Report

Five-Year Record of Decision Review

Second Five-Year Review Report
Tie Treating Plant
The Dalles, Oregon

Prepared by Oregon Department of Environmental Quality

December 20, 2007

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DEC 21 2007
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PDX/063420072.DOC

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Acronyms and Abbreviations

ACA	ammoniacal copper arsenate
ARARs	applicable or relevant and appropriate requirements
ATS	arsenic treatment system
bgs	below ground surface
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	constituents of concern
CPAH	carcinogenic PAH
CRB	Columbia River Basalt
DNAPL	dense nonaqueous-phase liquid
DSL	Division of State Lands
EPA	U.S. Environmental Protection Agency
FS	feasibility study
ft/ft	feet per foot
GAC	granular activated carbon
g/cm^3	grams per cubic centimeter
gpm	gallons per minute
IRA	interim remedial action
IRAM	interim remedial action measure
LDR	land disposal restriction
LNAPL	light nonaqueous-phase liquid
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
NAPL	nonaqueous-phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action

NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	operation and maintenance
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ORS	Oregon Revised Statute
OSHA	Occupational Safety and Health Administration
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCP	pentachlorophenol
PLC	process logic controller
ppb	parts per billion
ppt	parts per trillion
PRG	preliminary remediation goal
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SMOA	Superfund Memorandum of Agreement
TEF	toxicity equivalency factor
TEQ	toxicity equivalent
TI	technical impracticability (waiver)
UPRR	Union Pacific Railroad
VOC	volatile organic compound
WTP	water treatment plant

Executive Summary

The Record of Decision (ROD) for the Union Pacific Railroad (UPRR) TTP in The Dalles, Oregon, was issued in 1996. The ROD identified remedial actions for groundwater, soils, and sediments based on information generated during the remedial investigation (RI) and feasibility study (FS). This second *Five-Year Record of Decision Review Report* is intended to assess the effectiveness of the selected remedial actions based on current experience and understanding of the site. A summary of administrative issues addressed by this review is provided in Table ES-1 and a summary of the status of ROD provisions is presented in Table ES-2.

The selected remedy defined in the ROD focuses on removing creosote and wood-treating oils collectively known as dense, nonaqueous-phase liquid (DNAPL) from subsurface soils, pumping and treating groundwater to prevent migration of contamination away from the site, and groundwater monitoring to ensure the effectiveness of the remedy. The remedy also includes capping an area of contaminated sediments in the Columbia River (conducted in 1995 as an interim remedial action measure), removing contaminated soils from areas of Riverfront Park (conducted in 1992 as an interim remedial action measure), and isolating onsite soils from direct contact with site workers. These remedial actions have been effective in achieving their originally intended objectives, and continue to be protective of human health and the environment.

A total of 81,450 gallons of DNAPL has been recovered from the inception of the recovery system through June 2007. A three-phased implementation of the DNAPL recovery system had been planned, with Module 2 and Module 3 to be built sequentially when recovery rates from Module 1 became asymptotic. However, UPRR accelerated the buildout and startup of Modules 2 and 3 during 2003 and 2004. As a result, all three modules have subsequently operated concurrently. A Construction Complete designation was granted by the U.S. Environmental Protection Agency (EPA) in September 2004 for the UPRR Tie Treating facility.

Hydraulic containment wells ensure that potentially mobile NAPL and reinjected groundwater do not migrate outside the target zone. Groundwater within the containment zone is pumped to an onsite treatment plant and treated effluent is released to surface water (Threemile Creek) via a permitted discharge. Several modifications have been made to the water treatment system since its initial construction to ensure adequate treatment capacity and effectiveness.

Site soils do not present significant risks to site workers as a result of implemented engineering and institutional controls. Additional investigations are conducted when previously unexposed soils become accessible or when site observations indicate undocumented contamination. Removal of three aboveground storage tanks has resulted in two such investigations since the first *Five-Year Record of Decision Review Report* (Oregon Department of Environmental Quality, 2002).

Removal of soils in the Riverfront Park area was conducted as an interim remedial action measure in 1992 to address contamination from historical drainage pipeline discharge. An area of river sediments also affected by the historical drainage pipe discharge was capped in 1995 as an interim remedial action measure to isolate residual contaminants. Cap inspections are conducted at regular intervals as prescribed in the ROD. Both the capping and inspection actions were integrated into the ROD, although construction of subaqueous sediment capping actually predated the ROD.

The selected remedies have been modified as needed over the past five years, with formal approval from the Oregon Department of Environmental Quality (ODEQ), and these modifications are described in this report.

This five-year review has resulted in new approval and/or recommendations for additional remedy revisions. All are considered minor and none of the approvals or recommendations directly relate to achieving or maintaining the protectiveness of the remedy. The approved changes and/or recommendations are summarized as follows:

- Assessment of the frequency of groundwater quality monitoring in the unconfined and Sand Hollow I aquifers. UPRR has proposed modifying frequency of groundwater monitoring from semiannually to annually. ODEQ generally agrees that it is appropriate to modify the frequency of groundwater quality monitoring in specific wells contingent upon specific factors. Approval criteria for the revised monitoring and reporting requirements are described in this report (Appendix I).
- Assessment of the frequency of groundwater elevation monitoring. For the Unconfined Water Bearing Zone (UWB), ODEQ concluded, and UPRR agreed, that it is warranted to continue quarterly groundwater elevation monitoring in order to ensure that hydraulic control is maintained. Approval criteria for the revised monitoring and reporting requirements are described in this report (Appendix I).
- UPRR has proposed modifying the frequency of groundwater elevation monitoring from quarterly to semiannually in the confined groundwater zones. ODEQ tentatively agrees that it may be appropriate to change the groundwater elevation monitoring frequency in the three confined water bearing zones (SH1; SH2; and Ginkgo) from quarterly to semiannual. However, formal approval of facility reporting is pending, and specific provisions that accompany the revised monitoring and reporting requirements are described in this report (Appendix I). Specifically, Appendix I includes a description of currently approved and/or pending revisions to facility monitoring and reporting requirements.
- ODEQ agrees that it is appropriate to assess modification of facility milestone status reporting requirements from the present quarterly basis to an annual basis. Operational monthly progress reports will continue to be prepared and submitted. Formal approval of facility reporting is pending, and specific provisions that accompany the revised monitoring and reporting requirements are described in this report (Appendix I).

TABLE ES-1
Second Five-Year Review Administrative Summary

Site Identification		
Site name:	UPRR The Dalles Tie Treating Plant	
EPA RCRA ID:	ORD982658742	
EPA CERCLIS ID:	ORD009049412	
EPA Region: 10	State: Oregon	City/County: The Dalles, Wasco
Site Status		
NPL status:	Final	
Remediation status:	On July 28, 2004, ODEQ submitted a Preliminary Closeout Report to the Region 10 EPA for the purpose of obtaining a Construction Completion milestone.	
Operable units:	Two	
Construction completion date:	September 2004	
Site reuse:	Site continues to be used for wood-treating activity by Amerities West, LLC.	
Review Status		
Lead agency:	State (ODEQ)	
Author name:	Cliff Walkey	
Author title:	Project Manager, Hydrogeologist	
Author affiliation:	Oregon Department of Environmental Quality (ODEQ)	
Type of review:	Post-SARA, NPL State lead	
Review number:	Second Five-Year Record of Decision Periodic Review (2007)	
Triggering action:	RA construction at OU1 and OU2	
Triggering action date:	March 27, 1996	
Due date:	March 27, 2006	
Issues	Colloidal iron removal continues to present operational challenges for the water treatment plant. Current monitoring of the system ensures that the plant's discharge is meeting the requirements set forth in the Consent Decree and is protective.	
Protectiveness Statement	The remedial actions in OU1 and OU2 are expected to be protective of human health and the environment upon completion of the remedy.	
Long-term Protectiveness	Current monitoring data indicate that the remedy is functioning as required to achieve site remedial action goals for soils, sediments, and groundwater under existing land use conditions.	

EPA = U.S. Environmental Protection Agency
NPL = National Priorities List
ODEQ = Oregon Department of Environmental Quality
OU = operable unit
SARA = Superfund Amendments and Reauthorization Act of 1986
RA = remedial action

TABLE ES-2
Status of Record of Decision Provisions

Media/Area	1996 ROD Provision	2001 Modification	2007 Status	Nature of Modification	Future Planned Modifications
Groundwater					
OU1 Unconfined water-bearing zone	DNAPL recovery to the extent feasible in phased approach using water flooding to enhance recovery. Three construction phases (modules) are anticipated to be constructed and operated sequentially.	1. DNAPL Module No. 1 shifted to west to better recover NAPL; one new well added and one existing well dropped from extraction system 2. Injection well locations modified in Module No. 1. 3. Modification of injection wells to allow pressurized reinjection, increasing water inflow by 50 percent.	Additional Modification	Accelerated buildout of Module 2/3 in 2003 - 2004. Details are documented in *Design Basis Report for the Module 2/3 DNAPL Recovery System* (CH2M HILL, 2003). ODEQ submitted a Preliminary Closeout Report (PCOR) to Region 10 EPA for the purpose of obtaining a Construction Completion milestone.	Phase out Module No. 1 and Module No. 2/3 when DNAPL recovery rates approach asymptotic slopes in each of the respective modules.
	Hydraulic containment of DNAPL source areas and monitoring of dissolved plume. Original system configuration using six wells was documented in the *Final Groundwater Remedial Action Plan* (CH2M HILL, 1997b).	1. Three wells added to hydraulic containment system in 1999. Treatment system modified for higher flows. 2. LNAPL discovered west of DNAPL recovery wells. Delineation of LNAPL area resulted in installation of a new hydraulic containment well and two new monitoring wells. Further modifications to the treatment system to accommodate higher flow rates.	Same	None	Once DNAPL extraction is completed, evaluate benefit of continued hydraulic containment.
	Aboveground treatment of extracted groundwater, with reinjection for water flooding; discharge of excess.	1. Modified treatment plant in 1997 to improve arsenic treatment. 2. Modified treatment plant in 2001 to increase hydraulic capacity and replaced coprecipitation system with media filters.	Additional Modification	To reduce iron concentrations in effluent water several modifications to the treatment plant designed were researched and tested. Modifications included testing alternant media in the media filters and changing the size of the activated carbon vessels, as well as temporarily installing an air stripper, bag filters, and a secondary peroxide injection point.	Conduct periodic evaluation to identify cost savings and performance enhancements. WTP modifications led to a proposal to change the iron effluent discharge parameter. Approval of modification to Attachment C of the Wasco County Consent Decree is pending.
	Institutional controls to prohibit use of groundwater.	Note: For OU 1, the lease agreement between Kerr-McGee and UPRR transferred the deed restrictions on groundwater use at the site. For OU2, an agreement was signed in October 1996 between Port of The Dalles and UPRR restricting shallow groundwater use in Riverfront Park. Additional Equitable Servitude and Easement was recorded in February 1997 between UPRR and ODEQ governing site restrictions, including site groundwater use.	Same	None[1]	None
	Long-term monitoring, with five-year review of remedy.	None	Same	None	None
OU1 Sand Hollow I	Hydraulic containment with two extraction wells. Quarterly monitoring.	1998 natural attenuation study (CH2M HILL, 1998d) showed contamination only in vicinity of DNAPL. In 2001, ODEQ deferred indefinitely the implementation of hydraulic containment, contingent upon demonstration that MNA is viable.	Same	None	None
OU1 Sand Hollow II	Quarterly monitoring, with evaluation in 2 years to determine need for groundwater remediation.	Note: Evaluation for monitored natural attenuation (MNA) demonstrated that hydraulic containment could be deferred and/or postponed. Monitoring continues on an annual basis	Same	None	Contingent upon demonstration of MNA
OU1 Gingko II	Annual monitoring for five years.	Note: No evidence of contamination. Monitoring continues on an annual basis.	Same	None.	Contingent upon demonstration of MNA

[1] Although no modifications were made, obligations for IC transferred with fee title. In 2004, Kerr-McGee sold the facility equipment and above grade structures to Amerities West, LLC, and Amerities West, LLC, leased the property from UPRR. The deed restrictions for use of groundwater on site that were previously in place and required by the ROD were transferred in the lease agreement with Amerities West, LLC. In 2000, the Port of the Dalles donated the land to the Northern Wasco County Parks and Recreation District. Restrictions remain in force because easements and covenants are recorded deed instruments.

TABLE ES-2
Status of Record of Decision Provisions

Media/Area	1996 ROD Provision	2001 Modification	2007 Status	Nature of Modification	Future Planned Modifications
OU1 Groundwater monitoring program	Approved remedial action plan (CH2M HILL, 1997b) permitted reduction in scope of groundwater sampling after 2 years if conditions met.	1. Unconfined water-bearing zone: monitoring for selected constituents of natural attenuation discontinued. 2. Sand Hollow I: reduce number of wells sampled, discontinue monitoring for Cu and Cr.	Same	None	Review the groundwater monitoring program and revise as appropriate based on the stability of COC concentrations observed over the past nine years of monitoring.
OU2 Riverfront Park	Institutional controls (restrictive covenant) prohibiting use of shallow groundwater in Riverfront Park, with long-term monitoring.	Note: In 2000, Riverfront Park was deeded by the Port of The Dalles to the City of The Dalles. The protective covenants remained with the property.	Same	None	None
Surface Water					
OU2 Riverfront Park, Columbia River, Threemile Creek	No further action. Remedial investigation demonstrated no significant risk to public health or environmental receptors.	None	Same	None	None
Soils					
OU1 Tie treating plant	Bioventing (air injection) to promote in situ bioremediation in areas with soil risks >1 X 10^{-5}. Cleanup targets to be set during full-scale bioventing.	1. No soils above hot spot threshold; therefore, engineering and institutional controls (soil cap, access control, worker requirements, drip/spill and excavation management plans) provide protection of human/ecological risk. 2. Removal of bioventing as a viable soil remedy.	Same	None	None
	Institutional controls.	Equitable Servitude and Easement established in 1997. Soil excavation and drip and spill monitoring plan submitted in 1997.	Same	None	None
	Deferred soil investigation and cleanup as necessary.	1. 1997 changes to ODEQ remedy selection rules provide new criteria for removal triggers. 2. Three deferred investigations triggered in 1997, 1999, and 2000. Two areas capped; third was site of LNAPL investigation, resulting in new hydraulic containment. 3. Fourth area in 2001 investigated following structure removal. Approximately 45 yd^3 taken offsite. Area capped and new tanks installed.	Same	Two deferred investigations triggered in 2002 and 2003. The 2002 investigation resulted in capping of the area and installation of a new tank. The 2003 investigation resulted in no contamination observed.	None
OU2 Riverfront Park	No Further Action. 1992 interim removal action was effective.	None	Same	None	None
Sediments					
OU2 Columbia River sediments	No Further Action. 1995 interim remedial action (capping) completed. Inspection frequency specified.	None	Same	None	None

SECTION 1

Introduction

The Oregon Department of Environmental Quality (ODEQ) has completed a second five-year review of the remedial actions being implemented at the Union Pacific Railroad Company (UPRR) Tie Treating Plant (TTP) Superfund site in The Dalles, Oregon. The second five-year review (ODEQ, 2007) addresses the two operable units (OUs) at the site:

- **Tie treating plant (OU1)**. This operable unit encompasses the portions of UPRR property where wood-treating operations are currently, and were historically, conducted.
- **Columbia River Shoreline (OU2)**. This operable unit encompasses the near-shore sediments of the Columbia River and the undeveloped portion of Riverfront Park affected by wood-treating plant operations. The undeveloped portion of Riverfront Park is an area where 2,450 cubic yards of contaminated soil were removed in 1992, as an interim remedial action measure (IRAM). Impacted sediments in a side channel of the Columbia River were capped in 1995 as a second IRAM in OU2. These actions were successful and were, in part, the basis for the No Further Action (NFA) issued for these areas.

1.1 Statutory Requirements

This review is required by statute. ODEQ assumed the lead in conducting this periodic review, pursuant to the Consent Decree filed (January 27, 1997) in Circuit Court (Case CC97-8) in Wasco County, Oregon. There is no formal, specific agreement between ODEQ and the U.S. Environmental Protection Agency (EPA) stipulating that ODEQ lead at this site other than the general language of the Superfund Memorandum of Agreement (SMOA). The five-year periodic ROD reviews are designed to be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP). CERCLA § 121(c), as amended, which states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented…*

The NCP, part 300.430(f)(4)(ii) of the *Code of Federal Regulations* (CFR), states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The triggering action for this review is the date of actual remedial action onsite construction, which is established as the construction of a multilayer cap that covers approximately 1 acre of contaminated sediments in a side channel of the Columbia River, offshore of the undeveloped portion of Riverfront Park. The cap was constructed during February and March of 1995, as an IRAM. The final Record of Decision (ROD) governing operation and maintenance (O&M) for this cap and addressing all other remedial actions within the facility boundaries was signed on March 27, 1996. Because protectiveness standards rely, in part, on institutional controls and because remedial actions anticipate that hazardous substances, pollutants, or contamination will remain at the site above levels that allow for unrestricted use and unlimited exposure, a statutory five-year review is requisite. As always, construction completion is also a triggering action for a site where all of the remedial actions are subject to a policy review[2].

During the remedial investigation and feasibility study phase of the project, before the ROD was signed, UPRR implemented two interim actions in the Columbia River Shoreline operable unit (OU2). UPRR also initiated construction of a water treatment plant that was used as part of the permanent remedy. Remedial designs and implementation of the selected site remedies continued after March 1996, when the ROD was signed.

The first *Five-Year Record of Decision Review Report* (Oregon Department of Environmental Quality, 2002) (referred to hereafter as the *First Five-Year ROD Review Report*) was transmitted to EPA on February 28, 2002. This *Second Five-Year Review Report* of remedial actions at the site was conducted to meet state and federal statutory requirements. Hazardous substances at the site are being addressed in accordance with the requirements of Oregon Revised Statutes (ORS) 465.200 through 465.380 and Oregon Administrative Rules (OAR) 340-122-010 through 340-122-110. Also, to the extent practicable, the remedial implementation is consistent with the NCP, 40 CFR Part 300.

The methods, findings, and conclusions of the review are documented in this *Second Five-Year ROD Review Report*. In addition, this report summarizes deficiencies found during the review and provides recommendations to address them.

1.2 Purpose of Five-Year Review

The purpose of a five-year review on Superfund sites is to evaluate whether the selected remedial actions are protective of human health and the environment. For remedial actions that have not yet been completed, the five-year review will determine whether immediate threats have been addressed and whether remedies are expected to be protective once the remedial actions have been completed. The main purpose of the five-year review is not to reconsider the decisions made during selection of remedies, but to evaluate the implementation and performance of the remedies. However, in some situations, the five-year review contains recommendations that remedies be reevaluated or that additional response actions be considered. Examples of situations that might result in reevaluation of remedies or consideration of additional response actions include finding that a remedy will not adequately reduce levels of a contaminant of concern or finding that a new contaminant,

[2] First priority for five-year reviews is sites required by statute. As described, the UPRR Tie Treating facility review is required by statute. The fact that the facility has obtained construction completion certification since the first five-year review is therefore not a priority triggering action for the second five-year review.

source, or pathway of exposure has been identified or has not been sufficiently addressed. Where necessary, the five-year review report will include recommendations to improve the protectiveness of the remedy and address deficiencies identified during the review.

This five-year review consisted of a review of relevant documents and interviews with various individuals familiar with specific remedial activities, local officials, and/or stakeholders. In addition, because this is the second five-year review, progress since the last review is addressed. Several site inspections were conducted, in part to support the preparation of this report.

1.3 Relevant Guidance Documents

EPA has issued a guidance document titled *Comprehensive Five-Year Review Guidance* (U.S. Environmental Protection Agency, 2001) that was consulted in preparation of this five-year review. A process for the review was developed in accordance with EPA guidance and site-specific conditions at the TTP site and surrounding lands. To provide the summaries, evaluations, and recommendations for this report, the following sources were reviewed:

- Written descriptions of work areas, remedial actions, and background information
- Remedies selected in the ROD, along with performance standards and cleanup goals
- Work that has been performed and work that remains to be completed
- O&M procedures
- The performance of the remedies, their conformance with ROD requirements, and any newly identified information, deficiencies, and recommended improvements
- Written documents and information from interviews

The conclusions of the review are summarized in this report with recommendations for future actions to be taken at the site, a statement of the level of protectiveness of ongoing remedies, and a schedule for the next review.

ODEQ documents used to define the selected remedy and note changes to the remedy for the TTP are listed in Appendix A.

SECTION 2

Background

This section describes the site and its location; provides a chronology of historical site activities; and summarizes the source and nature of site contamination.

2.1 Site Location and Description

The site consists of an active wood-treating area that is currently operated by Amerities West, LLC; the undeveloped portion of Riverfront Park; and, a small area of Columbia River sediments adjacent to the undeveloped portion of Riverfront Park in The Dalles, Oregon. The wood-treating area is designated as Operable Unit 1 (OU1), whereas the undeveloped portion of Riverfront Park along with the capped Columbia River sediments together constitute Operable Unit 2 (OU2). Localized soil contamination in the undeveloped portion of Riverfront Park was addressed by soil removal. Collectively, these two OUs constitute the UPRR facility[3].

The TTP occupies approximately 83 acres within Sections 1 and 2, Township 1 North, Range 13 East, Willamette Baseline and Meridian, in Wasco County, Oregon. The plant is located approximately 500 feet south of the Columbia River and is bounded by Riverfront Park, The Dalles levee, and Interstate 84 to the north; the UPRR rail yard to the south; Threemile Creek and undeveloped land to the east; and, a residence and access road to the west. A site map is provided in Figure 2-1 and a map of the DNAPL Extraction Area Well Locations in provided in Figure 2-2.

The plant site is generally flat, bounded by a steep bluff to the south and The Dalles levee and the Interstate 84 causeway to the north. Site topography has been modified by the placement of sandy and gravelly fill material in various locations.

A more complete description of the site setting can be found in the ROD (Oregon Department of Environmental Quality, 1996). A diagram illustrating generalized site hydrostratigraphy is shown in Appendix B.

2.2 Site Chronology

The plant has operated exclusively as a wood-treatment facility since its inception. UPRR's corporate predecessor, the Oregon-Washington Railroad and Navigation Company, owned and operated the plant from 1923 to 1927. Tie treating operations were contracted by UPRR to the Nebraska Bridge and Timber Supply Company, later known as Forest Products Company, between 1927 and 1950. From 1950 to 1987, UPRR contracted the J.H. Baxter Company to operate the plant. Kerr-McGee Chemical Corporation leased the property from

[3] Oregon Administrative Rule 340-122-115 (26): "Facility" or "Site" means any building, structure, installation, equipment, pipe or pipeline including any pipe into a sewer or publicly owned treatment works, well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, aboveground tank, underground storage tank, motor vehicle, rolling stock, aircraft, or any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located and where a release has occurred or where there is a threat of a release, but does not include any consumer product in consumer use or any vessel.

UPRR and purchased the facility equipment and abovegrade structures in 1987 and operated the TTP from 1987 to 2004. In 2004, Kerr-McGee sold the facility equipment and abovegrade structures to Amerities West, LLC. Amerities West, LLC, currently leases the property from UPRR and operates the TTP.

Before the 1950s, the plant treated virtually all wood products with coal tar creosote. From 1950 to 1987, creosote and creosote-fuel-oil mixture accounted for more than 85 percent of the total volume of treating chemicals used at the site. Other wood preservatives used during this period included ammoniacal copper arsenate (ACA), pentachlorophenol, and Arban (an organophosphate fire retardant). Kerr-McGee used copper naphthanate to treat wood on a limited basis in 1993 and 1994 but creosote was the main treatment chemical used by Kerr-McGee. Amerities West, LLC, uses only creosote as a treatment chemical.

Wood-treatment operations at the site are conducted in five pressurized retorts. Wastes associated with the treatment process include steam condensate, boiler blowdown, water- and oil-containing wood preservatives, and residues resulting from the cleanout of retorts, oil/water separators, and wastewater treatment systems. During the early years of operation, until about 1980, process wastewaters were disposed of onsite in four ponds; these ponds were closed in the early 1980s. Although early waste management records are not available, sludges associated with cleaning out the retorts may also have been disposed of in these lagoons. The ponds were abandoned by UPRR in 1980. In addition, there is evidence of historical leaks or spills around the product storage and treatment facilities and, in the past, treated wood was allowed to drip dry on unpaved soils at the site.

In 1984, investigations began at the site under the authority of ODEQ's water quality program. Creosote components, pentachlorophenol, fuel oil, ammonia, volatile organic compounds (VOCs), and arsenic were found in soil and groundwater near the plant. Contamination was also found in soils and sediments in Riverfront Park and along the shoreline of the Columbia River. This latter contamination is believed to have come from an underground pipe that carried stormwater runoff from the plant to the river between 1937 and 1971.

The ODEQ Water Quality Division oversaw early investigations of the site. In May 1989, UPRR entered into an administrative consent order with ODEQ's Environmental Cleanup Division to investigate the nature and extent of contamination at the site. UPRR agreed to conduct a Remedial Investigation and Feasibility Study (RI/FS), which began in 1990 and 1991, respectively. EPA listed the site on the National Priorities List (NPL) in August 1990, and agreed that ODEQ should remain the lead agency for overseeing the investigation and cleanup of the site.

The RI/FS was completed in 1995. After soliciting public input, ODEQ issued a Record of Decision in March 1996. In addition to the RI/FS, two interim remedial action measures were completed at the site. In 1992, 2,450 cubic yards of contaminated soil were excavated from the undeveloped portion of Riverfront Park and disposed of offsite in a hazardous waste landfill. In 1995, an area of contaminated sediment in a side channel of the Columbia River was covered with a multiple-layer cap. Both IRAMs were associated with discharge points of a U.S. Army Corps of Engineers pipeline that carried stormwater runoff from the site to the Columbia River during the period from 1937 until 1971.

The site chronology is presented in Figure 2-3.

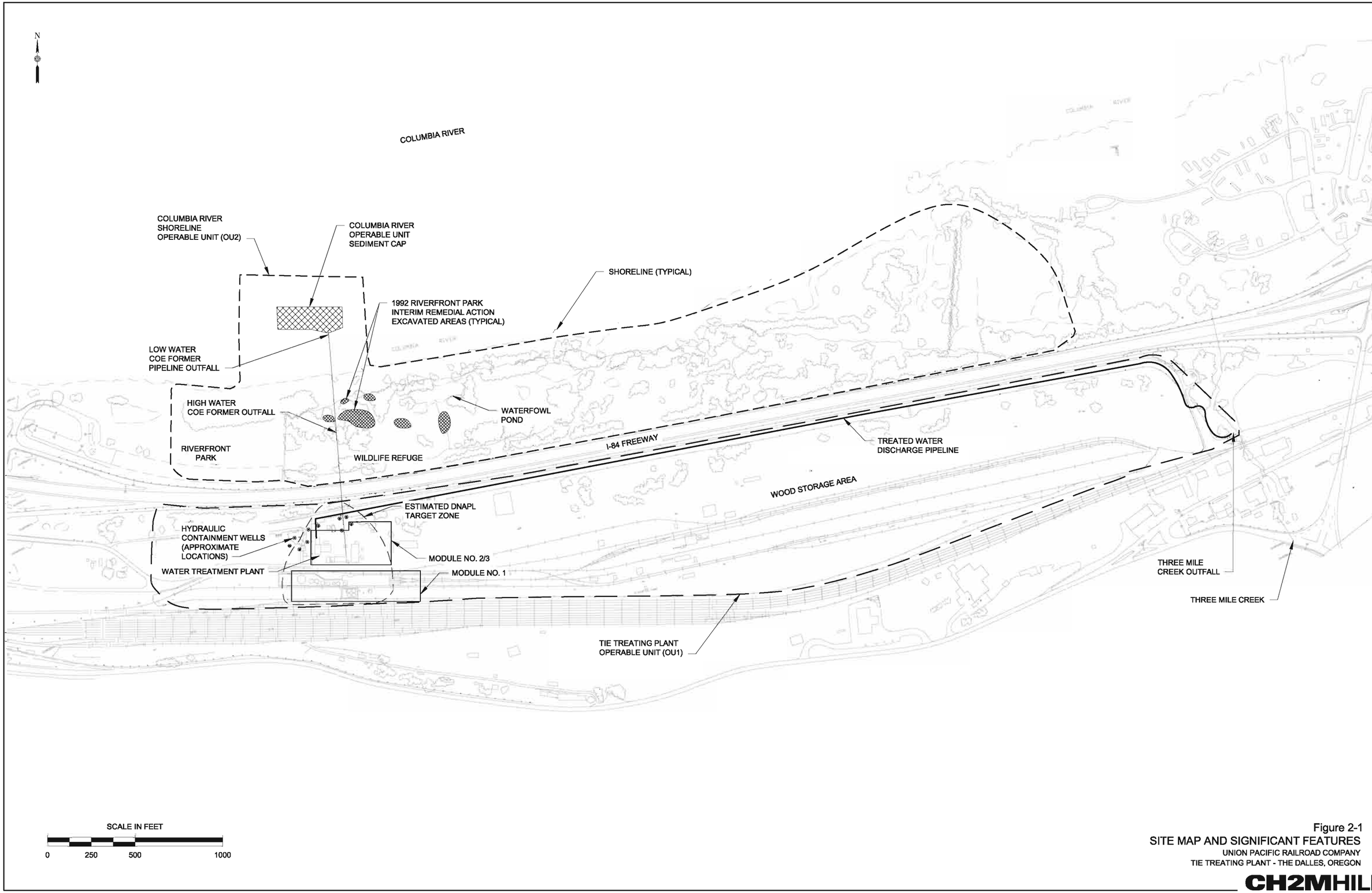

Figure 2-1
SITE MAP AND SIGNIFICANT FEATURES
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

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2.3 Source and Nature of Contamination

Soil, sediment, surface water, and groundwater contamination are found at the site. The primary constituents of concern (COCs) at the site are as follows:

- Total carcinogenic polycyclic aromatic hydrocarbons (CPAHs)—defined as the sum of the detected concentrations of benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene
- Naphthalene
- Pentachorophenol
- Benzene
- Arsenic

Contamination at the site occurred through facility operations normal for their time. Process chemicals were shipped by railcar and unloaded into storage tanks. These chemicals were then mixed and applied to wood in the retorts. Wastes from the wood-treatment process consisted of steam condensate, boiler blowdown, water and oil-containing preservatives, and residues resulting from the cleanout of the retorts, oil/water separators, and waste-water treatment systems.

Until 1980, process wastewater was disposed of in four onsite ponds situated along the southern limit of the TTP. Three of the ponds received process wastewater from wood-treatment activities, and the fourth pond received noncontact fluids from the retort building. The ponds may also have received leaks and spills from the tank farms and the former chemical storage and mixing building.

Stormwater runoff from the site has no natural surface drainage and historically was pumped through a pipeline from the site to the Columbia River. This pipe was constructed by the U.S. Army Corps of Engineers in 1937 and had two discharge points. The high-water discharge point was in Riverfront Park, and the low-water discharge point was in the Columbia River. UPRR abandoned the pipeline by sealing it with concrete in 1992. Interim remedial actions were conducted at both the high-water and low-water discharge points. Specifically, a soil removal action was taken at the high-water outfall location in 1992, and an engineered cap was placed on sediments near the low-water outfall in 1995.

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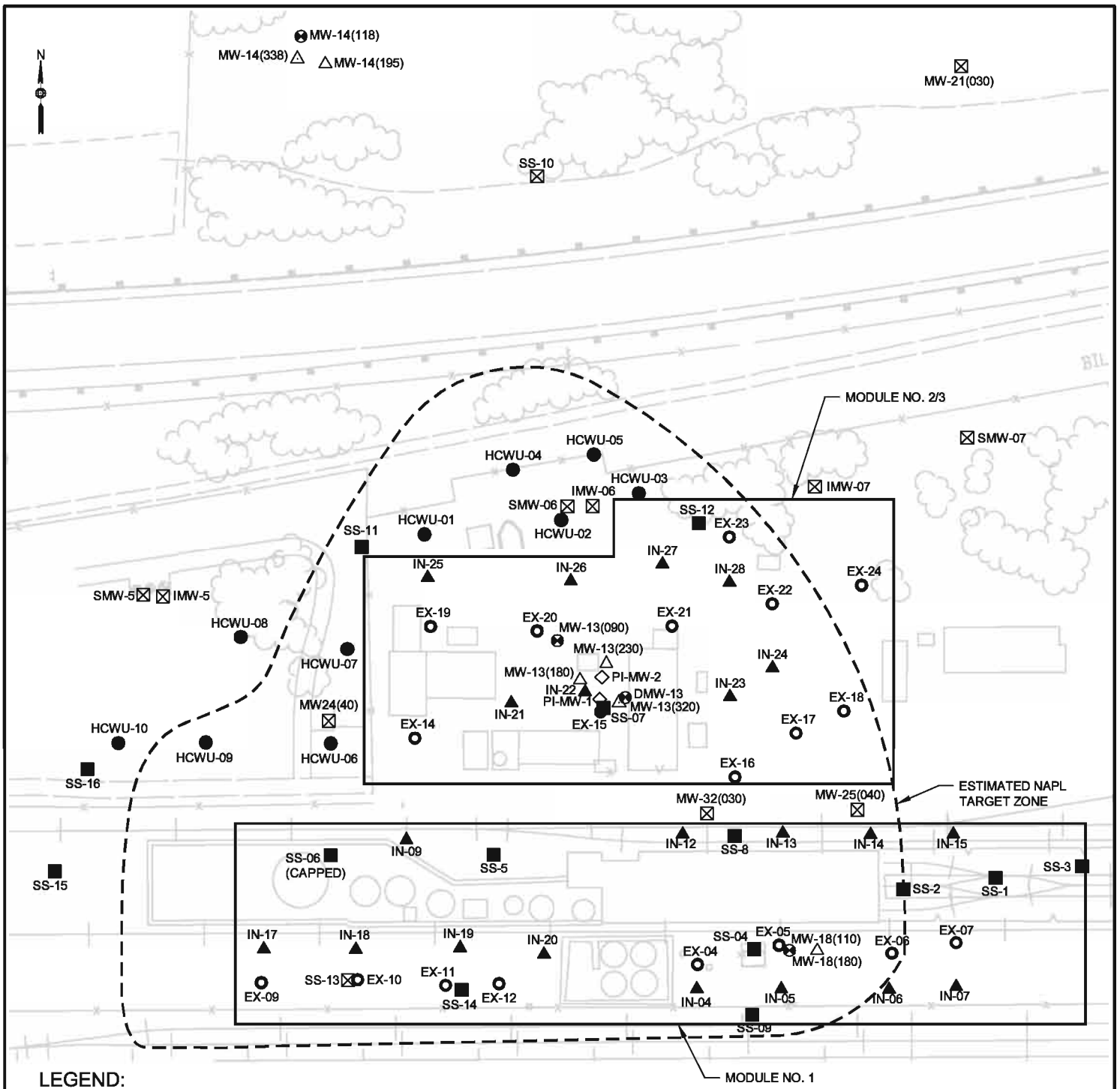

LEGEND:

- SAND HOLLOW I FLOW TOP MONITORING WELL
- SAND HOLLOW II FLOW TOP MONITORING WELL
- GINGKO II FLOW TOP MONITORING WELL
- MONITORING WELL
- HYDRAULIC CONTAINMENT WELL
- EXTRACTION WELL
- INJECTION WELL
- DNAPL PILOT TEST WELL
- PIEZOMETER

NOTE:

NAPL TARGET ZONE EXPANDED WESTWARD IN 2001.

FIGURE 2-2
DNAPL EXTRACTION AREA
WELL LOCATIONS
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

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PLOT DATE: 2-Aug-07 PLOT TIME: 8:54:25 AM

Timeline	Administrative Deliverable or Event	Project Milestone	Site Event
1920			
		1922	Portable tie treating plant (2 retorts) is moved to The Dalles site and set up as a permanent facility.
		1927	Nebraska Bridge and Timber Supply (later known as Forest Products Co.) becomes the plant operator.
1930			
		1937	US Army Corps of Engineers (USACE) builds levee along northern perimeter of site.
		1938	Three ponds (drain pond (A), cooling pond (B), and skimming pond (C)) are shown on USACE aerial photo.
1940			
		1941	A fourth retort is moved to the site. (A third was added between 1923 and 1941.)
		1948	Western part of plant flooded when Columbia River breached the levee.
1950		1950	J.H. Baxter and Company becomes plant operator. Pentachlorophenol and ammoniacal copper arsenate replace coal tar creosote as primary preservative.
		1950	Fifth retort was installed.
		1957-58	1957-8 Well 2F(1) was drilled as a water supply well but was not used because of apparent groundwater contamination. The well was sealed.
1960			
		1963	1963 Interstate 84 was constructed along the northern perimeter of the site.
		1967 - 70	ODEQ receives various reports that oil has been released into the Columbia River north of the site in the vicinity of the outfall for a USACE pipeline.
1970			
		1970	1970 A wastewater treatment system was constructed and placed into operation at the site.
		1971	1971 UPRR plugs USACE pipeline with concrete, and pump house is taken out of service.
1980		1980	1980 Ponds A, B, and C are abandoned.
		1983	1983 Improved wastewater treatment system was installed allowing site to operate as a zero discharge facility.
	1984		UPRR agrees to develop and implement a groundwater monitoring program for the site. EPA issues a Preliminary Site Inspection Report for the site.
		1984	UPRR donates Riverfront Park to the Port of The Dalles.
1990	1985		Phase I studies prepared by UPRR identified potential sources of groundwater contamination including retort building, chemical storage and mixing area, evaporator, and fueling area.

