

TABLE 1

Site Investigations and Removal Actions Conducted to Date at Taylor Lumber and Treating Site
Taylor Lumber and Treating Superfund Site

	Description	Reference
Site Investigations		
1988 NPDES Phase 1 Groundwater Investigation	Groundwater quality monitoring program	Taylor Lumber Phase 1 Final Report (Sweet-Edwards/EMCON 1988)
1988 NPL Preliminary Assessment and Site Inspection	Preliminary Assessment and Site Inspection	PA (E&E 1988a) SI (E&E 1988b)
1990 NPL Listing Site Inspection	Soil, sediment, groundwater, and are sampling and analysis	Listing Site Inspection Report (E&E 1990)
1990 RCRA Retort Area Characterization and Soil Removal	Characterize soils under drip pad and evaluate disposal options for excavated material	Retort Area Characterization (Sweet-Edwards/EMCON 1991b) Status of Excavated Soil (EMCON 1993)
1990 RCRA Former Vault Closure	Final closure of vault containing 116 35-gallon drums of waste	Amended Surface Impoundment Closure Plan for the Former Concrete Cooling Water Vault (EMCON 1994)
1994 RCRA Facility Assessment	Obtain information on past and present releases	EPA 1994
1995-1996 RCRA Interim Corrective Measures (ICM) Study	Documents ICMs that address surface water, leaking underground storage tanks, groundwater quality at the downgradient perimeter of the facility, and the potential beneficial uses of groundwater	Interim Corrective Measures Work Plan (EMCON 1995) and Interim Corrective Measures (EMCON 1996)
1995-1997 Phase 1 RCRA Facility Investigation (RFI)	Conducted RFI pursuant to 1995 EPA RCRA Consent Decree and an Administrative Order on Consent	Draft Phase 1 RCRA Facility Investigation Final Report (MFA 1997)
1999 EPA Emergency Responses	February 1999 response to 3,500 gallon spill of PCP-enriched P-9 oil from the P-9 tank farm	Trip Report (E&E 1999b)
	September 1999 response to 27,500 gallon spill of reclaimed creosote and wastewater when tanks toppled over	Trip Report (E&E 2000)
1999 Integrated Assessment	Conduct IA and re-evaluate site's potential for inclusion on NPL and assess need for subsequent removal actions	IA (E&E 1999a)
2000 Stormwater Treatment System	Prepare final design for stormwater treatment system	Stormwater Treatment System: Phase 1 and Phase 2 (MFA 2000)

TABLE 1 (Continued)

Site Investigations and Removal Actions Conducted to Date at Taylor Lumber and Treating Site

Taylor Lumber and Treating Superfund Site

	Description	Reference
2000 Hydrogeologic Characterization	Perform hydrogeologic characterization using existing data to provide design basis for underground barrier wall	Groundwater Characterization Report (E&E 2000)
Public Health Assessments		
2000 Health Consultation	Response to EPA request to review offsite air and soil sampling results	Agency for Toxic Substances and Disease Registry (ATSDR), May 19, 2000
2003 Public Health Assessment for Taylor Lumber and Treating	Reviews environmental data and community health concerns and determines whether adverse health effects are possible	ATSDR, December 16, 2003
EPA Time-Critical Removal Actions		
1999-2000 Removal Action	Install slurry barrier wall around a 4.6-acre area to contain NAPL plume beneath the Treatment Plan Area	Action Memorandum (EPA September 28, 1999)
	Construct groundwater extraction system inside barrier wall	Action Memorandum Amendment (EPA, September 18, 2000)
	Pave 2 acres of the Treated Pole Storage Area	Taylor Lumber and Treating Removal Action Report (E&E 2001)
	Stockpile soils in Soil Storage Cells	
	TLT removed contaminated soil from adjacent ditches	
2004 Removal Action	Excavate contaminated soil from residential property in 2004	Action Memorandum (EPA October 25, 2004)
	Excavate contaminated soil from ditch along east side of Rock Creek Road in 2005	Trip Report (E&E 2005)

TABLE 2

Summary of Chemicals of Concern in Soil
Taylor Lumber and Treating Superfund Site

