Taylor Lumber and Treating

Sheridan, Oregon

EPA Facility ID: ORD009042532

Basin: Yamhill

HUC: 17090008

Executive Summary

The Taylor Lumber and Treating site is a former wood-processing and wood-treating facility near Sheridan, Oregon, along the South Yamhill River. From 1966 to 2001, the facility treated wood products with petroleum-based creosote and pentachlorophenol solutions, as well as with ammoniacal copper zinc arsenate. The primary contaminants of concern to NOAA are metals, PAHs, dioxins, furans, and pentachlorophenol, which have been detected in surface water, groundwater, sediment, and soil at the site. The surface water and sediments of the South Yamhill River, which provides migratory and spawning habitat for steelhead and coho salmon, are the primary NOAA habitats of concern. Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. The steelhead present in the South Yamhill River are listed by NOAA Fisheries as federally threatened.

Site Background

The Taylor Lumber and Treating (Taylor) site is a former wood-processing and wood-treating facility approximately 1.6 km (1 mi) west of Sheridan, Oregon, and approximately 100 m (330 ft) north of the South Yamhill River (Figure 1). The Taylor property encompasses approximately 95 ha (235 acres), of which one-quarter was used for the wood-treating facility, one-quarter was used as a sawmill and planing facility, and the remainder was used for agricultural purposes (CH2M Hill 2002). Operations began in 1966 under the ownership of John Taylor. The sawmill ceased operations on May 7, 2001, and the wood-treating operations were stopped on July 20, 2001.

During the time operations were active at the site, wood products such as lumber, poles, pilings, posts, railroad ties, and plywood were conditioned and pressure-treated with preservatives to prolong their useful life. Wood-preserving chemicals such as petroleum-based creosote and pentachlorophenol (PCP) solutions and ammoniacal copper zinc arsenate (ACZA) were used (USEPA 2002a).

Rock Creek Road runs through the portion of the property dedicated to wood-treating operations, dividing it into what were called the West Facility and the East Facility (Figure 2). Primary operations within the East Facility included the peeling, milling, planing, and chipping of raw wood. Both finished and unfinished wood products were stored in the East Facility. Between the 1960s and the 1980s, wood waste and debris were deposited in a waste pile known as Moe's Mountain. Moe's Mountain, which is currently covered in vegetation, measures approximately 200 m by 110 m (660 ft by 360 ft) and is approximately 4.6 m (15 ft) high.

Operations in the West Facility included the treatment of wood products and the drying and storing of treated wood. Petroleum products used at the site were stored at the West Facility in two aboveground storage tank farms. Creosote was stored in the ABC tank farm, and oil was stored in the P-9 oil tank farm (CH2M Hill 2002) (Figure 2).