Figure 2-3
UPRR Tie Treating Plant Timeline
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon
Page 1 of 5

CH2MHILL

Timeline	Administrative Deliverable or Event	Project Milestone	Site Event
1986			
1986	1986 Completed Phase II hydrogeologic investigation.		
1987	Began Phase III hydrogeologic investigation.		
1987			
1987			Kerr-McGee purchases facility. Use of pentachlorophenol is discontinued.
1988			
1988	ODEQ issues draft consent order to UPRR for Remedial Investigation and Feasibility Study		
Feb			Kerr-McGee drip containment pad constructed.
1988	Completed Phase III hydrogeologic investigation.		
Dec			Phase 1 construction of Riverfront Park completed by the Port of The Dalles.
1989			
July	Draft RI/FS Work Plan Submitted to ODEQ.		
Sept			Phase 2 construction of Riverfront Park completed by the Port of The Dalles.
Nov	Revised Draft RI/FS Work Plan Submitted to ODEQ. ODEQ's 9/27/89 comments addressed.		
1990			
Jan		ODEQ approves RI/FS Work Plan.	
Aug		Tie treating plant listed on the NPL.	
Oct	ODEQ approves interim measure to place a geosynthetic cover over contaminated soils in Riverfront Park.		
1991			
June	Draft RI Report submitted to ODEQ.		
April	Draft interim Remedial Action Plan for Riverfront Park soils submitted to ODEQ.		
1992			
June		ODEQ approves Interim Remedial Action Plan for Riverfront Park soils.	
Sept	Draft Feasibility Study Report submitted to ODEQ.		
Sept		Interim Remedial Action to remove 2,300 cubic yards of contaminated soil from Riverfront Park completed.	
Dec	Sampling Plan for Columbia River Shoreline submitted to ODEQ.		
1993			
March		ODEQ approves Closure Report for Riverfront Park Interim Action.	
Aug		ODEQ approves RI Report.	
Aug	Work Plan for a pilot-scale DNAPL recovery program submitted to ODEQ.		
Sept		Work Plan for the RI/FS of the Columbia River Shoreline Operable Unit approved by ODEQ.	
Sept	Work Plan for the Soil Gas Survey and In Situ Respiration Tests approved by ODEQ.		

Figure 2-3
UPRR Tie Treating Plant Timeline
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon

CH2MHILL

Timeline		Administrative Deliverable or Event	Project Milestone	Site Event
1994	Feb	Revised draft of the FS submitted to ODEQ. Submission of the revised draft was delayed until the RI report was approved by ODEQ.		
	Feb	UPRR begins design of the water treatment plant to treat remediation waters for the site.		
	Feb	ODEQ approves the design basis report for the water treatment plant.		
	Mar	ODEQ approves the Work Plan for an Ecological Risk Assessment for the Columbia River Shoreline Operable Unit.		
	July	Draft Remedial Action Plan for the Columbia River Shoreline Operable Unit submitted to ODEQ.		
	July	Draft RI Report for the Columbia River Shoreline Operable Unit submitted to ODEQ.		
	Aug	ODEQ rejects revised draft FS report.		
	Nov	ODEQ approves the RI and Interim Remedial Action Plan for the Columbia River Shoreline Operable Unit.		
	Nov	ODEQ approves the Work Plan for a Pilot Scale Bioventing Test.		
1995	Jan	The technical memorandum describing the construction details of the Columbia River Shoreline OU cap is submitted to ODEQ.		
	Jan	Pilot scale bioventing test is started. However, the system was inoperable until July 1995 because of high groundwater levels.		
	Jan - Mar		Phase 1 of the Columbia River Shoreline OU cap is constructed.	
	June		UPRR completes construction of the water treatment plant.	
	July	Columbia River Shoreline Operable Unit Closure Report (Phase 1 construction) submitted to ODEQ.		
	Oct		ODEQ approves FS Report.	
1996	Oct	A technical memorandum presenting the results of the of the bioventing pilot test through fourth quarter 1995 is submitted to ODEQ.		
	Feb		ODEQ issues staff report for public comment on the proposed plan for the site.	
	Feb		Phase 2 of the Columbia River Shoreline Operable Unit cap completed.	
	Feb			Site floods
	Mar		RECORD OF DECISION ISSUED BY ODEQ	
	April	Revised Columbia River Shoreline Operable Unit Closure Report submitted to ODEQ.		
	May	ODEQ issues draft RD/RA Consent Decree for UPRR's review.		
	July	ODEQ approves Revised Columbia River Shoreline Operable Unit Closure Report.		
	Sept	Year one of the Columbia River Shoreline Operable Unit cap inspection completed.		
1997	Jan		The RD/RA Consent Decree is executed between UPRR and ODEQ.	
	Feb	Fourth quarter 1996 Bioventing Progress Report is submitted to ODEQ.		
	Mar	The Phase II Dense Nonaqueous-Phase liquid (DNAPL) Recovery Pilot Test results were submitted to ODEQ.		
	June	ODEQ approves the RD/RA Work Plan required by the Consent Decree.		
	June	ODEQ approves the Groundwater Remedial Action Plan required by the Consent Decree.		
	Sept	The Unconfined Water-Bearing Zone Design Basis Report is approved by ODEQ.		
	Aug - Oct	The hydraulic containment wells and Module 1 DNAPL Recovery wells are installed.		

Figure 2-3
UPRR Tie Treating Plant Timeline
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon
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CH2MHILL

Timeline	Administrative Deliverable or Event	Project Milestone	Site Event
1997 Dec	The first deferred soil investigation in the footprint area where two small buildings were removed by Kerr McGee is conducted.		
Dec	ODEQ issues a Notice of Noncompliance for exceeding the total dissolved solids limit in the water treatment plant discharge.		
Dec	A technical memorandum describing the results of year 2 of the Columbia River Shoreline Operable Unit monitoring is submitted to ODEQ.		
1998 Jan-Mar	The pump stations for wells 1 through 6 for the hydraulic containment system are constructed.		
Jan	A TDS reduction plan is submitted to ODEQ. The plan is implemented and the results indicate the proposed process changes will result in the effluent being in compliance with the TDS limit.		
Feb		The unconfined water-bearing zone hydraulic containment system begins operation.	
July	The configuration of the water treatment plant is modified so that the arsenic treatment system is upstream of the carbon beds to protect the carbon beds from high arsenic loading.		
Aug		Construction begins on the Module 1 DNAPL Recovery System.	
Sept	The Sampling Results, Feasibility Study and Corrective Action Assessment for the deferred soil investigation is submitted to ODEQ. Two feet of grave is placed over the area.		
Oct	A technical memorandum describing the results of year 3 of the Columbia River Shoreline Operable Unit monitoring is submitted to ODEQ.		
1999 Jan	UPRR requested a modification to the NPDES permit to raise the iron discharge limit from 3.0 to 5.0 mg/L.		
Mar	The Operation and Maintenance Manual for the Remedial Systems is submitted to ODEQ.		
Mar	The final report documenting the natural attenuation of the Sand Hollow I groundwater plume is submitted to ODEQ.		
April		The east side of the Module 1 DNAPL recovery system begins operation. Startup of the west side is delayed until the expansion of the hydraulic containment system is completed.	
July		Three new hydraulic containment wells were installed to expand the capture zone of the hydraulic containment system.	
Sept		Startup of the additional three wells of the hydraulic containment system occurs.	
Oct		The west side of the Module 1 DNAPL recovery system begins operation. Startup is delayed until the expansion of the hydraulic containment system is completed.	
2000 Nov	A technical memorandum describing the results of year 4 of the Columbia River Shoreline Operable Unit monitoring is submitted to ODEQ.		
Nov	The report documenting the results of the deferred soil investigation beneath the footprint of three tanks removed by Kerr-McGee is submitted to ODEQ.		
Dec		The tenth hydraulic containment well is installed.	
Nov	A deferred soil investigation in the area where LNAPL was encountered during a utility pole installation was conducted.		
2001 Jan-April		Water treatment plant capacity expanded to process the additional flow from the tenth hydraulic containment well.	
April		Tenth hydraulic containment well begins operation.	
April	A deferred soil investigation in the area where three process tanks removed by Kerr-McGee was conducted.		
May		Approximately 45 cubic yards of soil with free oil are removed from beneath the footprint of one of the Kerr-McGee process tanks.	

Figure 2-3
UPRR Tie Treating Plant Timeline
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon
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Timeline	Administrative Deliverable or Event	Project Milestone	Site Event
2002 Feb	Deferred soil investigation conducted in the area where Kerr-McGee removed two aboveground process storage tanks.		
2002 May	A modified Consent Decree was recorded for the change to the NPDES permit, which is regulated as an attachment to the 1997 Consent Decree.		
2003 Feb	Design Basis Report for the Module 2/3 DNAPL Recovery System submitted to ODEQ.		
2003 May	Deferred soil investigation conducted in the area where Kerr-McGee removed one aboveground former creosote tank.		
2003 Mar		DNAPL extraction begins at Module No. 2/3.	
2003 May		ODEQ conducted a pre-final inspection of Module 2/3 systems, and concluded that the groundwater remedy was fully constructed.	
2004 Jul		ODEQ submitted a Preliminary Closeout Report (PCOR) to Region 10 EPA for the purpose of obtaining a Construction Completion milestone.	
2004 Nov			Kerr-McGee sold the facility equipment and abovegrade structures to Amerities West, LLC.
2005			
2006			

Figure 2-3
UPRR Tie Treating Plant Timeline
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon
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SECTION 3

Review of Remedial Action Objectives

Remedial action objectives (RAOs) were developed following criteria set forth in OAR 340-122-090 and defined in the ROD (Oregon Department of Environmental Quality, 1996). The RAOs for groundwater, soil, and the Columbia River Shoreline Operable Unit (sediment and surface water) are presented in Sections 3.1, 3.2, and 3.3, respectively.

3.1 Remedial Action Objectives for Groundwater

The RAOs for groundwater, soil, and the Columbia River Shoreline Operable Unit (sediment and surface water) are as follows:

- Protect industrial workers at the site and reasonably likely future users of groundwater downgradient of the site from exposure to the unconfined water-bearing zone, Sand Hollow I flow top, or Sand Hollow II flow top groundwater contamination that exceeds protective levels (10^{-6} excess lifetime cancer risk levels, maximum contaminant levels [MCLs], or proposed MCLs) for CPAHs, pentachlorophenol, and arsenic. A potential reasonable exposure route is ingestion by humans of contaminated groundwater.
- Prevent degradation of the existing water quality in the Ginkgo flow top.
- Prevent further migration of dense nonaqueous-phase liquids (DNAPL) in the unconfined water-bearing zone and Sand Hollow II flow interior.
- Remove DNAPL to the extent practicable to prevent continued vertical or horizontal migration to the uncontaminated portions of the aquifer.
- Restore the water quality of the water-bearing zones currently contaminated with DNAPLs to the extent feasible at the site.

Relevant federal drinking water MCLs were selected as specific groundwater cleanup goals for the unconfined water-bearing zone, Sand Hollow I, and Sand Hollow II. These goals are presented in Table 3-1. For naphthalene, which did not have an MCL, the calculated health-based concentration of 0.15 milligram per liter (mg/L) was selected as the cleanup goal. A review of the current protectiveness of these standards is presented in Section 8.2, Question B—Are the [protective factors] used at the time of the remedy still valid?

TABLE 3-1
Groundwater Cleanup Goals Presented in the Record of Decision

Constituent	Concentration (mg/L)	Basis
Arsenic	0.05	MCL
Chromium	0.10	MCL
Copper	1.3	Proposed MCL
Pentachlorophenol	0.001	Proposed MCL
Benzo(a)anthracene	0.0001	Proposed MCL
Chrysene	0.0002	Proposed MCL
Benzo(a)pyrene	0.0002	Proposed MCL
Benzo(b,k)fluoranthene	0.0002	Proposed MCL
Dibenzo(a,h)anthracene	0.0003	Proposed MCL
Indeno(1,2,3-cd)pyrene	0.0004	Proposed MCL
Naphthalene	0.15	Non-cancer risk

Notes:
MCL = Maximum contaminant level.
Source: Oregon Department of Environmental Quality, 1996.

3.2 Remedial Action Objectives for Soil

The RAOs for soil are as follows:

- Prevent human exposure through direct contact (ingestion, inhalation, or dermal contact) to surface and subsurface soil that exceeds protective levels.
- Minimize further contamination from soil to groundwater, as appropriate (data gathered during the RI indicate that the potential migration from soil to groundwater, under existing conditions, is insignificant compared to the contribution from residual DNAPL).

Based on the protectiveness provided by these two objectives, no specific soil cleanup levels were specified in the ROD (Oregon Department of Environmental Quality, 1996). Decisions regarding deferred soil investigations and evaluation of potential cleanup actions are to be conducted using the ODEQ risk assessment protocol and remedy selection criteria in place at the time the investigation occurs.

3.3 Remedial Action Objectives for the Columbia River Shoreline Operable Unit (Sediment and Surface Water)

The RAOs for the Columbia River Shoreline Operable Unit (sediment and surface water) are as follows:

- Protect existing water quality in the Columbia River and in the waterfowl pond in the undeveloped portion of Riverfront Park.
- Prevent exposure of aquatic organisms to surface sediments with contaminant concentrations shown to be toxic to aquatic life.

The following sediment cleanup levels were approved as protective levels for sediments:

- 69 milligrams per kilogram (mg/kg) for arsenic
- 4 mg/kg for total PAHs (PAHs were also used as a surrogate for the presence of pentachlorophenol, which was detected only in samples where PAHs were above 4 mg/kg)

ODEQ adopted the following ambient water quality criteria for the protection of aquatic life in surface water (that is, in the Columbia River and the waterfowl ponds in Riverfront Park):

- 0.048 mg/L for arsenic
- 0.011 mg/L for chromium
- 0.012 mg/L for copper
- 0.013 mg/L for pentachlorophenol
- 0.62 mg/L for naphthalene
- 0.52 mg/L for acenaphthene

A review of the current protectiveness of these standards is presented in Section 8.2, Question B—Are the [protective factors] used at the time of the remedy still valid?

SECTION 4

Remedial Action Implementation and Modifications

This section identifies and describes the selected remedies for groundwater, soil, and the Columbia River Shoreline Operable Unit (sediment and surface water).

4.1 Groundwater Remedy

The selected groundwater remedy requires the following (ODEQ, 1996, page 60):

- Recovery of creosote oil (DNAPL) to the extent feasible from the unconfined water-bearing zone and the Sand Hollow II intraflow zone, with extraction wells and recycling or reuse of the recovered material, if possible. DNAPL recovery in the unconfined water-bearing zone will be implemented in a phased approach, including recovery using single wells and "water flooding" to push DNAPL to the recovery wells, if possible.
- Hydraulic containment of the DNAPL source areas in the unconfined water-bearing zone and monitoring of the dissolved contaminant plumes to determine if additional hydraulic containment is needed.
- Aboveground physical-chemical treatment of the extracted water from all affected water-bearing zones, to the extent practical.
- Reinjection or reinfiltration of extracted groundwater back into the Sand Hollow I and Sand Hollow II aquifers[4].
- Disposal of any excess water by either discharge to the City of The Dalles sanitary sewer system, discharge to surface water (Threemile Creek or the Columbia River), or land application of the treated water, in accordance with ODEQ requirements.
- Institutional controls, such as deed restrictions, to prohibit the use of shallow groundwater at the site and in Riverfront Park.
- Hydraulic containment of the DNAPL source areas in Sand Hollow I and monitoring of the dissolved contaminant plumes to determine whether additional hydraulic containment is needed.
- Monitoring of the Sand Hollow II water-bearing zone, to determine whether protective levels are exceeded and cleanup of this zone is necessary. If groundwater remediation is warranted, hydraulic containment will be implemented.

[4] Reinjection of extracted groundwater is required under the 1959 Order for The Dalles Critical Groundwater Area.

- Long-term monitoring, including a reassessment of the remedy every five years, to ensure the effectiveness of the remedy.

This section presents detailed information on the implementation of each aspect of the selected remedy. For each remedial component, the design and implementation of the selected remedy are described, as are any modifications to the selected remedy during the second five-year review period and any planned future modifications to the selected remedy. A conceptual model describing NAPL contamination, mobility, and recovery is presented in Appendix C.

4.1.1 Unconfined Water-Bearing Zone DNAPL Recovery System

Description of Selected Remedy

The selected remedy for DNAPL in the unconfined water-bearing zone is the recovery of creosote to the extent feasible. The original configuration of the unconfined water-bearing zone DNAPL recovery systems was presented in the *Final Groundwater Remedial Action Plan* (CH2M HILL, 1997b). The DNAPL recovery wells were to be installed and operated in phased modules to take advantage of the flow gradients created by the water flooding system.

Module 1 of the DNAPL extraction system began operation in April 1999. The buildout and modifications to Module 1 along with DNAPL recovery results for the first 900 days of operation were reviewed and presented in the *First Five-Year ROD Review Report*.

Module 2/3 began operation in February 2004. Well locations for both modules are shown in Figure 4-1 and cross sections of Module 2/3 are shown in Figures 4-2 and 4-3.

The system operates by extracting water and DNAPL simultaneously, though at different elevations, from the extraction wells and then reinjecting the treated water in a linear series of injection wells. Water is treated in an oil/water separator to remove the free oil and is then reinjected. DNAPL is recovered separately and stored for shipment offsite. The hydraulic gradient and water flow from the injection wells promotes DNAPL migration to the extraction wells as mounded water from injection wells creates a higher hydraulic head on the underlying DNAPL. A conceptual model describing NAPL contamination, mobility, and recovery is presented in Appendix C.

Modifications to Selected Remedy

Module 2 and Module 3 were envisioned to be constructed and operated sequentially after Module 1 operation terminated. The termination of operation was to be based on established methods. Specifically, when DNAPL recovery declined and as recovery rates approached asymptotic slopes, the operating module would be subsequently decommissioned and the next module would then be built and operated. However, in 2001, UPRR analyzed DNAPL source zone recovery technology life-cycles. Based on that analysis, UPRR decided that an accelerated buildout of Module 2/3 and concurrent operation of all three modules was feasible and cost-effective with respect to remediation life-cycle. Subsequently, UPRR submitted a design basis proposal for Module 2/3 buildout to ODEQ in February 2003.

Module 2/3 was modified from the original design of Module 1 based on insights gained and observations made during the operation of Module 1. The modifications were presented in detail in the *Design Basis Report for the Module 2/3 DNAPL Recovery System* (CH2M HILL 2003). The significant modifications are listed below:

- Module 2/3 is divided into three separate units. Each unit includes extraction wells, an extraction pump skid, injection wells, a DNAPL collection tank, and an oil/water separator.
- DNAPL pumps are progressive cavity pumps. Down-well piston pumps were used for Module 1. The down-well pumps operate on timers to control the average rate of DNAPL removal from the well. The progressive cavity pumps remove a DNAPL/groundwater mixture (the flow of DNAPL in the extraction wells is estimated to be between 0.01 and 0.001 gallons per minute [gpm]) at a set location in the wells, maintaining the DNAPL level at this location. This procedure requires less operator attention than the timer-controlled pumps on Module 1 and equivalent or better control of DNAPL levels.
- Injection wells are screened from approximately 15 feet below ground surface (bgs) to the top of the competent basalt (approximately 30 to 35 ft bgs). The Module 1 injection wells were screened from 5 feet bgs to the top of the fractured basalt (approximately 20 feet bgs). Extending the screen interval of the injection wells into the fractured basalt increases the yield of the injection well.
- Module 1 extraction wells were designed as 10-inch wells to accommodate the down-well pump and each well was completed at 40 feet bgs. This meant that for some of the extraction wells, the well screen extended into the competent basalt. The wells were installed with air rotary drilling techniques, where distinguishing between the fractured and competent basalt in the field is difficult. Constructing the wells 40 feet bgs assured that the screen interval of the extraction well extended completely through the fractured basalt.

  Extraction wells from Module 2/3 are 6 inches in diameter to allow adequate space for the down-hole piping and equipment, compared with the 10-inch well needed for a down-well pump used in Module 1. Extraction rates are low enough that the reduced well diameter will not restrict recovery. The wells were drilled using sonic drilling, which allowed better field analysis of cuttings to distinguish the fractured basalt from the competent basalt. This approach allowed the wells to be completed through the entire fractured basalt zone and extend only minimally into the competent basalt. Generally, completed wells were extended 2 feet into the competent basalt.
- Steel, universal flanges were installed on extraction and injection wells. Universal flange connections provide positive closure of injection wells for pressurized water injection and minimize entrainment of atmospheric oxygen.

During 2003 and culminating in late December 2003, UPRR constructed Module 2/3. Startup and optimization of Module 2/3 occurred from late December 2003 through July 2004. On May 12, 2004, ODEQ performed a prefinal inspection of Module 2/3 construction and determined that the groundwater remedy construction was complete.

Future Planned Remedy Modifications

No additional modifications are planned for the DNAPL extraction system. Modules will be phased out as recovery rates approach asymptotic slopes.

Phase-out of each module will occur as follows:

Modules will be shut down after 95 percent of the recoverable DNAPL has been recovered under the artificial gradients produced by the water flooding techniques in use at the site[5]. At the tie treating facility, water flooding has induced a high artificial gradient to mobilize a normally immobile fraction of the DNAPL. After the artificial gradient is removed, the residual DNAPL will be immobilized under background gradient conditions.

As presented in the *DNAPL Recovery Design Basis Report* (CH2M HILL 1998b) the 95 percent recovery endpoint will be demonstrated using the linear regression of DNAPL recovery rates verse time.

After DNAPL extraction module shutdown a Technical Impracticability evaluation will be prepared by UPRR. The evaluation will use applicable section of the EPA *Guidance for Evaluating the Technical Impracticability of Groundwater Restoration* (EPA 1993) in the analysis. Several components of the current guidance have already been addressed as part of the five year review process (i.e. ARAR analysis, conceptual site model). Applicable components will include but are not limited to a demonstration that no other remedial technologies (conventional or innovative) could reliably, logically, or feasibly attain the cleanup levels at the site within a reasonable timeframe.

[5]This technique is used because of the asymptotic nature of DNAPL recovery. As the total volume of recovered product approaches the maximum recoverable volume, the recovery rates decrease at an asymptotic rate, resulting in long recovery times for the last 5% of recoverable DNAPL. The remaining 5% of recoverable DNAPL is likely not mobile under background gradient conditions. Extraction wells (and associated injection wells) that produce little or no DNAPL may be shut down before the module as a whole. ODEQ will continue to evaluate possible ancillary approaches and/or methodologies that could potentially be useful for validation of the 95% criterion.

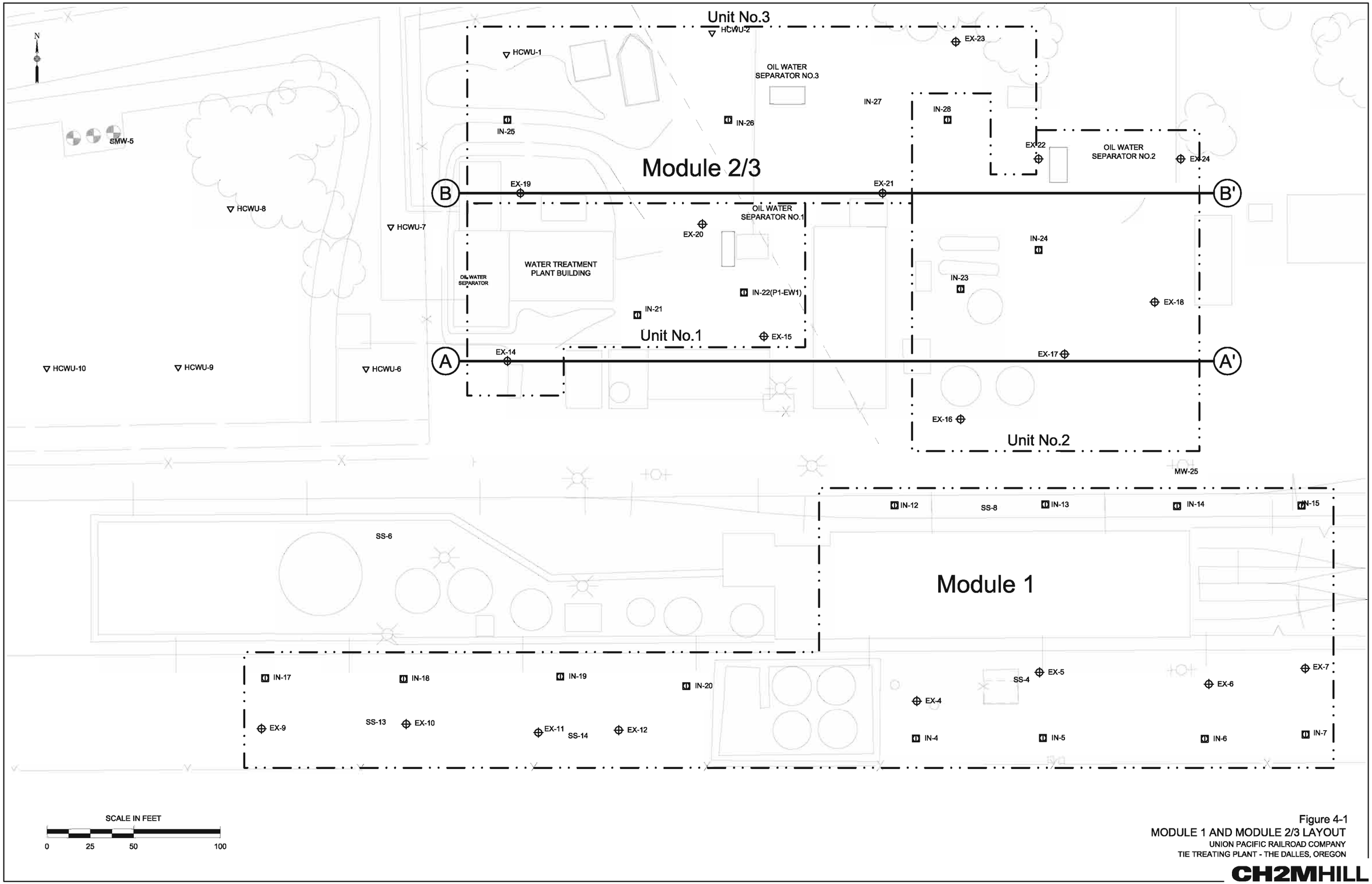

Figure 4-1
MODULE 1 AND MODULE 2/3 LAYOUT
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

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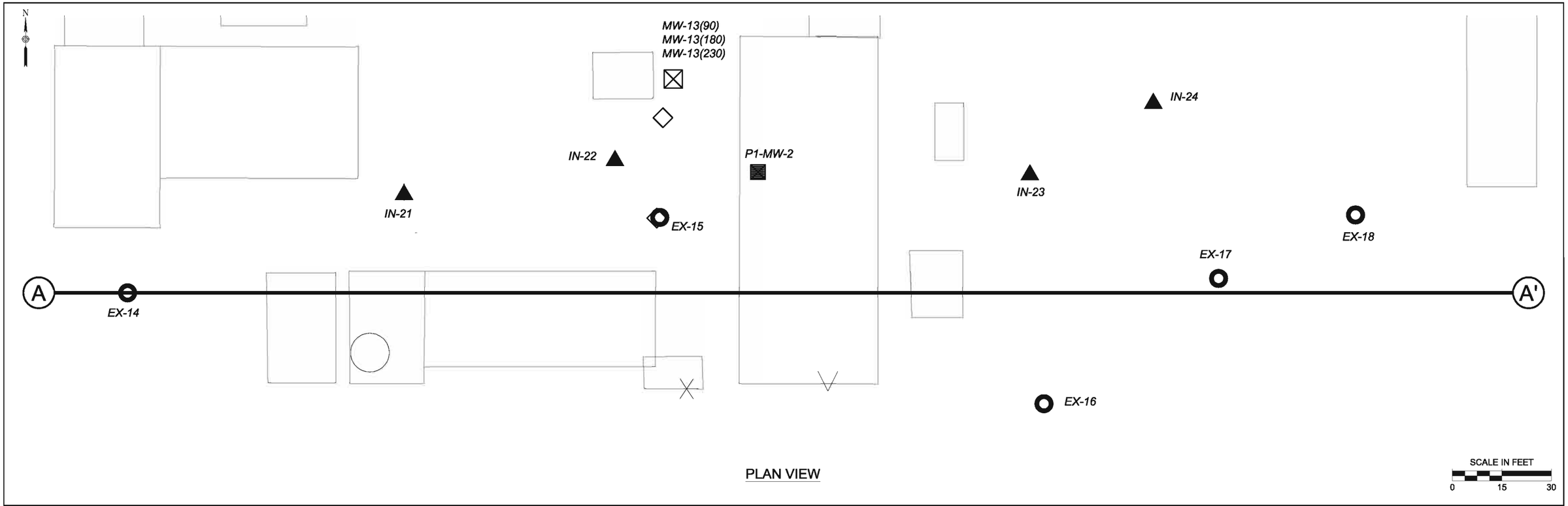
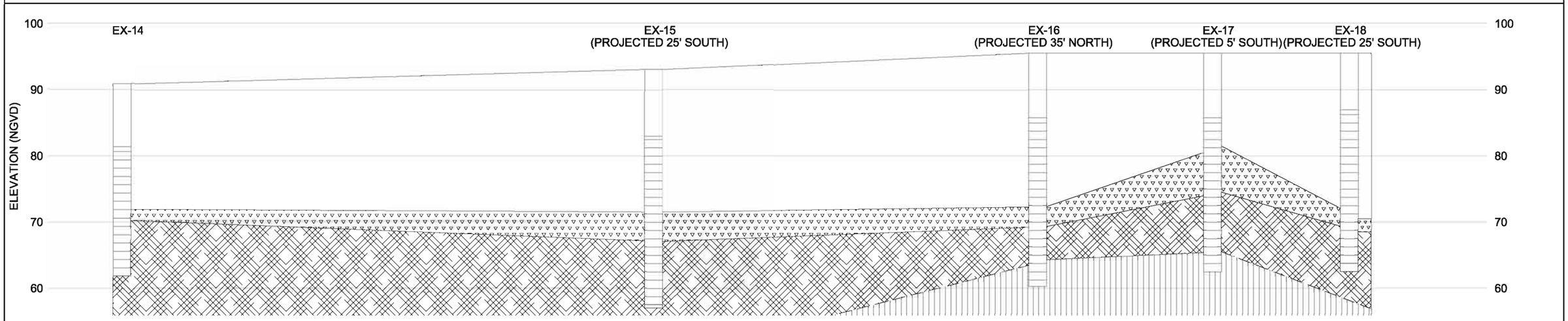


PLAN VIEW



CROSS SECTION A - A'

LEGEND:

- ALLUVIUM
- BRECCIA
- FRACTURED BASALT
- UNFRACTURED BASALT

Figure 4-2
PLAN VIEW AND CROSS SECTION A - A'
OF MODULE 2/3 EXTRACTION SYSTEM
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

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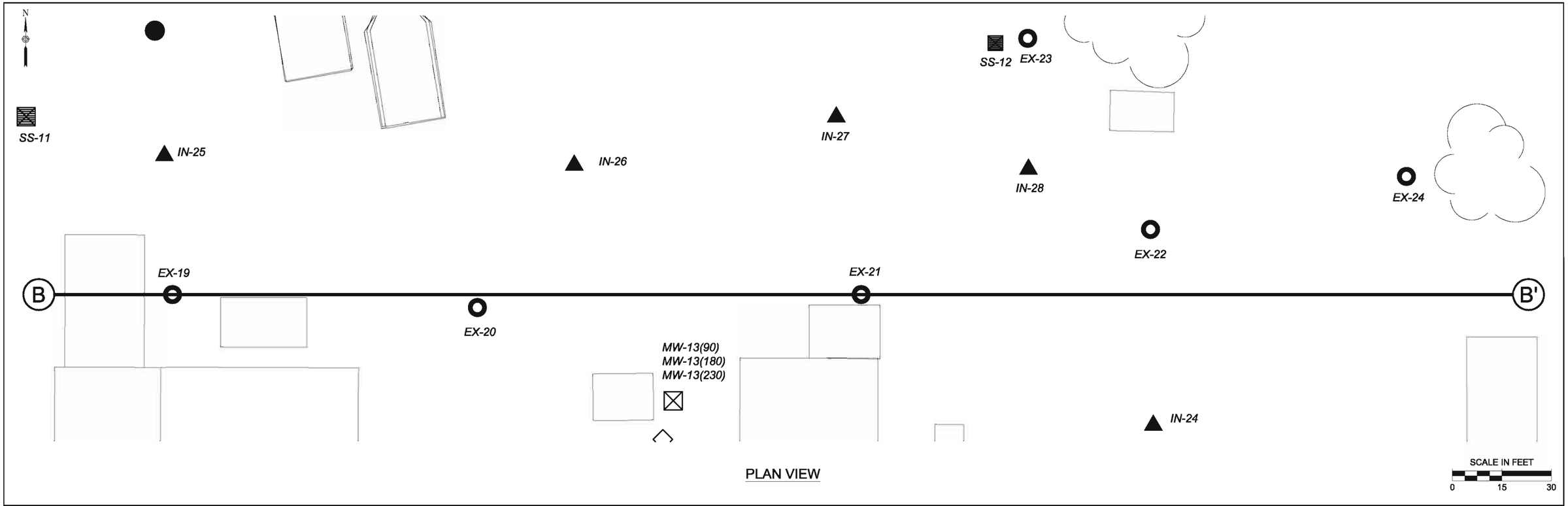
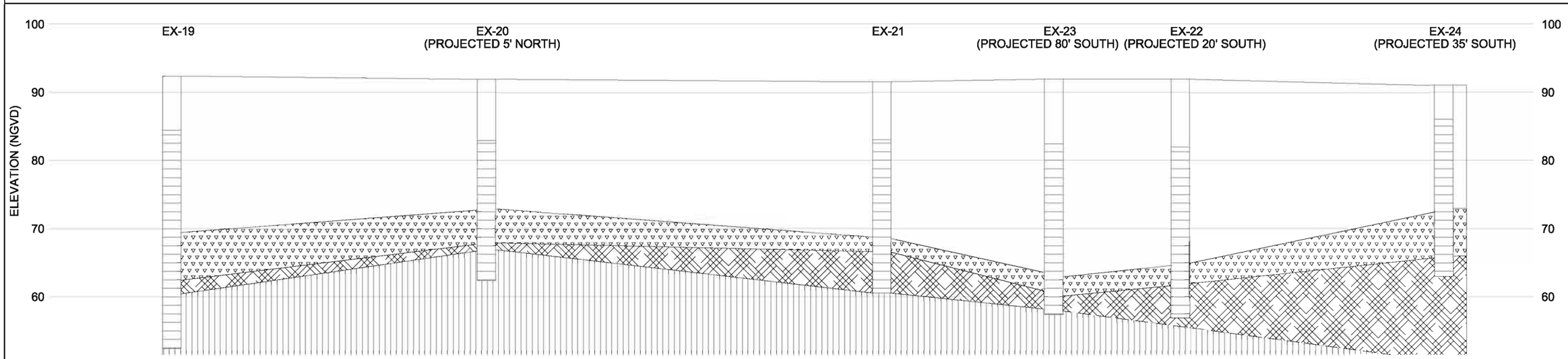


PLAN VIEW



CROSS SECTION B - B'

LEGEND:

- ALLUVIUM
- BRECCIA
- FRACTURED BASALT
- UNFRACTURED BASALT

Figure 4-3
PLAN VIEW AND CROSS SECTION B - B'
OF MODULE 2/3 EXTRACTION SYSTEM
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

PLOT DATE: 07-Dec-2006 FILENAME: \\Rosa\proj\UNION PACIFIC RAILROAD\168910\CAD\Drawings\Module 2-3 Extraction System Plan and Cross Section.dwg

4.1.2 Unconfined Water-Bearing Zone Hydraulic Containment System

Description of Selected Remedy

The hydraulic containment system for the unconfined water-bearing zone was designed in 1997 and installed in early 1998. The hydraulic containment wells were constructed in the fall of 1997, and the aboveground pumping and conveyance systems were constructed in early 1998. Hydraulic containment system operations began in spring 1998.