Exposure Point	Scenario	Chemical of Concern (COC) ¹	Units	Frequency of Detection	Minimum Detected Result	Maximum Detected Result	Exposure Point Concentration (EPC)	EPC Basis
West Facility Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	mg/Kg	41/41	2.09E-07	0.043	0.043	Max Detect
		Arsenic	mg/Kg	68/69	0.87	778	90	95% UCL
	Onsite Trench Worker (Subsurface Soil)	Total Dioxin TEQ's	mg/Kg	67/67	7.83E-09	0.043	0.0021	95% UCL
		Arsenic	mg/Kg	147/148	0.55	778	46	95% UCL
Treated Pole Storage and Treatment Plant Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	mg/Kg	38/38	3.46E-07	0.043	0.014	95% UCL
		Arsenic	mg/Kg	54/54	2.0	778	136	95% UCL
	Onsite Trench Worker (Subsurface Soil)	Total Dioxin TEQ's	mg/Kg	59/59	2.47E-09	0.043	0.043	Max Detect
White Pole Storage Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	mg/Kg	12/12	1.25E-06	0.0010	0.0010	Max Detect
		Arsenic	mg/Kg	16/17	1.4	67	67	Max Detect
		Benzo(a)pyrene	mg/Kg	8/24	0.070	2.3	2.1	95% UCL
	Onsite Trench Worker (Subsurface Soil)	Total Dioxin TEQ's	mg/Kg	32/32	2.12E-08	0.0010	0.0010	Max Detect
Truck Shop Area	Onsite Worker (Surface Soil)	Arsenic	mg/Kg	7/7	0.87	36	36	Max Detect
		Benzo(a)pyrene	mg/Kg	1/10	0.60	0.60	0.60	Max Detect
	Onsite Trench Worker (Subsurface Soil)	Arsenic	mg/Kg	16/16	0.87	36	22	95% UCL
Contaminated Soil Storage Cells Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	mg/Kg	1/1	6.28E-04	6.28E-04	6.28E-04	Max Detect
		Arsenic	mg/Kg	12/15	3.7	28	19	95% UCL
		Benzo(a)pyrene	mg/Kg	18/19	0.075	2.7	0.88	95% UCL
		Pentachlorophenol	mg/Kg	19/19	0.62	48	47	95% UCL
East Facility ⁴	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	mg/Kg	9/9	2.12E-06	7.76E-04	7.76E-04	Max Detect
		Arsenic	mg/Kg	26/27	0.70	71	48	95% UCL
Residential Yards ⁵	Off-property Residential (Surface Soil)	Total Dioxin TEQ's	mg/Kg	22/22	3.50E-08	6.38E-04	6.38E-04	Max Detect
		Arsenic ²	mg/Kg	25/25	3.4	15	9.4	95% UCL
		Chromium	mg/Kg	25/25	16	78	53	95% UCL
		Aroclor 1254 ³	mg/Kg	3/14	0.036	3.5	0.31	95% UCL
		Benzo(a)pyrene	mg/Kg	14/25	0.0033	0.70	0.16	95% UCL
		Dieldrin ³	mg/Kg	8/14	5.20E-04	0.079	0.027	95% UCL
Off-property Ditches	Recreational and Tribal Users (Surface Soil)	Total Dioxin TEQ's	mg/Kg	17/17	5.18E-08	0.0053	0.0053	Max Detect
		Arsenic	mg/Kg	47/47	3.0	445	61	95% UCL

Notes:

¹COCs are defined as risk drivers. COCs listed in this table include those chemicals that collectively contribute to 95% or greater of the excess lifetime cancer risk (ELCR) or noncancer risk (HQ).

²According to DEQ risk guidance, arsenic concentrations greater than 1.59 mg/kg (10⁶ risk) pose unacceptable risk to industrial workers. However, a statistical analysis performed on background soil data at TLT determined that arsenic concentrations less than or equal to 12 mg/kg are likely to be naturally occurring and concentrations greater than 12 mg/kg are considered site-related contamination (CH2M HILL, 2003).

³These chemicals are not considered site-related.

⁴Risk was calculated for subsurface soil in the East Facility, however, the risk from individual contaminants did not exceed 1x10⁻⁶.

⁵A removal action has been completed at the residential yard with the highest contaminant concentrations.

COC = chemical of concern

EPC = Exposure point concentration

ELCR = excess lifetime cancer risk

HQ = hazard quotient (non-cancer risk)

TEQ = toxicity equivalent

TABLE 3

Summary of Chemicals of Concern in Groundwater, Sediment and Surface Water
Taylor Lumber and Treating Superfund Site