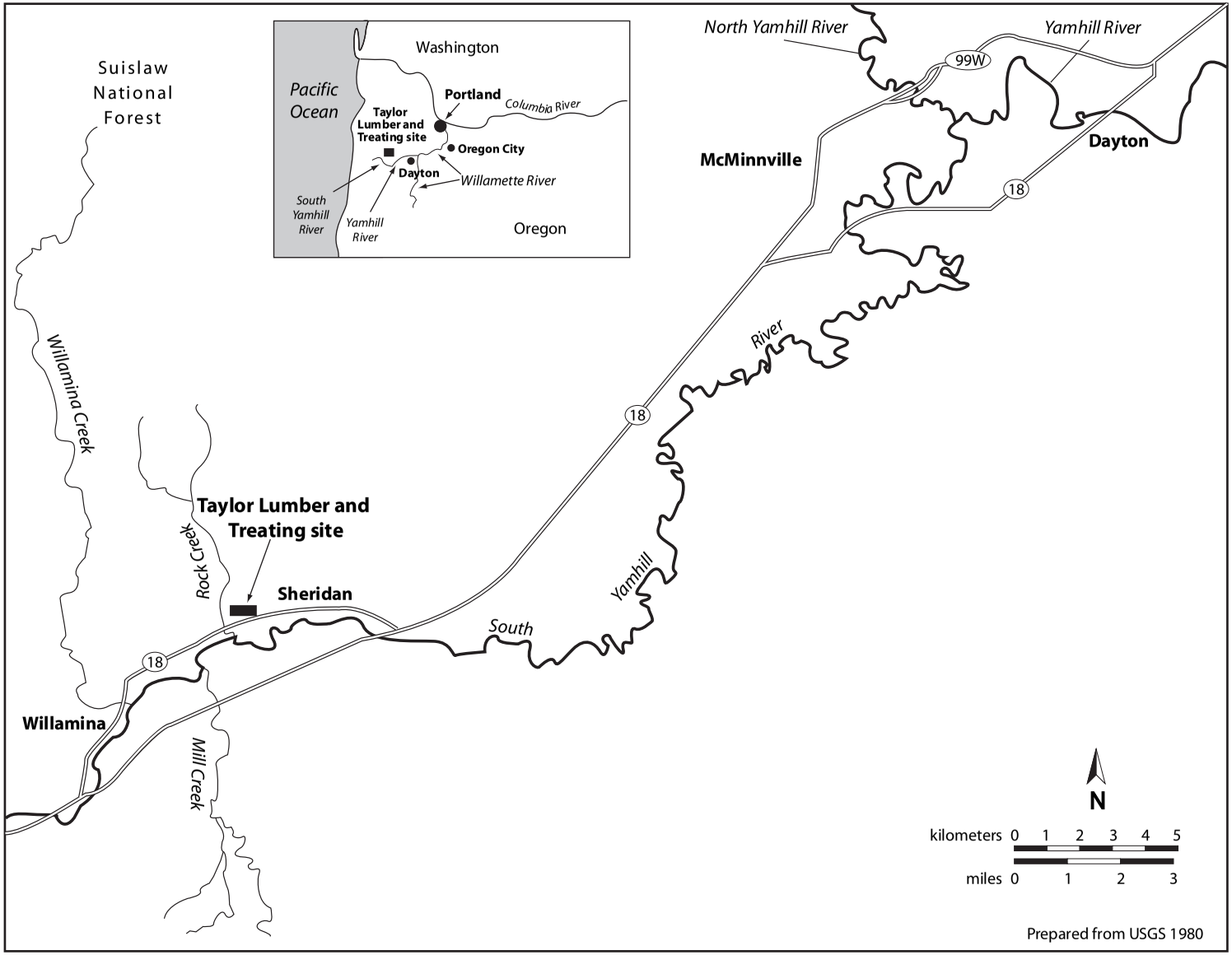

Figure 1. Location of the Taylor Lumber and Treating site, Sheridan, Oregon.