The unconfined water-bearing zone hydraulic containment system has twice been expanded since the initial remedy was implemented: to expand the capture zone of the system and to address changes in the nature and extent of the DNAPL source area at the site. These expansions were discussed in the *First Five-Year ROD Review Report*.

Complete capture by the hydraulic containment system has been demonstrated by empirical water level data collected routinely over the past 8 years of operation. Before the startup of Module 1 (CH2M HILL, 1997b) and Module 2/3 (CH2M HILL, 2003), capture of source area groundwater was demonstrated using an ODEQ-approved numerical groundwater model (MicroFem, Version 3). The effects of water flooding and groundwater extraction on the unconfined water-bearing zone are shown in Figure 4-4.

Modifications to Selected Remedy

Minor modifications were made to the above ground conveyance system in 2005. Changes were documented in *Technical Memorandum Replacement of HCWU 1" Steel Pipe, UPRR, The Dalles* (Appendix J).

Future Planned Remedy Modifications

The principal objective of the hydraulic containment system is to contain potentially mobile DNAPL. A secondary objective of the hydraulic containment system is the recovery of mobile DNAPL. The hydraulic containment system will be operated until DNAPL recovery in the unconfined zone reaches the 95 percent endpoint or up to 1.5 years after shutdown of DNAPL recovery modules, which ever is longer (1.5 years is the travel time for injected groundwater from Module 1 to be extracted by the hydraulic containment system). Following the shutdown of the hydraulic containment system, the system will be mothballed and a long-term monitoring program will be developed to demonstrate that the remedy is still protective.

Operation of individual hydraulic containment wells along the perimeter of the system may be shut down before the system as a whole, as DNAPL recovery wells and groundwater injection wells are phased out in Module 1 and/or Module 2/3.

4.1.3 Unconfined Water-Bearing Zone Water Treatment Plant

Description of Selected Remedy

The water treatment plant consists of unit operations for free oil recovery (oil/water separation), arsenic treatment (iron hydroxide coprecipitation), and dissolved organic treatment (carbon filtration). Treated water is piped to Threemile Creek, approximately 1 mile to the east, and discharged under National Pollutant Discharge Elimination System (NPDES) limitations, which are based on Oregon ambient water quality standards. The

basic unit processes have remained unchanged since the water treatment plant was constructed in 1995.

Two modifications to the configuration of the water treatment plant were completed and documented in the *First Five-Year ROD Review Report*.

Modifications to Selected Remedy

Several options for reducing the colloidal iron of the water treatment plant were tested and implemented:

- An air stripper was pilot tested upstream of the media filters to determine if agitation would produce larger particles that could be filtered out in the media filters.
- A secondary peroxide injection point was temporarily installed between the two media filters.
- The anthracite in the lag media filter was replaced with a dual sand/anthracite filter and bag filters were temporarily installed between the media filters and the carbon vessels to provide smaller effective filters to trap colloidal iron particles.
- Smaller activated carbon vessels were installed to increase carbon efficiency and reduce iron build up in the vessels.

Substantial iron reduction was not observed from any of these modifications.

Future Planned Remedy Modifications

Colloidal iron removal has been a long-standing operational concern for The Dalles water treatment plant. Colloidal iron is difficult to remove from water because of the small particle size. A review of the ARARs with respect to the effluent discharge limits is being conducted by UPRR and will be reviewed by ODEQ to determine whether the current discharge limit is appropriate and whether additional modifications to the water treatment plant are necessary.

4.1.4 Unconfined Water-Bearing Zone Institutional Controls

An agreement between the Port of The Dalles and UPRR to restrict the use of shallow groundwater in Riverfront Park was executed on October 4, 1996. In 2000, the Port of the Dalles donated the land to the Northern Wasco County Parks and Recreation District. The primary restrictive covenants of the Agreement were transferred along with the property. The agreement is provided in Appendix D of this report.

The lease agreement between Kerr-McGee and UPRR transferred the deed restrictions on groundwater use at the site. In 2004, Kerr-McGee sold the facility equipment and abovegrade structures to Amerities West, LLC, and Amerities West, LLC, leased the property from UPRR. The deed restrictions for use of groundwater on site that were previously in place and required by the ROD were transferred in the lease agreement with Amerities West, LLC. The lease agreement is presented in Appendix E.

No additional modifications are planned for this portion of the remedy.

4.1.5 Sand Hollow I Hydraulic Containment System

Description of Selected Remedy

During development of the *Remedial Design/Remedial Action Work Plan* for the site (CH2M HILL, 1997a), UPRR proposed that the implementation of the selected groundwater remedy for the Sand Hollow I aquifer be deferred to allow time for a study of the natural attenuation potential of this aquifer. ODEQ approved the deferral, and a natural attenuation study was implemented.

The results of the natural attenuation study were presented to ODEQ in the *Sand Hollow I Water-Bearing Zone: Natural Attenuation Assessment Summary Report* (CH2M HILL, 1998d). Based on a review of these data, on January 16, 1999, ODEQ agreed to defer implementation of the hydraulic containment system for the Sand Hollow I water-bearing zone until groundwater monitoring data indicate that natural attenuation is no longer an effective remedy. After 2 years of operation of the unconfined DNAPL recovery system, ODEQ formalized approval to defer implementation of the hydraulic containment system for the Sand Hollow I water-bearing-zone indefinitely (DEQ, June 7, 2001). These modifications to the selected remedy were presented in detail by ODEQ in the *First Five-Year ROD Review Report*. Monitored natural attenuation (MNA) is considered a remedy selected under CERCLA § 121. Because MNA was selected in lieu of hydraulic containment, it was important to evaluate whether MNA is effective and protective. ODEQ requested an updated assessment of MNA, which was provided by technical memorandum (CH2M HILL, May 16, 2007).

Monitoring of COCs, natural attenuation parameters, and groundwater elevations has confirmed that natural attenuation is still an effective remedy for the Sand Hollow I aquifer. Semiannual sampling has been conducted in the Sand Hollow I since 1997. A review of these data shows that concentrations of all COCs in downgradient wells have been stable or have decreased over the past nine years. Throughout the review period, COC and natural attenuation parameter levels indicated that COCs are not migrating outside of the source areas and that natural attenuation continues to occur. Figure 4-5 shows the naphthalene concentration in the Sand Hollow I groundwater in October/November 1990 and April 2006.

Quarterly water level measurements show that only minor changes in gradient and flow direction have occurred in the Sand Hollow I over the past 9 years. Water levels increased approximately 20 feet in all of the confined aquifers monitored at the site, thought to be caused by a decrease in regional groundwater use from aluminum plants in the area, which shut down in 2001. However, the increased levels did not have a large impact on groundwater gradients or flow directions. The average gradient across the site in the Sand Hollow I aquifer decreased slightly after 2001 from 0.0014 feet per foot (ft/ft) to 0.0008 ft/ft. Average groundwater flow direction has shifted very slightly north. Before 2001, average flow direction in the Sand Hollow I aquifer was from the west-southwest. After 2001, average flow direction was to the west.

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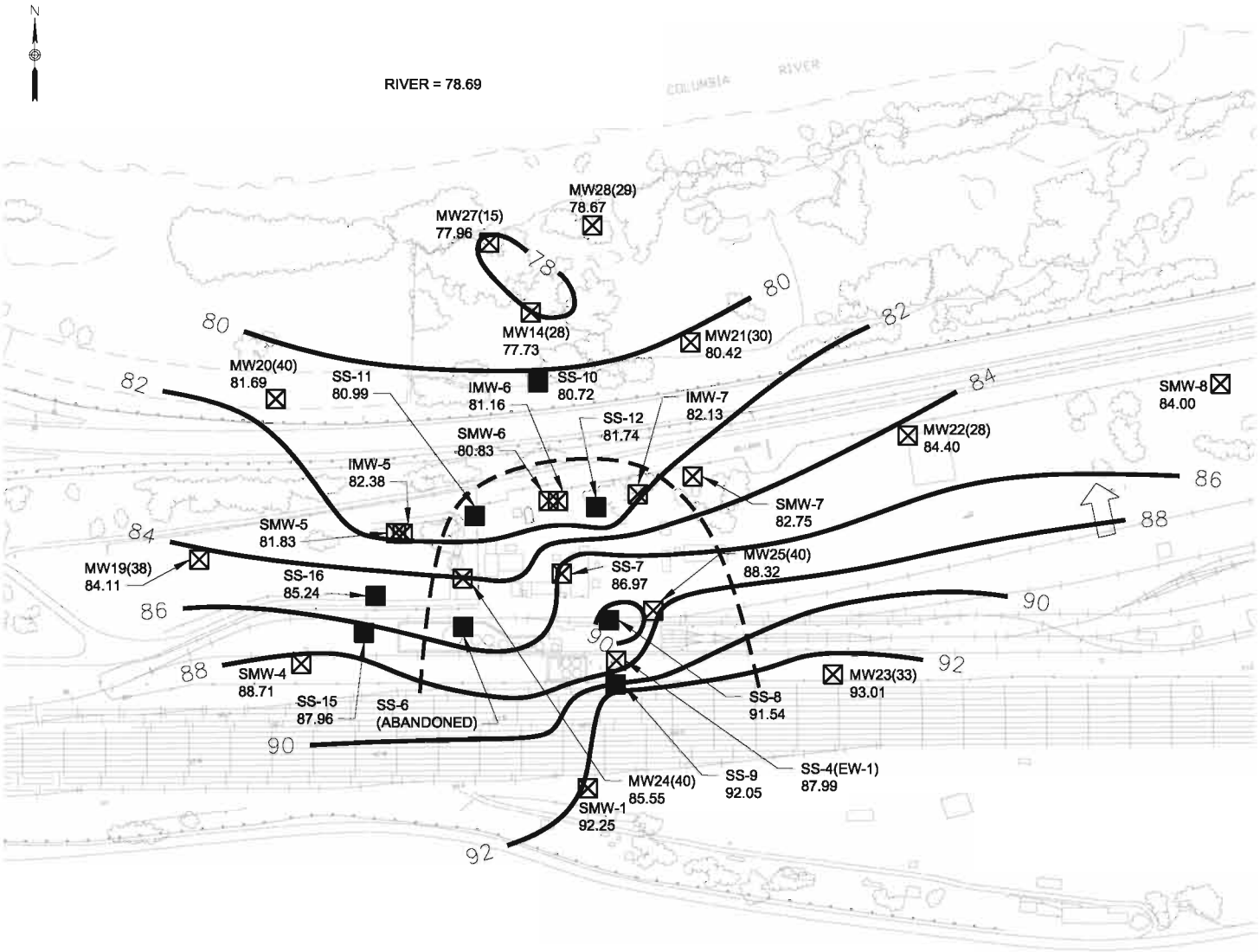

LEGEND:

- ⊠ UNCONFINED WATER-BEARING ZONE MONITORING WELL
- ■ UNCONFINED WATER-BEARING ZONE PIEZOMETERS
- ⇦ GROUNDWATER FLOW DIRECTION
- —82— GROUNDWATER ELEVATION CONTOUR, FEET ABOVE NGVD, 1929; LOCATION APPROXIMATE, CONTOUR INTERVAL = 2 FEET
- — — — APPROXIMATE GROUNDWATER CAPTURE ZONE

SCALE IN FEET

0 200 400 800

FIGURE 4-4
POTENTIOMETRIC SURFACE MAP
UNCONFINED WATER-BEARING ZONE
JULY 11, 2006
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

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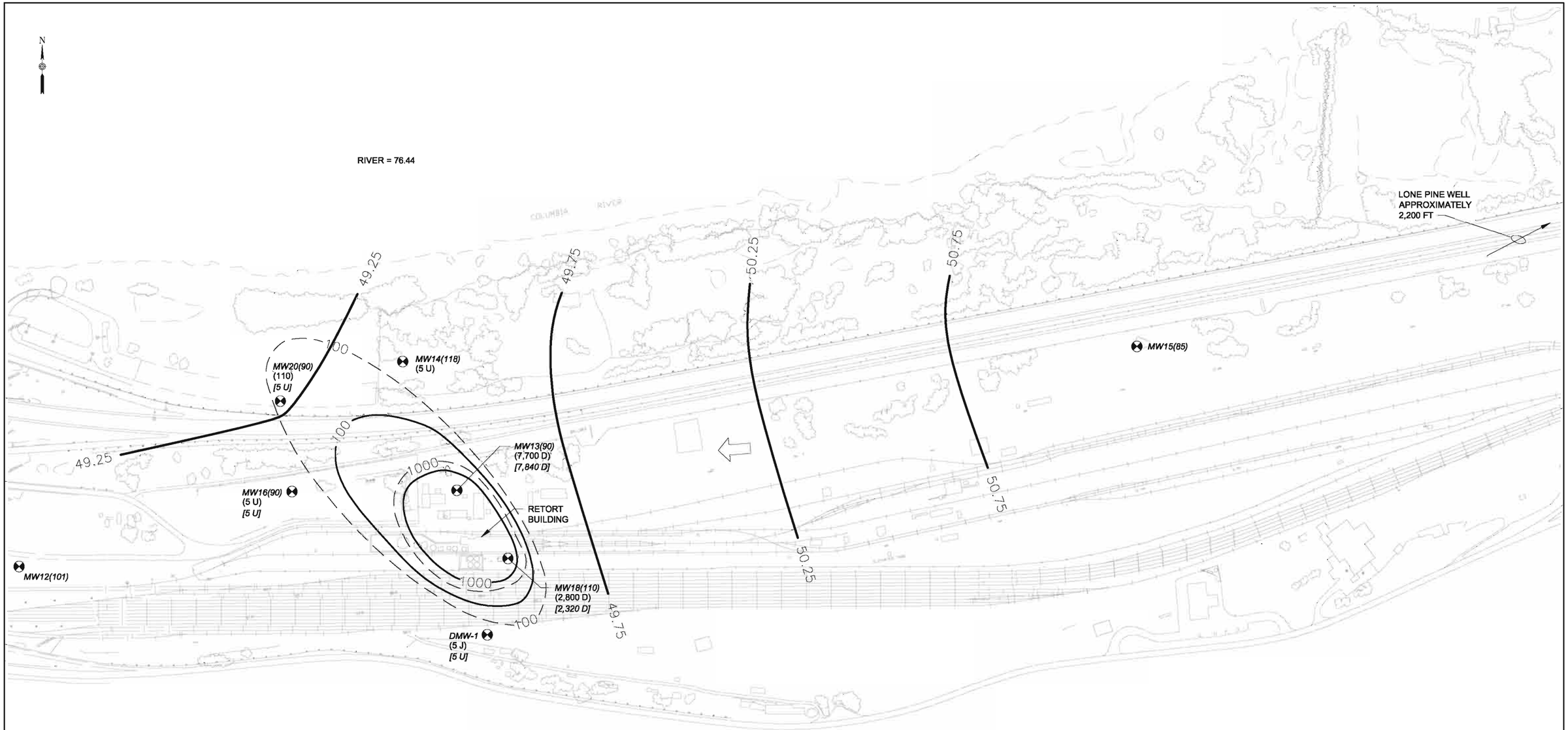

LEGEND:

- SAND HOLLOW I FLOW TOP MONITORING WELL
- GROUNDWATER FLOW DIRECTION
- 30 — APRIL 3, 2006 GROUNDWATER ELEVATION CONTOUR, FEET ABOVE NGVD, 1929; LOCATION APPROXIMATE, CONTOUR INTERVAL = 0.5 FOOT
- (7,700 D) — NAPHTHALENE (µg/L) OCT/NOV 1990
- 100 — NAPHTHALENE CONCENTRATION CONTOUR OCT/NOV 1990
- [3,370 D] — NAPHTHALENE (µg/L) APR 2006
- 100 — NAPHTHALENE CONCENTRATION CONTOUR APR 2006

SCALE IN FEET

0 200 400 800

Figure 4-5
SAND HOLLOW I
NAPHTHALENE (µg/L) IN GROUNDWATER
OCT/NOV 1990 AND APR 2006
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

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Modifications to Selected Remedy

No modifications have been made to the selected remedy during this five-year review period.

Future Planned Remedy Modifications

No additional remedy modifications are planned.

4.1.6 Sand Hollow II Hydraulic Containment System

Description of Selected Remedy

The ROD (Oregon Department of Environmental Quality, 1996) specified quarterly groundwater monitoring of Sand Hollow II for 2 years. After 2 years, a determination was to be made regarding the need for groundwater remediation. As stated in the *First Five-Year ROD Review Report*, groundwater monitoring data did not indicate that hydraulic containment of the Sand Hollow II water-bearing zone was warranted. Groundwater monitoring continues, as described in Section 4.1.8.

Groundwater monitoring data collected during the last five years continue to show that COC levels in both the Sand Hollow II and Ginko II water-bearing zones are stable. In the Sand Hollow II, naphthalene concentrations have remained stable in the source area and still have not been detected in the downgradient wells. No other COCs are detected in the Sand Hollow II. In the Ginkgo II, COCs have not been detected in any of the groundwater monitoring wells.

DNAPL continues to be removed from one well (MW13-230) completed in Sand Hollow II where a previously abandoned water supply well allowed DNAPL to migrate from the unconfined water-bearing zone to Sand Hollow II. A total of 4,926 gallons of DNAPL has been removed from this well and continues to be removed on a quarterly basis.

Quarterly water level measurements show that the gradient and flow direction has remained consistent over the past nine years and there have only been minor changes in gradient and flow direction in Sand Hollow II as a result of regional water supply uses. Water levels increased approximately 20 feet in all of the confined aquifers monitored at the site as a result of a decrease in regional groundwater use from aluminum plants in the area, which shut down in 2001. However, the increased levels did not have a large impact on groundwater gradients or flow directions. The average gradient across the site in the Sand Hollow II aquifer decreased slightly after 2001 from 0.0006 ft/ft to 0.0003 ft/ft. Average groundwater flow direction has shifted very slightly south. Before 2001, average flow direction in the Sand Hollow II aquifer was toward the northwest. After 2001, average flow direction was toward the west-northwest.

Modifications to Selected Remedy

No modifications have been made to the selected remedy during this five-year review period.

Future Planned Remedy Modifications

No future remedy modifications are planned.

4.1.7 Ginkgo II Remedy

Description of Selected Remedy

The ROD (Oregon Department of Environmental Quality, 1996) specified annual monitoring for five years in the Ginkgo II water-bearing zone to determine whether COCs from the overlying water-bearing zones appear in this zone. Groundwater monitoring data continue to indicate that Gingko II is not affected by COCs present in the overlying water-bearing zones. Groundwater monitoring continues as described in the groundwater monitoring section of this report.

Quarterly water level measurements show that only minor changes in gradient and flow direction have occurred in the Ginkgo II over the past nine years. Water levels increased approximately 20 feet in all of the confined aquifers monitored at the site as a result of a decrease in regional groundwater use from aluminum plants in the area, which shut down in 2001. However, the increased levels did not have a large impact on groundwater gradients or flow directions. The average gradient across the site in the Ginkgo II aquifer decreased slightly after 2001 from 0.0005 ft/ft to 0.0003 ft/ft. Average groundwater flow direction has shifted very slightly north. Before 2001, average flow direction in the Ginkgo II aquifer was toward the west-northwest. After 2001, average flow direction was toward the northwest.

Modifications to Selected Remedy

No modifications have been made to the selected remedy.

Future Planned Remedy Modifications

No future remedy modifications are planned.

4.1.8 Groundwater Monitoring Program

Description of Selected Remedy

The groundwater monitoring program to demonstrate the effectiveness of the selected groundwater remedies was presented in the *Final Groundwater Remedial Action Plan* (CH2M HILL, 1997b). This plan provided for reduced groundwater sampling in the unconfined water-bearing zone and in the Sand Hollow II water-bearing zone after 2 years of operation of the hydraulic containment and DNAPL recovery systems, provided that certain criteria are met. ODEQ requested a long-term groundwater monitoring plan for the Sand Hollow I water-bearing zone in its review of the *Sand Hollow I Water-Bearing Zone: Natural Attenuation Assessment Summary Report* (CH2M HILL, 1998d). These changes were approved by ODEQ in a July 19, 2001, letter to CH2M HILL, which was presented in the *First Five-Year ROD Review Report*.

Action levels have been established for the unconfined water-bearing zone at Riverfront Park (CH2M HILL, 1997b). The action levels were developed to be protective of the waterfowl ponds and the Columbia River. If an action level is exceeded in two consecutive sampling events in Riverfront Park, a more rigorous assessment of potential influences to the river and waterfowl ponds is triggered. The action levels are shown in Table 4-1.

TABLE 4-1
Action Levels for Determining the Effectiveness of Unconfined Hydraulic Containment System

Constituent	Action Level Concentrations (mg/L)
Arsenic	0.40
Chromium	0.10
Copper	1.3
Pentachlorophenol	4.0
Naphthalene	10.0

The groundwater monitoring program is presented in Tables 4-2 and 4-3.

TABLE 4-2
Semiannual Groundwater Monitoring Program

Location	Water-Bearing Zone	COC	Cu	Cr	NA
SMW-5	Unconfined	X			
SMW-7	Unconfined	X			
MW-14(28)	Unconfined	X			
MW-20(40)	Unconfined	X			
MW-21(30)	Unconfined	X			
MW-27(15)	Unconfined	X			
DMW-1	Sand Hollow I	X			X
MW-13(90)	Sand Hollow I	X			X
MW-16(90)	Sand Hollow I	X			X
MW-18(110)	Sand Hollow I	X			X
MW-20(90)	Sand Hollow I	X			X
MW-13(180)*	Sand Hollow II	X			
MW-16(168)*	Sand Hollow II	X			
MW-20(168)*	Sand Hollow II	X			
MW-13(320)*	Ginkgo II	X	X	X	
MW-14(338)*	Ginkgo II	X	X	X	

Notes:
* Fall only.
COC = Constituents of concern analyzed by SW846-8270; includes CPAHs, naphthalene, and pentachlorophenol. Arsenic is also a COC.
CPAH = carcinogenic polycyclic aromatic hydrocarbon.
Cu = Copper.
Cr = Chromium.
NA = Natural attenuation parameters.
X = Analysis performed.

TABLE 4-3
Quarterly Water Level Monitoring Well Locations

Unconfined Zone	Sand Hollow I	Sand Hollow II	Ginko II
IMW-05	MW12-101	MW13-180	MW13-320
IMW-06	MW13-090	MW15-198	MW14-338
IMW-07	MW14-118	MW15-206	MW15-329
MW14-028	MW15-085	MW16-168	MW15-383
MW19-038	MW16-090	MW18-180	
MW20-040	MW18-110	MW20-168	
MW21-030	MW20-090		
MW22-028	DMW-01		
MW23-033	DMW-13		
MW24-040			
MW25-040			
MW27-015			
MW28-029			
SMW-01			
SMW-05			
SMW-06			
SMW-07			
SMW-08			
SS-04			
SS-08			
SS-09			
SS-10			
SS-11			
SS-12			
SS-15			
SS-16			

Modifications to Selected Remedy

No modifications to the groundwater monitoring program were completed during this review period.

Future Planned Remedy Modifications

UPRR proposed to reduce monitoring and reporting requirements at the TTP facility based on a long period of consistency in site data. Specifically, monitoring data in all downgradient wells indicate that the groundwater plume has been stable or diminishing over the past nine years. Specific details of proposed revisions and supporting data are provided in technical memoranda (CH2M HILL, 1/15/07 and 5/16/07), which are included in Appendix I.

ODEQ has granted provisional approval to implement some, but not all, of the proposed reductions in the scope of TPP facility monitoring and reporting, while some issues remain pending. ODEQ's summary response (DEQ, 10/5/07) to proposed revisions to the facility groundwater monitoring program is also included in Appendix I.

4.2 Soil Remedy

The *Soil Remedial Action Plan* (CH2M HILL, 1998c) presented the details of the individual components of the soil remedial action. The *First Five-Year ROD Review Report* evaluated the information in the *Soil Remedial Action Plan* and presented detailed information regarding the implementation of each aspect of the selected remedy and any modifications to the selected remedy during the first five-year review period. A summary of the four requirements is presented below.

The selected soil remedy requires the following (ODEQ, 1996, page 61):

- No further action for the area in the undeveloped portion of Riverfront Park from which contaminated soils were removed in 1992.
- Phased in-situ bioremediation (bioventing) of subsurface soil at the TTP to the point at which contamination levels are protective and feasible. The decision regarding the extent to which bioventing will be implemented will be made under the remedy selection protocols in place at the time when the full-scale bioventing is implemented
- Institutional controls at the TTP.
- Deferred investigation and , as appropriate, cleanup of surface and subsurface soils that are currently inaccessible (e.g., beneath product storage tanks and treated wood storage areas)

4.2.1 Bioventing

Description of Selected Remedy

A full-scale bioventing system was described in the feasibility study based on ODEQ remedy selection criteria that were in place when the feasibility study was developed. The identified target areas corresponded to locations where soil concentrations exceeded the 1×10^{-5} level in the vadose zone.

Modifications to Selected Remedy

Removal of bioventing as a remedy was recommended in the *First Five-Year ROD Review Report* by ODEQ. This change was not officially documented by ODEQ, so the recommendation to remove bioventing as a remedy has been carried forward in this second five-year review report.

Specifically, ODEQ recommends removal of the bioventing component of the soil remedy (Appendix I; DEQ 10/5/07). ODEQ has determined that a ROD amendment is not required in order to remove the bioventing element because:

- The ROD (ODEQ, 1996) explicitly granted latitude to determine the scope of implementation of the bioventing element. As such, the selection of bioventing in the ROD was conditioned as a contingency and therefore optional. Specific language reads: *"The decision regarding the extent to which bioventing will be implemented will be made under the remedy selection protocols in place at the time when the full-scale bioventing is implemented"*; and,
- The protectiveness aspect of the soil remedy is not compromised by the decision to not implement the bioventing element in consideration of current protocols. Specifically, there are no "hot spots" in subsurface soils and the implemented institutional controls and deferred investigation elements of the soil remedy can currently be relied upon to ensure protectiveness to human health and the environment[6]. Implicit to the original ROD for the soil media within OU1 is the notion that contaminant mass associated with vadose zone soil does not represent a significant threat to site groundwater, which is notably impacted by the presence of NAPL mass.

The revision of ODEQ's hazardous substance cleanup rules in January 1997 modified the remedy selection protocols at the site for deferred components of the remedy. Before 1997, OAR Chapter 340 Division 122 required that soils and groundwater be remediated to background concentrations, or that remedial actions are applied that attain the lowest level that is feasible and protective. ODEQ revised the rules to require treatment for high-risk ("hot spot") contamination. For contamination below "hot spot" levels, the least expensive but protective measures are to be applied. Treatment for "hot spot" contamination is required, unless a disproportionate benefit analysis suggests otherwise.

ODEQ reevaluated the subsurface soil data from the RI and subsequent deferred soil investigations to determine whether subsurface soil "hot spot" levels are exceeded in any of the bioventing target areas. This analysis determined that no "hot spot" levels are exceeded in vadose zone soils in any of the target areas. Based on this assessment, the bioventing system is no longer warranted under post-1997 ODEQ remedy selection protocols and the current industrial site use of the facility because RAOs are achieved as specified in the ROD .

Under current ODEQ rules, the subsurface soil contamination does not present additional risks to groundwater or surface water and poses no direct threat to humans or the

[6] The revised soil remedy (i.e., removal of bioventing) is considered protective of the environment because (1) A NFA was issued for the IRAM completed in the undeveloped portion of Riverfront Park (OU2); (2) OU1 is devoid of viable ecologic habitat; and (3) Potentially complete exposure pathways to ecologic receptors from contaminated subsurface soil are incomplete. Similarly, the institutional control and deferred soil remedy is considered protective of human health within OU1 without implementation of bioventing.

environment. Accordingly, no further evaluation of bioventing is planned, and bioventing is removed as a soil remedy component. ODEQ concludes that procedures presented in the *Soil Remedial Action Plan* (CH2M HILL, 1998), which includes institutional controls; engineering controls; and deferred soil investigations, are protective of TTP site workers.

Future Planned Remedy Modifications

No additional modifications are planned at this time.

4.2.2 Institutional Controls

Description of Selected Remedy

A soil excavation management plan was presented in the *Soil Remedial Action Plan* (CH2M HILL, 1998c) to describe the procedures for handling, characterizing, and disposing of excavated soil at the TTP.

A notification plan and deferred soil investigation plan were also presented in the *Soil Remedial Action Plan*. The purpose of the notification plan is to define situations related to the disturbance of soils at the TTP that will require agency notification.

Operational controls were established in 1997 to ensure protection of onsite workers and the public. In 1997, these controls were incorporated into a deed restriction for the TTP and included in the *Soil Remedial Action Plan*. The deed restriction limits current and future public access to the property (OU1) with fencing and security personnel, and it provides a protocol for intrusive operations in or beneath ground surface to protect worker safety and to ensure proper handling of excavated material. Specifically, excavation of soils with contamination above a calculated risk of 1×10^{-5} may be performed only by workers properly trained under Occupational Safety and Health Administration HAZWOPER regulations (OSHA 1910.120).

Amerities West, LLC, took over ownership of the TTP in 2004, and has in place a spill control plan and a drip management plan for the operating wood-treating facility, as required by the Resource Conservation and Recovery Act (RCRA). In 2004, Kerr-McGee sold the facility equipment and above-grade structures to Amerities West, LLC, and Amerities West, LLC, leased the property from UPRR. The deed restrictions that were previously in place and required by the ROD were transferred in the lease agreement with Amerities West, LLC. The lease agreement is presented in Appendix E.

Modifications to Selected Remedy

No modifications have been made to this component of the soil remedy.

Future Planned Remedy Modifications

No future remedy modifications are planned.

4.2.3 Deferred Soil Investigations

Description of Selected Remedy

The selected remedy of soils also included deferred investigation, and cleanup as appropriate, of surface and subsurface soils at the TTP that are currently inaccessible.

Decisions regarding the deferred investigations and evaluation of potential cleanup actions are to be made using the ODEQ risk assessment protocol and remedy selection criteria in place at the time the investigations occur. Four situations are listed as triggers for deferred soil investigation. These triggers are to be reviewed periodically, and at a minimum of every five years. The original triggers are listed below:

1. Removal and/or replacement of a tank from the tank farm area
2. Demolition and/or replacement of the retort building or drip pad, or any other existing structure in the North Retort Area.
3. A permanent reduction in inventory levels in the wood storage yard, exposing an additional 50 percent of surface soils in that area.
4. Groundwater or NAPL monitoring data which indicate that there is a significant undiscovered source of groundwater contamination at the plant site.

Six deferred soil investigations have been conducted to date. Five of the deferred soil investigations were triggered by building or tank removals and one was triggered by the discovery of LNAPL outside of the capture zone of the hydraulic containment system.

Four of these investigations occurred during the first five-year review period and were presented in the *First Five-Year ROD Review Report*. Two occurred during this review period and are summarized below. The locations of the six deferred soil investigations are shown in Figure 4-6.

The fifth deferred soil investigation was conducted in February 2002 in the South Tank Farm area where Kerr-McGee removed two above-ground process storage tanks (CH2M HILL, 2002). Analytical results from soil samples collected from the soil borings identified that the soils exceeded acceptable risk levels and, at one location, exceeded hot spot levels in subsurface soils[7]. The installation of a new concrete floor in the South Tank Farm was deemed to effectively limit access to subsurface soil in excess of hot spot concentrations. ODEQ considers the concrete cap a protective remedy for these soils.

The sixth deferred soil investigation was triggered in spring 2003 by the removal of one aboveground former creosote storage tank (CH2M HILL, 2003). After the storage tank was removed, visual observations indicated no physical damage or visual sheen-like appearance to the concrete pad beneath the tank. Based on these conditions, no remedial investigation action was performed because no soil impacts were observed.

Modifications to Selected Remedy

Removal of the third deferred soil investigation trigger as a remedy was recommended by ODEQ in the *First Five-Year ROD Review Report*. This change has not yet been documented so the recommendation to remove the third deferred soil investigation trigger as a remedy has been carried forward in this second five-year review report.

[7] ODEQ determined that there was a disproportionate incremental benefit associated with treatment of this soil hot spot in consideration of the higher threshold for evaluating the reasonableness of cost for treating this specific soil hot spot. This determination was made after consideration of the relative insignificance of contribution to groundwater contamination from impacted soils when compared to NAPL mass, and after consideration of the proposed concrete floor in the South Tank Farm area.

The ROD states that a deferred soil investigation is required if there is a permanent reduction of the inventory levels in the wood storage yard such that an additional 50 percent of the surface soils in that area are exposed. This deferred investigation trigger was originally included because the analysis of site data in the FS indicated that soil in the wood storage yard had constituent concentrations exceeding 1×10^{-5} risk levels. The 1997 changes in Oregon's remedy selection protocols accept institutional controls as a protective remedy, and additional remedial actions are warranted only if hot spot levels are exceeded or there is an incremental benefit in selecting a higher-cost remedial action. Institutional controls are in fact in place, and no samples collected from the wood storage yard have exceeded hot spot levels. The ROD states that potential cleanup actions will be conducted using the ODEQ risk assessment protocol and remedy selection criteria in place at the time the investigations occur. Therefore, the 50 percent exposure trigger has been removed as a deferred soil investigation trigger.

ODEQ concludes that a ROD amendment is not required to remove the criteria for triggering a deferred soil investigation based upon permanent reduction in inventory levels in the wood storage yard, exposing an additional 50 percent of surface soils in that area. Specifically, the selected soil remedy is not substantively altered by the removal of this contingency, and overall, the soil remedy is considered protective without this particular criterion because it still is achieving RAOs defined in the ROD.

Future Planned Remedy Modifications

No modifications are planned for this component of the soil remedy.

4.3 Columbia River Shoreline Operable Unit Remedy

4.3.1 Description of Selected Remedy

The selected sediment/surface water remedy was to maintain and monitor the interim remedial action cap installed in 1995 and to verify that near-shore clean sediments have not eroded to expose historically contaminated sediments.

The riprap-armored cap covers a 1-acre portion of near-shore sediment. The cap was to be inspected at 1-, 3-, 5-, 10-, 15-, and 20-year intervals to ensure its integrity and to monitor for scouring of native sediment around the cap. The cap was inspected in 1996, 1997, 1998, 1999, 2000, and 2005 (CH2M HILL, 2006). Near-shore sediment monitoring was to be conducted annually for a period of five years and then every five years for a total of 20 years. The cap and near-shore sediments were also to be monitored after each 100-year flood event.

There has been no significant change in the elevation of the near-shore sediment or the cap integrity since the 2000 monitoring event. Deposition has occurred over 70 percent of the sediment monitoring area, while erosion has occurred in 30 percent of the area. Most of the erosion has occurred along the shoreline bank but does not affect areas where sediment contamination is present. On the basis of these results, no corrective action evaluation was recommended in the *Columbia River Shoreline Operable Unit – 2005 Monitoring Report* (CH2M HILL, 2006).

The next inspection of the OU2 will occur in 2010, or after a 100-year flood event, as required by the ROD.

4.3.2 Modifications to Selected Remedy

The implemented remedy did not vary from the selected remedy.

4.3.3 Future Planned Remedy Modifications

No additional work is planned at this time. However, UPRR will continue surveillance of water buoys that indicate the presence of this cap as an aid in navigation for boats or other vessels using this reach of the Columbia River. Historically, these buoys have become dislodged as a result of fluctuations in river stage or current.