Exposure Point	Scenario	Chemical of Concern (COC) ¹	Units	Frequency of Detection	Minimum Detected Result	Maximum Detected Result	Exposure Point Concentration ² (EPC)	EPC Basis
Onsite Groundwater Inside Barrier Wall	Hypothetical Residential	Total Dioxin TEQ's	mg/L	4/4	4.87E-10	3.44E-07	3.44E-07	Max Detect
		Arsenic ³	mg/L	17/18	1.70E-04	0.0048	0.0035	95% UCL
		Manganese ⁴	mg/L	18/18	0.084	3.9	1.8	95% UCL
		2-Methylnaphthalene	mg/L	13/18	1.30E-05	2.4	2.4	Max Detect
		2,4,6-Trichlorophenol	mg/L	5/18	0.0019	0.022	0.022	Max Detect
		4-Methylphenol	mg/L	10/18	9.10E-05	9.1	9.1	Max Detect
		Benzo(a)anthracene	mg/L	7/18	1.00E-05	0.039	0.039	Max Detect
		Benzo(a)pyrene	mg/L	4/18	3.40E-06	0.011	0.011	Max Detect
		Benzo(b)fluoranthene	mg/L	5/18	2.90E-06	0.030	0.030	Max Detect
		Dibenz(a,h)anthracene	mg/L	1/18	0.017	0.017	0.017	Max Detect
		Dibenzofuran	mg/L	15/18	5.20E-06	0.48	0.48	Max Detect
		Naphthalene	mg/L	16/18	2.80E-05	20	20	Max Detect
		Pentachlorophenol	mg/L	15/18	0.0023	3.5	3.5	Max Detect
Onsite Groundwater Outside Barrier Wall	Hypothetical Residential	Total Dioxin TEQ's	mg/L	15/15	4.40E-13	3.70E-09	3.70E-09	Max Detect
		Antimony	mg/L	5/62	0.0063	0.012	0.0043	95% UCL
		Arsenic	mg/L	41/62	2.00E-04	0.0039	0.0017	95% UCL
		Manganese	mg/L	62/62	0.021	2.7	0.89	95% UCL
		2,4,6-Trichlorophenol	mg/L	5/61	9.60E-04	0.0047	0.0021	95% UCL
		Bis(2-ethylhexyl) Phthalate	mg/L	13/61	1.30E-04	0.0033	0.0020	95% UCL
		Dibenz(a,h)anthracene	mg/L	7/62	1.30E-05	1.00E-04	1.29E-05	95% UCL
		Pentachlorophenol	mg/L	35/62	1.30E-05	0.25	0.090	95% UCL
Off-property Groundwater	Residential	Total Dioxin TEQ's	mg/L	19/19	3.40E-13	4.01E-08	4.01E-08	Max Detect
		Arsenic	mg/L	11/28	2.50E-04	0.0016	6.25E-04	95% UCL
		Dibenz(a,h)anthracene	mg/L	3/44	1.70E-05	2.30E-05	2.30E-05	Max Detect
		Manganese	mg/L	27/28	0.0011	1.1	1.1	Max Detect
		Pentachlorophenol	mg/L	18/28	2.60E-05	0.017	0.0041	95% UCL
South Yamhill River Surface Sediment	Recreational and Tribal User	Arsenic	mg/Kg	22/23	3.1	60	13	95% UCL
Rock Creek Surface Sediment	Recreational and Tribal User	Arsenic	mg/Kg	5/5	10	108	108	Max Detect
South Yamhill River Surface Water	Recreational and Tribal User	***						

Notes:

¹COCs are listed if their EPC resulted in an excess lifetime cancer risk (ELCR) greater than 1 in 1,000,000 (ELCR>10⁻⁶) or a noncancer risk (HQ) greater than 1.0, and the chemical contributed greater than 5% of the total risk.

²The EPCs for groundwater are calculated for the area as a whole. However, the EPCs used in the risk calculations were well specific.

³Arsenic levels in groundwater are generally attributed to background as concentrations upstream of the site are similar to downstream.

⁴Manganese is a naturally occurring metal in groundwater and elevated concentrations are often observed in groundwater impacted by dense non-aqueous phase liquids (DNAPL) as a result of changes in the hydrogeochemical balance. Manganese is not considered a TLT site-related chemical but was detected in numerous monitoring wells at concentrations significantly above the secondary drinking water standard of 0.05 mg/L. Manganese concentrations measured in site wells upgradient from the site are assumed to be naturally occurring levels unassociated with DNAPL, and range from 0.88 mg/L to 1.57mg/L. Concentrations above this range are considered to result from the presence of DNAPL.

*** No EPCs for chemicals detected in surface water resulted in an ELCR > 10⁻⁶ or an HQ >1

COC = chemical of concern

ELCR = excess lifetime cancer risk

EPC = Exposure point concentration

HQ = hazard quotient (non-cancer risk)

TABLE 4
 Potential Human Health Exposure Routes
Taylor Lumber and Treating Superfund Site