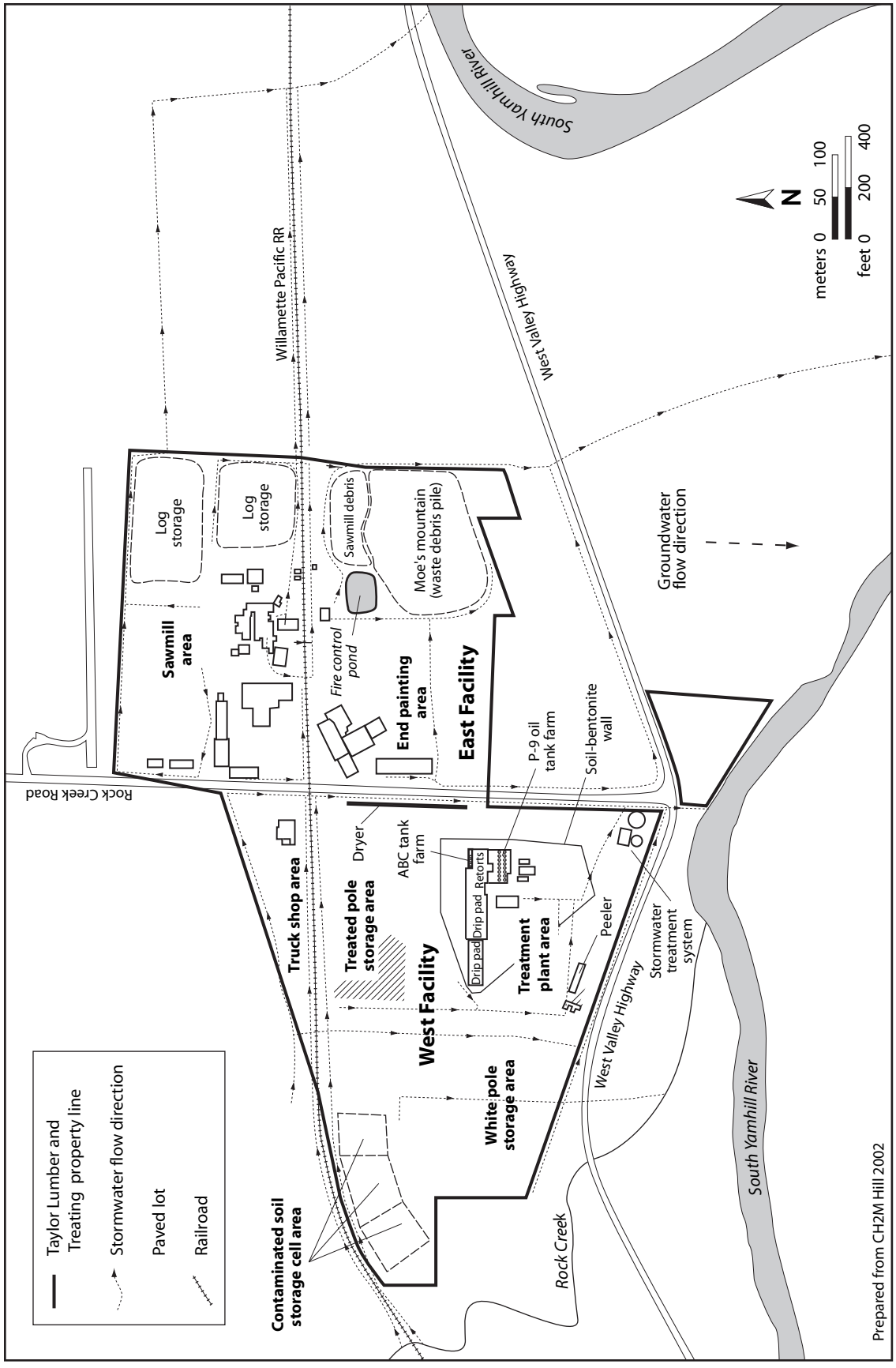

Figure 2. Detail of the Taylor Lumber and Treating property.

Two documented spills have occurred at the Taylor site. In February 1999, the U.S. Environmental Protection Agency (USEPA) responded to a discharge of approximately 13,000 L (3,400 gal) of 5-percent PCP-enriched oil from the P-9 oil tank farm. In September 1999, approximately 104,000 L (27,500 gal) of reclaimed creosote wastewater spilled from the P-9 oil tank farm. The majority of this spill was contained within the tank farm's secondary containment structure. Creosote-stained soils observed in the Rock Creek Road ditch indicate a potential breach in the secondary containment structures (USEPA 2002a).

In 1988, a preliminary assessment and a site inspection were performed to evaluate the site's potential for inclusion on the National Priorities List (NPL) (USEPA 2002a). In June and August 1999, the USEPA conducted an integrated assessment of the Taylor facility that documented the presence of contaminants, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCP, metals, and dioxins/furans. Many of these substances were detected in surface water, soil, and air. In addition, a plume of dense nonaqueous-phase liquid (DNAPL) was identified in the groundwater in the vicinity of the treatment plant area. A removal action conducted in 2000 included the installation of a bentonite barrier wall to contain the DNAPL. In addition, a portion of the treated pole storage area was capped during the removal action (USEPA 2002a). The Taylor site was proposed to the NPL on December 1, 2000, and was placed on the NPL on June 14, 2001.

Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. Surface water runoff is channeled from the site into ditches that drain to the south and discharge into the South Yamhill River (USEPA 2000). Stormwater runoff from the Taylor site is collected in a series of catch basins, storm drains, and ditches and is channeled to four outfalls under a National Pollutant Discharge Elimination System (NPDES) permit that regulates concentrations of oil, grease, arsenic, copper, zinc, and PCP. All of the outfalls at the site discharge to drainage ditches that empty into the South Yamhill River. Between 1994 and 1996, allowable contaminant discharge concentrations were violated several times. In 1999, several contaminants were detected at elevated concentrations in sediment samples collected from each of the four outfalls. SVOCs, including PCP and pyrene, and metals, including arsenic, copper, lead, and zinc, were detected at all four outfalls at concentrations that exceeded the criteria specified under the NPDES permit (USEPA 2002a).

Groundwater also provides a pathway for the migration of contaminants to the South Yamhill River. Groundwater in the vicinity of the Taylor site generally flows south toward the South Yamhill River, and groundwater beneath the site is hydraulically connected to the South Yamhill River (CH2M Hill 2002).

NOAA Trust Resources

The habitats of primary concern to NOAA are the surface water and sediments of the South Yamhill River. The river flows generally to the east, past the Taylor site and the city of Sheridan, and joins the North Yamhill River to form the Yamhill River approximately 64 river km (40 mi) northeast of the Taylor site near McMinnville (CH2M Hill 2002). From McMinnville, the Yamhill River flows approximately 19 km (12 mi) to its confluence with the Willamette River near Dayton, Oregon (USEPA 2000). The Willamette River flows northward through Portland and joins the Columbia River, which drains into the Pacific Ocean (Figure 1).

NOAA trust resources present in the South Yamhill, Yamhill, Willamette, and Columbia Rivers are listed in Table 1. The South Yamhill River provides a migratory route for both winter run steelhead

and fall run coho salmon. These species spawn in the tributaries of the South Yamhill River, including Mill and Willamina Creeks just upstream of the Taylor site. Occasionally, spring and fall run chinook and summer steelhead runs have also been documented in the Yamhill River. These species are strays from other river systems, are not native to the Yamhill River, and do not use the Yamhill River or South Yamhill River as regular migratory routes or for spawning habitat (Caldwell 2002).

Table 1. NOAA trust resources present in the South Yamhill, Yamhill, Willamette and Columbia Rivers (Caldwell 2002, Kostow 2002).

Species		**Habitat Use**			**Fisheries**		
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Rec. Fishery	Comm. Fishery	Subsistence Fishery
ANADROMOUS FISH							
American shad[a]	*Alosa sapidissima*	◆	◆		◆		
Coho salmon (fall run)	*Oncorhynchus kisutch*	◆	◆		◆	◆	
Pacific lamprey[a]	*Lampetra tridentata*	◆	◆		◆	◆	◆
Steelhead (winter run)[b]	*Oncorhynchus mykiss*	◆	◆				
White sturgeon[a]	*Acipenser transmontanus*	◆	◆		◆	◆[c]	

a: Presence not confirmed in South Yamhill or Yamhill Rivers

b: Listed as federally threatened

c: Commercial fishery in the Columbia River only

Historically, anadromous fish passage into the Willamette River was blocked at Willamette Falls in Oregon City. In 1971, however, a fish ladder was constructed that allows steelhead and salmon to access the Willamette River and its tributaries upstream of the falls. A historical park in McMinnville includes a relic set of locks that have also been provided with fish passage, allowing fish to migrate into the South Yamhill River. There are no other blockages along the migratory route to the South Yamhill River (Caldwell 2002).