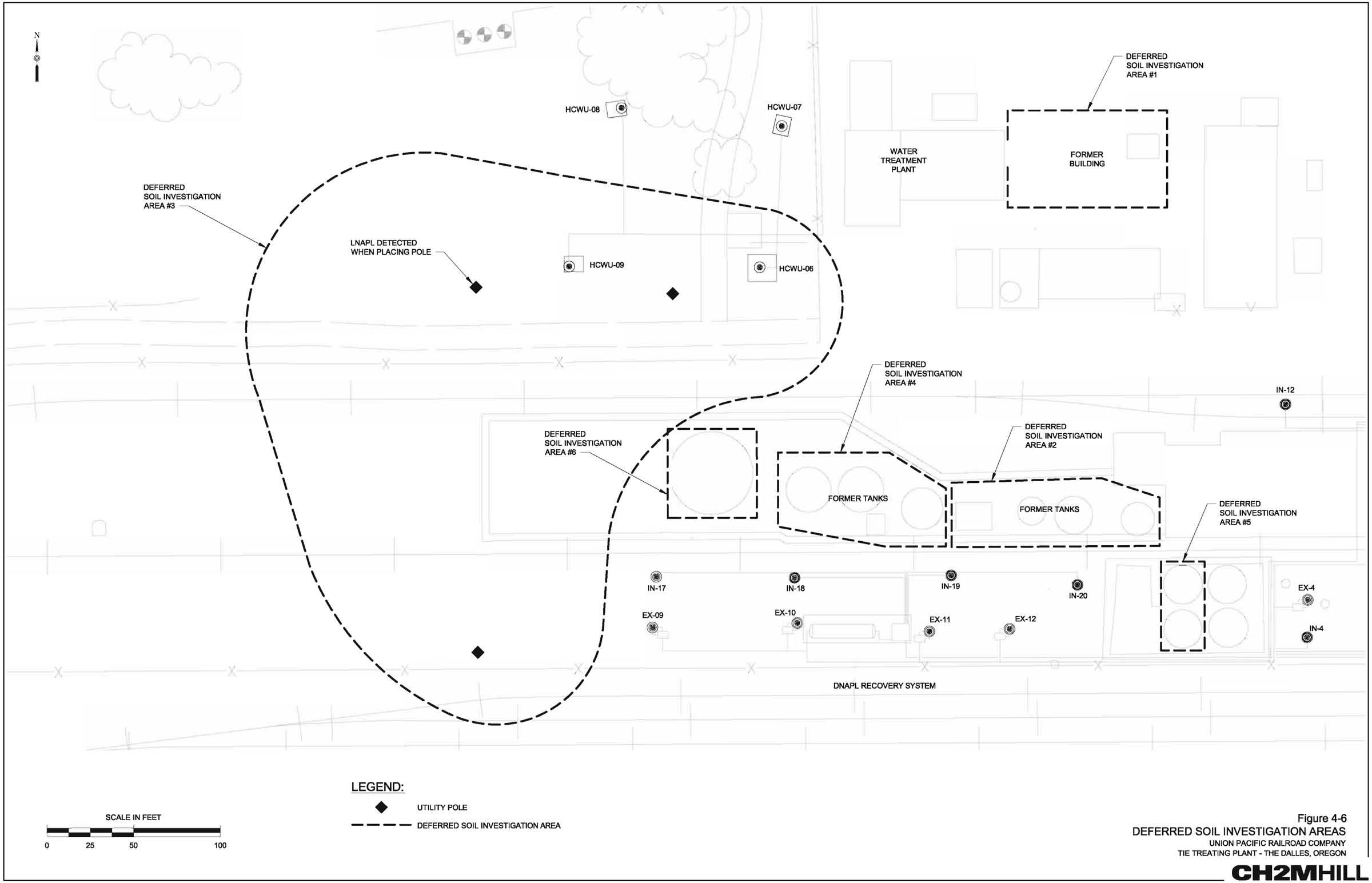

Figure 4-6
DEFERRED SOIL INVESTIGATION AREAS
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

USER: CJOLE TAB: LAYOUT1

PLOT DATE: 12-Dec-06 PLOT TIME: 1:54:36 PM FILENAME: \\ROSA\PROJ\UNION PACIFIC RAILROAD\168910\CAD\DRAWINGS\16891FIG3.DWG

SECTION 5

Operation and Maintenance Requirements

Operation and maintenance requirements for groundwater, soil, and the Columbia River Shoreline OU (sediment and surface water) are presented in this section.

5.1 Groundwater Remedy

The site is staffed with two full-time operators who routinely inspect and maintain the wells and equipment in the hydraulic containment system, DNAPL recovery system, and water treatment plant. Monthly system operation status reports are provided to ODEQ by UPRR and summarize routine operation and maintenance issues. Since 2001, the system has continued to run continuously with only minor or partial system shutdowns for routine maintenance, with the following exceptions:

- The water treatment plant, hydraulic containment system, and the Module 2/3 DNAPL recovery system were shut down in 2005 for one month because of increasing iron concentrations in the effluent. During this down time the plant's lines and vessels were cleaned to reduce iron loading to the effluent.
- The water treatment plant, hydraulic containment system, and the Module 2/3 DNAPL recovery system were shut down for 3 weeks in January 2007 for upgrades to the water treatment plant. Activated carbon vessels were replaced with small sized vessels to optimize VOC removal and reduce iron build up in the tanks.

5.2 Soil Remedy

Institutional controls are in place and are used to reduce the risk of potential exposure by industrial workers at the site. Compliance with these institutional controls by Amerities West, LLC, workers is enforceable under the contract between UPRR and Amerities West, LLC. A copy of the sections of the contract that address conformance with the institutional controls is provided in Appendix E of this report. As mentioned, engineering control (soil cap) provides additional protection for site workers in the North Retort area with respect to exposure potential from contaminated site soils.

5.3 Columbia River Shoreline Operable Unit Remedy

Maintenance on the subaqeous sediment cap is to be performed as necessary, based on the findings of the inspections. To date no maintenance has been needed. The last inspection was performed in 2005. The next inspection is scheduled for 2010.

SECTION 6

Progress Since Last Review

ODEQ conducted the previous five-year ROD review in 2001. The 2001 review determined that the OU1 and OU2 remedies were effective; that the remedies were working in accordance with the intended design; and, that the site remained protective of human health and the environment. Section 6.1 summarizes the recommendations and follow-up actions documented in the *First Five-Year ROD Review Report*. Section 6.2 summarizes DNAPL recovery at the site.

6.1 Recommendations and Follow-Up Actions from Last Review

A summary of the recommendations and follow-up actions identified in the *First Five-Year ROD Review Report*, along with their current status and results of actions performed, is presented in Table 6-1.

TABLE 6-1
Recommendations, Status, and Results of Actions from the First Five-Year Record of Decision Review Report

Issues, Recommendations, and Follow-Up Actions	Status	Results of Action
Incorporate newly identified cleanup standards and risk protocols, including hot spot criteria and other applicable action levels during work plan and report review.	Completed	New cleanup standards and risk protocols have been incorporated into the two deferred soil investigations conducted during this review period and will continue to be incorporated into future reports.
Incorporate newly identified NPDES limitations as a modified Attachment C to be filed with a new Consent Decree in Circuit Court in Wasco County.	Completed	The modified Attachment C of the Consent Decree is presented in Appendix F of this report.
Eliminate the trigger for a deferred soil investigation in OU1 based upon the criterion of a reduction of inventory levels to 50 percent of total area.	Completed	This approved remedy modification is documented in this Second Five-Year ROD Review report.
Eliminate the “bioventing” remedy contingency for soils in OU1.	Completed	This approved remedy modification is documented in this Second Five-Year ROD Review report.
Document a contingency plan for reassessment of risk should land use change in OU1.	Land use has not changed. Should land use change a contingency plan will be documented.	To be determined

TABLE 6-1
Recommendations, Status, and Results of Actions from the First Five-Year Record of Decision Review Report

Issues, Recommendations, and Follow-Up Actions	Status	Results of Action
Document all currently approved remedy modifications.	The elimination of the "50 percent inventory reduction" as a deferred soil investigation trigger and the "bioventing" remedy are documented in the Second Five-Year ROD Review report. Revised facility monitoring and reporting are also documented in the Second Five-Year ROD Review report.	Contingency elements of soil remedy are eliminated related to bioventing and 50% inventory criteria. Facility groundwater monitoring frequency is reduced, contingent upon continuous remedial system operation under normal circumstances.
Document current applicability of remedy-specific instruments such as institutional and engineering controls; financial assurance; and, general liability insurance.	Completed	UPRR has documented all deferred soil removal actions and has filed financial assurance and general liability insurance for the site.

6.2 DNAPL Recovery

A total of 81,450 gallons have been recovered from the inception of DNAPL removal through June 2007. The DNAPL recovery system Module 1 has removed 11,554 gallons of creosoting oils, Module 2/3 has removed 20,681 gallons of DNAPL since startup in February 2004, and 44,288 gallons of DNAPL have been recovered from the hydraulic containment system wells. An additional 4,903 gallons of DNAPL have been recovered from MW-13(230) since 1990.

DNAPL recovery from the Module 1 system has averaged approximately 90 gallons per month over the past five years, and ranged from 200 to 37 gallons per month. Recovery rates have gradually decreased to approximately 43 gallons per month. Cumulative production for Module 1 is shown in Figure 6-1.

DNAPL recovery from the Module 2/3 system has averaged approximately 510 gallons per month, after an initial startup recovery rate of 1,200 gallons per month, and ranged from 940 to 85 gallons per month. Recovery rates have gradually decreased since startup to approximately 388 gallons per month. Cumulative production for Module 2/3 is shown in Figure 6-1.

In the unconfined water-bearing zone, DNAPL is also recovered from the hydraulic containment wells and has averaged approximately 510 gallons per month over the last five years. Recovery rates increased dramatically with the startup of Module No. 2/3 and have decreased steadily since to approximately 216 gallons per month. Cumulative production for the hydraulic containment wells is shown in Figure 6-1.

DNAPL is recovered from the Sand Hollow II aquifer from MW12-(230) and has averaged approximately 20 gallons per month over the last five years. Cumulative production from the Sand Hollow II aquifer is shown in Figure 6-2.

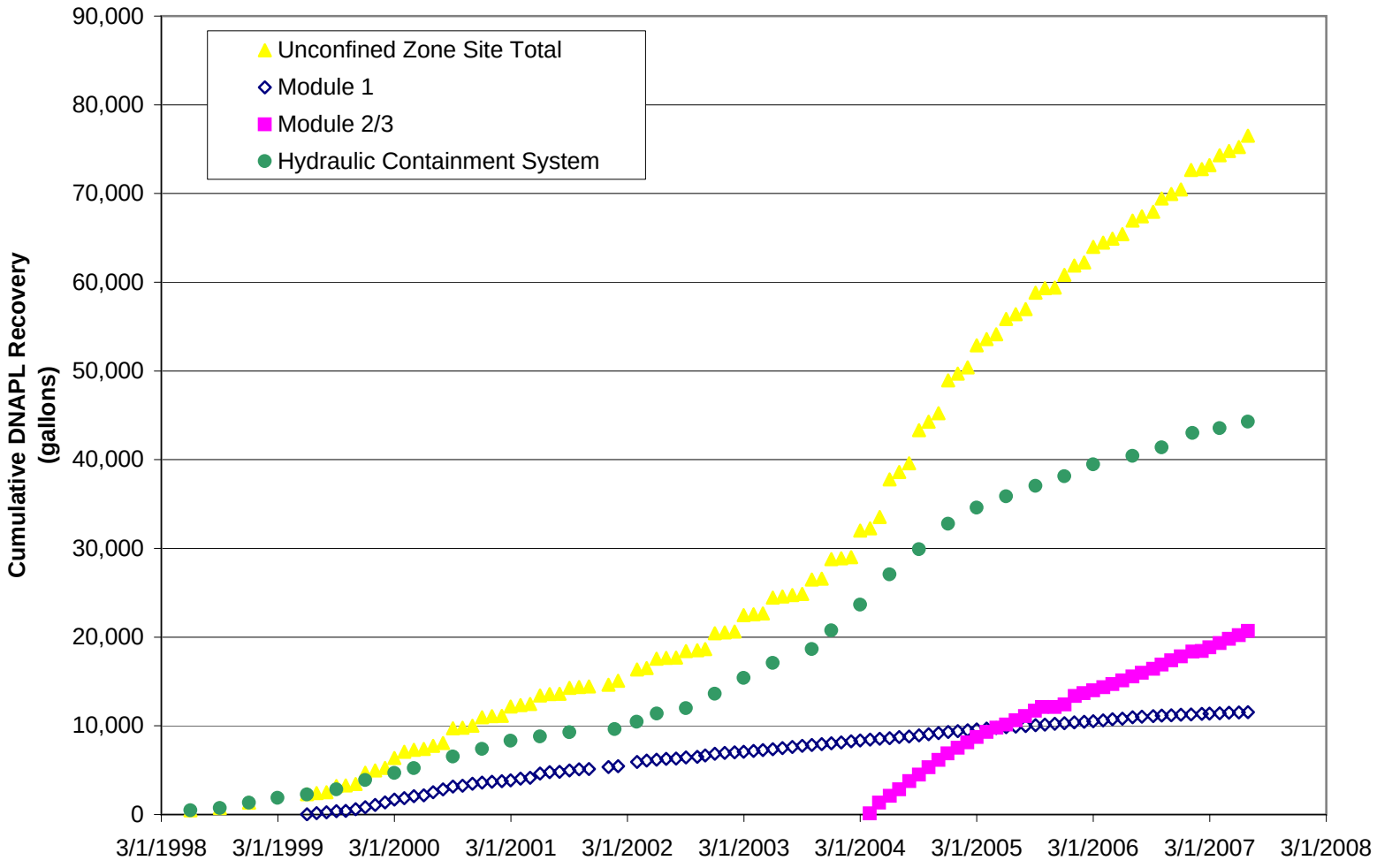

FIGURE 6-1

Cumulative DNAPL Recovery Curve in the Unconfined Zone

UNION PACIFIC RAILROAD COMPANY

TIE TREATING PLANT, The Dalles, Oregon

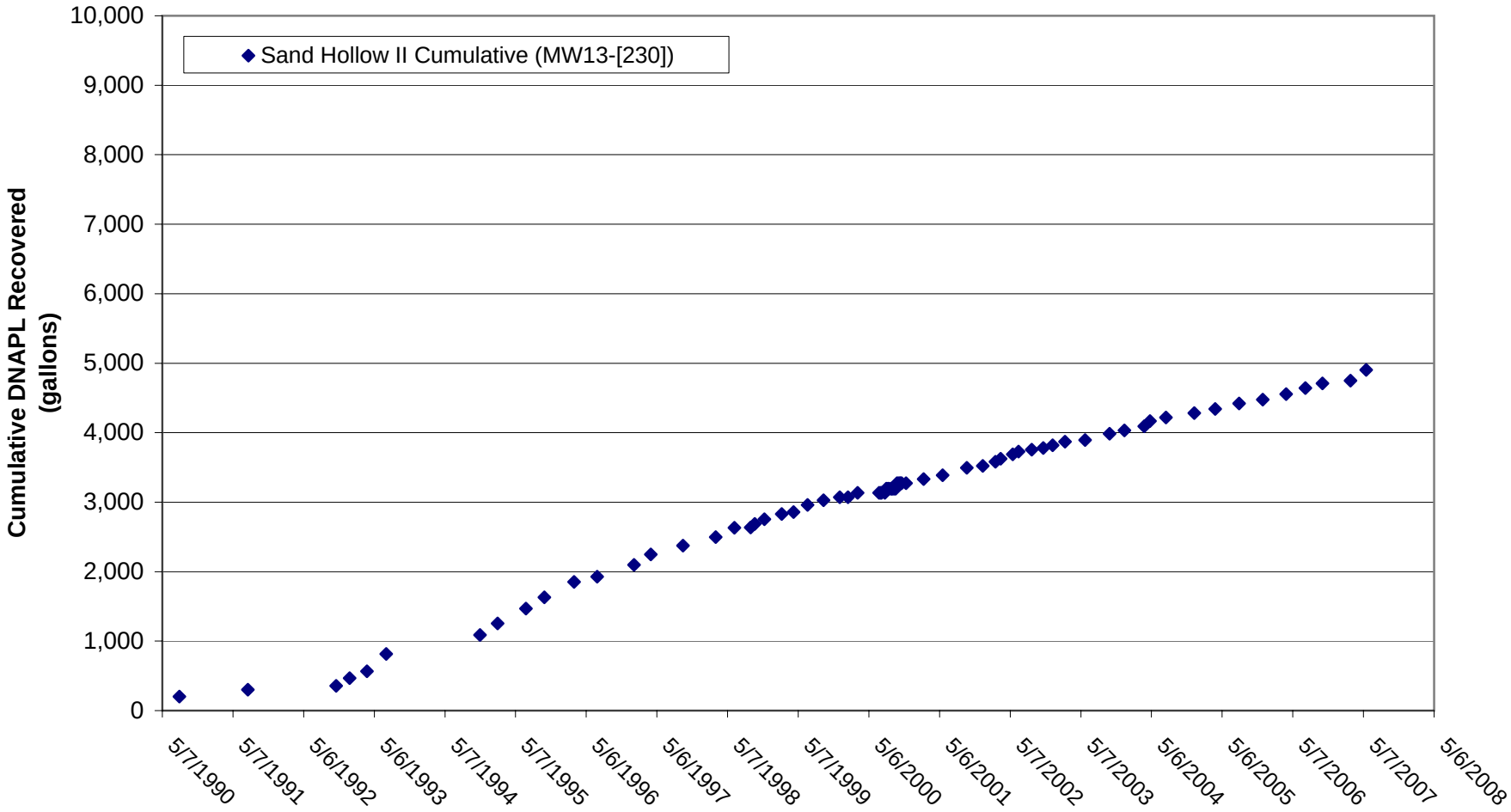

FIGURE 6-2

Cumulative DNAPL Recovery Curve in Sand Hollow II

UNION PACIFIC RAILROAD COMPANY

TIE TREATING PLANT, The Dalles, Oregon

SECTION 7

Five-Year Review Process

This section documents the process ODEQ followed in conducting the five-year ROD review of the TTP site.

7.1 Public Involvement

The site historically has had a low profile with the surrounding community[8]. The ROD opportunity for comment was announced in February 1996, with notices mailed to individuals who had previously requested to be on ODEQ's mailing list for The Dalles area. Only the responsible party, Union Pacific Railroad, submitted comments, which were addressed in the ROD.

7.2 Interviews

In conjunction with the second five-year ROD periodic review for the TTP facility, the ODEQ conducted interviews with stakeholders and others[9] as follows:

1. **Scott Green. Executive Director for Northern Wasco County Parks & Recreation District (NWPRD)**. NWPRD is located at 1505 W. 1st Street, The Dalles, Oregon 97058. Contact information: scott@nwprd.org. Interview date: April 27, 2007.

   NWPRD owns and operates Riverfront Park and The Dalles Riverfront Trail. Riverfront Trail currently has 8 of 10 miles completed, including the segment through the wildlife refuge east of Riverfront Park. Specifically, the Riverfront Trail is completed through to the Lone Pine Area and crosses much of the area referred to as the undeveloped area in OU2. Riverfront Park is closed November 1 through Memorial Day weekend. The Riverfront Trail and Riverfront Park are used extensively during summer and early fall for wildlife viewing and general recreation by the public.

   Mr. Green generally stated that NWPRD did not have specific concerns or requests related to Riverfront Park or The Dalles Riverfront Trail. He described limitations to development in this area due to U.S. Fish and Wildlife regulation of nesting geese. NWPRD has no goal for use of site groundwater and Mr. Green did not cite any reason for concern related to ongoing conformance by NWPRD with existing institutional controls that restrict specific activities in Riverfront Park and The Dalles Riverfront Trail areas.

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[8] The community of The Dalles has typically been generally accepting of this business given its very long historical presence. In the modern era, participation in DEQ public meetings related to operational permits and remediation has been sporadic and relatively subdued. Significant improvement in operational air quality controls for odor suppression; other facility improvements; and, general compliance with regulatory requirements have been achieved during recent timelines.

[9] ODEQ TTP Project Manager Cliff Walkey (541-388-6146 ext. 224)

2. **Jeff Thompson, Plant Manager, Amerities West, LLC**. Amerities (The Dalles) is located onsite at 100 Tie Plant Road, The Dalles, Oregon 97058. Mailing address: Amerities West, LLC, P.O. Box 1608, The Dalles, Oregon. Contact information: jthompson@amerities.com, 541-296-1808. Interview date: April 26, 2007.

   Mr. Thompson generally stated that Amerities West, LLC, does not have any specific concerns or requests related to the UPRR Tie Treating project or operations. He stated that Amerities West, LLC, and UPRR have a good working relationship. Amerities West, LLC, currently employs approximately 44 employees who work multiple shifts. Mr. Thompson described the wood treating industry in the specific context of the Amerities West, LLC, operations and market, and offered no new information regarding anticipated changes to operations in the foreseeable future.

3. **Ed Hulshizer, Operator, UPRR Waste Water Treatment Plant**. Mr. Hulshizer is an employee of CH2M HILL, OMI and has served as Plant Operator for the UPRR TTP project for several years. Contact information: Ed.Hulshizer@ch2m.com, 541-296-3638. Interview date: April 27, 2007.

   Mr. Hulshizer responded to several ODEQ questions related to plant operation, trouble-shooting, plant modifications, and remedy optimization. He commented about the media filters re-engineering, change-out, and weekly sampling program. When requested to identify any specific operational constraint that ODEQ could facilitate, Mr. Hulshizer solicited ODEQ assistance in evaluation of "drying bed" implications for RCRA 90-day satellite accumulation regulations. Mr. Hulshizer otherwise described several operational procedures and protocols.

4. **Brad Ostapkowitz, Engineer, CH2M HILL**. Mr. Ostapkowitz responded to several ODEQ questions related to plant operation, trouble-shooting, plant modifications, and remedy optimization. Specific discussions were related to colloidal iron, early breakthrough in media filters (granular activated carbon), and possible plant modifications to address this problem. Interview date: April 26, 2007.

5. **Rob Healy, Project Manager, CH2M HILL**. Mr. Healy is the current project manager for CH2M HILL and the environmental consultant for UPRR at the TTP. ODEQ works closely with Mr. Healy on all remedial system performance, reporting, and compliance issues for this facility. Interview date: April 26, 2007 (facility inspection).

6. **David Lacey, Hydrogeologist, CH2M HILL**. Mr. Lacey provides technical support for the CH2M HILL team at the UPRR TTP. Along with Mr. Healy, ODEQ works closely with Mr. Lacey on technical issues, including the evaluation of site monitoring and reporting. Interview date: April 26, 2007 (facility inspection).

7.3 Document Review

Documents and information sources used for this review are listed in Appendix A.

7.4 Data Review and Trends

Semiannual and annual groundwater sampling occurs in selected wells. The groundwater monitoring program is presented in Section 4.

7.4.1 Unconfined Water-Bearing Zone

Semiannual groundwater samples have been collected in the unconfined water-bearing zone for nine consecutive years and have shown the contaminant plume to be stable or diminishing in size. No COCs have been detected (with the exception of arsenic, which has been detected well below its action level) in monitoring wells located outside of the DNAPL source area. Monitoring results in the unconfined groundwater zone continue to indicate that (1) the source plume is stable; and, (2) the hydraulic containment system is capturing groundwater within the DNAPL target zone.

7.4.2 Sand Hollow I

Semiannual ground water samples have been collected in the Sand Hollow I aquifer for nine consecutive years and have shown the contaminant plume to be stable or diminishing in size. No COCs have been detected (with the exception of arsenic, which has been detected well below its action level) in monitoring wells located outside of the DNAPL source area. COC concentrations and natural attenuation parameters in the Sand Hollow I aquifer continue to indicate that (1) the source plume is stable, and (2) natural attenuation is continuing to occur.

7.4.3 Sand Hollow II

Annual groundwater samples have been collected in the Sand Hollow II aquifer for nine consecutive years. No COCs have been detected in monitoring wells located outside of the DNAPL source area. Naphthalene concentrations have remained consistent in MW13-180 (located in the DNAPL source area). No other COCs have been detected above the reporting limit in the Sand Hollow II aquifer.

7.4.4 Ginkgo II

Annual groundwater samples have been collected in the Ginkgo II aquifer for nine consecutive years. No COCs have been detected above the reporting limit in the Ginkgo II aquifer.

7.5 Site Inspections

ODEQ has performed site visits during the past five years to observe a variety of actions, including observation of normal remedial system operation. Site-specific activities have included Module 2/3 DNAPL extraction system construction, well installation, deferred soil investigations, routinely scheduled inspections, and meetings with UPRR or their contractors. The frequency and variety of visits provide the opportunity to inspect and discuss issues of interest or concern with UPRR and the remedial system operators.

UPRR's contractor (CH2M HILL) has historically submitted quarterly reports summarizing site activities to ODEQ. These reports generally include data on the following activities:

- Water treatment plant operation
- DNAPL recovery
- Hydraulic containment
- Soil investigations
- Waste management
- Maintenance and administrative actions
- Groundwater and NAPL monitoring

Site status reports are also submitted electronically to ODEQ monthly, providing more frequent updates on the performance of the NAPL recovery systems, the hydraulic containment system, the water treatment plant, and other issues and upcoming events.

ODEQ has received and is currently evaluating a request from UPRR to modify the format, content, and frequency of facility reporting requirements. ODEQ, UPRR, and CH2M HILL are continuing to discuss and reassess the particular aspects of appropriate reporting, and revisions to this program are pending.

SECTION 8

Technical Assessment

8.1 Question A—Is the remedy functioning as intended by the decision documents?

The remedial actions as described in the ROD for the site have been implemented and are functioning as designed. A construction complete designation was issued for the site in September 2004.

8.1.1 Operable Unit 1 (Tie Plant Area)

The groundwater remedy has been implemented and is currently in operation and maintenance. The remedy is meeting the RAOs for groundwater at the site. Monitoring of system operations, extraction and monitoring wells, and the water treatment plant indicated that the systems are functioning as intended and in a manner that is protective, as summarized below:

- Institutional controls implemented under an agreement between UPRR and Amerities West, LLC, are in place to prevent onsite and offsite use of the contaminated groundwater, and to ensure that the site remains industrial.
- Groundwater monitoring indicates that the remedial actions taken have prevented degradation of the existing water quality in the Ginkgo flow top.
- Groundwater monitoring indicates that the remedial actions taken have prevented discharge of contaminated groundwater to the Columbia River and/or the waterfowl pond at concentrations that exceed ODEQ Surface Water Quality Criteria.
- DNAPL recovery in the unconfined water-bearing zone and Sand Hollow II continues to be successful and to reduce the risk of further migration of DNAPL in the unconfined water-bearing zone and Sand Hollow II flow interior.

The soil remedy has been implemented and is meeting the RAOs for soil at the site. Since 1996, six different soil investigations have been conducted to assess previously inaccessible soils or areas where new data indicated further assessment is appropriate. Two different soil investigations have occurred during this review period.

8.1.2 Operable Unit 2 (Shoreline Area)

The surface water and sediment remedy has been implemented and is meeting the RAOs for surface water and sediment at the site, as summarized below:

- The sediment cap remains intact and is functioning as intended.
- Restrictive covenants and easements and all affirmative obligations therein were conveyed when the Port of The Dalles donated the park to Wasco County in 2001.

8.2 Question B—Are the [protective factors] used at the time of the remedy still valid?

There are no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

ARARs were identified for the site and presented in Appendix C of the feasibility study (CH2M HILL, 1995). As part of this five-year ROD review, the ARARs were reevaluated. The results of that evaluation are discussed in this section.

8.2.1 Soil ARARs

Changes to ODEQ's cleanup standard in 1997 allowed the use of equally protective but less costly alternatives on the site. These criteria apply to the deferred soil investigations. This change allowed the use of institutional controls to address site soils, removing the need for bioventing. This change was first addressed in the *First Five-Year ROD Review Report*; however, the elimination of bioventing and the 50% inventory trigger for deferred investigations is memorialized in this *Second Five-Year ROD Review Report*. Recalculation of soil risk levels to include dermal exposure pathways and incorporate updated PAH, dioxin, and furan toxicity equivalency factors (TEFs) was also addressed in the *First Five-Year ROD Review Report* and did not change the protectiveness of the existing remedy.

The most recent (March 2007) ODEQ generic Risk-Based Concentrations (RBCs) for occupational (surface soil) and excavation worker (subsurface soil) scenarios were used to assess acceptable risk levels and verify current hot spot levels. Acceptable risk levels and hot spot concentrations for surface soils decreased slightly and increased for subsurface soils[10]. The most recent ODEQ default exposure assumptions did not change the protectiveness of the existing remedy[11].

Tables 8-1 and 8-2 list the acceptable risk levels and hot spot levels calculated using the approved exposure assumptions from the RI report and toxicity equivalence factors.

[10] See table 8-1 and 8-2. Site specific risk levels are the same as the current RBCs so RBCs are presented as the current acceptable risk levels. Occupation exposure RBCs are used for surface soil and excavation worker RBCs are used for subsurface soil.

[11] ODEQ also compared COC site data with Risk-Based Decision Making (ODEQ, 2003) and EPA Region 6 preliminary remediation goals (See table 8-1 and 8-2. Site specific risk levels are the same as the current RBCs so RBCs are presented as the current acceptable risk levels. Occupation exposure RBCs are used for surface soil and excavation worker RBCs are used for subsurface soil.

TABLE 8-1
Acceptable Risk Levels and Hot Spot Levels for Surface Soil

Chemical	Pre-1997 Acceptable Risk Level Concentration without Toxicity Equivalency Factors [a] (mg/kg)	Current Acceptable Risk Level Concentration 2007 ODEQ RBC for Occupational Soil Ingestion, Dermal Contact, and Inhalation[b] (mg/kg)	Hot Spot Concentration Level (mg/kg)
Arsenic	3.0	1.7	170
Pentachlorophenol	48	13	1,300
Benzo(a)anthracene	0.8	2.1	210
Benzo(a)pyrene	0.8	0.27	27.0
Benzo(b)fluoranthene	0.8	2.7	270
Benzo(k)fluoranthene	0.8	27	2,700
Chrysene	0.8	270	27,000
Dibenzo(a,h)anthracene	0.8	0.27	27
Indeno(1,2,3-cd)pyrene	0.8	2.7	270

[a] Acceptable risk levels (for example, $1x10^{-6}$ excess cancer risk levels) were documented in Table 4-1 of the *Final Feasibility Study* (CH2M HILL, 1995). Supporting documentation of exposure assumptions and toxicity values used in current hot spot calculations were submitted to ODEQ in a letter dated January 18, 2002.

[b] Current acceptable risk level concentrations from the March 2007 updated *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* guidance.

TABLE 8-2
Acceptable Risk Levels and Hot Spot Levels for Subsurface Soil

Chemical	Pre-1997 Acceptable Risk Level Concentration without Toxicity Equivalency Factors [a] (mg/kg)	Current Acceptable Risk Level Concentration 2007 ODEQ RBC for Excavation Worker Soil Ingestion, Dermal Contact, and Inhalation [b] (mg/kg)	Hot Spot Concentration Level (mg/kg)
Arsenic	13.0	370	37,000
Pentachlorophenol	185	2,900	100,000[c]
Benzo(a)anthracene	3.0	590	59,000
Benzo(a)pyrene	3.0	59	5,900
Benzo(b)fluoranthene	3.0	590	59,000
Benzo(k)fluoranthene	3.0	5,900	100,000
Chrysene	3.0	59,000	100,000
Dibenzo(a,h)anthracene	3.0	59	5,900
Indeno(1,2,3-cd)pyrene	3.0	590	59,000

[a] Acceptable risk levels (for example, $1x10^{-6}$ excess cancer risk levels) were documented in Table 4-1 in the *Final Feasibility Study* (CH2M HILL, 1995). Supporting documentation of exposure assumptions and toxicity values used in current hot spot calculations were submitted to ODEQ in a letter dated January 18, 2002.

[b] Current acceptable risk level concentrations from the March 2007 updated *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* guidance.

[c] In accordance with ODEQ guidance, if the risk-based concentration exceeds a ceiling limit of 100,000

TABLE 8-2
Acceptable Risk Levels and Hot Spot Levels for Subsurface Soil

Chemical	Pre-1997 Acceptable Risk Level Concentration without Toxicity Equivalency Factors [a] (mg/kg)	Current Acceptable Risk Level Concentration 2007 ODEQ RBC for Excavation Worker Soil Ingestion, Dermal Contact, and Inhalation [b] (mg/kg)	Hot Spot Concentration Level (mg/kg)

milligrams per kilogram (mg/kg), then the hot spot level is set at 100,000 mg/kg.

8.2.2 Groundwater and Surface Water ARARs

The ARARs identified in the feasibility study for groundwater and surface water (CH2M HILL, 1995) are maximum MCLs, MCL goals (MCLGs), secondary MCLs, and federal ambient water quality criteria (which the state of Oregon adopted and provided in ODEQ's Table 20 – Water Quality Criteria Summary).

Current groundwater and surface water ARARs are presented in Table 8-3 and include MCLs, Risk-Based Concentrations (RBCs), and current ambient water quality criteria. Only one MCL changed since the previous review. On January 23, 2006, the MCL for arsenic was changed from 50 to 10 µg/L. MCLGs and secondary MCLs have not changed. RBCs for petroleum-contaminated sites were developed by ODEQ in 2003 and updated in 2007. These ARARs changes will not affect the implementation of the remedy because the water criteria have changed only slightly, and because of the hydraulic containment system operation and ongoing monitoring.

8.2.3 Treatment Plant ARARs

The water treatment plant that is operated in conjunction with the hydraulic containment system is subject to regulation under RCRA. RCRA has requirements for hazardous waste treatment systems, as described in 40 CFR 264.94.

In 2002, EPA promulgated a new provision allowing offsite placement of hazardous CAMU-eligible waste in hazardous waste landfills, if they are treated to meet CAMU treatment standards (Amendments to the Corrective Action Management Unit Rule; Final Rule, 67 Fed. Reg. 2962).

"CAMU-eligible wastes" are defined as "all solid and hazardous wastes, and all media (including groundwater, surface water, soils and sediments) and debris, that are managed for implementing cleanup" (40 CFR § 264 552(a)(1)). Because the granular activated carbon (GAC) used to treat effluent water is an integral part of the groundwater treatment process at the UPRR-Tie Treating facility, it would be considered "managed for implementing cleanup." See 63 Fed. Reg. 65, 874, 65, 881 (Nov. 30, 1998) (spent carbon filters used in groundwater pump and treat systems considered "remediation waste" because they are managed for implementing cleanup).

The GAC is subject to CAMU treatment standards. Analytical results from the GAC were compared to the CAMU-eligible wastes alternative treatment standards (10 x universal

treatment standards). Concentrations for arsenic and all PCDD/ PCDF homologs were below the CAMU-eligible waste alternative treatment standards. The detected concentrations of three PAHs [acenaphthene (298 milligrams per kilograms mg/kg), fluorene (85.6 mg/kg), and naphthalene (236 mg/kg)] were greater than the CAMU-eligible waste alternative treatment standards. The 10 x UTS (Universal Treatment Standard) standard is “substantially met” and the remaining PHCs are of “very low mobility”.

The GAC is dewatered onsite prior to transporting to Chemical Waste Management's Arlington, Oregon facility via drop boxes after the GAC is dewatered. All other hazardous waste generated through operation of the treatment plant is transported to the Clean Harbors incineration facility in Aragonite, Utah, for incineration following land disposal restriction (LDR) regulations.

TABLE 8-3
Groundwater and Surface Water ARARs

	Groundwater Cleanup Goals Presented in 1997 ROD		State Water Quality Standards as Adopted from the Federal Ambient Water Quality as Presented in 1997 ROD[1]		2007 Protective Standards			
Constituent	**Concentration (mg/L)**	**Basis**	**Concentration (mg/L)**	**Basis**	**Current MCL (mg/L)**	**Secondary MCLs (mg/L)**	**2007 DEQ RBC for Occupational Ingestion[2] (mg/L)**	**EPA 33A Aquatic Life Freshwater Acute/Chronic[3] (mg/L)**
Volatile Organic Compound								
Benzene	0.005	MCL	5,300	Freshwater Acute	0.005		0.0022	
Metals								
Arsenic	0.05	MCL	0.19	Freshwater Chronic	0.01		0.00027	
Chromium	0.1	MCL	0.011	Freshwater Acute	0.1		220	
Copper	1.3	Proposed MCL	0.012	Freshwater Chronic	1.3	1.0	5.4	
Iron						0.3		1.0 (Chronic)
Manganese						0.05	6.9	
Mercury	0.002	MCL	0.012	Freshwater Chronic	0.002		0.044	0.012 (Chronic)
Zinc			0.11	Freshwater Chronic		5.0		
PAHs								
Acenphthylene								
Acenaphthalene			0.52	Freshwater Chronic			1.5	
Benzo(a)anthracene	0.0001	Proposed MCL					0.00056	
Benzo(a)pyrene	0.0002	Proposed MCL			0.0002		0.000056	
Benzo(b)fluoranthene	0.0002	Proposed MCL					0.00056	
Benzo(g,h,i)perylene								
Benzo(k)fluoranthene	0.0002	Proposed MCL					0.0056	
Chrysene	0.0002	Proposed MCL					0.056	
Dibenzo(a,h)anthracene	0.0003	Proposed MCL					0.000056	
Fluoranthene			3.98	Freshwater Acute			5.8	
Fluorene							0.97	
Hexachlorocyclopentadine	0.05	MCL	0.0052	Freshwater Chronic	0.05			
Indeno(1,2,3-cd)pyrene	0.0004	Proposed MCL					0.00056	
Naphthalene	0.15	Non-Cancer Risk	0.62	Freshwater Chronic			0.025	
Phenanthrene								
Pyrene							4.4	
Phenols								
Pentachlorophenol	0.001	Proposed MCL	0.013	Fresh Chronic	0.001		0.0034	0.0032[4]

MCL = maximum contaminant level.
[1] Clean Water Act Section 303(c), state water quality criteria (Table 20 of OAR 340-41). Values are freshwater acute or chronic criteria, the lowest criteria is shown.
[2] DEQ RBCs for occupational ingestion and inhalation of tap water.
[3] Table 33A water quality criteria for aquatic live in fresh water.
[4] CMC=exp(1.005(pH)-5.134). Measured pH of Columbia River at site is 6.24

8.3 Question C—Has any other information come to light that could call into question the protectiveness of the remedy?

No new relevant information was identified that would suggest the remedy is not currently protective.

