

Union Pacific Tie Treating Facility

The Dalles, Oregon

Region 10

ORD009049412

Site Exposure Potential

The 33-hectare Union Pacific Tie Treating site is located along the Columbia River in an industrialized area of The Dalles, Oregon (Figure 1). Since the early 1920s, the facility was operated as a railroad tie-treating facility. Prior to 1950, creosote and fuel oil were used predominantly to preserve wood ties. Zinc chloride may also have been used during this time. Other substances used since 1950 include preservatives, including ammoniacal copper arsenate, PCP, and a proprietary flame retardant (Arban) (CH₂M Hill 1989).

Wastes generated by the plant include steam condensate, boiler blowdown, water and oil containing wood-preserving chemicals, and residues from treatment facilities cleaning. Process wastes were treated over the years and discharged to ponds on-site where the residues either percolated into the soil or evaporated. Until 1970, wastewater from an oil/water separator was discharged directly into process ponds. This wastewater contained residual wood-preserving contaminants not removed by the separator. In 1970, a wastewater treatment facility was installed for better oil/water separation, along with an evaporator for wastewater disposal. However,

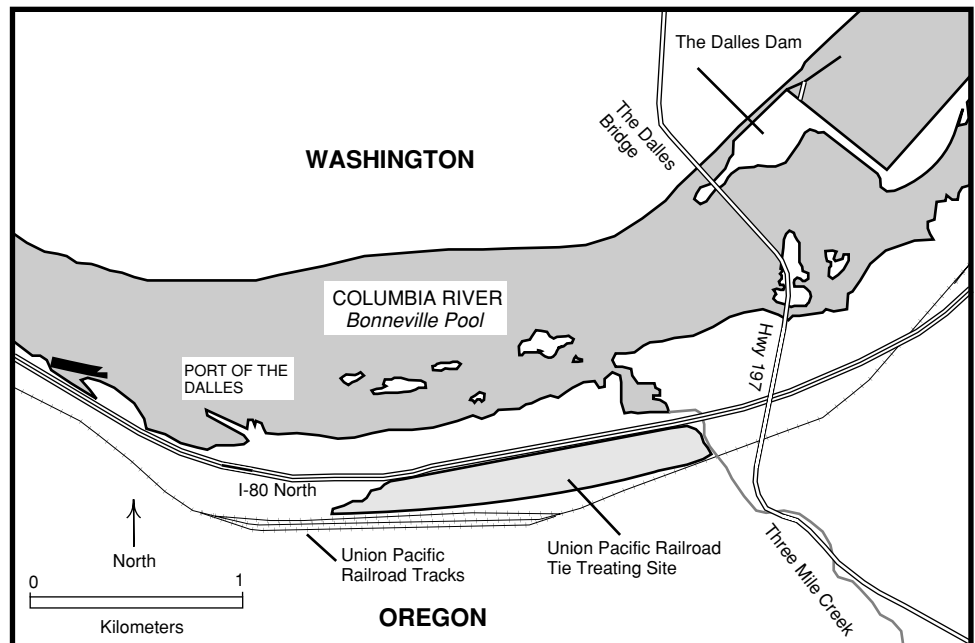


Figure 1.
The Union Pacific
Tie Treating
facility, The

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Site Exposure Potential, *cont.*

excess wastewater may have been released onto the ground north and south of the treatment system. In 1980, approximately 8 million liters of liquids and 450,000 liters of sludge were removed from the process ponds and disposed of off-site. Clean fill material was placed over the former ponds. In 1983, the wastewater treatment system was improved and expanded to result in zero discharge.

Three Mile Creek flows along the eastern border of the site before discharging to the Columbia River. The site lies approximately 200 meters south of the Columbia River and is separated from the river by a levee constructed in 1937 for flood control. Prior to construction, the site was open to the river. In 1948, flooding along the Columbia River breached a levee, inundating operational portions of the plant. In 1958, construction of The Dalles Dam was completed and provided flood control for the site and the city of The Dalles.

Groundwater occurs in both an unconfined shallow aquifer and deeper confined aquifers. The unconfined unit is 1.5 to 3.5 meters below the ground surface and flows north towards the Columbia River. Deeper, confined aquifers are located about 12 to 15 meters below the level of the river. The confined aquifers lack good hydraulic connection with the Columbia River and discharge is believed to occur primarily by well pumping.

The primary migratory pathways for contamination from the site to the Columbia River and Three Mile Creek are via groundwater movement and surface runoff. Direct discharge to the Columbia River may also occur through the old pipeline beneath the levee.

Site-Related Contamination

The RI/FS sampling program has been completed and the RI report is in preparation. Data characterizing contamination at the site are very limited and are based on results from preliminary hydrogeologic surveys (CH₂M Hill 1986, 1987).

Concentrations of PAHs, the major contaminants found at the facility, were elevated in groundwater and soil (Table 1; CH₂M Hill 1986, 1987). Concentrations of PCP were also elevated in

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Site-Related Contamination, *cont.*

Table 1.
Maximum concentrations of contaminants of concern in groundwater and soil at the site.

	Water		Soil	
	Ground-water µg/l	AWQC ¹ µg/l	Soil mg/kg	Average U.S. Soil ² mg/kg
INORGANIC SUBSTANCES				
arsenic	190	190	59	5
zinc	26	110 ⁺	NR	50
ORGANIC COMPOUNDS				
total PAHs	>20,000	300 [*]	>6300	NA
PCP	780	13 ⁺⁺	0.4	NA
dibenzofuran	790	NA	990	NA
PCBs	6.3	0.014	ND	NA
1: Ambient water quality criteria for the protection of aquatic life, freshwater chronic criteria presented (EPA 1986).				
2: Lindsay (1979).				
+ Hardness -dependent criteria; 100 mg/l CaCO ₃ used.				
++ pH-dependent criteria; 7.8 pH used				
* Insufficient data to develop criteria; lowest observed effect level for freshwater acute effects given				
NA: Screening level not available				
ND: Not detected at method detection limit; detection limit not reported				

these matrices. PCBs were detected in groundwater but not found in soil samples. However, only a limited number of samples was taken.