American shad and white sturgeon are present in the lower and main stem Willamette River, but it is unknown whether either species is present in the Yamhill River or South Yamhill River because those rivers have not been sampled for these fish species (Caldwell 2002). The Pacific lamprey is also present in the Willamette River, where it is fished commercially, recreationally, and for subsistence (Kostow 2002).

Both recreational and commercial fishing of fall run coho salmon occur on the South Yamhill River. The winter run steelhead are listed by NOAA Fisheries as federally threatened and are therefore protected from recreational or commercial fishing. White sturgeon are fished commercially in the Columbia River and recreationally in the Columbia and Willamette Rivers. American shad are fished recreationally in the Willamette River (Caldwell 2002).

A fish advisory is currently in effect for the main stem Willamette River. The advisory recommends that all species of resident fish in the main stem Willamette River be eaten in only moderate amounts because of elevated levels of mercury in the fish tissue. This advisory also includes migrating ocean fish such as salmon, steelhead, shad, and lamprey (ODHS 2004).

Site-Related Contamination

The primary contaminants of concern to NOAA at the Taylor site are metals, polycyclic aromatic hydrocarbons (PAHs), dioxins, furans, and PCP. One hundred and three soil samples, 22 groundwater samples, 16 surface water samples, and 68 sediment samples have been collected at the Taylor site for analysis. The sediment and surface water samples were collected from stormwater ditches that drain the site, the South Yamhill River, and Rock Creek. All the sampled media were analyzed for metals, VOCs, pesticides and polychlorinated biphenyls (PCBs), and dioxins and furans. Soil, groundwater, and sediment samples were also analyzed for SVOCs, including PAHs and PCP.

Table 2 summarizes maximum contaminant concentrations detected during the site investigations and compares them to appropriate screening guidelines. The screening guidelines are the ambient water quality criteria (AWQC) for groundwater and surface water, the threshold effects concentrations (TECs) for sediment, and the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs) and the USEPA's ecological soil screening guidelines for soil, with exceptions as noted on Table 2. Only maximum concentrations that exceeded relevant screening guidelines are discussed below.

Surface Water

Metals, the pesticide DDT, dioxins, and furans were detected in surface water samples collected at the site. PCP detected in surface water samples did not exceed the AWQC and so are not discussed below. The maximum concentration of cadmium exceeded the AWQC by a factor of approximately 2.5. The maximum concentrations of copper and lead exceeded the AWQC by a factor of approximately seven in samples collected from a drainage ditch adjacent to the stormwater treatment plant and from the South Yamhill River, respectively. The maximum concentration of mercury, which was detected in a sample from the Yamhill River, exceeded the AWQC by one order of magnitude.

Dioxins, furans, and DDT were also detected in surface water samples. The dioxin detected at the greatest concentration was octachlorodibenzo-p-dioxin (OCDD) and the furan detected at the greatest concentration was octachlorodibenzo-p-furan (OCDF). AWQCs are not available for comparison to the maximum concentrations of OCDD and OCDF. The maximum concentration of DDT, which occurred in a sample taken from the South Yamhill River downstream of the site, exceeded the AWQC by two orders of magnitude.

Groundwater

Metals, PAHs, PCP, dioxins, and furans were detected in groundwater samples at the site; pesticides detected in groundwater samples did not exceed AWQC and so are not discussed below. Sample collection was focused on the soil-bentonite wall installed to contain DNAPL in the treatment plant area. Samples were collected both from inside the barrier wall and outside or downgradient of the wall. Maximum concentrations of chromium, copper, and lead exceeded the AWQC by one order of magnitude. The majority of maximum metals concentrations were detected in samples collected from inside the bentonite wall; however, maximum concentrations of cadmium, nickel, and zinc were detected outside the bentonite wall in the treatment plant area. The maximum concentrations of cadmium, mercury, zinc, and nickel exceeded the AWQCs by factors of seven, six, five, and slightly less than four, respectively. The maximum concentration of selenium slightly exceeded the AWQC.