Exposure Media	Scenarios	Exposure Areas	Potential Exposure Routes
Onsite Soil ¹	Current onsite worker (surface soil)	West Facility	Incidental soil ingestion, dermal contact, dust inhalation
	Current onsite trench worker (subsurface soil)		
Onsite Soil ¹	Future onsite worker (surface soil)	Treated Pole Storage and Treatment Plant Areas	Incidental soil ingestion, dermal contact, dust inhalation
	Future onsite trench worker (subsurface soil)	White Pole Storage Area	
		Truck Shop Area	
		Soil Storage Cells East Facility	
Off-property Soil	Current and future off-property residential (surface soil)	Residential yards	Incidental soil ingestion, dermal contact, dust inhalation
	Current and future off-property recreational and tribal user (surface soil)	Off-property ditches	Incidental soil ingestion, dermal contact, dust inhalation
Onsite Groundwater	Hypothetical future onsite residential	Onsite groundwater inside the barrier wall	Ingestion, dermal contact, vapor inhalation
		Onsite groundwater outside the barrier wall	Ingestion, dermal contact, vapor inhalation
Off-property Groundwater	Current and future off-property residential	Off-property groundwater	Ingestion, dermal contact, vapor inhalation
Surface Water and Sediment	Current and future off-property recreational and tribal user	Surface water and sediment in South Yamhill River or Rock Creek	Incidental ingestion and dermal contact
		Surface water in South Yamhill River	Fish ingestion

Note:

¹Human health risk at the West Facility was assessed for current and future conditions under an industrial use scenario. Current risk was calculated assuming that workers have equal exposure to all areas in the West Facility that are not paved and not beneath buildings. For future risk, the individual areas of the West Facility are considered separately, and it is assumed that all asphalt and soil cover is removed. The White Pole Storage Area, Truck Shop, Soil Storage Cells, and East Facility are not paved or covered. For these areas the data sets are the same for both current and future scenarios.

TABLE 5

Summary of Cancer Toxicity Data Available for Chemicals of Concern

*Taylor Lumber and Treating Superfund Site***Pathway: Ingestion, Dermal, Inhalation**

Chemicals of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence¹	Source²	Date
Total Dioxin TEQ ³	1.50E+05	1.50E+05	1.50E+05	kg-day/mg	B2	HEAST	1997
Arsenic	1.50E+00	1.50E+00	1.51E+01	kg-day/mg	A	IRIS	2003
Chromium	-	-	2.94E+02	kg-day/mg	A	IRIS	2003
Benzo(a)anthracene	7.30E-01	7.30E-01	7.30E-01	kg-day/mg	B2	US EPA	2002
Benzo(a)pyrene	7.30E+00	7.30E+00	7.30E+00	kg-day/mg	B2	IRIS	2003
Benzo(b)fluoranthene	7.30E-01	7.30E-01	7.30E-01	kg-day/mg	B2	US EPA	2002
Dibenz(a,h)anthracene	7.30E+00	7.30E+00	7.30E+00	kg-day/mg	B2	US EPA	2002
Pentachlorophenol	1.20E-01	1.20E-01	1.20E-01	kg-day/mg	B2	IRIS	2003

Notes:

¹Cancer Weight of Evidence Classifications:

Group A: Human carcinogen

Group B1: Probable human carcinogen (limited human data available)

Group B2: Probable human carcinogen (sufficient animal evidence; inadequate/no human evidence)

Group C: Possible human carcinogen

Group D: Not classifiable

Group E: No evidence of carcinogenicity

²Sources: HEAST (U.S. EPA. 1997a.); IRIS (U.S. EPA. 2003a.); US EPA (U.S. EPA. 2002a)³Toxicity equivalency factors (TEFs) were calculated in accordance with Vanden Berg, M., et al., 1998.

TABLE 6

Summary of Non-Cancer Toxicity Data available for Chemicals of Concern
Taylor Lumber and Treating Superfund Site

Pathway: Ingestion, Dermal, Inhalation

Chemical of Concern	Chronic / Subchronic	Oral RfD Value	Dermal RfD Value	Inhalation RfD Value	RfD Units	Primary Target Organ	Combined uncertainty / Modifying Factors	Sources of RfD¹	Date of RfD
Antimony	chronic	4.00E-04	6.00E-06	-	mg/kg-day	-	1000 / 1	IRIS	2003
Arsenic	chronic	3.00E-04	3.00E-04	-	mg/kg-day	vascular	3 / 1	IRIS	2003
Manganese	chronic	2.40E-02	9.60E-04	1.40E-05	mg/kg-day	CNS	1 / 1	IRIS	2003
2-Methylnaphthalene	chronic	9.00E-03	9.00E-03	-	mg/kg-day	N/A	N/A	US EPA	2003
2,4,6-Trichlorophenol	chronic	1.10E-02	1.10E-02	1.10E-02	mg/kg-day	N/A	N/A	US EPA	2002
4-Methylphenol	chronic	5.00E-02	5.00E-02	-	mg/kg-day	CNS / resp.	1000 / -	HEAST	1997
Dibenzofuran	chronic	4.00E-03	4.00E-03	-	mg/kg-day	N/A	N/A	US EPA	2002
Naphthalene	chronic	2.00E-02	2.00E-02	8.57E-04	mg/kg-day	-	3000 / 1	IRIS	2003
Pentachlorophenol	chronic	1.20E-01	1.20E-01	1.20E-01	mg/kg-day	liver / kidney	100 / 1	IRIS	2003

