CSID 3226

SITE HAZARD ASSESSMENT
WORKSHEET 1
SUMMARY SCORE SHEET

July 21, 2004

Site assessed for the August 17, 2004, update of the Site Register

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

Zink Dump	Township:	23N
South of Perdemco Ave SE and east of	Range:	1E
Bonneville Place SE	Section:	12
Port Orchard, WA 98367	Longitude:	122° 37′ 8.15″
	Latitude:	47° 29′ 59.8″

Facility Site ID: 12465742

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

HISTORY AND SITE DESCRIPTION

The Zink Dump site is a historic mixed municipal solid waste landfill located in rural Kitsap County south of Port Orchard, WA. This site was listed on the Washington State Department of Ecology's (Ecology) Confirmed and Suspected Contaminated Sites (CSCS) list on November 9, 2000. The site was listed after the Kitsap County Health District (KCHD) conducted closed and abandoned landfill inspections within Kitsap County. These inspections led to the listing of multiple landfills on the CSCS list. The site was listed on the CSCS list based on suspected releases of metals, petroleum products, polynuclear aromatic hydrocarbons (PAHs), and organic compounds to soil and ground water.

Based on permit data, an estimated total of 126,360 cubic yards of waste were dumped at the landfill from 1947-1975. Throughout the site's history, problems with inadequate cover and rodents were noted. Burning of garbage occurred from time to time. Based on site conditions and permit descriptions, the fill occurred upslope of the headwaters of a tributary of Salmonberry Creek. Salmonberry Creek flows to Long Lake, then Curley Creek, and finally into the Puget Sound at Yukon Harbor. Health District records indicate that mixed municipal waste, wood waste, construction debris, tires, and drums were disposed of in the landfill. A telephone interview with the current property owner, who was also the last operator of the landfill, revealed that the Zink Dump was operated as the disposal site for Peninsula Disposal's route collection trucks from 1973 to 1975. During that time no public or private dumping was allowed except for the route collection trucks. The current property owner also operated Peninsula Disposal, as both the collection business and disposal site were purchased from Mr. Ted Zink.

Currently, the property is undeveloped, wooded, and vegetated. The property appears to have a wet area that was filled in with waste. Health District records contain photographs of the landfill in 1975 showing standing water in a depression in the center of the property. This

depression is now filled in with waste and soil. Hidden Creek Elementary School is situated on the property immediately to the north of the landfill on the opposite side of Perdemco Lane. There is an abandoned ground water monitoring well located on the south edge of the school property. No records have been found for this monitoring well. To the west and east of the property residential homes have been developed, while the property to the south has not been developed.

SITE HAZARD ASSESSMENT INVESTIGATION

In preparation for conducting a site hazard assessment (SHA) for the Zink Dump, a site visit confirming the landfill's location was conducted by KCHD on September 9, 2002. The site visit provided KCHD staff a familiarity with the property, nearby drinking water well locations, and surface water flow directions.

The property is located on the edge of a plateau above a small valley to the east. It appears that the property was originally a depression on top of the plateau. The property is 10 acres and currently has an excavated pit at the northwest corner, and a built up hill in the center. Soil from the excavated pit was used to cover waste. The built up hill is the landfill consisting of waste and cover soil from the pit.

Surface water flow was generally into the original depression where it stood and then infiltrated into the ground. Currently surface water infiltrates into the pit or runs to the east into a small valley. This valley contains a seasonal tributary of Salmonberry Creek which flows into Long Lake, Curley Creek, and then into Yukon Harbor of Puget Sound. The tributary to Salmonberry Creek is approximately 1,500 feet from the property. Surface water is being impacted by contaminated groundwater migrating to the surface approximately 600 feet from the landfill.

Based on local well logs, the groundwater flow appears to be primarily in the east-southeast direction. In the area of the landfill, there are wells that have static water levels as shallow as 42 feet below ground surface (bgs). In the valley to the east the static water level in most wells is between 0 and 15 feet bgs. The geology of the area is typical of Kitsap County. Primarily alternating layers of sand, mixed gravel and clay, and clay are the stratum below the property. The closest well, which draws from a shallow aquifer (42 ft. bgs) is approximately 570 feet away. Numerous public water systems and private wells are located within two (2) miles of the site. Well over 10,000 local residents are served by these wells and there are eight (8) public water systems within one mile of the property. The closest public water system (Martell Mobile Manor) is approximately 1000' to the northwest of the landfill.

SOIL SAMPLING

Sampling efforts during the SHA focused on collecting representative soil and ground water samples. Sampling was conducted July 17, 2003 and on May 31, 2004. Below ground surface soil samples were collected in the landfill area (see Figure 1). Soil samples were collected from a depth between 24 and 36 inches bgs.