All maximum concentrations of PAHs in groundwater were detected in samples collected from inside the bentonite wall. The maximum concentrations of acenaphthene and naphthalene exceeded the AWQC by one order of magnitude. AWQCs are not available for comparison to the

Table 2. Maximum concentrations of contaminants of concern to NOAA detected in samples collected at the Taylor Lumber and Treating site (CH2M HILL 2002; 2003). Contaminant concentrations in bold exceed screening guidelines.

	Soil (mg/kg)		Water (µg/L)			Sediment (mg/kg)	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	Surface Water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS							
Arsenic	**1400**	9.9	51	73	150	**450**	9.79
Cadmium	**15**	0.38[d]	**1.8**	**0.7**	0.25[e]	**2.9**	0.99
Chromium[f]	**160**	0.4	**300**	3.3	11	**88**	43.4
Copper	**1600**	60	**560**	**68**	9[e]	**1700**	31.6
Lead	**2900**	40.5	**41**	**18**	2.5[e]	**140**	35.8
Mercury	**0.41**	0.00051	**4.8**	**9.2**	0.77[g]	**8.5**	0.18
Nickel	**340**	30	**200**	4.6	52[e]	**270**	22.7
Selenium	**3**	0.21	**5.1**	3.3	5.0[h]	3.4	NA
Silver	**18**	2	1.2	N/A	3.2[e,i]	3.7	4.5[j]
Zinc	**430**	8.5	**600**	120	120[e]	**1900**	121
PAHs							
Acenaphthene	**310**	20	**8900**	N/A	520[k]	**3.7**	0.29[j]
Acenaphthylene	2.8	NA	75	N/A	NA	**0.4**	0.160[j]
Anthracene	47	NA	1600	N/A	NA	**16**	0.0572
Benz(a)anthracene	39	NA	1300	N/A	NA	**9**	0.108
Chrysene	34	NA	1400	N/A	NA	**13**	0.166
Dibenz(a,h)anthracene	1.3	NA	N/A	N/A	NA	**0.47**	0.033
Fluoranthene	120	NA	3800	N/A	NA	**20**	0.423
Fluorene	260	NA	7700	N/A	NA	**5**	0.0774
2-Methylnaphthalene	590	NA	19000	N/A	NA	11	NA
Naphthalene	1200	NA	**49000**	N/A	620[k]	**7.3**	0.176
Phenanthrene	270	NA	9100	N/A	NA	**17**	0.204
Pyrene	67	NA	2100	N/A	NA	**18**	0.195
PHENOLs							
Pentachlorophenol	**960**	3	950	3	15[i]	11	NA
PESTICIDES/PCBs							
Aldrin	0.000076	NA	0.093	N/A	3.0[i]	0.0087	0.040[j]
4,4′-DDE	0.021	NA	ND	N/A	1050[i,k]	**0.033**	0.00316
4,4′-DDT	0.17	NA	ND	**0.32**	0.001	0.0041	0.00416
Dieldrin	**0.079**	0.000032[d]	ND	N/A	0.056	N/A	0.0019
Endosulfan (alpha + beta)	0.0014	NA	ND	N/A	0.056	N/A	NA
Endrin	0.0089	NA	ND	N/A	0.036	N/A	0.00222
Gamma-BHC (Lindane)	0.0042	NA	0.1	N/A	0.95[i]	N/A	0.00237
Heptachlor	0.0002	NA	ND	N/A	0.0038	0.0033	0.010[j]
Heptachlor Epoxide	0.0026	NA	ND	N/A	0.0038	N/A	0.00247
Total PCBs	0.25	0.371	ND	N/A	0.014	N/A	0.0598
DIOXINS/FURANS							
2,3,7,8-TCDD	0.0013	NA	ND	ND	0.00001[k]	1.2×10^{-5}	0.0088[j]
2,3,7,8-TCDF	3.78×10^{-4}	NA	ND	ND	NA	3.9×10^{-5}	NA
OCDD	8.6	NA	0.11	0.061	NA	1.2	NA
OCDF	0.64	NA	0.0024	0.42	NA	0.069	NA

Table 2 continued on next page.