8.4 Confirmation of Measures in Place and Effective

The following measures were taken in accordance with the ROD and are effectively protecting human health and the environment from immediate threats from site-related contamination:

- Institutional controls identified in the ROD have been implemented in order to protect the health and safety of workers at the UPRR facility and the general public.
- Amerities West, LLC, has been notifying UPRR of any activities that may trigger notification to ODEQ for performance of a deferred soil investigation.
- Deferred soil investigations have been conducted as the need arises to investigate, evaluate, and address soil contamination, as appropriate.
- The cap over contaminated sediments in the Columbia River is in place and intact.
- The hydraulic containment system in the unconfined water-bearing zone has been operating for approximately nine years to prevent the migration of the groundwater contaminant plume in the unconfined water-bearing zone.
- Monitored Natural Attenuation continues to be demonstrated for the SH1 water bearing zone and is considered protective in lieu of hydraulic containment.
- The Health and Safety Plan is in place, is sufficient to control risks, and is properly implemented.
- DNAPL recovery continues to occur from the unconfined and Sand Hollow II water-bearing zones, which reduces the contaminant source mass in remedial target zones.

SECTION 9

Issues

EPA's *Comprehensive Five-Year Review Guidance* (U.S. Environmental Protection Agency, 2001) indicated that remedy deficiencies should be identified that "currently prevent the response action from being protective, or have the potential to do so in the future." Using this guidance, remedy issues were identified. Table 9-1 summarizes the issues.

None of the issues identified has resulted in a situation in which the selected remedy was not protective of human health and the environment.

TABLE 9-1
Remedy Issues

Remedy Issue	Affects Protectiveness (Yes/No)
Colloidal iron removal has been a long-standing operational concern for The Dalles water treatment plant. To reduce iron concentrations in effluent water several modifications to the treatment plant design have been researched and tested. Modifications include testing different media in the media filters, changing the size of the activated carbon vessels, as well as temporarily installing an air stripper, bag filters and a secondary peroxide injection point,	No
Prolonged water treatment plant shutdowns (approximately 3 weeks or greater) occurred twice in the last five years. The water treatment plant, hydraulic containment system, and Module 2/3 DNAPL recovery system were shut down in 2005 for one month due to rising iron concentrations in the treatment plant effluent water, and for 3 weeks in January 2007 for upgrades to the water treatment plant.	No

DNAPL = dense, nonaqueous-phase liquid.

SECTION 10

Consistency with NCP

Because this is a state-lead federal Superfund site, the selection criteria in the ROD are based primarily on State of Oregon remediation criteria. One difference between the state criteria and those in the federal *National Contingency Plan* is that the NCP has strict guidelines on protocols to be followed if the selected remedy does not meet ARARs. The presence of NAPL in the unconfined and Sand Hollow I water-bearing zones virtually ensures that drinking water ARARs will not be met at the site in the foreseeable future, as the ROD (ODEQ, 1996) for the site discusses:

> *However, based on the information obtained during the remedial investigation, ODEQ believes that the selected remedy may not achieve the concentration levels presented above [shown in Table 3-1 of this ROD review] in the unconfined water-bearing zone nor in a portion of the Sand Hollow I aquifer. Groundwater contamination may be especially persistent in the immediate vicinity of the contaminant source areas (former ponds, retort area, etc.) where concentrations are relatively high and DNAPL is present. DNAPL [removal] is the highest priority remedial action at the site, as it provides significant permanent reduction of the highly concentrated contaminants (primarily creosote) and prevents the vertical or horizontal migration of NAPL. Water flooding or other innovative techniques will be used to optimize DNAPL recovery, to the extent they are feasible. However, following the removal of mobile DNAPL, significant amounts of residual, immobile DNAPL will remain in the soil pore spaces. This residual contamination presents a long-term source (i.e. decades) for dissolved phase contamination of the groundwater. EPA has generally concluded that it is generally not feasible to restore contaminated groundwater in direct contact with mobile or residual DNAPL to drinking water quality. The water-bearing zones currently contaminated with DNAPL will be given a preference for treatment. The selected remedy will remove as much NAPL from the aquifer as practicable, and prohibit use of the unconfined aquifer.*

This justification for selecting a remedy that does not achieve ARARs is somewhat different than the criteria in the NCP. The NCP presents the following requirements for remedies that do not achieve ARARs:

> *40 CFR 300.430(f)(1)(ii)(B) On-site remedial actions selected in a ROD must attain those ARARS identified at the time of the ROD signature or provide a grounds for invoking a waiver under 40 CFR 300.430(f)(1)(ii)(C).*

Two of the waiver criteria potentially applicable to the site at The Dalles for not achieving ARARs are as follows:

- "Compliance with the ARAR will result in greater risk to human health or the environment than other alternatives" (40 CFR 300-430(f)(1)(ii)(C)(2)).
- "Compliance with ARARs is technically impracticable from an engineering perspective" (40 CFR 300-430(f)(1)(ii)(C)(3)).

The "greater risk" criterion is directly applicable to the site at The Dalles for the following reasons:

- The majority of the DNAPL at the site is in the unconfined water-bearing zone. Although there is an aquitard between this zone and the Sand Hollow I aquifer, site data indicate that there has been downward migration of DNAPL through cracks and fissures in the aquitard. Water flooding is effective at mobilizing free DNAPL in the unconfined water-bearing zone and has the important characteristic of not altering the viscosity of the DNAPL, unlike some other innovative methods such as thermally enhanced extraction. Maintaining the current viscosity of creosote DNAPL reduces the chance that DNAPL will be mobilized and migrate downward through the aquitard, releasing more source contaminants to Sand Hollow I.
- Sand Hollow I is directly connected to other deeper aquifers that are used as a drinking water source. The contamination in Sand Hollow I has been demonstrated through extended monitoring to be naturally attenuating. Enhanced DNAPL recovery technologies that change the DNAPL viscosity have the high probability of releasing more source materials to Sand Hollow I, and adversely impacting sole-source beneficial aquifer(s).

ODEQ believes that the water-flooding DNAPL recovery technique is consistent with the NCP because it removes the source materials from the unconfined water-bearing zone to the maximum extent practicable while minimizing the additional potential risk of further downward migration of DNAPL. The risk to human health and the environment may be significantly increased if technologies that change the DNAPL viscosity are used. Thus, the selected water-flooding DNAPL recovery technique is consistent with the NCP, based on 40 CFR 300-430(f)(1)(ii)(C)(2).

For NCP sites administered by EPA, a TI waiver is issued for the areas of the site where ARARs will not be achieved. The ROD for this site discusses how the remedy will not achieve ARARs, but no technical impracticability analysis following EPA guidance was performed and no official TI waiver was issued because of the widely understood problems with restoring groundwater to drinking water quality when contaminated by creosote DNAPL.

SECTION 11

Recommendations

Based on the scope of this five-year review of remedy protectiveness, ODEQ recommends completion of the actions identified in Table 11-1. None of the identified recommendations directly relate to achieving or maintaining the protectiveness of the remedy.

TABLE 11-1
Recommendations and Follow-Up Actions

Recommendations/ Follow-Up Action	Party Responsible	Oversight Agency[12]	Milestone Date	Follow-Up Action: Affects Protectiveness (Y/N)	
				Current	Future
Assess frequency of status report[13] submittals. If appropriate, recommend modifying submittal frequency from quarterly to annually.	ODEQ / UPRR	EPA / ODEQ	9/31/2007	N	N
Assess the frequency of groundwater monitoring in the unconfined and Sand Hollow I aquifers. ODEQ provisionally granted approval to modify frequency from semiannually to annually on August 7, 2007 .	ODEQ / UPRR	EPA / ODEQ	9/31/2007	N	N
Assess the frequency of groundwater elevation monitoring. If appropriate, recommend modifying frequency from quarterly to semiannually. ODEQ concluded that quarterly groundwater elevation monitoring will be conducted in the unconfined water bearing zone in order to verify hydraulic capture. ODEQ is currently evaluating whether groundwater elevation monitoring frequency can be reduced in underlying confined systems (SH1; SH2; Ginkgo).	ODEQ / UPRR	EPA / ODEQ	9/31/2007	N	N
Document a contingency plan for reassessment of risk should land use change in OU1.	ODEQ / UPRR	EPA / ODEQ	To be determined as necessary	N	N
Document all currently approved remedy modifications	ODEQ / UPRR	EPA / ODEQ	Ongoing	N	N

12 Oregon Department of Environmental Quality is the lead agency.

13 Status report refers to TTP facility milestone reporting requirements, which include monthly operational progress reports, annual projects status reports (formerly quarterly), and other special reports such as deferred soil reports.

SECTION 12

Protectiveness Statement

Two informally designated OUs are located within the UPRR tie treating facility. OU1 constitutes the active wood-treating operation controlled by Amerities West, LLC. Site access is controlled for OU1, which is located behind cyclone fencing. OU2 is the area inclusive of the Columbia River shoreline sediments and also includes the undeveloped portion of Riverfront Park. OU1 includes selected remedies for both groundwater and soil. OU2 received a No Further Action finding for implemented remedial actions for surface water, sediments, and soils, which acknowledged the protective Columbia River Shoreline cap present at the time the ROD was signed and which described other completed IRAMs. OU1 remedy implementation is ongoing and includes DNAPL recovery, hydraulic control, wastewater treatment and effluent discharge, groundwater monitoring, and institutional and engineering control. The OU2 remedy consists of long-term monitoring and institutional control.

12.1 Operable Unit 1

The remedies at OU1 are expected to be protective of human health and the environment upon completion, and immediate threats have been identified and addressed. For groundwater, the remedy components of DNAPL recovery, hydraulic control, wastewater treatment, and subsequent discharge are operated efficiently and controlled with well-designed integrated program logic that includes many safeguards. For soils, an effective engineering control (clean gravel/soil cap) and the multiple separate soil investigations/removals that have been completed consistent with Oregon cleanup rules and the ROD. These remedial actions have removed any immediate threat to human health and the environment. Site access is controlled and a health and safety plan sufficient to control risks is in place and has been properly implemented. The remedy implementation phase has operated at full scale for approximately nine years, and various remedial systems have been modified for operational optimization. All modules (1/2/3) of the DNAPL recovery system are currently operating and the site has received a construction complete designation.

12.2 Operable Unit 2

The IRAMs conducted at OU2 (an engineered submerged cap and multiple soil removals), are expected to continue to be protective of human health and the environment. The remedy at OU2 was implemented for surface water, sediment, and soils, and resulted in an ODEQ No (further) Action decision, contingent upon periodic inspection and monitoring. Bioassay tests and tissue analyses conducted on fish and macro-invertebrates indicated no elevated concentrations of contaminants of concern. Additional remedial actions were considered to have unacceptable short-term implementation risks and were not implemented. The near-shore sediments were effectively isolated through construction of the cap. Periodic monitoring of the cap and adjacent sediments ensures that erosion does not expose

contaminated material. Restrictive covenants prohibiting appropriation of shallow, affected groundwater are in place. These restrictions “run-with-the-land” and will therefore be conveyed to any future property owner/operator.

SECTION 13

Future Review Schedule

Reviews for most Superfund sites are required by statute at five-year intervals from the promulgation of the ROD. Therefore, a third five-year review will be triggered in 2011. The site has been granted construction complete status and no further construction activities are anticipated. No significant changes in land use or potential exposure pathways are envisioned. No significant changes to site infrastructure, topography, or contaminant mobility are expected.

SECTION 14

Works Cited

CH2M HILL. 1993. *Final Remedial Investigation Report: Union Pacific Railroad Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad. July 1993.

CH2M HILL. 1995. *Final Feasibility Study*. September 1995.

CH2M HILL. 1997a. *Remedial Design/Remedial Action Work Plan, the Union Pacific Railroad Site, The Dalles, Oregon*. June 1997.

CH2M HILL. 1997b. *Final Groundwater Remedial Action Plan, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company. July 1997.

CH2M HILL. 1998a. *Sampling Results, Feasibility Study, and Corrective Action Assessment for a Deferred Soil Investigation, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company.

CH2M HILL. 1998b. *DNAPL Recovery Design Basis Report.* Prepared for Union Pacific Railroad Company, Tie Treating Plant, The Dalles, Oregon. June 1998.

CH2M HILL. 1998c. *Soil Remedial Action Plan*. Prepared for Union Pacific Railroad Company. August 1998.

CH2M HILL. 1998d. *Sand Hollow I Water-Bearing Zone: Natural Attenuation Assessment Summary Report, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company. November 1998.

CH2M HILL. 1999. *Sampling and Analysis Results for a Deferred Soil Investigation, Footprint Area of Three Tanks in the Tank Farm Area, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company.

CH2M HILL. 2000a. *Sampling and Analysis Plan for a Deferred Soil Investigation in the Utility Pole Installation Area, Tie Treating Plant The Dalles, Oregon*. Prepared for Union Pacific Railroad Company. August 2000.

CH2M HILL. 2000b. *Work Plan for HCWU-10, SS-15 and SS-16 Installation, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company. December 2000.

CH2M HILL. 2001. *Sampling and Analysis Results for a Deferred Soil Investigation, Utility Pole Installation Area, Tie Treating Plant, The Dalles, Oregon*. Prepared for Union Pacific Railroad Company. February 2001.

CH2M HILL. 2002. *Sampling and Analysis Results for a Deferred Soil Investigation, South Tank Farm Area, Tie Treating Plant, The Dalles Oregon*. Prepared for Union Pacific Railroad Company. March 2002.

CH2M HILL 2003. *Design Basis Report for the Module 2/3 DNAPL Recovery System.* Prepared for Union Pacific Railroad Company. February 2003.

CH2M HILL. 2006. *Columbia River Shoreline Operable Unit – 2005 Monitoring Report*. Prepared for Union Pacific Railroad. January 2006.

CH2M HILL, 2007. Proposed Revisions to the Groundwater Monitoring Program at the Tie Treating Plant in The Dalles, Oregon. January 15, 2007.

CH2M HILL, 2007. Addendum No. 1 to Proposed Revisions to the Groundwater Monitoring Program at the Tie Treating Plant in The Dalles, Oregon. May 16, 2007.

Oregon Administrative Rule 340-122-090.

Oregon Department of Environmental Quality. 1996. Record of Decision, The Union Pacific Railroad Site, The Dalles, Oregon. March 1996.

Oregon Department of Environmental Quality. 1998. *Guidance for Identification of Hot Spots*. April 23, 1998

Oregon Department of Environmental Quality. 2002. *First Five-Year Record of Decision Review Report, Tie Treating Plant, The Dalles, Oregon*. February 2002.

Oregon Department of Environmental Quality. 2003. *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. September 22, 2003.

Oregon Department of Environmental Quality. 2006. *Water Quality Criteria Summary – Table 33A.* Oregon Department of Environmental Quality – Division 41.

Oregon Revised Statute 465.315.

U.S. Environmental Protection Agency. 1998. *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration*. September 1993.

U.S. Environmental Protection Agency. 2001. *Comprehensive Five-Year Review Guidance*. June 2001.

Vanden Berg, M., et al. 1998. *Environmental Health Perspectives*, Vol. 106, pp. 775-792.

APPENDIX A

Oregon Department of Environmental Quality Documents Used for Decisionmaking at The Dalles Tie Treating Plant

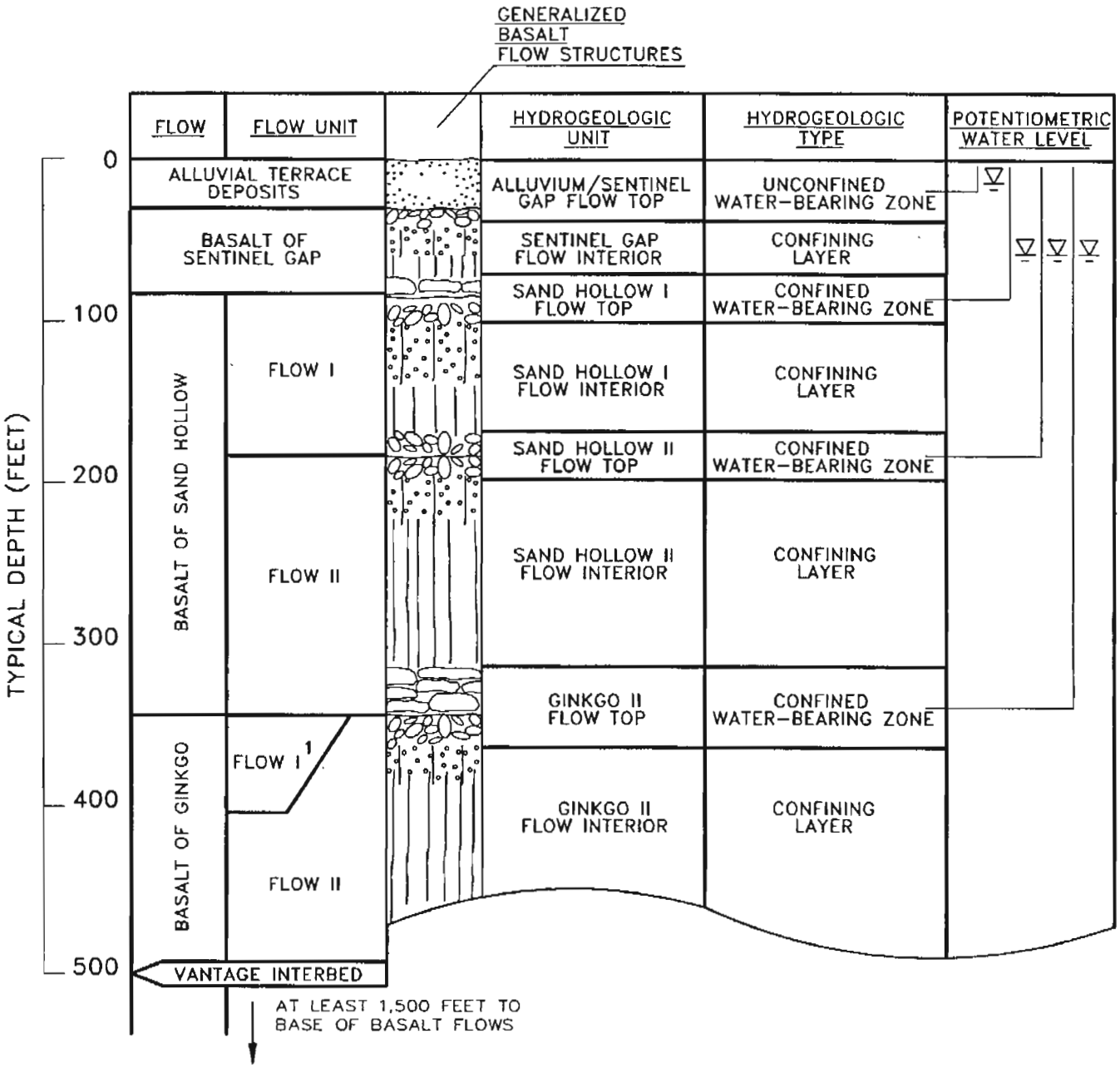
- Columbia River Shoreline interim action reports:
  - *Interim Remedial Action Plan for Riverfront Park Cleanup, Tie Treating Plant, The Dalles, Oregon*. Prepared for Union Pacific Railroad Company by CH2M HILL, 1992.
  - *Remedial Investigation: Columbia River Shoreline/Abandoned Pipeline Outfall Operable Unit, Tie Treating Plant, The Dalles, Oregon*. Prepared for Union Pacific Railroad Company by CH2M HILL, 1994.
  - *Interim Remedial Action Plan: Columbia River Shoreline/Abandoned Pipeline Outfall Operable Unit, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, 1994.
  - *Columiba River Shoreline Operable Unit – 2005 Monitoring Report, Tie Treating Plant, The Dalles Oregon. Prepared for Union Pacific Railroad Company by CH2M HILL, 2006.*
- Water treatment plant interim action reports:
  - *Wastewater Treatment System Design Basis Report, Tie Treating Plant, The Dalles, Oregon*. Prepared for Union Pacific Railroad Company by CH2M HILL, June 1994.
  - *Iron Coprecipitation System Design Basis Report, Tie Treating Plant, The Dalles, Oregon*. Prepared for Union Pacific Railroad Company by CH2M HILL, October 1994.
- Record of Decision, The Union Pacific Railroad Site, The Dalles, Oregon, March 1996.
- Remedial Design/Remedial Action Consent Decree. Executed between Union Pacific Railroad and ODEQ on January 31, 1997.
- Amended Remedial Design/Remedial Action Consent Decree. Executed between Union Pacific Railroad and ODEQ on May 13, 2002.
- *Remedial Design/Remedial Action Work Plan, the Union Pacific Railroad Site, The Dalles, Oregon.* Prepared by CH2M HILL, June 1997.
- *Final Groundwater Remedial Action Plan, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, July 1997.
- *Final Groundwater Remedial Action Plan Revisions, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, October 1997.
- *Revisions to Final Groundwater Remedial Action Plan, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad by CH2M HILL, February 1998.
- *Proposed Changes to the Groundwater Monitoring Program at the UPRR Tie Treating Plant, The Dalles, Oregon.* Prepared by CH2M HILL, April 14, 2000.
- Letter from ODEQ approving changes to the groundwater monitoring program at the UPRR Tie Treating Plant, The Dalles, Oregon, July 19, 2000.
- *Soil Remedial Action Plan, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, August 1998.

- *Final Operation and Maintenance Plan, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, 1998.
- *Sand Hollow I Water-Bearing Zone: Natural Attenuation Assessment Summary Report, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, November 1998.
- Letter from ODEQ approving indefinite deferral of the Sand Hollow I hydraulic containment system, dated June 7, 2001.
- Deferred soil investigation reports:
  - *Sampling Results, Feasibility Study, and Corrective Action Assessment for a Deferred Soil Investigation, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, 1998.
  - *Sampling and Analysis Results for a Deferred Soil Investigation, Footprint Area of Three Tanks in the Tank Farm Area, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, 1999.
  - *Sampling and Analysis Plan for a Deferred Soil Investigation in the Utility Pole Installation Area, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, August 2000.
  - *Work Plan for HCWU-10, SS-15 and SS-16 Installation, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, December 2000.
  - *Sampling and Analysis Results for a Deferred Soil Investigation, Utility Pole Installation Area, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, February 2001.
  - *Sampling and Analysis Results for a Deferred Soil Investigation, Footprint Area of Three Tanks in the Tank Farm Area, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, 2001.
  - *Sampling and Analysis Results for a Deferred Soil Investigation, South Tank Farm Area, Tie Treating Plant, The Dallas Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, March, 2002.
  - *Sampling and Analysis Results for a Deferred Soil Investigation, Tank Farm Area, Tie Treating Plant, The Dallas Oregon.* Prepared for the Union Pacific Railroad Company by CH2M HILL, February, 2003.
- *Design Basis Report for the Module 2/3 DNAPL Recovery System.* Prepared for Union Pacific Railroad Company by CH2M HILL, February, 2003.
- *DNAPL Recovery Module 2/3 startup Report, Tie Treating Plant, The Dalles, Oregon.* Prepared for Union Pacific Railroad Company by CH2M HILL, November, 2004.

- Quarterly progress reports for the UPRR tie treating plant in The Dalles, Oregon. Prepared for Union Pacific Railroad Company by CH2M HILL. Submitted each quarter (four per year) since 1997.
- The Administrative Record for the UPRR ROD is available at the Bend, Oregon office of ODEQ (300 SE. Reed Market Road, Bend, OR 97702-2237, telephone 541/388-6146) and can be reviewed by making arrangements through that office.

APPENDIX B
Generalized Site Hydrostratigraphy

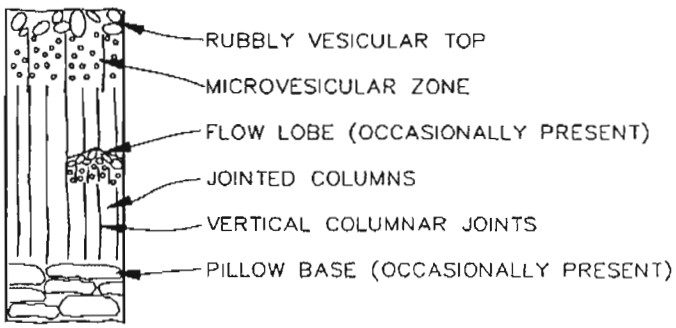
03-18-94 0077C138.DWG



NOTES:

1. FLOW I OF THE BASALT OF GINKGO WAS ENCOUNTERED ONLY AT THE EASTERN AREA OF THE SITE AT LOCATION 15.

LEGEND



GENERALIZED SITE HYDROSTRATIGRAPHY

UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT—THE DALLES, OREGON

APPENDIX C
Conceptual Site Model

APPENDIX C

Conceptual Model-Creosote Distribution and Recovery

Former Ponds, located south of the retort building, seeped creosote more then 50 years ago. The immiscible creosote, which was only slightly heavier than water, sank to the top of the mostly impermeable Sentinel Gap Basalt Flow Top formation. The creosote moved along the sloped top of the Sentinel Gap basalt and pooled into a low area of the formation just south of Interstate 84. Some creosote reached the lower confined zones, apparently through both fractures in the basalt flows and a deep onsite water supply well installed in 1958, as evidenced by residual creosote in the Sand Hollow I interflow zone and Sand Hollow II intraflow zone. The water supply well was properly abandoned in 1988. Figure C-1 illustrates the conceptual model of DNAPL migration through various hydraulic and stratigraphic zones.

The DNAPL recovery system was designed to remove pooled creosote from the top of the Sentinel Gap basalt. The (Module 1) recovery system consists of wells with dual pumps -- deeper pumps to remove the dense creosote that has migrated to the bottom of the well, and shallower pumps to pump groundwater. The Module 2/3 recovery system, in contrast, consists of pumps which remove all liquids (NAPL and water) simultaneously at lower rates. In either case, removing water depresses the water table in the vicinity of the well, thereby reducing the head, or weight, of water overlying the creosote layer around the well. The relatively higher water pressures around the well create a pressure gradient for creosote toward the recovery well. This approach can be further enhanced by injecting water adjacent to extraction wells to create "mounds" of water for an even steeper pressure gradient on underlying creosote, thereby accelerating its migration to recovery wells. This technique is known as water flooding and is achieved by reinjecting groundwater removed from the DNAPL extraction wells back into injection wells bounding the system. Figure C-2 illustrates the conceptual model for NAPL contamination and recovery.

Creosote began migrating to extraction wells when the DNAPL recovery system and hydraulic containment systems began operation. Creosote depth was allowed to increase in the vicinity of the extraction wells to promote "flow paths" for creosote to the wells. Residual creosote (i.e. creosote within the soil matrix that is no longer mobile under static conditions) was also mobilized by the extraction system, particularly where water flooding increased pressure gradients near the extraction wells.

When the DNAPL enters the well, some portion may float to the surface of the water. This occurs because the specific gravity of the pooled creosote (approximately 1.02 grams per cubic centimeter [g/cm^3]) us very close to water (1.00 g/cm^3), and much of the creosote is mixed with carrier oils with specific gravities less than that of water (CH2M HILL, 1993). When the creosote/oil mixture enters the free water column of the well, some lighter fractions may separate and float to the surface. The light, floating fraction may appear in wells and may also escape through the well screen into surrounding soils, rising to the top

of the water table and appearing as floating product in areas where no direct release or natural migration has occurred. However, extraction of groundwater by the shallow pumps captures and recovers any floating oils. Therefore, both LNAPL and DNAPL are captured by the existing recovery system.

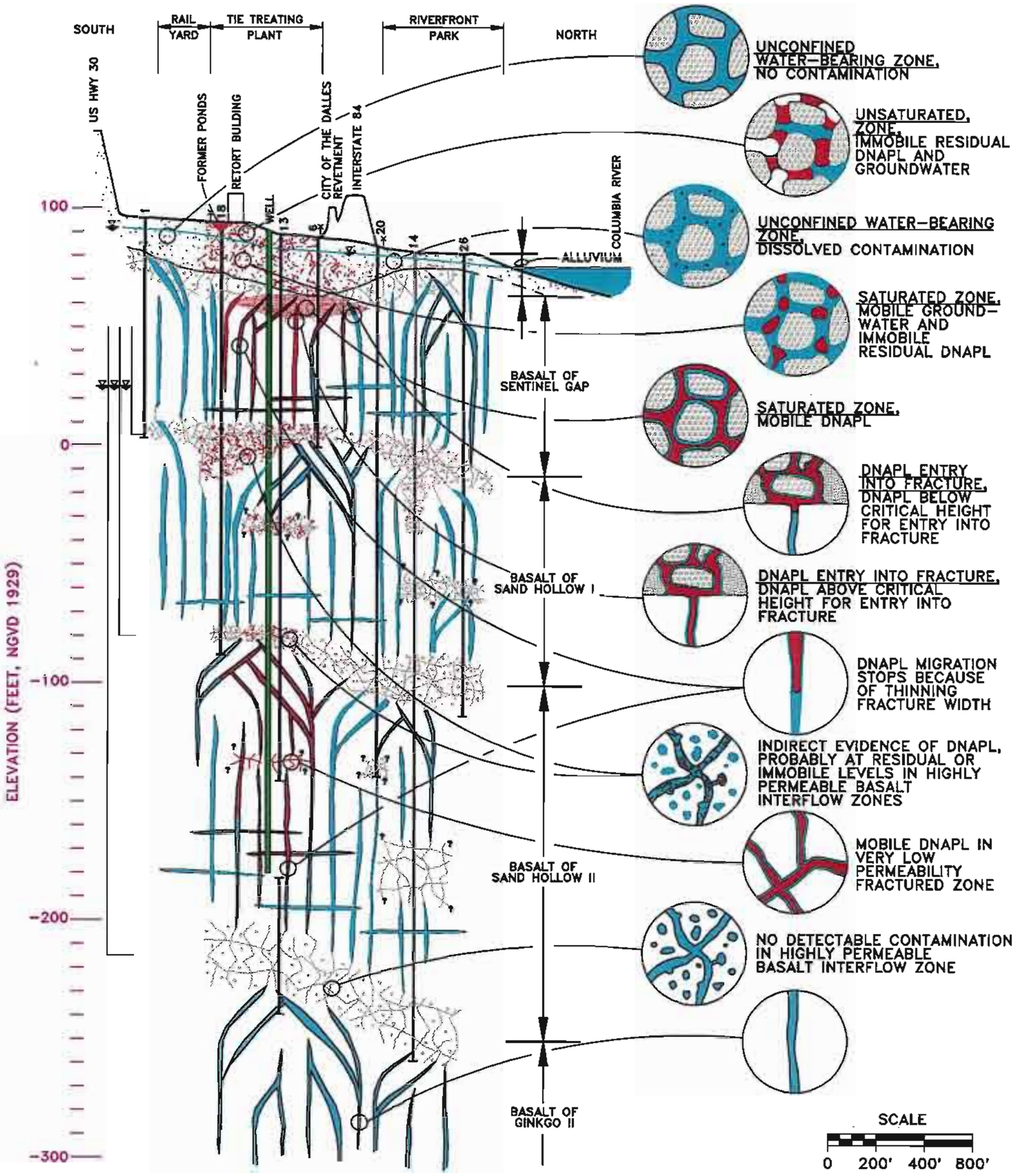
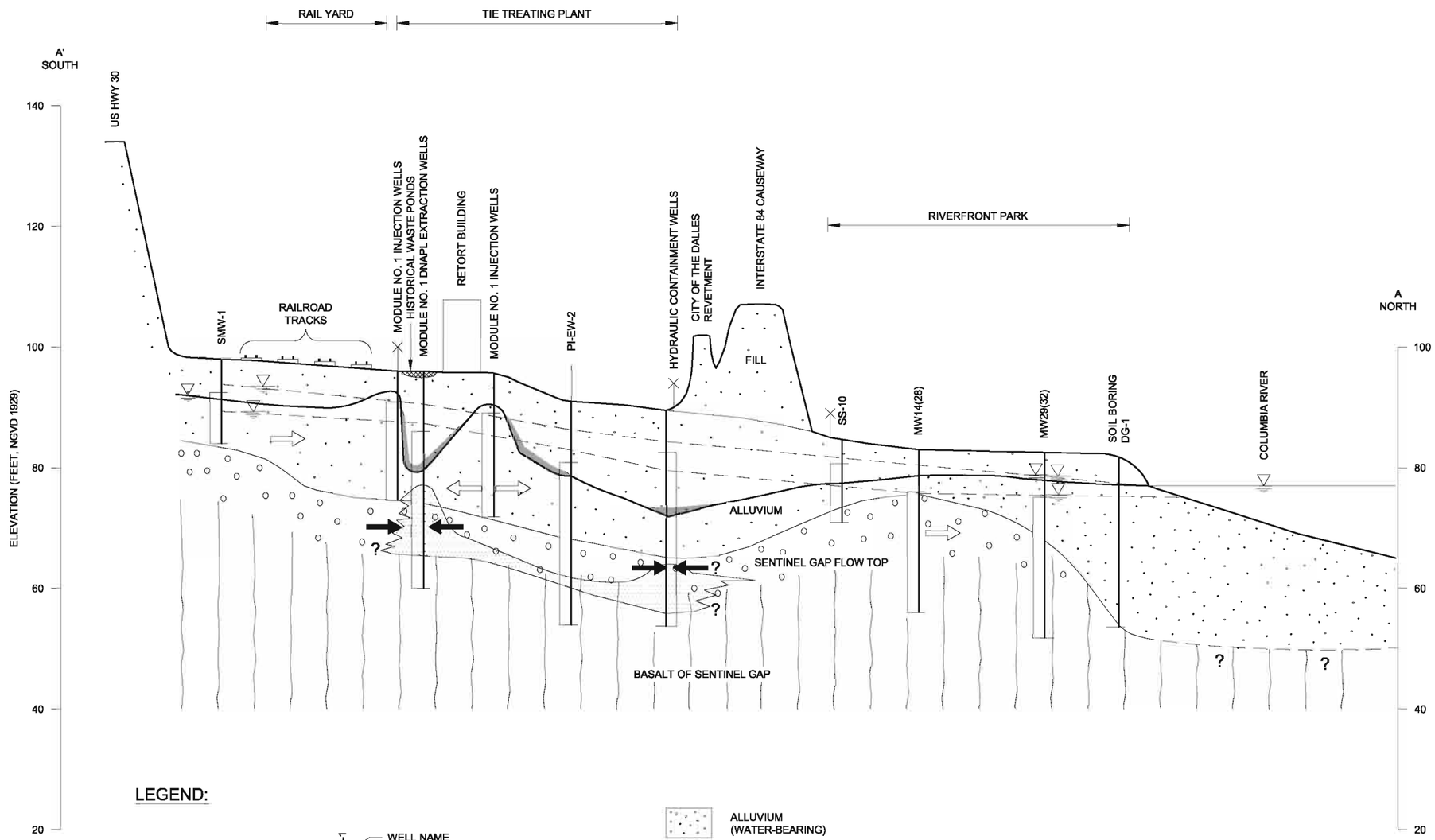


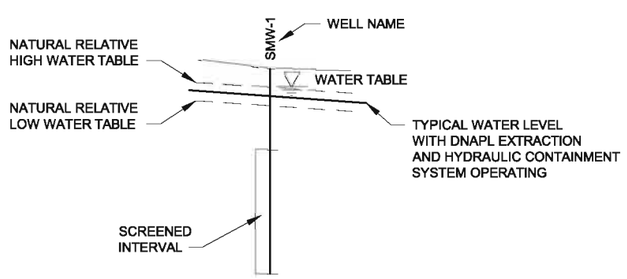
Figure C-1
SCHEMATIC SITE HYDROSTRATIGRAPHY SHOWING CONCEPTUAL DNAPL TRANSPORT
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT—THE DALLES, OREGON

CH2MHILL

0077FL4.DWG



LEGEND:



- ALLUVIUM (WATER-BEARING)
- BASALT OF SENTINEL GAP:
  - FLOW TOP (WATER-BEARING)
  - FLOW INTERIOR (NON WATER-BEARING)
- EXTENT OF DNAPL
- LNAPL
- CHAIN LINK FENCE
- GROUNDWATER FLOW DIRECTION
- DNAPL FLOW DIRECTION

SCALE IN FEET

0 100 200 400

VERTICAL EXAGGERATION = X10

NOTE:

MODULE NO 2/3 INJECTION AND EXTRACTION WELLS ARE NOT SHOWN.