Notes:

RfD = Reference dose

CNS = central nervous system

resp. = respiratory

N/A = not available

¹ Sources: HEAST (U.S. EPA. 1997a); IRIS (U.S. EPA. 2003a); US EPA (U.S. EPA. 2002a)

TABLE 7

Risk for Each Chemical of Concern in Soil
Taylor Lumber and Treating Superfund Site

Exposure Point	Scenario	Chemical of Concern (COC) ¹	Excess Lifetime Cancer Risk		Total ELCR ³	Total Hazard Quotient (HQ) ⁴
			(ELCR) ²	% Contribution		
West Facility Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	2.7E-03	97	2.80E-03	-
		Arsenic	5.7E-05	2.0		-
	Onsite Trench Worker (Subsurface Soil)	Total Dioxin TEQ's	1.2E-05	79	1.50E-05	-
		Arsenic	2.6E-06	17		-
Treated Pole Storage and Treatment Plant Area	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	9.1E-04	90	1.00E-03	-
		Arsenic	8.6E-05	8.5		-
	Onsite Trench Worker (Subsurface Soil)	Total Dioxin TEQ's	2.4E-04	98	2.40E-04	-
		Arsenic	6.5E-05	53		-
White Pole Storage Area	Onsite Worker (Surface Soil)	Arsenic	4.2E-05	34	1.20E-04	-
		Benzo(a)pyrene	1.0E-05	8.2		-
		Total Dioxin TEQ's	5.7E-06	84		6.80E-06
	Onsite Trench Worker (Subsurface Soil)	Arsenic	2.3E-05	83	2.80E-05	-
Truck Shop Area	Benzo(a)pyrene	2.8E-06	10.3	-		
	Onsite Trench Worker (Subsurface Soil)	Arsenic	1.2E-06	96	1.30E-06	-
Contaminated Soil Storage Cells Area		Total Dioxin TEQ's	3.9E-05	61		6.50E-05
	Arsenic	1.2E-05	18	-		
	Benzo(a)pyrene	4.2E-06	6.4	-		
	Pentachlorophenol	5.2E-06	8.0	-		
East Facility	Onsite Worker (Surface Soil)	Total Dioxin TEQ's	4.9E-05	60	8.20E-05	-
		Arsenic	3.0E-05	37		-
Residential Yards	Off-Property Residential (Surface Soil)	Total Dioxin TEQ's	1.1E-06 - 1.5E-04	3.6 - 81	1.1E-05 - 1.9E-04	-
		Arsenic	8.7E-06 - 3.6E-05	18 - 91		-
		Chromium	1.2E-06 - 2.6E-06	0.76 - 22		-
		Benzo(a)pyrene	1.1E-06 - 8.2E-06	3.7 - 15		-
Off-Property Ditches	Recreational and Tribal Users (Surface Soil)	Total Dioxin TEQ's	1.5E-04	89	1.70E-04	-
		Arsenic	1.7E-05	10		-

Notes:

¹COCs are listed if their EPC resulted in an excess lifetime cancer risk (ELCR) greater than 1 in 1,000,000 (ELCR>10⁻⁶) or a noncancer risk (HQ) greater than 1.0, and the chemical contributed greater than 5% of the total risk.

²Off-Property Residential Surface Soil exposure points were evaluated for risk on a sample-by-sample basis. The total ELCR listed here represent a range of values.

³Total cancer risk from all chemicals in exposure area for a given scenario.

⁴HQs did not exceed 1.0 for any soil COC.

COC = chemical of concern
 EPC = Exposure point concentration
 ELCR = excess lifetime cancer risk
 HQ = hazard quotient (non-cancer risk)