The soil samples were tested for several parameters including: Northwest Total Petroleum Hydrocarbons - Diesel Range (NWTPH-Dx), RCRA Metals, Semi volatile Organic Compounds (SVOCs), Polychlorinated Biphenyl (PCBs), and Pesticides. Soil sample results showed either no detected contaminants or contaminant levels well below the Model Toxics Control Act (MTCA) Method A Unrestricted Land Use cleanup standards. The table below lists the highest concentration in any of the samples for the various parameters.

Table 1. ZINK DUMP SOIL SAMPLE RESULTS

Analysis	Sample	Highest Result (mg/kg)	MTCA levels (mg/kg)
NWTPH-Dx	---	Non Detect (ND)	2000
SVOCs	ZD-3	0.03 (Benzo-a-pyrene)	0.1
Pesticides	ZD-4	0.013 (beta-BHC)	0.556
PCBs	---	ND	1
Metals -Aluminum	ZD-2	16,939	---
Antimony	---	ND	32
Arsenic	ZD-2	3.56	20
Barium	ZD-3	86.9	5600
Beryllium	ZD-3	1.69	160
Cadmium	ZD-3	1.21	2
Chromium	ZD-2	30.0	---
Cobalt	ZD-2	14.8	---
Copper	ZD-3	26.6	2960
Iron	ZD-2	21,349	---
Lead	ZD-3	47.4	250
Manganese	ZD-2	384	11,200
Mercury	ZD-3	0.164	2
Nickel	ZD-3	39.7	---
Selenium	---	ND	400
Silver	---	ND	400
Thallium	---	ND	5.6
Tin	---	ND	48,000
Zinc	ZD-3	452	24,000