Figure C-2
SCHEMATIC CROSS SECTION SHOWING DNAPL RECOVERY
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

CH2MHILL

USER: CJOLE TAB: LAYOUT1

PLOT DATE: 7-Dec-06 PLOT TIME: 6:43:10 PM FILENAME: \\ROSA\PROJ\UNION PACIFIC RAILROAD\168910\CAD\DRAWINGS\0077C20A.DWG

APPENDIX D

UPRR/Port of the Dalles/Northern Wasco County Parks and Recreation Department Agreement on Institutional Control

After recording return to:

Northern Wasco County Parks & Recreation District
319 E. 7th Street
The Dalles, OR 97058

COPY

True and actual consideration:

None. However, the actual consideration consists of or includes other property or value given or promised which is the whole consideration.

Until a change is requested all tax statements shall be sent to:

Northern Wasco County Parks & Recreation District
319 E. 7th Street
The Dalles, OR 97058

DONATION QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, That PORT OF THE DALLES, an municipal corporation, hereinafter called the grantor, for the consideration hereinafter stated, does hereby remise, release and quitclaim unto NORTHERN WASCO COUNTY PARKS AND RECREATION DISTRICT, a municipal corporation, hereinafter called grantee, and unto grantee's heirs, successors and assigns, for so long as during the ten years from the date of execution hereof issues related to the environmental clean-up of the real property herein described necessitating the expenditure of funds by grantee was not required, to a level not otherwise acceptable to grantee, and caused by the neighboring and adjacent property listed as a Superfund site, and retaining in the grantor a possibility of reverter such if the aforesaid condition occurs, the interest of the grantee shall automatically terminate and title shall revert to the grantor; the real property described below to be used exclusively for conservation purposes as hereinafter more specifically provided, all of the grantor's right, title and interest in that certain real property, with the tenements; hereditaments and appurtenances thereunto belonging or in anywise appertaining, situated in the County of Wasco and State of Oregon, described as follows, to wit:

See Exhibit A attached hereto and by this reference incorporated herein.

SUBJECT TO AND EXCEPTING:

20010387

1. EXCEPTING from this quitclaim and RESERVING unto Grantor, its successors and assigns, forever, all minerals and all mineral rights of every kind and character now known to exist or hereafter discovered, including, without limiting the generality of the foregoing, oil and gas and rights thereto, together with the sole, exclusive and perpetual right to explore for, remove and dispose of, said minerals by any means or methods suitable to Grantor, its successors and assigns, but without entering upon or using the surface of the lands hereby quitclaimed, and in such manner as not to damage the surface of said lands or to interfere with the use thereof by Grantee, its successors or assigns

2. The land described in Exhibit A is quitclaimed by Grantor subject to the following covenant, condition and restrictions which Grantee by the acceptance of this deed covenants for itself, its successors and assigns, faithfully to keep, observe and perform:

> The land hereby quitclaimed shall be used by Grantee, its successors and assigns, in perpetuity exclusively for the preservation of land areas for outdoor recreation by the general public.

3. The foregoing covenant, condition and restriction set out in paragraph 2 above shall run with the land hereby quitclaimed, and a breach of the same, or the continuance thereof, may, at the option of Grantor, its successors or assigns, be enjoined, abated or remedied by appropriate proceedings. It is understood, however, that the breach of the foregoing covenant, condition and restriction shall not defeat or render invalid the lien of any mortgage on said premises made in good faith and for value; PROVIDED, however, that any breach, or the continuance thereof, may be enjoined, abated or remedied by proper proceedings as aforesaid; and PROVIDED FURTHER, that the foregoing covenant, condition and restriction shall at all times remain in full force, and effect against said land, or any part thereof, title to which is obtained by foreclosure of any such mortgage.

4. The possibility of reverter referenced above in this deed is not realized and title is not reverted to grantor for environmental hazards, waste and environmental clean up, damages and expense caused or occurring during such times as grantee has leased the real property from grantor or is in title hereafter, if said environmental problems and pollution are not the result of existing hazardous waste or material identifiable as emanating from the neighboring adjacent property Superfund site and migrating on or existing on the above described real property, or if said environmental problems and pollution were otherwise caused or allowed to occur by grantee, its employees, invitees, successors or assigns, for which in either case there is no automatic reversion and grantee bears the liability and expense of cleanup and remediation.

To Have and to Hold the same unto the said grantee and grantee's heirs, successors and assigns forever.

The true and actual consideration paid for this transfer, stated in terms of dollars, is None. However, th actual consideration consists of or includes other property or value given or promised which is the whol consideration.

IN WITNESS WHEREOF, the grantor has caused its corporate name to be signed and its corporate sea affixed hereto by its officers duly authorized thereunto by order of its board of directors this 13 day of December 2000.

20010387

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMIT ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

PORT OF THE DALLES, an Oregon Municipa Corporation

By_____
Scott Mengis, President

By_____
D.M. Courtney, Secretary

STATE OF OREGON)
) ss.
County of Wasco)

December 13, 2000

Personally appeared Scott Mengis and D.M. Courtney, who, being sworn, did say that the former is the president and the latter is the secretary of Port of The Dalles, a municipal corporation, that said instrument was signed and sealed in behalf of said corporation by authority of its governing body; and each of them acknowledged said instrument to be its voluntary act and deed.

Before me:

Notary Public for Oregon
My commission expires 3 - 2 - 2003

OFFICIAL SEAL
WILLIAM O. DICK II
NOTARY PUBLIC-OREGON
COMMISSION NO. 321215
MY COMMISSION EXPIRES MARCH 2, 2003

20010387

20010387

EXHIBIT A

Parcel 1

A parcel of land situate in the William C. Laughlin Donation Land Claim No. 38, in Sections 2 and 3, all in Township 1 North, Range 13 East of the Willamette Meridian, in Wasco County, State of Oregon, bounded and described as follows:

Commencing at a United States Army Engineer's monument on the north line of said Laughlin D.L.C., said monument being 140.00 feet distant easterly, measured along said north line of Laughlin D.L.C., from the southeast corner of Lot 2 of said Section 3 and being the northwest corner of that certain parcel of land heretofore conveyed by Union Pacific Railroad Company to State of Oregon by Deed dated October 16, 1962, recorded on January 15, 1963, U.P.RR. Co. L.S.D.A. No. 3140;

thence easterly along the north line of said Laughlin D.L.C., a distance of 900.00 feet to the northeast corner of said deeded parcel of land and the TRUE POINT OF BEGINNING;

thence South 00 degrees 16 minutes 44 seconds East along the east line of said deeded parcel, a distance of 450.00 feet, more or less, to a point of the northerly line of that certain parcel of land conveyed by an agreement between both the Oregon-Washington Railroad & Navigation Company and Union Pacific Railroad Company with the State of Oregon, agreement dated November 1, 1962, Deed Audit No. 102320;

thence along the northerly line of said conveyed parcel, the following bearings and distances:

North 85 degrees 43 minutes 40 seconds East a distance of 90.00 feet;

South 89 degrees 43 minutes 55 seconds East a distance of 281.06 feet;

South 7 degrees 14 minutes 54 seconds West a distance of 260.00 feet;

South 71 degrees 24 minutes 13 seconds East a distance of 497.82 feet;

South 80 degrees 16 minutes 26 seconds East a distance of 197.33 feet;

South 87 degrees 49 minutes 42 seconds East a distance of 584.35 feet, more or less, to a point on the southerly prolongation of the west line of Lot 3 of said Section 2;

thence along said southerly prolongation of the west line of Lot 3, North 0 degrees 16 minutes 46 seconds East, a distance o 900.18 feet, more or less, to a point on said north line of Laughlin D.L.C.;

20010387

thence westerly along said north line of Laughlin D.L.C., a distance of 1,594.93 feet, more or less, to the TRUE POINT OF BEGINNING.

Containing an area of 1,203,897 square feet, (27.64 acres), more or less.

Parcel 2

A parcel of land situate in the William C. Laughlin Donation Land Claim No. 38, in Sections 1 and 2, all in Township 1 North, Range 13 East of the Willamette Meridian in Wasco County, State of Oregon, bounded and described as follows:

Commencing at a United States Army Engineer's monument on the north line of said Laughlin D.L.C., said monument being 140.00 feet distant easterly, measured along said north line of Laughlin D.L.C., from the southeast corner of Lot 2 of Section 3 in said Township and Range, and being the northwest corner of that certain parcel of land heretofore conveyed by Union Pacific Railroad Company to State of Oregon by Deed dated October 16, 1962, recorded on January 15, 1963, U.P.RR. Co. L.S.D.A. No. 3140;

thence easterly along the north line of said Laughlin D.L.C., a distance of 2,494.93 feet, more or less, to the southwest corner of Lot 3 of said Section 2 and the TRUE POINT OF BEGINNING;

thence South 00 degrees 16 minutes 46 seconds West along the southerly prolongation of the west line of said Lot 3 a distance of 900.18 feet, more or less, to a point on the northerly line of that certain parcel of land conveyed by an agreement between both the Oregon-Washington Railroad & Navigation Company and Union Pacific Railroad Company with the State of Oregon, agreement dated November 1, 1962, Deed Audit No. 102320;

thence along the northerly line of said conveyed parcel, the following bearings and distances:

South 87 degrees 49 minutes 42 seconds East a distance of 104.81 feet;

North 82 degrees 53 minutes 09 seconds East a distance of 492.67 feet to the beginning of a non-tangent curve concave northwesterly, the center of the circle of which the arc is a part bears North 7 degrees 57 minutes 06 seconds West, a distance of 7,051.97 feet;

thence northeasterly along said curve and along said northerly line, through a central angle of 1 degree 08 minutes 54 second an arc distance of 141.34 feet to a point opposite the beginning of a spiral curve in the centerline of the relocated Columbia River Highway;

20010387

thence northeasterly, continuing along said northerly line of said conveyed parcel and parallel with said spiral in said centerline, through a spiral angle of 1 degree 36 minutes, (the long chord of said spiral in said centerline bears North 79 degrees 50 minutes East, a distance of 400.0 feet) an arc distance of 396.93 feet to a point opposite the end of said spiral curve in said centerline;

thence continuing along the northerly line of said conveyed parcel, North 79 degrees 18 minutes East, a distance of 3,645.68 feet;

thence northeasterly along said northerly line, a distance of 105.00 feet, more or less, to a point on said north line of Laughlin D.L.C.;

thence westerly along said north line of Laughlin D.L.C., a distance of 4,804.16 feet, more or less, to the TRUE POINT OF BEGINNING.

Containing an area of 2,311,808 square feet, (53.07 acres), more or less.

20010387

Microfilm No. 20010387
FILED WASCO CTY
THE DALLES OR.

JAN 26 2 21 PM '01

KAREN R. LEBRETON
COUNTY CLERK

STATE OF OREGON, } ss
County of Wasco,
I certify that this document was received
and recorded in the

CH2M HILL
825 NE Multnomah
Suite 1300
Portland, OR
97232-2146
Tel 503.235.5000
Fax 503.736.2000

Proud Sponsor of National Engineers Week 2000

January 12, 2001

161599.TP.PM

Mr. Robert Markworth
Union Pacific Railroad
1416 Dodge St. Room 930
Omaha, NE 68179-0930

Subject: Technical Issues Identified for the Proposed Transfer of the Riverfront Park Property from the Port of The Dalles to the City of The Dalles

Dear Bob:

At your request, CH2M HILL has reviewed the technical issues associated with proposed transfer of the property known as Riverfront Park in The Dalles, Oregon from the Port of The Dalles (Port) to the local Parks and Recreation District. This potential and transfer was identified to UPRR in a December 13, 2000 letter from Dick and Dick, LLP, a law firm representing the Port on this matter, to UPRR. A copy of this letter is provided in Attachment A of this letter.

UPRR Involvement in Riverfront Park

UPRR donated the land to the Port of The Dalles in September 1984. A copy of the deed for the property donation is provided in Attachment B. The deed contained the following use restriction on the property;

> *(The land) shall be used by Grantee, its successors and assigns, in perpetuity exclusively for the preservation of land areas for outdoor recreation by the general public.*

Subsequent to UPRR's donation of the property, The Port of The Dalles constructed Phase 1 of Riverfront Park on the western end of the property in 1988. The Port expanded the Riverfront Park in Phase 2 in 1989 and 1990.

Institutional Controls and Port of The Dalles Agreement

Part of the approved remedy for The Dalles site includes an institutional control restricting uses in Riverfront Park. This institutional control is part of the Record of Decision (March 1996) for the site.

An Agreement between Union Pacific Railroad and the Port of the Dalles was executed on October 4, 1996 that provided restrictive covenants on the property required for the institutional controls. The Agreement was incorporated into the Groundwater Remedial

Action Plan (July 1997); a required document under the scope of work attached to the Remedial Design/Remedial Action Consent Decree.

A copy of the Agreement is provided in Attachment C of this letter. The primary restrictive covenants (see item 8 of the Agreement) were:

- Restrictions on groundwater extraction
- Restrictions on soil excavation without UPRR and Oregon Department of Environmental Quality approval
- Prohibits property development for residential use
- Any development which would interfere or hamper remedies currently implemented on the property

The Agreement also indicates that the restrictive covenants go with the land and any subsequent property owner is subject to these conditions.

Potential Future Park Expansions

Based on contacts between the Port and CH2M HILL, there are not plans for further expansion of Riverfront Park. Further expansion is difficult because the undeveloped areas are designated a wildlife refuge and wetlands. Expansion would trigger significant mitigation requirements. The Port Director, Scott Hege, offered the following comments concerning future park expansion:

> *Operating the park in it current configuration and size has been a real financial constraint on the Port and the community. We are looking to get out of this obligation and the Parks and Recreation district is no better off that us. So to suggest the possibility of an expansion, I really don't ever see it. Plus there are a variety of issues that would need to be worked out for something like that to happen. It is really not even an remote issues in my opinion.*
>
> *However, there is a bit of development that is planned for that general area in relationship to the Riverfront Trail. This development has been in the planning stages since 1988 and before and has recently garnered significant funding. The development would be a 12' wide paved trail along the freeway side of the nature area. This project is in the final planning stages and should be constructed in the coming years.* (copied from January 11, 2001 E-mail to from Scott Hege, Port Director to Jeff Gentry of CH2M HILL)

The proposed paved path is allowed under the current Agreement.

Potential Remedy Impacts

A five-year Record of Decision review is being conducted this year for this site. At this time, there is no information to indicate that the restrictive covenants in the Agreement, combined with the onsite remedies implemented, will not still be considered protective to the Oregon

Department of Environmental Quality and the United States Environmental Protection Agency.

If you need additional information concerning these issues, give me a call at 503-235-5022 ext. 4390.

Sincerely,

CH2M HILL

Jeff Gentry
Project Manager

PDX\Riverfront Park Transfer Letter.doc
c: File

ATTACHMENT A

Riverfront Park Land Transfer Notification from Dick and Dick, LLP

DICK & DICK, LLP
ATTORNEYS-AT-LAW
601 WASHINGTON STREET
THE DALLES, OREGON
97058
A REGISTERED LIMITED LIABILITY PARTNERSHIP

WILLIAM G. DICK (1916-1992)
EDGAR M. DICK (1924-1986)

TELEPHONE (541) 296-2152

December 13, 2000

Union Pacific Land Resources Corporation
c/o Union Pacific Railroad
1416 Dodge Street, Room 930
Omaha, NE 68179
Attention: Mr. Robert Markworth

RE: Port of The Dalles, Oregon, Proposed Transfer to parks & Rec District/UIC Law Department Document No. 1-7515-1

Ladies and Gentlemen:

The Union Pacific donated property for a public park above described to my client in 1984. At the present time, my client would like to transfer all the property to the local Parks and Rec District. Within enclosed is a copy of the proposed deed.

In light of the covenants running with the land regarding usage and your general interest in this property, we would like to secure your permission to make this transfer.

Please be in touch with me.

Yours truly,

William G. Dick II

WGDII/kr

Enclosure

After recording return to:	**Northern Wasco County Parks & Recreation District 319 E. 7th Street The Dalles, OR 97058**
ue and actual consideration:	**None. However, the actual consideration consists of or includes other property or value given or promised which is the whole consideration.**
Until a change is requested all tax statements shall be sent to:	**Northern Wasco County Parks & Recreation District 319 E. 7th Street The Dalles, OR 97058**

DONATION QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, That **PORT OF THE DALLES, an municipal corporation,** hereinafter called the grantor, for the consideration hereinafter stated, does hereby remise, release and quitclaim unto **NORTHERN WASCO COUNTY PARKS AND RECREATION DISTRICT, a municipal corporation,** hereinafter called grantee, and unto grantee's heirs, successors and assigns, for so long as during the ten years from the date of execution hereof issues related to the environmental clean-up of the real property herein described necessitating the expenditure of funds by grantee was not required, to a level not otherwise acceptable to grantee, and caused by the neighboring and adjacent property listed as a Superfund site, and retaining in the grantor a possibility of reverter such if the aforesaid condition occurs, the interest of the grantee shall automatically terminate and title shall revert to the grantor; the real property described below to be used exclusively for conservation purposes as hereinafter more specifically provided, all of the grantor's right, title and interest in that certain real property, with the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, uated in the County of Wasco and State of Oregon, described as follows, to wit:

See Exhibit A attached hereto and by this reference incorporated herein.

SUBJECT TO AND EXCEPTING:

1. EXCEPTING from this quitclaim and RESERVING unto Grantor, its successors and assigns, forever, all minerals and all mineral rights of every kind and character now known to exist or hereafter discovered, including, without limiting the generality of the foregoing, oil and gas and rights thereto, together with the sole, exclusive and perpetual right to explore for, remove and dispose of, said minerals by any means or methods suitable to Grantor, its successors and assigns, but without entering upon or using the surface of the lands hereby quitclaimed, and in such manner as not to damage the surface of said lands or to interfere with the use thereof by Grantee, its successors or assigns

2. The land described in Exhibit A is quitclaimed by Grantor subject to the following covenant, condition and restrictions which Grantee by the acceptance of this deed covenants for itself, its successors and assigns, faithfully to keep, observe and perform:

> The land hereby quitclaimed shall be used by Grantee, its successors and assigns, in perpetuity exclusively for the preservation of land areas for outdoor recreation by the general public.

3. The foregoing covenant, condition and restriction set out in paragraph 2 above shall run with the land hereby quitclaimed, and a breach of the same, or the continuance thereof, may, at the option of Grantor, its successors or assigns, be enjoined, abated or remedied by appropriate proceedings. It is understood, however, that the breach of the foregoing covenant, condition and restriction shall not defeat or render invalid the lien of any mortgage on said premises made in good faith and for value; PROVIDED, however, that any breach, or the continuance thereof, may be enjoined, abated or remedied by proper proceedings as aforesaid; and PROVIDED FURTHER, that the foregoing covenant, condition and restriction shall at all times remain in full force, and effect against said land, or any part thereof, title to which is obtained by foreclosure of any such mortgage.

4. The possibility of reverter referenced above in this deed is not realized and title is not reverted to grantor for environmental hazards, waste and environmental clean up, damages and expense caused or occurring during such times as grantee has leased the real property from grantor or is in title hereafter, if said environmental problems and pollution are not the result of existing hazardous waste or material identifiable as emanating from the neighboring adjacent property Superfund site and migrating on or existing on the above described real property, or if said environmental problems and pollution were otherwise caused or allowed to occur by grantee, its employees, invitees, successors or assigns, for which in either case there is no automatic reversion and grantee bears the liability and expense of cleanup and remediation.

To Have and to Hold the same unto the said grantee and grantee's heirs, successors and assigns forever.

The true and actual consideration paid for this transfer, stated in terms of dollars, is None. **However, the ual consideration consists of or includes other property or value given or promised which is the whole consideration.**

IN WITNESS WHEREOF, the grantor has caused its corporate name to be signed and its corporate seal affixed hereto by its officers duly authorized thereunto by order of its board of directors this __ day of **December, 2000.**

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMIT ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

PORT OF THE DALLES, an Oregon Municipal Corporation

By_____
Scott Mengis, President

By_____
D.M. Courtney, Secretary

STATE OF OREGON)
) ss.
County of Wasco)

December ____, 2000

Personally appeared **Scott Mengis** and **D.M. Courtney**, who, being sworn, did say that the former is the president and the latter is the secretary of **Port of The Dalles**, a municipal corporation, that said instrument was signed and sealed in behalf of said corporation by authority of its governing body; and each of them acknowledged said instrument to be its voluntary act and deed.

Before me:

_____
Notary Public for Oregon
My commission expires _____

ATTACHMENT B

1984 Deed for UPRR Land Donation

ORIGINAL

UIC LAW DEPARTMENT
DOCUMENT NO. 1-7515-1
Page 1

DONATION QUITCLAIM DEED

THIS DEED, Made this 13th day of SEPTEMBER, 1984, between UNION PACIFIC LAND RESOURCES CORPORATION, a corporation of the State of Nebraska, Grantor, and PORT OF THE DALLES, a municipal corporation of the State of Oregon, whose postal address is 110 Union Street, The Dalles, Oregon 97058 Grantee:

WITNESSETH, That

WHEREAS, Grantee desires to acquire the property described in Exhibit A, hereto attached and hereby made a part hereof, to be used for a public park; and

WHEREAS, Grantor is willing to donate said property to Grantee;

NOW THEREFORE, in consideration of the premises, Grantor does, by these presents, DONATE, REMISE, RELEASE and QUITCLAIM unto Grantee, and unto its successors and assigns, in perpetuity exclusively for conservation purposes as hereinafter more specifically provided, all of its right, title and interest in and to the real estate situate in the City of The Dalles, Wasco County, State of Oregon, described in Exhibit A hereto attached and made a part hereof.

EXCEPTING from this quitclaim and RESERVING unto Grantor, its successors and assigns, forever, all minerals and all mineral rights of every kind and character now known to exist or hereafter discovered, including, without limiting the generality of the foregoing, oil and gas and rights thereto, together with the sole, exclusive and perpetual right to explore for, remove and dispose of, said minerals by any means or methods suitable to Grantor, its successors and assigns, but without entering upon or using the surface of the lands hereby quitclaimed, and in such manner as not to damage the surface of said lands or to interfere with the use thereof by Grantee, its successors or assigns.

842548

The land described in Exhibit A is quitclaimed by Grantor subject to the following covenant, condition and restriction which Grantee by the acceptance of this deed covenants for itself, its successors and assigns, faithfully to keep, observe and perform:

> The land hereby quitclaimed shall be used by Grantee, its successors and assigns, in perpetuity exclusively for the preservation of land areas for outdoor recreation by the general public.

The foregoing covenant, condition and restriction shall run with the land hereby quitclaimed, and a breach of the same, or the continuance thereof, may, at the option of Grantor, its successors or assigns, be enjoined, abated or remedied by appropriate proceedings. It is understood, however, that the breach of the foregoing covenant, condition and restriction shall not defeat or render invalid the lien of any mortgage on said premises made in good faith and for value; PROVIDED, however, that any breach, or the continuance thereof, may be enjoined, abated or remedied by proper proceedings as aforesaid; and PROVIDED FURTHER, that the foregoing covenant, condition and restriction shall at all times remain in full force, and effect against said land, or any part thereof, title to which is obtained by foreclosure of any such mortgage.

ORS 308.210 provides in part that the following statement shall be included in the body of an instrument transferring fee title to real property:

THIS INSTRUMENT DOES NOT GUARANTEE THAT ANY PARTICULAR USE MAY BE MADE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT. A BUYER SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

Nothing in the foregoing statement shall be or be deemed to be a limitation on the aforesaid covenant, condition and restriction.

TO HAVE AND TO HOLD, subject to the aforesaid exception, reservation and other provisions, the premises described in Exhibit A with all the rights and appurtenan-

ces thereunto belonging unto Grantee, its successors and assigns, forever.

IN WITNESS WHEREOF, Grantor has caused these presents to be signed by its Executive Vice President and attested by its Assistant Secretary, and its corporate seal to be hereunto affixed the day and year first above written.

UNION PACIFIC LAND RESOURCES CORPORATION

In Presence of:

A. A. Burnside

By A. P. Vickers
Executive Vice President

Attest:

[signature] (Seal)
Assistant Secretary

842548

STATE OF NEBRASKA)
) ss.
COUNTY OF DOUGLAS)

On this 13th day of SEPTEMBER, 1984, before me, the undersigned, a Notary Public in and for said County in the State aforesaid, personally appeared A. P. VICTORS, to me personally known, and to me personally known to be Executive Vice President of Union Pacific Land Resources Corporation and to be the same person whose name is subscribed to the foregoing instrument, and who, being by me duly sworn, did say that he is EXECUTIVE VICE PRESIDENT of Union Pacific Land Resources Corporation that the seal affixed to said instrument is the corporate seal of said corporation; and that said instrument was signed and sealed on behalf of said corporation by authority of its board of directors; and the said A. P. VICTORS acknowledged said instrument to be his free and voluntary act and deed and the free and voluntary act and deed of said corporation, by it voluntarily executed, for the uses specified therein.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year last above written.

My Commission expires 8-19-88.

T. A. Peterson
Notary Public

Residing at Omaha, NE
(Seal)

GENERAL NOTARY - State of Nebraska
T.A. PETERSON
My Commission Expires
August 19, 1988

842548

EXHIBIT A

Parcel 1

A parcel of land situate in the William C. Laughlin Donation Land Claim No. 38, in Sections 2 and 3, all in Township 1 North, Range 13 East of the Willamette Meridian, in Wasco County, State of Oregon, bounded and described as follows:

Commencing at a United States Army Engineer's monument on the north line of said Laughlin D.L.C., said monument being 140.00 feet distant easterly, measured along said north line of Laughlin D.L.C., from the southeast corner of Lot 2 of said Section 3 and being the northwest corner of that certain parcel of land heretofore conveyed by Union Pacific Railroad Company to State of Oregon by Deed dated October 16, 1962, recorded on January 15, 1963, U.P.RR. Co. L.S.D.A. No. 3140;

thence easterly along the north line of said Laughlin D.L.C., a distance of 900.00 feet to the northeast corner of said deeded parcel of land and the TRUE POINT OF BEGINNING;

thence South 00 degrees 16 minutes 44 seconds East along the east line of said deeded parcel, a distance of 450.00 feet, more or less, to a point of the northerly line of that certain parcel of land conveyed by an agreement between both the Oregon-Washington Railroad & Navigation Company and Union Pacific Railroad Company with the State of Oregon, agreement dated November 1, 1962, Deed Audit No. 102320;

thence along the northerly line of said conveyed parcel, the following bearings and distances:

North 85 degrees 43 minutes 40 seconds East a distance of 90.00 feet;

South 89 degrees 43 minutes 55 seconds East a distance of 281.06 feet;

South 7 degrees 14 minutes 54 seconds West a distance of 260.00 feet;

South 71 degrees 24 minutes 13 seconds East a distance of 497.82 feet;

South 80 degrees 16 minutes 26 seconds East a distance of 197.33 feet;

South 87 degrees 49 minutes 42 seconds East a distance of 584.35 feet, more or less, to a point on the southerly prolongation of the west line of Lot 3 of said Section 2;

thence along said southerly prolongation of the west line of Lot 3, North 0 degrees 16 minutes 46 seconds East, a distance of 900.18 feet, more or less, to a point on said north line of Laughlin D.L.C.;

thence westerly along said north line of Laughlin D.L.C., a distance of 1,594.93 feet, more or less, to the TRUE POINT OF BEGINNING.

Containing an area of 1,203,897 square feet, (27.64 acres), more or less.

Parcel 2

A parcel of land situate in the William C. Laughlin Donation Land Claim No. 38, in Sections 1 and 2, all in Township 1 North, Range 13 East of the Willamette Meridian in Wasco County, State of Oregon, bounded and described as follows:

Commencing at a United States Army Engineer's monument on the north line of said Laughlin D.L.C., said monument being 140.00 feet distant easterly, measured along said north line of Laughlin D.L.C., from the southeast corner of Lot 2 of Section 3 in said Township and Range, and being the northwest corner of that certain parcel of land heretofore conveyed by Union Pacific Railroad Company to State of Oregon by Deed dated October 16, 1962, recorded on January 15, 1963, U.P.RR. Co. L.S.D.A. No. 3140;

thence easterly along the north line of said Laughlin D.L.C., a distance of 2,494.93 feet, more or less, to the southwest corner of Lot 3 of said Section 2 and the TRUE POINT OF BEGINNING;

thence South 00 degrees 16 minutes 46 seconds West along the southerly prolongation of the west line of said Lot 3 a distance of 900.18 feet, more or less, to a point on the northerly line of that certain parcel of land conveyed by an agreement between both the Oregon-Washington Railroad & Navigation Company and Union Pacific Railroad Company with the State of Oregon, agreement dated November 1, 1962, Deed Audit No. 102320;

thence along the northerly line of said conveyed parcel, the following bearings and distances:

South 87 degrees 49 minutes 42 seconds East a distance of 104.81 feet;

North 82 degrees 53 minutes 09 seconds East a distance of 492.67 feet to the beginning of a non-tangent curve concave northwesterly, the center of the circle of which the arc is a part bears North 7 degrees 57 minutes 06 seconds West, a distance of 7,051.97 feet;

thence northeasterly along said curve and along said northerly line, through a central angle of 1 degree 08 minutes 54 seconds, an arc distance of 141.34 feet to a point opposite the beginning of a spiral curve in the centerline of the relocated Columbia River Highway;

thence northeasterly, continuing along said northerly line of said conveyed parcel and parallel with said spiral in said centerline, through a spiral angle of 1 degree 36 minutes, (the long chord of said spiral in said centerline bears North 79 degrees 50 minutes East, a distance of 400.0 feet) an arc distance of 396.93 feet to a point opposite the end of said spiral curve in said centerline;

thence continuing along the northerly line of said conveyed parcel, North 79 degrees 18 minutes East, a distance of 3,645.68 feet;

thence northeasterly along said northerly line, a distance of 105.00 feet, more or less, to a point on said north line of Laughlin D.L.C.;

thence westerly along said north line of Laughlin D.L.C., a distance of 4,804.16 feet, more or less, to the TRUE POINT OF BEGINNING.

Containing an area of 2,311,808 square feet, (53.07 acres), more or less.

Microfilm No. 842548

INDEXED COMPARED
THE DALLES OR.

OCT 2 11 45 AM '81

SUE A. PROFFITT
COUNTY CLERK

STATE OF OREGON, County of Wasco, } ss

I certify that this document was received and recorded in the records.

Sue A. Proffitt, County Clerk

by _____ Deputy

Return to
Port of The Dalles
Box 457
TD

842548

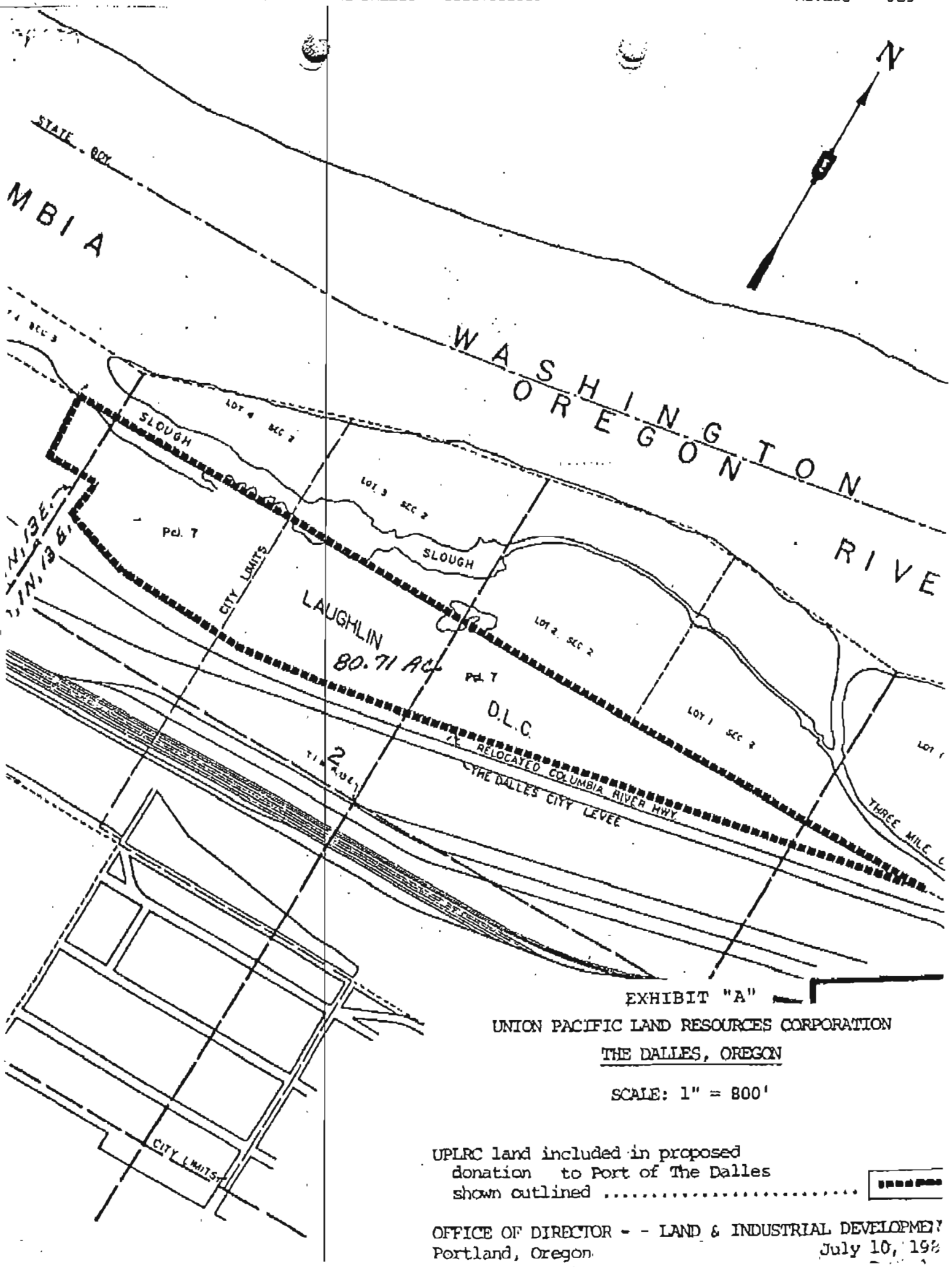


EXHIBIT "A"

UNION PACIFIC LAND RESOURCES CORPORATION

THE DALLES, OREGON

SCALE: 1" = 800'

UPLRC land included in proposed donation to Port of The Dalles shown outlined .....

OFFICE OF DIRECTOR - - LAND & INDUSTRIAL DEVELOPMENT
Portland, Oregon July 10, 198

COPY

RESOLUTION 88-08

WHEREAS, in July of 1984, Upland Industries, a subsidiary of Union Pacific Railroad Company donated to the Port of The Dalles approximately 80 acres, adjacent to the Columbia River and upstream of the Port of The Dalles Marina and launch ramp;

WHEREAS, the deed donating said property restricted the use of the land to community recreational purposes; and

WHEREAS, in January of 1985, the Port of The Dalles began planning and funding the construction of a community park of approximately 10 acres in size; and

WHEREAS, the Port of The Dalles, in conjunction with the City of The Dalles and the Wasco County Court, has filled approximately 2.8 acres of said park; and

WHEREAS, the voters of the Port District authorized the expenditure of $100,000 of the 1985 G.O. Bond Issue, to be utilized as a match to complete Phase I of Riverfront Park; and

WHEREAS, on May 19, 1987, the State of Oregon awarded to the Port of The Dalles $91,998 in a grant/loan mix to complete the construction of Phase I of Riverfront Park; and

WHEREAS, the construction of Phase I of Riverfront Park was completed in December of 1988; and

WHEREAS, Phase I of Riverfront Park was utilized by approximately 100,000 visitors during the summer months of 1988; and

WHEREAS, in March of 1989, the State of Oregon, through the Regional Strategies Program, awarded to Wasco County $295,000 for the completion of Phase II of Riverfront Park; and

WHEREAS, the Port of The Dalles has utilized monies from it's General Fund to maintain and operate Riverfront Park during the 1988 season; and

WHEREAS, this expense estimated at $12,000 per annum, is in excess of the normal maintenance fund of the Port of The Dalles; and

NOW, THEREFORE BE IT RESOLVED that the Port of The Dalles place before the taxpayers of the Port District a three year operating serial levy of $12,000 per annum, to operate and maintain Riverfront Park use by the general public; and

FURTHER, BE IT RESOLVED that monies raised from said serial levy shall be utilized exclusively for operation and maintenance of Riverfront Park for benefit of the general public.