Table 2, *cont.*

a	Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).
b:	Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002b). Freshwater chronic criteria presented.
c:	Threshold Effects Concentration (TEC). Concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).
d:	Ecological soil screening guidelines (USEPA 2005).
e:	Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.
f:	Screening guidelines represent concentrations for Cr^{+6}.
g:	Derived from inorganic, but applied to total mercury.
h:	Criterion expressed as total recoverable metal.
i:	Chronic criterion not available; acute criterion presented.
j:	Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.
k:	Lowest Observable Effects Level (LOEL) (USEPA 1986).
NA:	Screening guidelines not available..
N/A:	Contaminant not analyzed for.
ND:	Not detected

maximum concentrations of other detected PAHs. PCP was detected in samples taken from wells both inside and outside the bentonite wall. The maximum concentration of PCP exceeded the AWQC by one order of magnitude. The dioxin detected at the greatest concentration was OCDD, and the furan detected at the greatest concentration was OCDF. AWQCs are not available for comparison to the maximum concentrations of OCDD and OCDF.

Sediment

Metals, PAHs, pesticides, PCP, dioxins, and furans were detected in sediment samples collected from the Taylor site. Arsenic was the contaminant of major concern in the stormwater ditch sediments (CH2M Hill 2002). Maximum concentrations of arsenic, copper, mercury, nickel, and zinc exceeded TECs by one order of magnitude. The maximum concentration of arsenic was detected in the treatment plant area, and the maximum concentrations of mercury, nickel, and zinc were detected in the white pole storage area.

Eleven PAHs were detected in sediment samples at concentrations exceeding the TECs: one exceeded the TEC by two orders of magnitude; nine exceeded TECs by one order of magnitude; and one exceeded the TEC by a factor of 2.5. Another PAH compound was also detected, but no TEC is available for comparison to that maximum concentration. The majority of the maximum PAH concentrations occurred in samples from the West Facility.

PCP was detected, but no TEC is available for comparison to that maximum concentration. The maximum concentration of DDE exceeded the TEC by one order of magnitude and was detected in a site stormwater ditch sample. The dioxin detected at the greatest concentration was OCDD, and the furan detected at the greatest concentration was OCDF. TECs are not available for comparison to the maximum concentrations of OCDD and OCDF.

Soil

Metals, PAHs, pesticides, PCBs, PCP, dioxins, and furans were detected in soil samples from the Taylor site; the maximum PCB concentration did not exceed the ORNL-PRG and so is not discussed below. All maximum concentrations of metals were detected in samples from the West Facility excluding the maximum concentration of lead, which was detected in a sample taken at a residence west of the Taylor site. Maximum concentrations of arsenic, chromium, and mercury exceeded the ORNL-PRGs by two orders of magnitude. Maximum concentrations of cadmium, copper, lead, nickel,

selenium, and zinc exceeded the ORNL-PRGs or USEPA ecological soil screening guidelines by one order of magnitude. The maximum concentration of silver exceeded the ORNL-PRG by a factor of nine.

Several PAHs were detected at the Taylor site; the majority of the maximum concentrations of PAHs were detected in soil samples collected from the treatment plant area. The maximum concentration of acenaphthene exceeded the ORNL-PRG by one order of magnitude. Screening guidelines are not available for the other detected PAHs. Several pesticides were also detected in the soil samples. All maximum concentrations of pesticides were detected in samples from the West Facility. The maximum concentration of the pesticide dieldrin exceeded the USEPA ecological soil screening guideline by two orders of magnitude; screening guidelines are not available for the other detected pesticides. PCP was detected in a sample collected from the West Facility at a maximum concentration that exceeded the ORNL-PRG by two orders of magnitude. The dioxin detected at the greatest concentration was OCDD and the furan detected at the greatest concentration was OCDF; the maximum concentrations of OCDD and OCDF occurred in a sample collected from the West Facility. Soil screening guidelines are not available for comparison to the maximum concentrations of OCDD and OCDF.

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