TABLE 8

Risk for Each Chemical of Concern in Groundwater, Sediment, and Surface Water

Taylor Lumber and Treating Superfund Site

Exposure Point	Scenario	Chemical of Concern (COC) ¹	Total Excess Lifetime Cancer Risk (ELCR) ²	% Contribution	Total ELCR ³	Hazard Quotient ² (HQ)	% Contribution	Hazard Index (HI) ⁴
Onsite Groundwater Inside Barrier Wall	Hypothetical Residential	Total Dioxin TEQ's	1.8E-06 - 1.3E-03	0.2 - 12		-	-	
		Arsenic	3.8E-06 - 1.1E-04	0.6 - 100		-	-	
		Manganese	-	-		1.3 - 6.4	1.8 - 89	
		2-Methylnaphthalene	-	-		2.2 - 11	9 - 30	
		2,4,6-Trichlorophenol	-	-		2.2 - 8.9	24 - 72	
		4-Methylphenol	-	-		41 - 53	44 - 51	
		Benzo(a)anthracene	5.8E-05 - 7.3E-04	4.5 - 54		-	-	
		Benzo(a)pyrene	2.7E-04 - 2.2E-03	13 - 14		-	-	
		Benzo(b)fluoranthene	4.0E-05 - 5.7E-04	2.6 - 37		-	-	
		Dibenz(a,h)anthracene	3.4E-03	21		-	-	
		Dibenzofuran	-	-		1.3 - 4.8	4.0 - 24	
		Naphthalene	-	-		21 - 35	26 - 30	
		Pentachlorophenol	4.8E-06 - 7.4E-03	4.5 - 99	1.5E-05 - 1.6E-02	1.5 - 3.9	2.1 - 24	0.53 - 118
Onsite Groundwater Outside Barrier Wall	Hypothetical Residential	Total Dioxin TEQ's	1.2E-06 - 2.2E-05	0.4 - 51		-	-	
		Antimony	-	-		1.0 - 1.5	27 - 48	
		Arsenic	6.3E-06 - 8.8E-05	2.9 - 100		-	-	
		Manganese	-	-		1.1 - 2.8	33 - 91	
		2,4,6-Trichlorophenol	-	-		1.4	30	
		Bis(2-ethylhexyl) Phthalate	3.3E-06	6.1		-	-	
		Dibenz(a,h)anthracene	2.6E-06 - 3.2E-05	3.3 - 26		-	-	
		Pentachlorophenol	2.3E-06 - 5.3E-04	2.1 - 96	1.6E-05 - 5.5E-04	-	-	0.65 - 4.7
Off-Property Groundwater	Residential	Total Dioxin TEQ's	1.3E-06 - 1.5E-04	5 - 92		-	-	
		Arsenic	6.5E-06 - 3.6E-05	7.9 - 95		-	-	
		Dibenz(a,h)anthracene	3.4E-06 - 4.5E-06	21 - 88		-	-	
		Manganese	-	-		1.1 - 4.4	55 - 86	
		Pentachlorophenol	3.6E-05	76	7.8E-06 - 1.7E-04	-	-	0.3 - 5.1
South Yamhill River Surface Sediment	Recreational and Tribal User	Arsenic	3.6E-06	78	4.50E-06	-	-	0.5
Rock Creek Surface Sediment	Recreational and Tribal User	Arsenic	3.0E-05	99	3.10E-05	-	-	1.09
South Yamhill River Surface Water	Recreational and Tribal User	***						

Notes:

¹COCs are listed if their EPC resulted in an excess lifetime cancer risk (ELCR) greater than 1 in 1,000,000 (ELCR>10⁻⁶) or a noncancer risk (HQ) greater than 1.0, and the chemical contributed greater than 5% of the total risk.

²All groundwater exposure points were evaluated for risk on a sample-by-sample basis. The total ELCR and HQ listed here represent a range of values.

³Total cancer risk from all chemicals, shown as a range across all wells in a given exposure area.

⁴Total noncancer risk from all chemicals, shown as a range across all wells in a given exposure area.

*** No EPCs for chemicals detected in surface water resulted in an ELCR > 10⁻⁶ or an HQ > 1

COC = chemical of concern

EPC = Exposure point concentration

ELCR = excess lifetime cancer risk

HQ = hazard quotient (non-cancer risk)

TABLE 9

Cumulative Risk for Recreational and Tribal User

Taylor Lumber and Treating Superfund Site

Scenario: Recreational and Tribal User

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			Exposure Routes Total
				Ingestion	Inhalation	Dermal	
Soil	Soil from Ditch	Soil Off-Property - Direct Contact	Total Dioxin TEQ	1.3E-04	N/A	1.5E-05	1.5E-04
		Soil Off-Property - Direct Contact	Arsenic	1.5E-05	N/A	1.7E-06	1.7E-05
	Dust from Ditch	Soil Off-Property - Inhalation	Total Dioxin TEQ	N/A	1.5E-04	N/A	1.5E-04
		Soil Off-Property - Inhalation	Arsenic	N/A	1.7E-05	N/A	1.7E-05
Soil risk total=							3.3E-04
Sediment	Sediment from Yamhill River	Sediment Off-Property - Direct Contact	Arsenic	3.20E-06	N/A	3.60E-07	3.6E-06
	Sediment Dust from Yamhill River	Sediment Off-Property - Inhalation	Arsenic	N/A	1.7E-09	N/A	1.7E-09
	Sediment from Creek	Rock Sediment Off-Property - Direct Contact	Arsenic	2.70E-05	N/A	3.10E-06	3.0E-05
	Sediment Dust from Rock Creek	Sediment Off-Property - Inhalation	Arsenic	N/A	1.4E-08	N/A	1.4E-08
Sediment risk total=							3.4E-05
Surface Water	South Yamhill River	Surface Water ¹	none	1.40E-08	--	1.8E-07	1.9E-07
	Rock Creek	Surface Water ²	none	--	--	--	--
Surface Water Risk total =							1.90E-07
Total Risk =							3.6E-04

Note:

¹No volatiles that could contribute to inhalation risk were detected in surface water.