ADOPTED by the Port of The Dalles Commission, April 12, 1989.

PORT OF THE DALLES

John E. Geiger
PRESIDENT

ATTEST:

Barbara L. Stone
SECRETARY

ATTACHMENT C

1996 Port of The Dalles – UPRR Agreement

AGREEMENT

THIS AGREEMENT, dated and effective as of October 4, 1996, is made and entered into by and between The Port of The Dalles (the "Port") and Union Pacific Railroad Company ("UP").

RECITALS

A. This Agreement arises out of environmental conditions at the Union Pacific Railroad Tie Treating Plant Site at the Dalles, Oregon (the "Tie Treating Plant Site"). The Tie Treating Plant Site includes an active wood-treating facility (currently operated by Kerr-McGee Chemical Corporation). The location of the Tie Treating Plant Site is described more specifically in Exhibit A.

B. The Port is the owner of certain real property, including Riverfront Park, located adjacent to the Tie Treating Plant Site (the "Port Property"), as described more specifically in Exhibit B. The Port Property, including Riverfront Park and a small area of Columbia River Sediments adjacent to the undeveloped portion of Riverfront Park, are off-site of the Tie Treating Plant Site.

C. The Port claims that contamination of shallow groundwater beneath the Port Property has resulted from environmental conditions at the Tie Treating Plant Site, and that UP is liable for the mandated remedies of the regulatory agencies which affect the Port Property (the "Subject Claims"). UP denies the Subject Claims.

D. The Port has granted UP access to the Port Properties to carry out preliminary remedial and study activities. UP has undertaken environmental studies pertaining to the Port Properties. UP has spent approximately $2,474,000 to date for Interim Remedial Actions ($1,630,000.00 for removal of contaminated soils from Riverfront Park, and $844,000 for construction of the Columbia River Sediment Cap) which benefit the Port Property.

E. A Remedial Investigation was completed for the Tie Treating Plant Site, including off-site areas, in August 1993. A Final Feasibility Study for the Tie Treating Plant Site was completed in September 1995 and approved by the Oregon Department of Environmental Quality's Waste Management Division, Site Response Section (Oregon DEQ) in October 1995.

F. Oregon DEQ prepared and issued a "Staff Report, Recommended Remedial Action for the Union Pacific Railroad Site, The Dalles, Oregon" in February 1996 (the "Recommended Remedial Action Report"). Oregon DEQ has made the Recommended Remedial Action report available for public review and comment. A Record of Decision subsequently was signed for the Tie Treating Plant Site on March 27, 1996 (the "ROD").

G. Among the elements of the Recommended Remedial Action identified in the Recommended Remedial Action Report and the Selected Remedial Action identified in the ROD is restriction on the use of groundwater.

H. The Parties desire to enter into this Agreement: 1) to ensure that groundwater within the unconfined aquifer at the Port Property including Riverfront Park is not accessed or used for any purposes and to impose certain other restrictive covenants; 2) to resolve any claims, causes of action or liabilities arising out of or related to contamination of such groundwater from contamination or environmental conditions at the Tie Treating Plant Site, as described more specifically below; and 3) to reimburse the Port for costs and expenses related to the Port's monitoring and oversight of UP's activities at the Port Site, including Riverfront Park and the Tie Treating Plant Site, and to finally resolve any liability for such costs and expenses.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained in this Agreement, the Parties agree as follows:

AGREEMENT

1. Payment by UP. UP shall pay the Port $10,000 in full and complete satisfaction of and to finally resolve any and all of the Port's past costs and expenses associated with or related to monitoring, review and oversight of UP's activities at the Port Properties, including Riverfront Park, and the Tie Treating Plant Site, and as consideration for the covenant not to sue in paragraph 2 below, the access provided in paragraph 4 below, and the covenants in paragraph 9 below. This amount shall be paid in full not later than 30 days following the effective date of this Agreement.

2. Port Covenant Not To Sue. In consideration of UP's payment of $10,000 and UP's prior remedial activities on or related to the Port Property, the Port, its successors and assigns, hereby agrees to release and covenant not to sue UP, its successors and assigns, officers, directors, affiliates, subsidiaries, employees, agents, contractors, from and for any past, present or future liabilities, losses, damages, claims, causes of action, fines, penalties, charges or expenses, including, without limitation, costs and reasonable attorneys' fees incurred in defending against any claims, and any administrative or judicial proceedings, orders, judgments or enforcement actions of any kind ("Claims"), arising out of the present or future environmental condition or contamination of the groundwater migrating onto, at, beneath or migrating from the Tie Treating Plant Site or the Port Property, including Riverfront Park, whether known or unknown as of the date hereof, except and as necessary to enforce the indemnity granted in paragraph 3 below.

3. UP Indemnity. To the extent allowed by law, and except as provided in paragraph 2 above, UP agrees to indemnify and hold harmless the Port, and the Port's lenders, lessees, contractors and subcontractors and partners for the Port Property, together with the successors and assigns of each such person or entity, against any Claims arising out of: (a) contamination from the Tie Treating Plant Site on the Port Property, whether known or unknown as of the date hereof, which has a direct and material adverse affect on the Port's Property; (b) any necessary

remediation required by the United States Environmental Protection Agency or the Oregon DEQ under applicable environmental laws for contamination in, under, or emanating from the Port Property and directly attributable to contamination from or remediation of the Tie Treating Plant Site; and (c) any damage to or loss of physical improvements located on the Port Property, caused or permitted by UP as a direct result of any remedial investigation or remediation of contamination on the Port Property. This agreement to indemnify and hold harmless shall not apply in the event of: 1) any material breach of any representation, covenant, or obligation made herein by the Port or any other person or entity afforded indemnification under this paragraph; 2) any action by the Port or any other person or entity afforded indemnification under this paragraph that results in exacerbation of or contribution to environmental conditions or containment on, about, beneath, from or related to the Port Property, including Riverfront Park, after the effective date of this Agreement; 3) any hindrance or interference, or failure to provide access as provided by this Agreement, with respect to implementation, operation or maintenance of remedial, monitoring, investigatory, or operation and maintenance activities on or related to the Port Property, including Riverfront Park; 4) general liabilities not associated with environmental conditions on, about, beneath from or related to the Port Property; or 5) any Claims based upon stigma or other theories premised upon the proximity of the Port Property to the Tie Treating Plant Site.

4. Access. The Port for itself, its successors and assigns, hereby agrees to grant access to the Port Property, including Riverfront Park, to UP, its successors, assigns, agents, employees, representatives, contractors, and subcontractors and to State and Federal agencies, as may be required to conduct testing, monitoring, investigations or remediation of environmental conditions or contamination on, about, beneath, from, or related to the Port Property, including Riverfront Park.

5. Contribution and Other Claims. Except as specifically provided in paragraphs 2 and 3 above, this Agreement is not intended in any way to limit any rights of contribution, cost recovery or other claims relating to environmental conditions or contamination that the Parties may have against any other persons or entities not a party to this Agreement

6. Definitions.

a. For purposes of this Agreement, the terms "Contamination" or "Contaminated" mean the presence of any substance defined or listed as a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act or any comparable state law that is applicable, including, without limitation, petroleum oil and its fractions, creosote, arsenic and pentachlorophenol, in the soil, water (including surface water and groundwater) or ambient air if: 1) such presence of a hazardous substance constitutes a violation of applicable environmental laws; or 2) a removal or remedial action is required with respect to such presence of a hazardous substance, or legally could be required, by a Federal or State governmental agency or court under applicable environmental laws.

b. For purposes of this Agreement, the term "Environmental Conditions" shall mean any condition, quality, or other state of the land, subsurface strata, air, surface water, soils, ground water, fish, wildlife, biota, including the presence of Hazardous Materials in any quantity, and also including without limitation any such condition, quality, or other state arising out of, related to or resulting from the release or threatened release, generation, transport, handling, treatment, storage, disposal, management, presence of or exposure to any Hazardous Materials.

c. For purposes of this Agreement, the term "Hazardous Materials" shall mean any substance (i) the presence of which requires investigation of or remediation under any federal, state or local statute, regulation, ordinance, order, action, policy or common law; or (ii) which is defined as a "hazardous waste," "hazardous substance," "hazardous or deleterious substance," "solid waste" or "pollutant or contaminant" or "hazardous material" under any federal, state or local statute, regulation, rule or ordinance or amendments thereto including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. §§ 9601 et seq.) and/or the Resource Conservation and Recovery Act (42 U.S.C. §§ 6901 et seq.), and/or Oregon's Environmental Cleanup Law, O.R.S. §§ 465.200 through 465.380, all as amended; or (iii) which is toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or hazardous; or (iv) the presence of which causes or

threatens to cause a nuisance or poses or threatens to pose a threat to human health, safety, the environment, or natural resources; or (v) without limitation which contains gasoline, diesel fuel or other petroleum hydrocarbons; or (vi) which contains polychlorinated bipheynols (PCBs), creosote, DNAPLs, PAHs, arsenic, pentachlorophenol, asbestos or urea formaldehyde foam insulation.

d. For purposes of this Agreement, the term "Party" shall mean Port or UP.

e. For purposes of this Agreement, the term "Parties" shall mean Port and UP.

7. Third Party Beneficiaries. Notwithstanding anything stated elsewhere in this Agreement, UP agrees, that purchasers of Port Property that assume the Port's duties and obligations hereunder, shall have third party beneficiary status as to the provisions of paragraph 3 above. Specifically, at the closing of a sale or transfer of Riverfront Park to Northern Wasco County Parks and Recreation District or fractional interest thereof, UP agrees to give said District transferee the specific written indemnity as contained in paragraph 3 above. This paragraph does not diminish in any way the rights and duties otherwise owed under this Agreement, or create any other rights, duties or obligations in or to third parties. Except as specifically set forth herein, this Agreement shall not create third party beneficiaries, and none of the provisions of this Agreement shall be deemed to be for the benefit of any person or entity not a party to this Agreement.

8. Restrictive Covenants.

a. Within thirty (30) days of the effective date of this Agreement, The Port shall institute a restrictive use covenant which shall provide that ground water within the unconfined aquifer on the Port Property, including Riverfront Park in The Dalles, Oregon, shall not be accessed or used for any purpose other than as provided within the terms of the restrictive use covenant. Such restrictive use covenant shall burden the Port Property and River Front Park and shall run with the land and be binding upon any successors-in-interest, including any

successor owners of all or any part of the Port Property, including Riverfront Park. The restrictive use covenant shall prohibit the use, construction, installation and operation of any water well within the Port Property described in Exhibit B (except for testing and monitoring wells), but shall not restrict the use of the stilling well currently used by the Port to maintain water levels in the waterfowl or mitigation pond. The restrictive covenant shall also provide that the Port and successors in interest shall not excavate soils in a significant way, nor undertake any below ground level construction or alteration, or otherwise disturb the ground, soils or ground water in a way that may cause the migration of contamination without obtaining the express permission of UP and Oregon DEQ . The restrictive covenant shall also prohibit development of the Port Property or River Front Park for residential use. The restrictive covenant shall prohibit any development or construction by the Port which would interfere or hamper remedies currently implemented on the Port Property and Riverfront Park, or which are required to be implemented under applicable law by governmental entities. Exhibit C, attached hereto, depicts that unconfined aquifer where the ground water's use shall be restricted and the stilling well, and the location of residual soils contamination on the Port Property, including Riverfront Park.

b. The Port and UP shall agree on the specific form of the restrictive covenant to be filed. Nothing contained in the restrictive use covenant shall be deemed or construed to restrict the Port or its successors in interest from using the Port Property described in Exhibit B as a park, nature trail, or riverfront trail for the public use and benefit, or to restrict in the future public uses occurring as of the date of this agreement. The restrictive use covenant to be filed shall expressly provide that such public uses of the Port Property are not limited by the restrictive use covenant and are protected and preserved in perpetuity.

9. Binding Effect on Subsequent Transferees. In the event that the Port transfers or conveys all or any part of its interest in the Port Property, including without limitation any leasehold interest, the Port shall include in its transfer or conveyance documents the release and covenant not to sue described in paragraph 2 above, the access provisions in paragraph 4 above, and the restrictive covenants described in paragraph 8 above. No subsequent grant, transfer, lease or conveyance of title, easement or other form of conveyance or transfer of any interest in

all or any portion of the property shall be made or effected without these provisions. All such subsequent conveyances of title, grants, transfers or conveyance of any interest in all or any of the Port Property shall contain such provisions, except that each subsequent transferee's name shall be substituted in each subsequent documents as the person or entity subject to the above provisions and bound by such provisions.

10. No Admission of Liability. Nothing herein shall be construed as an admission of liability by either of the Parties, or of any of the terms and conditions contained herein. This Agreement may not be admitted into evidence in any judicial or administrative proceeding except for a proceeding to enforce this Agreement, including the Indemnity provision of paragraph 3 above. By entering into this agreement, UP does not admit and expressly denies any liability pertaining to contamination or environmental conditions at, to, from, beneath, about or related to the Tie Treating Plant Site or the Port Properties, including Riverfront Park.

11. Governing Law. This Agreement shall be governed by the laws of the state of Oregon. In any enforcement of this Agreement and the indemnity contained in paragraph 3 above, the parties stipulate that such action shall be brought in and resolved by a general Oregon state court of competent jurisdiction and venue.

12. Remedies. All remedies, available at law or in equity, including specific performance, shall be available for the enforcement of this Agreement. The Parties agree that this Agreement is capable of specific performance.

13. Authority. Each party warrants that the individual executing this Agreement acts with authority to bind that party.

14. Termination. This Agreement shall remain in force and effect until it is mutually terminated by written agreement of the parties.

15. Negation of Agency Relationship. This Agreement shall not be construed to create, either expressly or by implication, the relationship of agency or partnership between or among the Parties. No Party (including such Party's agents, employees or contractors) is authorized to act on behalf of any other Party in any manner relating to the subject matter of this Agreement. No party shall be liable for the acts, errors or omissions of the officers, agents, employees or contractors of any other Party entered into, committed or performed with respect to or in the performance of this Agreement.

16. Binding Effect. This Agreement is binding upon the Parties, their successors and assigns, and any subsequent transferees as provided by paragraph 10.

17. Perpetuities. Notwithstanding any provision of this Agreement to the contrary, any right to acquire any interest in real property or personal property under this Agreement must be exercised, if at all, so as to vest such interest in the acquirer within the time period allowed under applicable law.

18. Counterparts. This Agreement may be executed in any number of counterparts, each of which may have the signature of only one party, but each of which shall be deemed an original, and all of which, when taken together, shall be deemed to be a single agreement among all the parties.

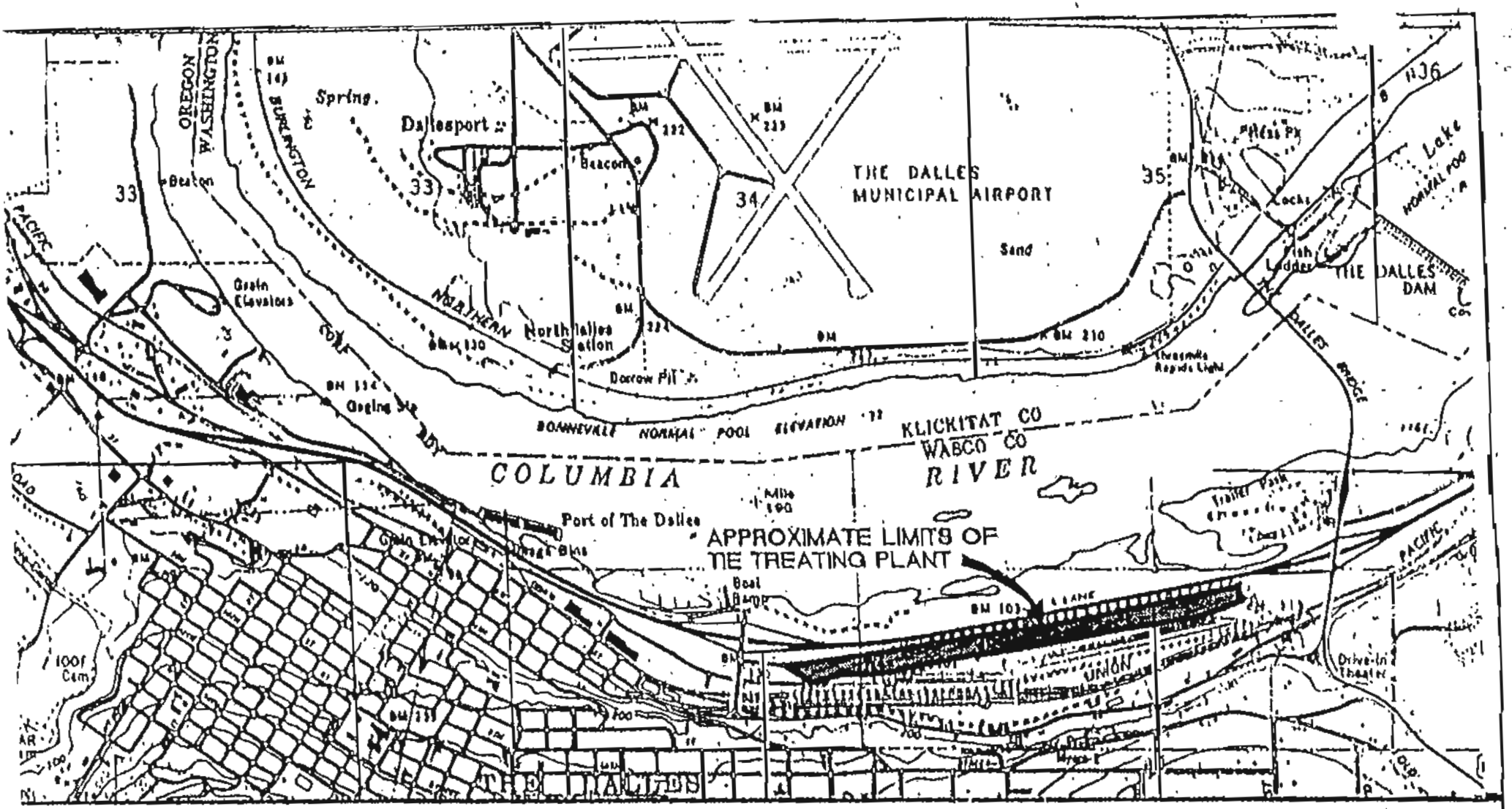
DATED as of _____, 1996.

THE PORT OF THE DALLES

By: _____
Title: Port President

UNION PACIFIC RAILROAD COMPANY

By: _____
Title: Assistant Vice-President, Law



NORTH

0 1000 2000 FEET

SCALE

LEGEND

Approximate Limits/Boundary

SOURCE:
USGS Base Map, 1977, The Dalles South, 7.5 Quadrangle

MAP LOCATION.

EXHIBIT A

Figure 1

SITE LOCATION

UNION PACIFIC RAILROAD COMPANY
TIE-TREATING PLANT – THE DALLES, OREGON

Source: Final Remedial Investigation Report, Tie Treating Plant, The Dalles, Oregon. Prepared by CH2M Hill, July 1993

03-16-92 0077C51.DWG

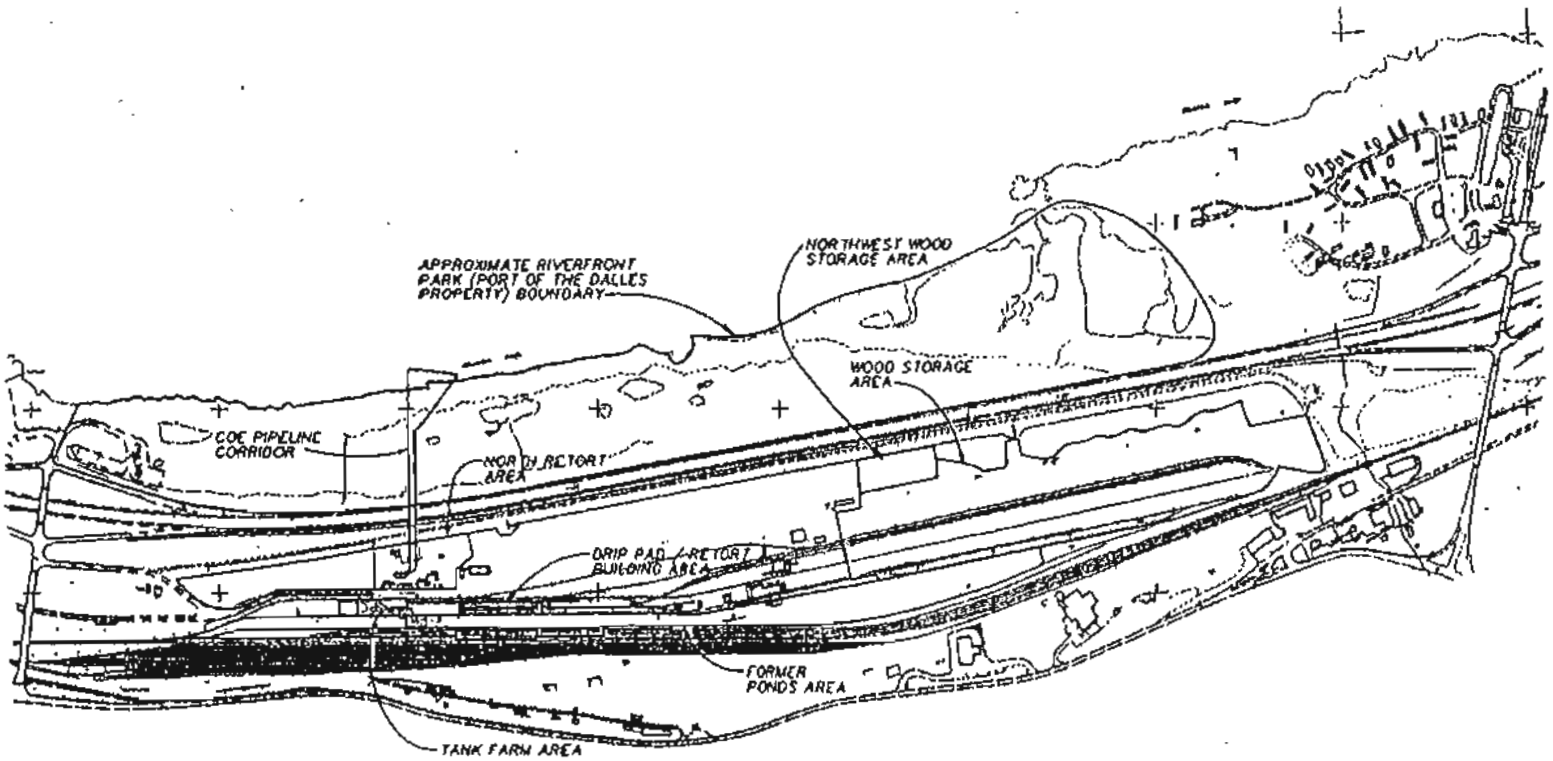


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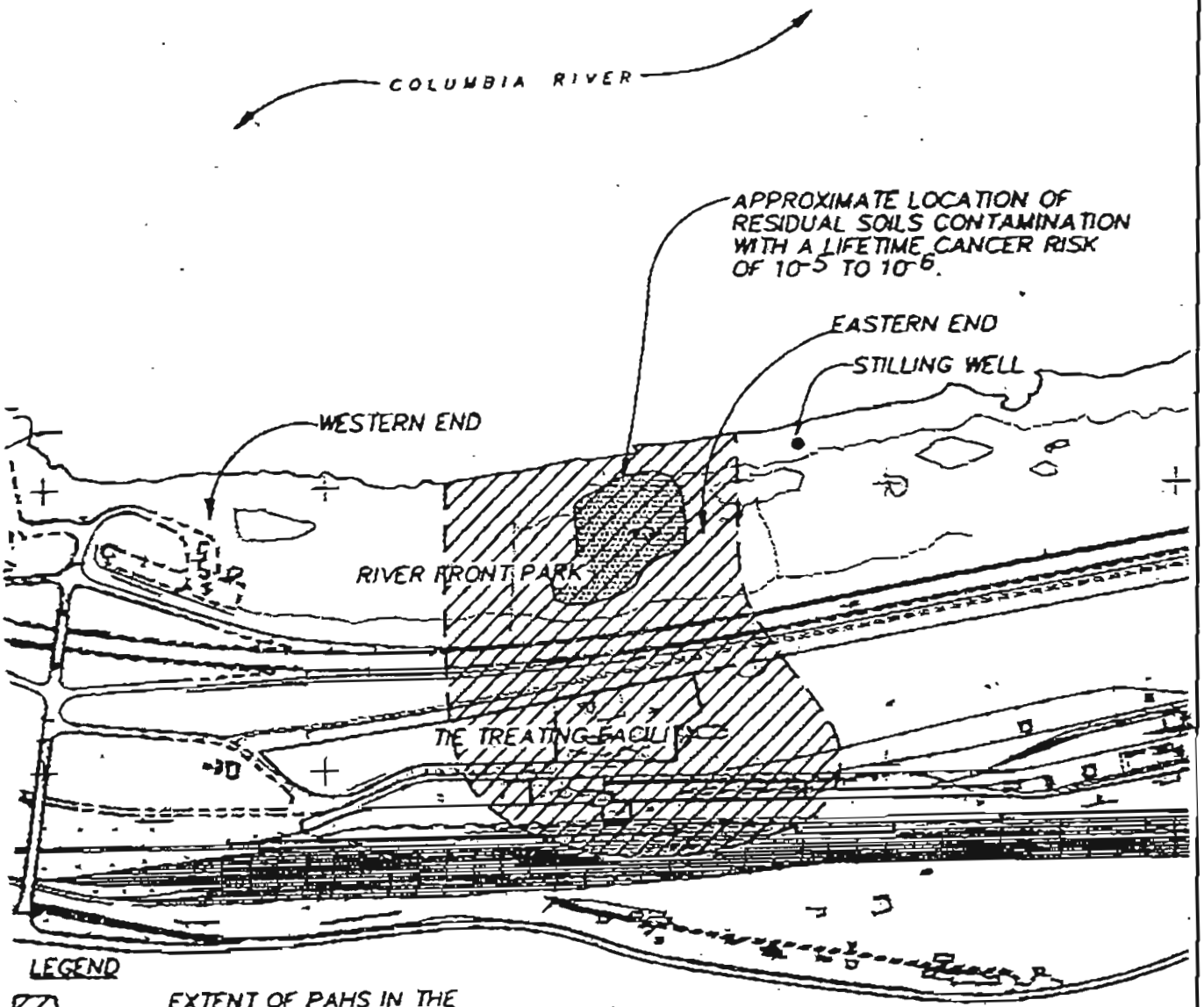
EXHIBIT B
FACILITIES LAYOUT AND RI OPERABLE UNIT DESIGNATIONS
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT - THE DALLES, OREGON

12-Feb-1996 E:\20077\CAD\C100.DWG



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SCALE: 1"=600'

EXHIBIT C
RIVERFRONT PARK
UNION PACIFIC RAILROAD COMPANY
TIE TREATING PLANT-THE DALLES, OREGON

CH2M HILL

APPENDIX E

UPRR/Amerities West, LLC, Institutional Controls Agreement

Lessor, for any amount so paid by Lessor within ten (10) days after receiving written demand therefor.

ARTICLE 8
QUIET ENJOYMENT

Lessor covenants, represents and warrants that it has full right and power to execute and perform this Lease and to grant the estate demised herein and that Lessee, subject to the terms and conditions of this Lease and performance of the covenants and agreements hereof shall peaceably and quietly have, hold and enjoy the Premises, subject to the terms and conditions set forth herein, without molestation or hindrance of any person claiming by, through or under Lessor. Lessor agrees to defend any claims against title, which materially or substantially impact or impair Lessee's use of the Premises.

ARTICLE 9
USE OF PREMISES

9.1 Permitted Use. Lessee shall use the Premises during the Term solely for the use specified in Article 1.7 above, and Lessee shall not use or suffer or permit the Premises (or any portion thereof) to be used for any other purpose whatsoever. Lessee, at Lessee's expense, shall promptly comply with all present and future federal, state or local laws, ordinances, orders, rules, regulations and requirements of all governmental authorities having jurisdiction, affecting or applicable to the Premises, including, but not limited to the applicable requirements of the Resource Conservation and Recovery Act ("RCRA"), the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. Sections 9601, et seq., as heretofore or hereafter amended, and the regulations heretofore or hereafter promulgated pursuant to such Act (collectively, "CERCLA"), the Clean Water Act ("CWA") and other laws or regulations that govern the cleanliness, safety, occupancy and use of the same. If any governmental license(s) or permit(s) shall be required for the proper and lawful conduct of Lessee's business or other activity carried on from the Premises, then Lessee, at its sole expense, shall duly procure and thereafter maintain such license(s) or permit(s) and submit the same for inspection by Lessor prior to the Commencement Date and thereafter upon Lessor's request therefor.

9.2 Specific Use Restrictions. Unless approved by Lessor, which approval may be granted or withheld in Lessor's sole discretion, Lessee shall not do any of the following:

(a) Use, develop or attempt to use or develop the Premises or any portion thereof for any purpose other than the purposes expressly allowed (without the benefit of a conditional use permit, zoning variance, exception or amendment) as of the Commencement Date under the municipal, county, state and federal statutes, laws, ordinances, judicial decisions, rules and regulations, including zoning ordinances and regulations (collectively "Regulations") applicable to the Premises;

(b) Change or attempt any change in zoning, or obtaining or applying for a conditional use permit, zoning variance or exception or other similar approval with respect to the use or development of the Premises or any portion thereof not expressly allowed under the existing Regulations as of the Commencement Date;

(c) Construct or maintain any building or other Improvements on the Premises not in full compliance with all requirements of law, the provisions of this Lease or in any recorded covenants, conditions and restrictions existing from time to time and encumbering the Premises.

9.3 Hazardous Substances; Disclosure; Access.

(a) As used in this Agreement, the term "Hazardous Substance", "Hazardous Waste" or "Hazardous Material" shall mean the following: (i) those substances included within the definitions of "hazardous substance," "pollutant," or "contaminant" in CERCLA, (ii) the definitions pursuant to Section 1004 of RCRA, and state laws and regulations similar to or promulgated pursuant to such Acts; (iii) any material, waste or substance which is (A) petroleum, (B) asbestos, (C) flammable explosive, or (D) radioactive; and (iv) such other substances, materials and wastes which are or become regulated or classified as hazardous or toxic under federal, state or local law.

(b) Lessee shall use the Premises during the Term solely for the use specified in Article 1.7 above, and Lessee shall not use or suffer or permit the Premises (or any portion thereof) to be used for any other purpose whatsoever. Lessee hereby releases Lessor and Lessor's Affiliates from all liability arising out of or in any manner whatsoever resulting from Lessee's use of any Hazardous Substance on the Premises during the Term.

(c) Lessor acknowledges that it has ongoing remediation obligations to federal and state agencies relating to the Premises. Lessor agrees to retain all liabilities, costs, damages, and expenses arising in connection with conditions (i) existing on the Environmental Liability Date, or (ii) arising after the Environmental Liability Date that result from activities or events prior to the Environmental Liability Date (hereafter "Retained Environmental Liabilities"). The Retained Environmental Liabilities shall not include any condition or event that is caused by Lessee while occupying the Premises or conducting operations described in Article 1.7.

(d) Nothing contained herein shall be construed or interpreted as making Lessor an owner, operator, generator, arranger or a transporter of hazardous substances or wastes or an operator of a treatment, storage or disposal facility pursuant to the provisions of CERCLA, RCRA, or any other federal, state or local laws, statutes, rules and regulations governing the generation, treatment, storage and disposal of hazardous and non-hazardous substances or wastes, except with respect to Retained Environmental Liabilities.

(e) If, based solely on the operations by Lessee on the site after the Environmental Liability Date, Lessor shall be interpreted to be an owner, operator, generator or a transporter of hazardous substances or wastes or a generator, arranger or operator of a treatment, storage or disposal facility under RCRA, CERCLA or any state statute governing the treatment, storage and disposal of hazardous wastes, Lessee agrees to indemnify, hold harmless and defend Lessor from and against any and all liabilities, costs, damages or expenses of any sort resulting from such an interpretation, except with respect to Retained Environmental Liabilities.

(f) Without limiting Lessee's obligations under Article 10 of this Lease, Lessee shall protect, defend, indemnify and hold harmless Lessor and any parent, subsidiary or affiliate of Lessor, the officers, directors, shareholders and employees of Lessor and any such parent, subsidiary or affiliate of Lessor, and the successors and assigns of any of the foregoing (collectively, "Lessor's Affiliates") from and against any and liabilities, losses, damages, claims, demands, causes of action, costs and expenses, fines and penalties, of whatsoever nature (including, without limitation, court costs and reasonable attorneys' fees and the cost and expense of cleaning, restoration, containment, remediation, decontamination, removal, investigation, monitoring or closure), arising out of and from (i) the use of the Premises during the Term of this Lease by the Lessee for any Hazardous Substance use regardless of Lessor's consent to such use, other than Retained Environmental Liabilities; and (ii) any Hazardous Substance which otherwise first becomes present in, on or under the Premises during the Term of this Lease, as a result of any acts of Lessee other than Retained Environmental Liabilities.

(g) Lessee acknowledges having been informed by Lessor: (i) that the Premises are listed as a Superfund site by the United States Environmental Protective Agency with site remediation work administered by the Oregon Department of Environmental Quality; (ii) that there are previous agreements with the ODEQ including:

(1) Deed restrictions. Includes restrictions on groundwater and soil handling and a Right of Entry for ODEQ staff during reasonable hours; that a worker health and safety program will need to be implemented by Lessee;

(2) Expanded Worker Health and Safety Requirement. Requires workers be protected from wood treating constituents present in soils above levels considered protective.

(3) Site Access Controls. Access control using fencing is a required component of the site remedy. Lessee will maintain the existing fencing at the site with site access controlled during non-working hours.

(h) Lessee will make its best efforts to give reasonable notice to Lessor if it has knowledge that its activities are likely to trigger deferred soil investigations. Lessee will give reasonable access to Lessor to collect the required soil samples and perform the required analyses prior to continuing work on the project that triggered the deferred soil investigation. Situations that trigger the deferred investigation are:

(1) Removal and/or replacement of tank from the tank farm area;
(2) Demolition and/or replacement of the retort building or drip pad or any other structure in the north retort area; and
(3) Groundwater or NAPL monitoring data indicates that there is a significant source undiscovered source of groundwater contamination at the plant site.

(i) Lessor hereby reserves for itself, its employees, contractors, consultants and agents the right to enter upon the Premises, 24 hours a day, 365 days a year as provided in this Agreement as Lessor may reasonably deem necessary or appropriate, to operate and maintain the existing remediation systems, to expand remedial systems and to perform environmental investigations or characterization or remediation. This license shall include, without limitation: the right to install soil test borings; installation of groundwater monitoring wells; soil removal and replacement; installation of soil vapor extraction wells; installation of soil vapor monitoring wells; installation of contaminant extraction/recovery wells; installation of utility trenches; installation of contaminant recovery equipment and appropriate enclosures; storage of containerized investigation/remediation derived wastes; and use of soil stockpiles. When Lessor no longer requires use of any monitoring or recovery system installed in connection with this license, Lessor shall remove such monitoring and recovery system, except that trenches and wells may be abandoned in place. Notwithstanding the license reserved in this Article 9.3(i), nor any other provision of this Agreement, Lessor shall not unreasonably interfere with Lessee's operations on the Premises.

(j) The current system consists of 29 groundwater extraction wells, 20 injection wells, four oil-water separation systems, a water treatment plant and an effluent discharge line. Lessee agrees to conduct wood treating operations in a manner that protects the existing groundwater remedial systems including, but not limited to the following:

1) Protection of Equipment. The groundwater remediation system is distributed in the retort area of the site. There is both above-ground and below-ground equipment. Lessee agrees to repair and/or replace damage to this equipment that has been caused as a result of any act of Lessee, its contractors, subcontractors, agents or invitees of Lessee. All other repairs and replacement shall be completed at Lessor's sole cost and expense.