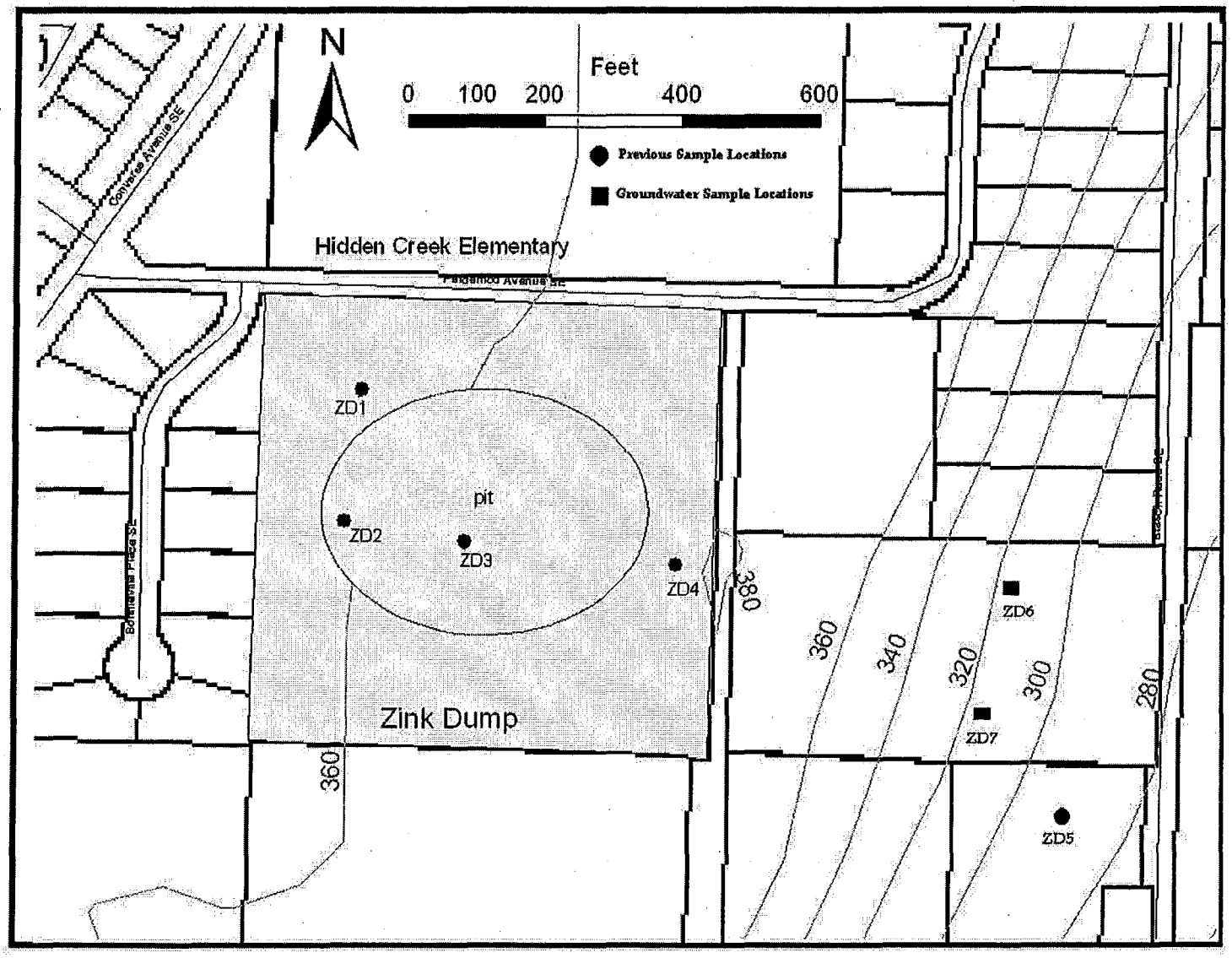

Figure 1. Zink Dump area and sample locations

GROUNDWATER SAMPLING

To determine if leachate migration had affected local groundwater, KCHD sampled a down gradient drinking water well in the surrounding area and two shallow groundwater seeps (ZD-6 and ZD-7) located approximately 60 feet in elevation below and 500 feet to the southeast (see Figure 1). The drinking water well sample (Roberts well) was taken from a hand dug well hydraulically down gradient of the landfill location. This well draws from a shallow depth (approx 8 ft. bgs).

The ground water samples were analyzed for Volatile Organic Compounds (VOCs) and metals. The Roberts Well (identified as ZD-5 in the Sampling and Analysis Plan) showed no signs of

contamination from these chemical compounds. Physical parameters were all within normal drinking water ranges and no sample results were above either MCLs or applicable MTCA cleanup standards. No other wells in the area were sampled due to lack of owner's permission.

Sampling records from the Group A System "Martells Mobile Manor -upper well", located approximately 1,000 feet to the northwest of the landfill showed no chemical contamination. These results are based on data maintained by the Health District's Drinking Water Program. Group A systems are sampled once every three years for chemical contamination.

The results of the three groundwater samples for chemical parameters which were detected in the samples, are listed in Table 2 below.

Table 2. Groundwater Sample Results
All reported values above detection levels

Analysis	Sample	Result (mg/l)	MTCA level (mg/l)
NWTPH-Dx	ZD7	0.22	0.5
Aluminum	ZD6	6.01	--
	ZD7	10.91	--
Barium	ZD5	0.006	--
	ZD6	0.022	--
	ZD7	0.070	--
Chromium	ZD6	0.024	0.050
	ZD7	0.061	0.050
Copper	ZD5	0.021	--
	ZD6	0.007	--
Iron	ZD6	1.99	--
	ZD7	5.17	--
Lead	ZD7	0.0012	0.015
Manganese	ZD6	0.019	--
	ZD7	0.092	--
Mercury	ZD7	0.00016	0.002
Nickel	ZD7	0.017	--
Zinc	ZD5	0.084	--
	ZD7	0.016	--
BOD	ZD6	4.16	--
	ZD7	3.62	--
COD	ZD6	82.2	--
	ZD7	6860	--
NO3+NO2	ZD6	0.017	--
	ZD7	0.042	--
pH	ZD6	6.44	--
	ZD7	6.04	--
Conductivity	ZD6	161	--
	ZD7	81.6	--

One sample showed an exceedance of the MTCA Method A groundwater cleanup standards. That was chromium in sample ZD7 as noted in Table 2.

CONCLUSIONS / RECOMMENDATIONS

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 groundwater sample ZD7 showed two indicators of landfill leachate. They were the analysis for COD (Chemical Oxygen Demand) and the pH in ZD7 as noted in Table 2.

The scoring was done using the Kitsap County average of 2.5 people per household. In the groundwater pathway, the 2.5 average was also used for the number of residents using drinking private well water.

The air pathway was not scored for this site as only the water samples had any contaminants above the cleanup standards.

Scoring for the toxicity of chromium was done as chromium (III).

PATHWAY SCORES:

Surface Water/Human Health:	11.4	Surface Water/Environ:	20.8
Air/Human Health:	NS	Air/Environmental:	NS
Groundwater/Human Health:	29.5		

OVERALL RANK: 5

WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE -

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

Chromium (scored as Cr+3)

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

This substance was identified in an analytical water sample from the site at a concentration above the applicable cleanup standard.

List those management units to be considered in scoring: Source: 1

Contaminated surface and ground water.

Explain basis for choice of unit to be considered in scoring.

Surface water being impacted by contaminated groundwater seeping to surface.

2. AIR ROUTE

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

Not Scored

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

Not Scored

List those management units to be considered in scoring: Source: 1

Not scored.

Explain basis for choice of unit to be considered in scoring:

Not scored.

3. GROUND WATER ROUTE

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

Chromium (scored as Cr+3)

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

This substance was identified in an analytical sample from groundwater that migrated off-site, at a concentration above the applicable cleanup standard.