NOAA Trust Habitats and Species

Bonneville Pool in the Columbia River and Three Mile Creek are the habitats of primary concern to NOAA. The Columbia River, the largest river basin in western North America, drains approximately 668,220 km² and supports diverse biota, particularly prolific salmonid runs that sustain intensive commercial and recreational fisheries (Beccasio et al. 1981).

Below The Dalles Dam, the Columbia River is approximately 850 meters wide and free-flowing until reaching the Bonneville Dam 67 kilometers downriver. Wetlands are sparse along this reach, known as the Bonneville Pool, due to levee and rip-raps.

Three Mile Creek, a narrow, shallow intermittent stream on the site's eastern boundary, flows unimpeded into the Columbia River below the Interstate 84 overpass. The substrate is sandy and stream flow varies with seasonal precipitation. Due to its shallowness, temperature variations are substantial. Extensive upstream agriculture results in periodic sediment

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NOAA Trust Habitats and Species, *cont.*

Table 2. Major anadromous fish species in Bonneville Pool.

loading in the creek (Newton personal communication 1990). Near the site, Three Mile Creek nurtures a corridor of wetlands consisting of narrow and broad-leaved emergents and short shrubs. The creek is undergoing a long-term restoration, coor-

Common Name	Species		Habitat		Adult Forage
	Scientific Name		Spawning	Nursery	
white sturgeon ¹	<i>Acipenser transmontanus</i>			♦	♦
American shad	<i>Alosa sapidissima</i>		♦	♦	♦
chum salmon ²	<i>Oncorhynchus keta</i>				♦
coho salmon	<i>Oncorhynchus kitsutch</i>		♦	♦	♦
steelhead trout	<i>Oncorhynchus mykiss</i>		♦	♦	♦
sockeye salmon	<i>Oncorhynchus nerka</i>		♦	♦	♦
chinook salmon	<i>Oncorhynchus tshawytscha</i>		♦	♦	♦
cutthroat trout	<i>Salmo clarki</i>		♦	♦	♦

1. Before dam construction, white sturgeon migrated freely throughout the Columbia River basin. Migration is now limited to the lower reach south of Bonneville Dam. Except in cases of incidental release, separate pool populations have emerged (ODFW and WDF 1989; Newton personal communication 1990).

2. Chum salmon are regarded as a lower Columbia River species. They can occur above Bonneville Dam but would be considered rare there. There is no fishing effort for chum salmon in the Bonneville Pool (ODFW and WDF 1989; Newton personal communication 1990).

minated by the Oregon Department of Fish and Wildlife (ODFW), to improve water quality and habitat (Newton personal communication 1990).

Bonneville Pool and Three Mile Creek provide habitat for several anadromous fish species (Table 2; Beccasio et al. 1981; ODFW and Washington Department of Fisheries (WDF) 1989) in addition to resident freshwater species of recreational significance.

Bonneville Pool is a migratory corridor and spawning, nursery, and adult forage areas for coho and chinook salmon, and steelhead and cutthroat trout. These species also use Three Mile Creek for spawning (Newton personal communication 1990). In the last decade, salmonid populations have declined due to increased fishing, restricted upstream passage, and loss of upstream spawning habitats. Summer chinook, coho, sockeye,

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**NOAA Trust
Habitats and
Species,**
cont.

and chum salmon, and summer steelhead have been particularly impacted (ODFW and WDF 1989). Within Bonneville Pool, coho and chinook populations are bolstered by hatchery releases. White sturgeon populations have rebounded slowly from nearly complete depletion in the late 1800s. Primarily deep channel spawners, it is doubtful that they spawn in the vicinity of the site, but they may use adjacent areas as nursery and forage areas. American shad, introduced in 1885, have flourished throughout the lower Columbia River, producing a record run of 2.2 million fish in 1988 (ODFW and WDF 1989).

References

Beccasio, A.D., J.S. Isakson, A.E. Redfield, W.M. Blaylock, H.C. Finney, R.L. Frew, D.C. Lees, D. Petrula, and R.E. Godwin. 1981. Pacific Coast Ecological Inventory. User's guide and information Base. Washington, D.C.: U.S. Fish and Wildlife Service, Biological Services Program. 159 pp.

CH₂M Hill. 1986. Phase II Report: Hydrogeologic Investigation, Union Pacific Railroad Tie Treating Plant, The Dalles, Oregon. Omaha: Union Pacific Railroad Company.

CH₂M Hill. 1987. Retort Area Subsurface Exploration Report for Union Pacific Railroad Tie Treating Plant, The Dalles, Oregon. Omaha: Union Pacific Railroad Company.

CH₂M Hill. 1989. Work plan for the remedial investigation and feasibility study at the Tie Treating Plant, The Dalles, Oregon. Omaha: Union Pacific Railroad Company.

Lindsay, W.L. 1979. Chemical Equilibria in Soils. New York: John Wiley & Sons. 449pp.

Newton, Jim, Oregon Department of Fish and Wildlife, Clakamas Regional Office, personal communications, August 14, 1990.

Oregon Department of Fish and Wildlife and Washington Department of Fisheries. 1989. Status Report: Columbia River Fish Runs and Fisheries, 1960-88. 105 pp.

U.S. Environmental Protection Agency. 1986. Quality criteria for water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-87-003.