²No carcinogenic constituents were detected in surface water from Rock Creek.

N/A = not applicable

TABLE 10

Summary of the Ecological Risk Assessment Process, Results, and Conclusions

Taylor Lumber and Treating Superfund Site

Media Evaluated	Ecological Endpoints Evaluated	Risk Evaluation Method	COPECs Exceeding Benchmarks and Background or Upstream Locations	Conclusion	Chemicals of Ecological Concern	Action Warranted?
Surface Soil (from ecological habitat areas)	Terrestrial Vegetation	Comparison of soil concentrations with terrestrial plant benchmarks	Arsenic	The risk from COECs to the terrestrial vegetation is expected to be marginal to low.	none	No
	Terrestrial Invertebrates and Soil Biota	Comparison of soil concentrations with terrestrial invertebrate benchmarks	Arsenic and Manganese	The risk from COECs to the terrestrial invertebrate and soil biota communities is expected to be marginal to low.	none	No
	Terrestrial Mammals and Birds	Calculation of hazard quotients through food chain modeling	Copper, Zinc, Dioxins/Furans	The risk to the terrestrial bird and mammal populations posed by site-related dioxins and furans in surface soil is a concern in ditch soils. The risk posed by copper and zinc to the terrestrial birds and mammals is expected to be marginal to low, but will be addressed with actions to cleanup dioxins/furans.	dioxin/furans	Yes
South Yamhill River Sediment	Benthic Invertebrates	Comparison of sediment concentrations with benthic invertebrate benchmarks (i.e., TEC and PEC)	Arsenic and Nickel	The risk from COECs to the benthic organisms is expected to be marginal to low.	none	No
South Yamhill River Surface Water	Aquatic Organisms	Comparison of surface water concentrations with surface water benchmarks (i.e., AWQC)	Barium, Lead, Manganese, and Mercury	The risk from COECs to the aquatic organisms is expected to be marginal to low.	none	No
Rock Creek Sediment	Benthic Invertebrates	Comparison of sediment concentrations with benthic invertebrate benchmarks (i.e., TEC and PEC)	Slight exceedances for all COPECs including arsenic, chromium, copper, nickel, and zinc	The risk from COECs to the benthic organisms is expected to be marginal to low.	none	No
Rock Creek Surface Water	Aquatic Organisms	Comparison of surface water concentrations with surface water benchmarks (i.e., AWQC)	Barium	The risk from COECs to the aquatic organisms is expected to be marginal to low.	none	No
Groundwater (downgradient off-property wells)	Aquatic Organisms (potential future risk)	Comparison of groundwater concentrations with surface water benchmarks (i.e., AWQC)	Copper, Barium, Copper, Iron, Lead, Manganese, PCP	The wells nearest to potential exposure points (Rock Creek and South Yamhill River) indicate that the likelihood of toxicity is marginal or low.	none	No
	Hyporheic Organisms (potential future risk)	Comparison of groundwater concentrations with surface water benchmarks (i.e., AWQC)	Copper, Barium, Copper, Iron, Lead, Manganese, PCP	The wells nearest to potential exposure points (Rock Creek and South Yamhill River) indicate that the likelihood of toxicity is marginal or low.	none	No

Notes:
 COPECs = chemicals of potential ecological concern
 COECs = chemicals of ecological concern
 TEC = threshold effects concentration
 PEC = probable effects concentration
 AWQC = ambient water quality criteria
 PCP = pentachlorophenol

TABLE 11

Chemicals of Ecological Concern

Taylor Lumber and Treating Superfund Site

Exposure Point	Chemicals of Ecological Concern (COEC)	Min Conc (mg/kg)	Max Conc (mg/kg)	Mean Conc (mg/kg)	95% UCL (mg/kg)	Background (mg/kg) ^a	Screening Toxicity Value ^b (mg/kg)	Source	HQ ^d
	Dioxins	5.18E-08	0.0029	0.00046	0.0029	-	6.70E-06	LOAEL based protective value for deer mouse ^c	438.8
Surface Soil in Offsite Ditches	Copper	29	1,700	130	139	36	33	LOAEL based protective value for deer mouse	4.2
	Zinc	60	1,280	188	214	86	30.5	LOAEL based protective value for American robin	7.0

Notes:^a Source: DEQ suggested default background concentrations for metals (DEQ, 2002).^b The screening toxicity value represents a LOAEL based protective level for the most sensitive endpoint species evaluated.^c Screening toxicity value for dioxin is based on dioxin TEQs.^d HQs reported here are not the same as those reported in the ERA because the ERA conservatively used the mean concentration for deriving bioaccumulation rates, whereas calculation of screening toxicity values assumes the mean and 95% UCL are equal.