List those management units to be considered in scoring: Source: 1

Contaminated groundwater.

Explain basis for choice of unit to be considered in scoring:

Contaminants moving into groundwater at the site.

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.
chromium (scored as CrIII)	100	6	-	ND	1	1	-	-	ND

Source: 1,3,4
Highest Value: 6
2 Bonus Points? 0
Final Toxicity Value **6**

1.2 Environmental Toxicity

(X) Freshwater
( ) Marine

Substance	Acute Criteria (ug/l)	Val.	Non-human Mammalian Acute Toxicity (mg/kg)	Val.
chromium (scored as CrIII)	1700	2	-	ND

Source 1,3,4 Value: **2**

1.3 Substance quantity — Source 1,3 Value: 1
Explain basis: unknown

2.0 MIGRATION POTENTIAL

2.1 Containment — no run-on / run-off controls and exposed waste in portions of fill area — Source 1, 3 Value: 10

2.2 Surface Soil Permeability: sandy, poorly graded sand — Source 1,2,8 Value: 1

2.3 Total Annual Precipitation: inches/year 44 inches / year — Source 6 Value: 3

2.4 Max. 2-Yr/24-hour Precipitation: 3.6 inches — Source 3 Value: 3

2.5 Flood Plain: not in a flood plain — Source 1,10 Value: 0

2.6 Terrain Slope: 2-5% — Source 1,2,8 Value: 2

3.0 TARGETS

3.1 Distance to Surface Water: contaminated groundwater discharging to surface — Source 1,2 Value: 10

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

3.2 Population Served within 2 miles: 0 persons	Source	1	Value:	0
3.3 Area Irrigated within 2 miles: 0 acres	Source	1	Value:	0
3.4 Distance to Nearest Fishery Resource: 4,700 feet	Source	1,2	Value:	6
3.5 Distance to, and Name (s) of, nearest Sensitive Environment(s) : wetlands (950 feet)	Source	1,2	Value:	12

4.0 RELEASE

Explain basis for scoring a release to surface water: contaminated groundwater seeping to surface	Source	1,3	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.
chromium (scored as CrIII)	100	6	-	ND	1	1	-	-	ND
							Source:	1,3,4	
							Highest Value:	6	
							2 Bonus Points?	0	
							Final Toxicity Value:		**6**

1.2 Mobility (Use numbers to refer to above listed substances) Source 1,3,4 Value: 1

Solubility (0-3)	substance	solubility	score
	Chromium	K<0.1	1

1.3 Substance Quantity — unknown — Source 1,3 Value: 1
Explain basis:

2.0 MIGRATION POTENTIAL 5.58

2.1 Containment — scored as a landfill with no liner (3), poor cover (1), no leachate collection (2), and possible liquids disposed of in fill (1) (3+2+2+2) — Source 1,3 Value: 7
Explain basis:

2.2 Net Precipitation (N-A): N-A precip (33.4) - N-A ET (5.6) = 27.8 inches — Source 3,5 Value: 3

2.3 Subsurface Hydraulic Conductivity: permeable till with sand and gravels — Source 3,8 Value: 3

2.4 Vertical Depth to Ground Water: contaminated groundwater seeping to surface — Source 1,3,7 Value: 8

3.0 TARGETS

3.1 Ground Water Usage: public & private wells with alternates available — Source 3,7,9 Value: 4

3.2 Distance to Nearest Drinking Water Well: approx. 570 feet — Source 1,3,7,9 Value: 5

3.3 Population Served within 2 Miles: 9 Group A and 10 Group B public >300 private wells — Source 3,7,9 Value: 100

WORKSHEET 6
GROUND WATER ROUTE (CONTINUED)

3.4 Area Irrigated by (Groundwater) Wells within 2 miles: no irrigation — Source NA — Value: 0

4.0 RELEASE

Explain basis for scoring a release to ground water: contaminated groundwater seeping to surface — Source 1,3 — Value: 5

Sources Used in Scoring

1. Kitsap County Health District SHA research, site visits, and sampling event data

2. KCHD environmental GIS maps

3. Washington Department of Ecology, WARM Scoring Manual, April, 1992.

4. Washington Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January, 1992.

5. Kitsap County Groundwater Management Plan

6. Public Utility District #1 rainfall data for Kitsap County

7. Ecology well log viewer website http://apps.ecy.wa.gov/welllog/

8. Soil Survey of Kitsap County Area, WA, United States Department of Agriculture, Soil Conservation Service, September 1980

9. Kitsap County Health District public water system Database

10. FIRM flood plain maps

11. http://www.nws.noaa.gov/oh/hdsc/noaaatlas2.htm for max. 2 yr./ 24 hr. precip