2) Expansion of System. Although unlikely, there is a potential that the groundwater remediation system could be expanded in the future if a new source to groundwater contamination is discovered, Lessee agrees to provide reasonable access to the site to accommodate future expansions of the groundwater remedial system.

3) Retort Building Piping Chase. A piping chase in the retort building is used for piping to transfer water and recovered oil from the south to the north side of the retort area. Lessee agrees to repair and/or replace damage to piping and other parts of the remedial system located in plant structures if such damage has been as a result of any independent act of Lessee, its contractors, subcontractors, agents or invitees of Lessee. All other repairs and replacement shall be completed at Lessor's sole cost and expense.

(k) Subsurface soil at the site may be classified as a RCRA hazardous waste if excavated. Any Party, including its contractors, subcontractors or other agents acting on their behalf, who excavates any soil shall be responsible, at its sole cost and expense for proper disposal of any hazardous waste generated, released or disturbed by such excavation. If the soil excavation is required by governmental law, order, or regulation to inspect, repair, or remediate a structure, equipment or soil condition that existed prior to the Environmental Liability Date or arises after the Environmental Liability Date but results from activities or events prior to the Environmental Liability Date, the costs for such disposal shall be borne by Lessor. Lessee shall obtain the consent of Lessor prior to commencing any substantial excavation of soil on the Premises.

(l) The Parties acknowledge that, as of the Environmental Liability Date Lessor and/or its environmental contractors are operating ground remediation oil cars in and around the Premises. Lessee agrees that, during the Term, it will permit Lessor and/or its contractors to operate and store ground remediation oil cars in and around the Premises at no charge. Lessor agrees to indemnify, hold harmless and defend Lessee, any financial institution as permitted by Article 18.14, and any parent, subsidiary or affiliate of Lessee or such financial institution, the officers, directors, shareholders and employees of Lessee and any such parent or affiliate, and the successors and assigns of the foregoing (collectively "Lessee's Affiliates") from and against any and liabilities, losses, damages, claims, demands, causes of action, costs and expenses, fines and penalties, of whatsoever nature, including, without limitation, court costs and reasonable attorneys' fees, and the cost and expense of cleaning, restoration, containment, remediation, decontamination, removal, investigation, monitoring or closure arising out of or resulting from the activities of the Lessor and/or its consultants and other agents on the Premises.

(m) Without limiting other obligations under this Lease, Lessor shall protect, defend, indemnify and hold harmless Lessee and Lessee's Affiliates from and against any and liabilities, losses, damages, claims, demands, causes of action, costs and expenses, fines and penalties, (including, without limitation,

court costs and reasonable attorneys' fees, and the cost and expense of cleaning, restoration, containment, remediation, decontamination, removal, investigation, monitoring or closure), arising out of and/or resulting from the Retained Environmental Liabilities or any federal, state or local law, ordinance, rule or regulation applicable thereto, including, without limitation, RCRA or CERCLA and any damages or costs or remediation arising out of or resulting form the Retained Environmental Liabilities. Lessor promises to continue to perform remediation, clean-up, removal, investigation and all other necessary work as required by any governmental agency relating to the Retained Environmental Liabilities.

ARTICLE 10
INSURANCE AND INDEMNITY

10.1 Property and Liability Insurance. Lessee, at no cost or expense to Lessor, shall procure and maintain the insurance coverage set forth on Exhibit D attached hereto and made a part hereof throughout the Term or any extension thereof. Certificates of Insurance evidencing the required coverage shall be furnished to Lessor prior to Lessee taking possession of the Premises. The All Risk Property Insurance shall include debris removal and demolition in case of casualty.

10.2 Liability Limits. The limits of the insurance required by this Lease to be obtained by Lessee shall in no event limit the liability of Lessee or relieve Lessee of any obligation under this Lease.

10.3 Release/Indemnity. Lessee, to the extent it may lawfully do so, waives and releases any and all claims against Lessor for, and agrees to indemnify, defend and hold harmless Lessor and Lessor's Affiliates from and against, any loss, personal injury, liability, claim, demand, cost or expense (including, without limitation, attorneys' fees and court costs), fine or penalty (collectively, "Loss") incurred by any person (including, without limitation, Lessor, Lessee, or any employee of Lessor or Lessee) and arising from or related to (i) any use of the Premises by Lessee or any invitee or licensee of Lessee, (ii) any act or omission of Lessee, its officers, agents, employees, licensees or invitees, or (iii) any breach of this Lease by Lessee, except in each case with respect to the Retained Environmental Liabilities. This release and indemnity shall not apply to the extent said Loss was caused by the negligence of any indemnified party. For the purposes of this section, "invitee or licensee of Lessee" shall be deemed to exclude Lessor and Lessor's agents and/or other contractors working on the Premises.

ARTICLE 11
REPAIRS AND MAINTENANCE; FENCING; CLEARANCE STANDARDS

APPENDIX F

Modified Attachment C of the Consent Order

FILED
WASCO COUNTY

2002 MAY 13 A 8:45

TRIAL COURT ADMIN

BY _____

CIRCUIT COURT OF OREGON

WASCO COUNTY

STATE OF OREGON, DEPARTMENT OF ENVIRONMENTAL QUALITY Plaintiff, v. UNION PACIFIC RAILROAD COMPANY, a Utah Corporation, Defendant.	Case No. CC 97-8 MOTION FOR ORDER APPROVING MODIFICATION OF CONSENT DECREE

The State of Oregon, Department of Environmental Quality ("DEQ"), requests that the Court enter an order approving modification of the Stipulation and Consent Decree currently lodged with the Court under Wasco County Case No. CC 97-8. Counsel for Union Pacific Railroad Company ("UPRR") has represented to the undersigned counsel for DEQ that UPRR supports this motion.

1.

On January 31, 1997, The Honorable John V. Kelly ordered entry of the Stipulation and Consent Decree ("Consent Decree ").

2.

The Consent Decree provides for remediation of hazardous substances at property owned by UPRR in The Dalles, Oregon. That remediation includes the extraction and treatment of contaminated groundwater, and discharge of the treated water to Threemile Creek in accordance with discharge limitations and other requirements set forth in Attachment C to the Consent Decree. (See Consent Decree Paragraph 4.I.(3))

RECEIVED
MAY 22 2002
Eastern Region - Bend

Department of Justice
1515 SW Fifth Ave, Suite 410
Portland, OR 97201
(503) 229-5725

3.

Attachment C was modified upon motion of the parties, by order of this Court dated April 7, 1999.

4.

Based on recent data, DEQ and UPRR have determined that the discharge limits and other requirements set forth in Attachment C should be modified a second time, generally as follows:

(a) Eliminating the discharge limits and monitoring requirements for water quality parameters no longer of concern -- i.e., biological oxygen demand, total suspended solids, and alkalinity.

(b) Revising discharge limits for other parameters based on differing flow and dilution conditions.

(c) Reducing the discharge limit for iron.

5.

A copy of Attachment C as proposed to be modified by the parties is attached to this motion.

6.

On March 1, 2002, DEQ provided public notice and opportunity to comment on the proposed modifications to Attachment C. The public comment period ended April 1, 2002. No comments were received.

7.

Under Subsection 4.R. of the Consent Decree, modifications of the Consent Decree, including Attachment C, require approval by this Court.

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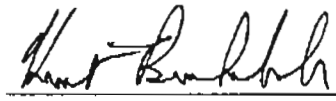
Department of Justice
1515 SW Fifth Ave, Suite 410
Portland, OR 97201
(503) 229-5725

The State of Oregon therefore respectfully requests that the Court enter the order set forth below approving the modified Attachment C. Counsel for UPRR, David P. Young, has represented to the undersigned counsel that UPRR supports this motion.

DATED this 9th day of May, 2002.

HARDY MEYERS
Attorney General



Kurt B. Burkholder OSB No. 80465
Assistant Attorney General
Of Attorneys for Plaintiff
Oregon Department of Justice
1515 SW 5th Avenue, Suite 410
Portland, OR 97201
(503) 229-5725

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ORDER

Upon motion by the State of Oregon, this Court approves modification of Attachment C to the Stipulation and Consent Decree, Wasco County Case No. CC97-8, which modified Attachment C is attached hereto.

SO ORDERED this 13 day of May 2002.

CIRCUIT COURT JUDGE
WASCO COUNTY

Department of Justice
1515 SW Fifth Ave, Suite 410
Portland, OR 97201
(503) 229-5725

Attachment C

NPDES Discharge Limitations, Monitoring and Reporting Requirements

This attachment establishes conditions, effluent discharge limits, monitoring, and reporting requirements for discharge of treated water resulting from the extraction of groundwater from the unconfined water-bearing zone at the UPRR site in The Dalles, Oregon. UPRR will operate the extraction system and treatment plant as part of a remediation action set forth in the ROD. These conditions, discharge limits, monitoring, and reporting requirements are comparable to those that would be required under a National Pollutant Discharge Elimination System (NPDES) permit and are established in lieu of a permit, pursuant to OAR 340-045-0062.

I. Conditions

A. Treated effluent may be discharged only to Three Mile Creek based upon three (3) stream flow conditions:

- Low (≤ 300 gpm or less), when stream water available for dilution is limited (July-October);
- Normal (300 to 500 gpm), when stream flow and treatment plant effluent flows are adequate for standard operation (November-June); and,
- High (≥ 500 gpm or more), when stream flow available for dilution is ample (November-June).

For each flow condition, a minimum dilution requirement, and discharge limits based on the minimum dilution necessary to maintain ambient water quality in Three Mile Creek, are specified in Section II below.

Stream flow between November and June (inclusive) is considered adequate to provide the dilution necessary for normal operating conditions, and is therefore not monitored during this period. Stream flows measured during monitoring periods (July through October, or when high flow limits are desired) will be used to represent stream flow until the next scheduled stream flow measurement.

B. In the event monitoring results show any exceedance of the discharge limitations, the discharge shall immediately be stopped and the DEQ Site Response Project Manager and the DEQ's Eastern Region Water Quality Source Control section shall immediately be notified.

C. UPRR shall operate and maintain the treatment system in a manner that optimizes treatment system contaminant removal efficiency.

II. Discharge Limits and Monitoring Requirements

The following tables specify the discharge limits and monitoring requirements for the flow conditions described in Section I above:

Table 1

Discharge Limits & Monitoring Requirements During **Normal** Flow Conditions (300-500 gpm)

Parameter	Discharge Limit	Monitoring Frequency	Sample Type
Effluent Flow	≤ 30 gpm and ≤ 1/10 the flow in Three Mile Creek	Daily	Measurement
Three Mile Creek Flow	N/A	Not measured (November through June) Twice/month (July to October)	Not measured Handheld ultrasonic Monitor (Flowtote)
Arsenic	190 µg/L	Once/month	Grab
PCP	10 µg/L	Once/month	Grab
PAHs	10 µg/L for each PAH	Once/month	Grab
TDS	1,200 mg/L	Once/month	Grab
PH	6.5 – 8.5	Once/month	Grab
Chloride	700 mg/L	Once/month	Grab
Iron	3.0 mg/L	Once/month	Grab

Table 2

Discharge Limits & Monitoring Requirements During **Low** Flow Conditions (300 gpm or less)

Parameter	Discharge Limit	Monitoring Frequency	Sample Type
Effluent Flow	≤ 30 gpm and ≤ 1/5 the flow in Three Mile Creek	Daily	Measurement
Three Mile Creek Flow	N/A	Twice/month (July to October)	Handheld ultrasonic Monitor (Flowtote)
Arsenic	190 µg/L	Once/month	Grab
PCP	10 µg/L	Once/month	Grab
PAHs	10 µg/L for each PAH	Once/month	Grab
TDS	1,200 mg/L	Once/month	Grab
PH	6.5 – 8.5	Once/month	Grab
Chloride	700 mg/L	Once/month	Grab
Iron	1.5 mg/L	Once/month	Grab

Table 3

Discharge Limits & Monitoring Requirements During **High** Flow Conditions (500 gpm or more)

Parameter	Discharge Limit	Monitoring Frequency	Sample Type
Effluent Flow	≤ 50 gpm and ≤ 1/10 the flow in Three Mile Creek	Daily	Measurement
Three Mile Creek Flow	N/A	Twice/month	Visual staff gauge only if effluent flow > 30 gpm
Arsenic	190 µg/L	Once/month	Grab
PCP	10 µg/L	Once/month	Grab
PAHs	10 µg/L for each PAH	Once/month	Grab
TDS	1,200 mg/L	Once/month	Grab
PH	6.5 – 8.5	Once/month	Grab
Chloride	700 mg/L	Once/month	Grab
Iron	3.0 mg/L	Once/month	Grab

Notes: Discharge limits are based on achievable limits using Best Demonstrated Available Technology for treatment of the groundwater containing PAH, PCP, BTEX, and arsenic and that are necessary to prevent violation of in-stream water quality standards as set in OAR 340-41. The treatment process consists of carbon treatment and coprecipitation systems. Relative to in-stream water quality standards, for those parameters that are potentially toxic, the discharge limits have been set at levels such that concentrations in the receiving stream for those parameters will be less than the chronic toxicity as established in OAR 340-41, Table 20. Parameters with higher limits have discharge limits set at levels such that after mixing concentrations in the receiving stream will be less than chronic toxicity levels.

III. Monitoring and Reporting

Monitoring frequency and sample collection methods are specified in Tables 1, 2, and 3 in Section II above. Grab samples shall be collected at the point of discharge from the treatment system.

Notes: Test methods should generally conform to requirements under 40 §CFR, Part 136 and as required under a DEQ-approved sampling plan. No changes to the sampling plan may be made unless otherwise approved in writing by the DEQ.

A. Analytical Methods must have a detection limit that is less than of equal to ½ the discharge limitation. The pH may be measured in the field using a portable pH meter with accuracy greater than +/- 0.1 pH units.

B. Monitoring reports shall be submitted quarterly to the DEQ Site Response Project Manager.

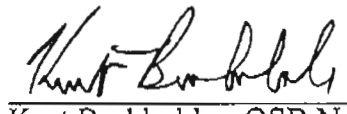
C. The DEQ will review these limitations and requirements every five (5) years, in accordance with ORS 468.B.050.

CERTIFICATE OF SERVICE

I certify that, on May 9 2002, I served a true and correct copy of the foregoing Motion for Order Approving Modification of Consent Decree, with Attachment C, by regular mail, postage prepaid, to:

David P. Young
Law Department, Room 830
Union Pacific Railroad Company
1416 Dodge Street
Omaha, Nebraska 68179

Attorney for Union Pacific Railroad Company



Kurt Burkholder, OSB No.80465
Assistant Attorney General
Of Attorneys for Plaintiff

Department of Justice
1515 SW Fifth Ave, Suite 410
Portland, OR 97201
(503) 229-5725

APPENDIX G

UPRR Financial Assurance

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701
(541) 388-6146
Eastern Region
Bend Office

February 26, 2003

Mr. Jeff Gentry, P.E.
CH2MHill
825 NE Multnomah, Suite 1300
Portland, OR 97232-2146

Re: Financial Assurance Documentation
Union Pacific Railroad (UPRR)
Tie Treating Plant
ECSI # 54

Dear Mr. Gentry:

The Department (DEQ) has received and reviewed your proposal related to financial assurance at the above-referenced facility, which is dated February 24, 2003. This proposal seeks a reduction in the amount of financial assurance required by the DEQ based upon anticipated future cost associated with remedy implementation.

Based upon its review, the DEQ agrees that it is appropriate to reduce the financial assurance requirements based upon estimated remedial action costs as projected in the February 24th request. Should these cost estimates prove to be underestimated, the DEQ will require future adjustments to the associated financial assurance requirement for this facility.

Based upon our telephone conversation on February 19, 2003, I have the impression that UPRR is changing the procedure which they used to document financial assurance with the DEQ. Specifically, I understand that financial assurance guarantees will be provided separately for individual facilities.

Please address verification of financial assurance pursuant to this letter approval to my attention. The new approved amount of required financial assurance is the amount specified in Table 2 of your proposal ($9,562,000.00).

If you would like to discuss this matter further, please contact me at (541) 388-6146, ext. 224.

Sincerely,

W. C. Walkey

William C. Walkey
Hydrogeologist

WCW/ns
C: Gary L. Honeyman, UPRR
Paul Burnet, CH2MHill
File/LQD/SRS/Bend

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701
(541) 388-6146
Eastern Region
Bend Office

February 22, 2006

Paul Burnet
CH2M HILL
2020 SW Fourth Avenue
Suite 300
Portland, Oregon 97201

Re: Financial Assurance Documentation
Union Pacific Railroad (UPRR) Tie Treating Plant
ECSI # 54

Dear Mr. Burnet :

The Department (DEQ) has received and reviewed your proposal related to financial assurance at the above-referenced facility, which is dated February 20, 2006 Your letter submittal seeks a reduction in the amount of financial assurance required by the DEQ based upon anticipated future cost associated with remedy implementation. In particular, a reduction in required financial assurance is sought based upon the fact that the groundwater remedy is fully constructed. The Union Pacific Railroad Tie Treating Plant is #918 on the United States Environmental Protection Agency's Superfund Construction Completion List, having achieved this milestone in October 2004.

Based upon its review, the DEQ agrees that it is appropriate to reduce the UPRR Tie Treating Plant facility's financial assurance requirements based upon estimated remedial action costs as projected in your February 20, 2006 request. Should these cost estimates prove to be underestimated; the DEQ will require future adjustments to the associated financial assurance requirement for this facility.

Please address verification of financial assurance pursuant to this letter approval to my attention. The DEQ concurs that the new approved amount of required financial assurance is the amount specified in Table 2 of your proposal ($9,062,000 00).

If you would like to discuss this matter further, please contact me at (541) 388-6146, ext. 224

Sincerely,

W. C. Walkey

William C. Walkey
Hydrogeologist

C: File/LQD/SRS/Bend
Gary L. Honeyman, UPRR

APPENDIX H

ODEQ Status Reports for Amerities West, LLC, Operations

Air Quality permit summary for Amerities West, LLC:

Amerities West, LLC operates a wood preserving facility located on Tie Plant Road in The Dalles, Oregon. The process includes two boilers, three cyclones, working/holding tanks, five retorts (wood treating cylinders), and treated wood storage. The wood preservative is a mixture of creosote and oil. The facility has operated since the early 1900's under several different owners. Most recently, the facility was owned and operated by Kerr-McGee Chemical, LLC until February 2005 when Amerities West purchased the plant

The Department of Environmental Quality (DEQ) issued an Air Contaminant Discharge Permit (ACDP) for the facility in 1977 and the permit has been renewed approximately every 5 years since that time The current permit was issued on August 5, 2002 and was scheduled to expire on March 1, 2007 but will remain in effect until the permit is re-issued because Amerities West has submitted a timely and complete application for renewal.

The permit contains generic plant site emission limits (tons/year) for particulate matter (PM), particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC). Generic plant site emission limits are equal to one ton less than the significant emission rate for each pollutant. The significant emission rate is the level at which an air quality impact analysis is required.

In addition to the pollutants listed above, the facility emits small amounts of hazardous air pollutants, including but not limited to naphthalene, dibenzofuran, quinolene, and biphenyl. The source is considered an area source under the federal hazardous air pollutant program (section 112 of the Clean Air Act) because EPA determined that wood preserving operations emit less than 10 tons of any individual HAP and less than 25 tons of combined HAPs. EPA recently promulgated standards for the wood preserving area source category that reflects current levels of control so the standards will not require any additional controls for the facility in The Dalles.

As part of the permit renewal, the DEQ is considering converting the ACDP from a Simple to a Standard ACDP because of odor issues related to the plant operations Odors have been an issue in the past, but the Department had insufficient information to warrant a higher level permit. In response to the public testimony provided during the last permit renewal, the Department assembled an odor workgroup that included representatives from the community and plant personnel to assess the significance of the odor issues and evaluate possible remedies. Several odor surveys were conducted and the results indicate that the frequency, duration, and strength of the odors, as well as the number of people impacted warrants additional measures to minimize the odors. More information about the odor surveys and workgroup is available at the following website: http://www.deq.state.or.us/er/TieOdors.html

WALKEY Cliff

From: INGALLS Jeff
Sent: Friday, March 16, 2007 2:17 PM
To: WALKEY Cliff
Subject: Hazardous Waste Program history Kerr McGee/AmeriTies

AmeriTies was inspected under our Technical Assistance Program on September 15,2005. This is the only hazardous waste activity at the site since AmeriTies purchased the facility from Kerr McGee. As this is the most recent visit I will provide you a copy of the Technical Assistance Site Visit Summary In summary no major issues were uncovered during this visit there were some recordkeeping tweaks that we discussed and there was some pipe jacketing on the ground in a containment basin that had come in contacted with F034 regulated creosote and consequently needed to be picked up, containerized and managed as F034 hazardous waste.

Kerr McGee notified of their hazardous waste activity in 1989

Kerr McGee was first inspected on February 15,1994 significant and numerous violations were observed. This inspection resulted in a compliance order and civil penalty and a national work group was created with representatives from the wood treatment industry, the EPA and State Environmental Programs that resulted in the Wood Preserving RCRA Compliance Guide.

Kerr McGee was inspected a second time on June 23, 1998 some Class 1 violations were observed; however, the facility had certainly turned things around since the 1994 inspection. The inspection none-the-less did result in a civil penalty the primary issue was failure to clean up a spill in the yard.

Kerr McGee was inspected under Technical Assistance on April 14, 2002. Some issues did arise surrounding recordkeeping, incidental drippage, and drip pad maintenance.

Over the 10 years of DEQ awareness of Kerr McGee as a hazardous waste generator 1994 to 2004. The facility made at a minimum the following major changes in their operations:

* They replaced the retorts in the treatment building and made upgrades to the piping of material from the tank farm to the treatment retorts;
* They totally revamped their waste water treatment system;
* They did a complete tank replacement project in their tank farm; and
* They made numerous changes throughout the facility:
    * dedicated tram cars to the drip pad;
    * drip pad repair (berming, sealing and repair)
    * Air Quality changes and upgrades including emission controls on the tanks to reduce odor and discharges and others.

Cliff I hope this is what you needed if you need any further specifics concerning these activities let me know.

APPENDIX I

Recommendations for Revisions to Facility Monitoring and Reporting

State of Oregon
Department of Environmental Quality Memorandum

To: **File**
SRS/LQD/Bend

Date: 10/5/07

From: **Cliff Walkey**
SRS/Bend

Subject: **Recommendations for Facility Monitoring and Reporting—Union Pacific Railroad Tie Treatment Plan – The Dalles, Oregon – ECSI # 54**

This memorandum outlines the basis for reconsidering the scope of facility monitoring and reporting and provides recommendations for implementation of revised monitoring and reporting requirements at the above-referenced facility.

Proposed Revisions to Facility Monitoring and Reporting

Union Pacific Railroad (UPRR) formally proposed to modify existing facility monitoring and reporting, and also formally proposed to change a specific effluent discharge limit for iron. The following documents provide a basis for recommendations as proposed by UPRR:

- *Proposed Revisions to the Groundwater Monitoring Program at the Tie Treating Plant in The Dalles, Oregon* (Technical Memorandum, CH2MHill, January 15, 2007).
- *Addendum No. 1 to Proposed Revisions to the Groundwater Monitoring Program at the Tie Treating Plant in The Dalles, Oregon* (Technical Memorandum, CH2MHill, May 16, 2007).
- *UPRR The Dalles – Proposed Change to the Iron Discharge Limit* (Memorandum, CH2MHill, September 10, 2007).
- *Proposed Revision to the Groundwater Monitoring Program at the Tie Treating Plant in The Dalles, Oregon ECSI # 54* (Letter, DEQ, August 7, 2007).
- *Response to Letter from DEQ Dated August 7, 2007 regarding Proposed Revision to the Groundwater to Monitoring Program at the Tie Treating Plant in the Dalles, Oregon, ECSI # 54* (Letter, CH2MHill, September 25, 2007).
- *Progress Report for Activities Conducted from January 1, 2007 Through June 30, 2007 – Tie Treating Plant – The Dalles, Oregon* (Report, CH2MHill, September 2007).
- *UPRR The Dalles – Proposed Change to the Iron Discharge Limit* (Memorandum, CH2MHill, September 10, 2007).

Approval for Implementation of Appropriate Revisions to Facility Monitoring and Reporting

On August 7, 2007, DEQ granted approval to implement the following revisions to the UPRR facility monitoring and reporting:

- For the Unconfined Water Bearing Zone (UWBZ), reduce monitoring frequency from semiannual to annual and conduct annual monitoring during the spring.

- For the Sand Hollow I (SH1) Zone, reduce monitoring frequency from semiannual to annual and conduct the annual monitoring in the spring.

- For the SH1 Zone, DEQ concludes that Monitored Natural Attenuation (MNA) continues to be a protective remedy in lieu of hydraulic containment.

- For MNA parameters in the SH1 Zone, reduce the monitoring frequency from semiannual to annual and conduct the annual monitoring in the spring.

- For the UWBZ, groundwater elevation monitoring frequency will be conducted quarterly to verify and document that the hydraulic control objective is being met.

Second Five Year Record of Decision (ROD) Review Report

In this 5-Year ROD Review report, DEQ formally acknowledges the following revisions to the Tie Treating Plant Record of Decision (DEQ, 1996), which do not require a ROD amendment:

1. DEQ formally eliminates bioventing from the selected remedy in OU1, which is documented in Section 4.2.1 (Bioventing) of the Second Five Year Record of Decision Review report. Specifically, the ROD (ODEQ, 1996) explicitly granted latitude to determine the scope of implementation of the bioventing element. As such, the selection of bioventing in the ROD was conditioned as a contingency option.

2. The 1996 ROD also stated that a deferred soil investigation is required should there be a permanent reduction of the inventory levels in the wood storage yard such that an additional 50 percent of the surface soils in that area are exposed. This deferred investigation trigger was originally included because the analysis of site data in the FS indicated that soil in the wood storage yard had constituent concentrations exceeding 1×10^{-5} risk levels. However, 1997 changes in Oregon's remedy selection protocols accepted institutional controls as a protective remedy, and additional remedial actions are warranted only if hot spot levels are exceeded or there is an incremental benefit in selecting a higher-cost remedial action. Institutional controls are in fact in place, and no samples collected from the wood storage yard have exceeded hot spot levels. The ROD states that potential cleanup actions will be conducted using the ODEQ risk assessment protocol and remedy selection criteria in place at the time the investigations occur. Therefore, DEQ determines that the 50 percent exposure trigger is removed as a deferred soil investigation trigger.

Proposed Revisions to Facility Monitoring and Reporting Still Pending DEQ Review and Approval

- For the three unconfined water bearing zones (SH1, SH2, and Ginkgo), UPRR proposes to reduce the groundwater elevation monitoring frequency from quarterly to semiannual.

- UPRR proposes to decrease the frequency of Progress Reporting from a quarterly to an annual basis.

- UPRR proposes to change the iron discharge limit of treated groundwater from a hydraulic containment system to Three Mile Creek.

APPENDIX J

Remedial System Modifications

Replacement of HCWU 1" Steel Pipe, UPRR, The Dalles

PREPARED FOR: File/UPRR The Dalles Tie Treating Plant

PREPARED BY: Brad Ostapkowicz/CH2M HILL

DATE: December 23, 2005

PROJECT NUMBER: 168910.05.57

Background

The hydraulic containment well unit (HCWU) system captures groundwater moving north/northwest through the DNAPL source area. The western portion of the HCWU system (wells 7, 8, 9 and 10) transfers groundwater to well 6 via 1" steel pipe. The 1" pipe servicing wells 6-10 has a 3" PVC outer casing for secondary containment because the wells are located in an area outside the active wood treating area and are in an area where standing water was occasionally observed. The 3" PVC pipe is heat traced and insulated, protected by aluminum sheathing. Iron scaling inside the pipes has been a problem since the start up of the HCWU wells. To relieve pressure build up in the lines that results from occlusion caused by scale, a UPRR-approved contractor (NRC Environmental) was subcontracted to remove scale in the piping with a high pressure washing device. Work was conducted between November 21 and 30, 2005. Within a week after flushing was completed, water was observed in the secondary containment in the pipes at the tee connection between HCWU wells 6, 7 and 8. The leak was observed for several days as options were considered. Replacement of the inner 1" pipe was deemed necessary to fix the problem.

Corrective Action

The following paragraphs explain the procedure to be followed to replace the leaking 1" inner steel pipe.

Removal of 1" steel pipe

Five areas of PVC, insulation, and heat trace will need to opened in order to gain access to the inner steel pipe (two 90 degree elbows joining HCWU-7 and 10 to the main line and three tees were HCWU 6, 8 and 9 connect to the main line). The insulation on the pipe will

be cut on the bottom side and removed for possible reuse The heat trace wrapped around the pipe should be flexible enough to allow needed work to be completed. The outer 3" PVC secondary casing will be cut at the two 90 degree elbows and the three tees. Each elbow or tee will need to be cut back to allow installation of new "sweeping" 90 degree bends of 3" PVC or to allow working room for HDPE fusion welders. Cuts in the existing PVC around the 90s should be precisely measured to allow insertion of the new sweeping 90s. Cuts around the tees should be adequate to allow use of HDPE welders; approximately two feet should allow access for cutting the 1" steel pipe and welding of the HDPE fittings. The steel pipe will be cut and pulled out in manageable pieces (depending on access and weight restrictions). The removed steel pipe will then be pressured washed with hot water on the decontamination pad and will be recycled as steel scrap or disposed of as municipal waste.

Installation of HDPE Pipe

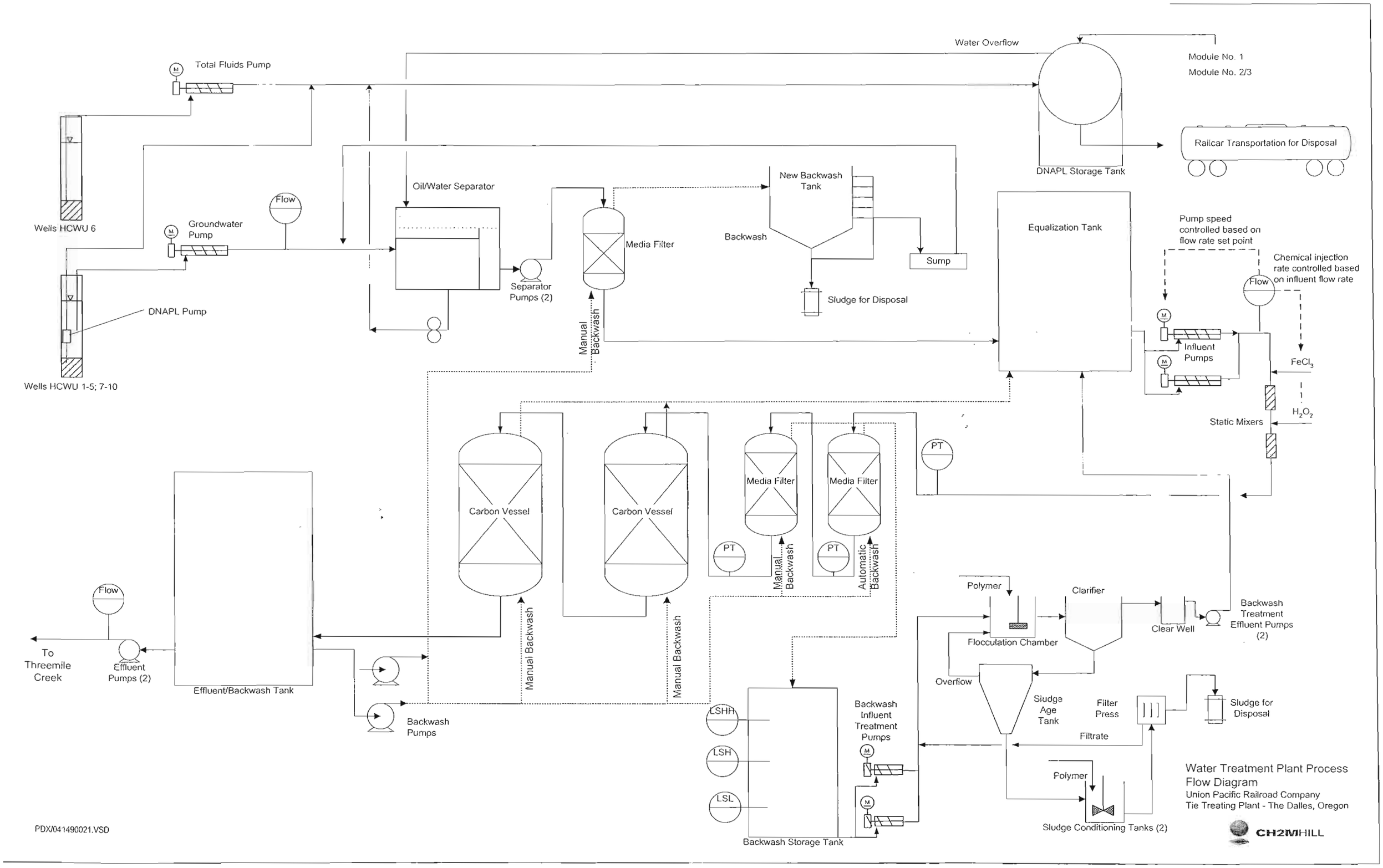
Note: Sweeping 90 degree fittings will be installed to the PVC pipe prior to installation of HDPE pipe and Fernco rubber fittings will be installed at tees before HDPE pipe is installed. The HDPE pipe will be pulled into the 3" PVC. The HDPE pipe will be continuous through the 90 degree bends near HCWU-7 and 10. (NOTE: HPDE pipe can be installed through 90 degree bends at temperatures below 20 degrees Fahrenheit without the potential for cracking or breaking.) The HPDE tees will be installed at HCWU-6 and 9 and at the junction of HCWU-8 and the main line. Either a socket weld or butt weld fusion will be used based on implementability in the field. Transition fittings will connect the HDPE pipe with the existing steel pipe The 1" HDPE line will then be pressure tested to verify the absence of leaks.

The original PVC pipe around the tees will be clamped back in place and secured with both Fernco rubber fittings (note: these need to be installed on PVC before installation of HDPE tees) and a PVC sealant to the horizontal seams. Sweeping 90 degree fittings will be PVC welded to the existing PVC pipe to replace standard 90 degree PVC elbows. Installing sweeping elbows will allow a continuous piece of HDPE to be pulled through the elbow and enable jet rod cleaning. The PVC secondary containment will not be pressure rating but will contain spills from the interior HPDE pipe.

The existing heat trace and insulation will be reinstalled on the PVC pipe.

Road Crossing

A 20" diameter culvert runs under the access road. A layer of controlled density fill (CDF) was placed above the culvert. Both the 1" steel and the 3" PVC pipe currently run through the culvert with a series of standard 90 degree elbows allowing minimal access for jet rod cleaning. The insulation, heat trace and elbows will be removed as above. Access will be limited and the existing steel pipe in the culvert will be left in place. The new HDPE pipe will be pulled through the culvert and four new sweeping 90 degree PVC elbows will be installed.


Water Overflow
Total Fluids Pump
Module No. 1
Module No. 2/3
Railcar Transportation for Disposal
DNAPL Storage Tank
Wells HCWU 6
Groundwater Pump
Flow
Oil/Water Separator
Separator Pumps (2)
Media Filter
Manual Backwash
New Backwash Tank
Backwash
Sump
Sludge for Disposal
Equalization Tank
Pump speed controlled based on flow rate set point
Chemical injection rate controlled based on influent flow rate
Influent Pumps
$FeCl_3$
H_2O_2
Static Mixers
DNAPL Pump
Wells HCWU 1-5; 7-10
Carbon Vessel
Carbon Vessel
Media Filter
Media Filter
PT
PT
PT
Manual Backwash
Automatic Backwash
Manual Backwash
Manual Backwash
Polymer
Clarifier
Flocculation Chamber
Clear Well
Backwash Treatment Effluent Pumps (2)
Overflow
Sludge Age Tank
Filter Press
Filtrate
Sludge for Disposal
Polymer
Sludge Conditioning Tanks (2)
Flow
To Threemile Creek
Effluent Pumps (2)
Effluent/Backwash Tank
Backwash Pumps
LSHH
LSH
LSL
Backwash Storage Tank
Backwash Influent Treatment Pumps
PDX/041490021.VSD
Water Treatment Plant Process Flow Diagram
Union Pacific Railroad Company
Tie Treating Plant - The Dalles, Oregon
CH2MHILL