 10)
3.2	**Population Served within 2 miles (see WARM Scoring Manual Regarding Direction):** Approximately 2165 residents served by surface water.	2,7,9,10	**35** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles : (0.75)*√# acres =** Approximately 180 acres irrigated by surface water within 2 miles	2,7	**10** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** Deer Creek, a salmon-bearing creek, lies approximately 4400 ft to the southeast	2,7	**6** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** An Emergent, Shrub/scrub, and a tidal emergent wetland are all within the boundaries of this property.	2,7	**12** (Max = 12)

4.0 Release

Explain Basis: Widespread surface contamination by lead made it available to the surface water route, especially in the wetland located within this parcel, however documentation of surface water contamination was not provided.	Source: 1,2 **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		Value
								WOE	PF*	
1	Lead	0.5	10	--	ND	--	ND	--	--	ND
2										
3										
4										
5										

* *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	0.0E+00	gravelly sandy loam	22	<1
2				
3				

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

Source: 2,3
Value: 0
(Max = 4)

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

(Use highest of: 1)

Final Matrix Value: 5
(Max = 24)

1.5	Environmental Toxicity/Mobility –					
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
2	Lead	--	ND	0.0E+00	1	
6						

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

1.6	Substance Quantity	
	Explain Basis: Quantity of substance released could not be estimated, thus it was assigned a value of 1	Source: 1,2 **Value: 1** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Spill/discharge to surface, no cover or vapor collection system	1,2	**10** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** Nearest residence is approximately 650 ft north	2,7	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s):** An Emergent, Shrub/scrub, and a tidal emergent wetland are all within the boundaries of this property.	2,13	**7** (Max = 7)
3.3	**Population within 0.5 miles:** Approximately 360 residents within 0.5 miles	2,7	**19** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: Widespread surface contamination by lead made it available to the air route, however documentation of air contamination was not provided.	Source: 1,2 **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	Lead	5	8	--	ND	--	ND	--	--	NE
2										
3										
4										
5										
6										

* *Potency Factor*

Source: 1,2,3

Highest Value: 8
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 8
(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=	1= 0.0E+00 = 2
2=	2=
3=	3 =
4=	4=
5=	5=
6=	6=

Source: 2,3

Value: 2
(Max = 3)

1.3 Substance Quantity:

Explain basis: Quantity of substance released could not be estimated, thus it was assigned a value of 1	Source: 1,2 **Value: 1** (Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Spill/discharge/contaminated soil at the surface with no cap	1,2	**10** (Max = 10)
2.2	**Net precipitation:** 50.1-60 inches	2,4	**5** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Alderwood gravelly sandy loam	2,8	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** documented groundwater at 38 ft	1,2,12	**6** (Max = 8)

2.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Private supply with no alternate unthreatened sources	2,5,6	**5** (Max = 10)
3.2	**Distance to nearest drinking water well:** Nearest well located 1480 ft northeast	2,5,7	**3** (Max = 5)
3.3	**Population served within 2 miles:** Approximately 108 residents served by groundwater within 2 miles	2,5,6	**8** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** **(0.75)*√** Approximately 46 acres irrigated by groundwater within 2 miles	2,9,10	**5** (Max = 50)

3.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Samples confirm groundwater contamination at this site.	1,2	**5** (Max = 5)

SOURCES USED IN SCORING

1. Washington State Department of Ecology Site Hazard Assessment File/TCP file
2. Washington State Department of Ecology, WARM Scoring Manual, April 1992
3. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992
4. U.S. Department of Interior Geological Survey Topographical Map
5. Washington State Department of Health, Public Water System Database
6. Washington State Department of Ecology, Water Resources Explorer
7. Mason County GIS map
8. Washington State Department of Agriculture, soil maps
9. Washington State Department of Ecology Water Rights Tracking System
10. GeoCommunicator, Land Survey Information System
11. Model Toxics Control Act, Statue and Regulation, November 2007
12. Washington State Department of Ecology Well Log Viewer
13. Pacific County, National Wetlands Inventory Area Map
14. Washington State Department of Ecology, Costal Atlas, Flood Hazard Maps
15. NOAA Atlas 2 Precipitation Frequency Estimates