TABLE 12Cost Estimates and Timeframes for Remedial Alternatives¹*Taylor Lumber and Treating Superfund Site*

Cost Estimates and Timeframes for Remedial Alternatives				
Alternative	Estimated Capital Cost (\$ Millions)	Estimated Operation & Maintenance Cost (\$ Millions)	Estimated Time to Construct	Estimated Time to Achieve RAOs
SO-2	1.7	0.9	1 yr	short
SO-3	5.7	2.9	2 yr	short
SO-4	25	1.6	2 yr	short
GW-2	0	0.12	1 yr	very long
GW-3	0.165	0.327	2 yr	short
GW-4	0.641	0.302	2 yr	long to very long
BW-2	1.6	1.8	2 yr	short
BW-3	1.1	1.8	2 yr	short
BW-4	0.8	1.8	2 yr	short

Notes:

¹Cost estimates are taken from the Feasibility Study Report.

Estimated time to achieve RAOs:

Short = less than 5 years

Medium = 5 to 30 years

Long = 30 to 100 years

Very long = over 100 years

TABLE 13

Cost Estimate Summary for the Selected Remedy
Taylor Lumber and Treating Superfund Site

Capital Costs for Selected Remedy

Description	Quantity	Unit	Unit Cost	Cost
1 Northeast Area Grading and Clearing ¹				
Remove Existing Vegetation and Debris and Dispose	36650	SY	\$3.00	\$109,950
Grading	36650	SY	\$5.00	\$183,250
2 Excavation and Consolidation ¹				
Ditch Soil	860	CY	\$7.44	\$6,398
Surface Soil	2260	CY	\$7.44	\$16,814
Storage Cells	19100	CY	\$7.44	\$142,104
3 Installation in Northeast Area ¹				
Stabilize, Spread and Compact	22210	CY	\$20.00	\$444,200
Base Asphalt Course (installed) ²	36650	SY	\$3.70	\$135,605
Top Asphalt Course (installed) ²	36650	SY	\$4.41	\$161,627
Drainage Repair or Installation	1	LS	\$15,000.00	\$15,000
4 Fill Excavated Areas to Grade ¹				
Fill Material Installation	6780	SY	\$9.22	\$62,512
Drainage Repair or Installation	1	LS	\$10,000.00	\$10,000
5 Asphalt Repair within Barrier Wall ¹				
Rubbleize and Rebind Damaged Asphalt	0.875	Acre	\$27,174.00	\$23,777
6 Installation of Engineered Asphalt within Barrier Wall ¹				
Impermeable Asphalt Course (installed) ²	3.5	Acre	\$130,000.00	\$455,000
Modifications Due to Grade Change	1	LS	\$50,000.00	\$50,000
Drainage Repair or Installation	1	LS	\$15,000.00	\$15,000
7 Surveying and Testing				
Surveying	1	LS	\$11,000.00	\$11,000
Geotech Testing	24	Per Test	\$1,600.00	\$38,400
Subtotal				<u>\$1,880,637</u>
Reporting (5%) ³				\$94,032
Design and Planning (15%) ³				\$282,096
Services During Construction (10%)				\$188,064
Project Management (10%) ³				\$188,064
Contingency Allowances (15%) ³				\$282,096
Total Capital Cost				<u>\$2,914,988</u>

TABLE 13 (continued)

Cost Estimate Summary for the Selected Remedy
Taylor Lumber and Treating Superfund Site

Operation and Maintenance Costs for Selected Remedy

Description	Quantity	Unit	Unit Cost	Total Cost	Annual O&M PV	Total O&M PV
1 Institutional Controls						
Legal and Clerical Fees	1	LS	\$10,000	\$10,000	\$138	\$4,136
Oversight ³	30	Year	\$1,000	\$30,000	\$414	\$12,409
2 Replace 1/4 of the Asphalt Cap Every 5 Years ²	30	Year	\$69,609	\$2,088,270	\$28,793	\$863,781
3 Engineered Asphalt Reseal Every 5 Years ²	30	Year	\$3,440	\$103,200	\$1,423	\$42,687
4 Storm Water Treatment and GW Extraction System ^{3,4}	30	Year	\$50,666	\$1,519,980	\$20,957	\$628,716
5 GW Monitoring and Reporting (16 wells)						
New Monitor Well ³	1	LS	\$6,650	\$6,650	\$92	\$2,751
Monitoring Plan, QAPP, Health and Safety Plan ³	1	LS	\$15,000	\$15,000	\$207	\$6,205
Fieldwork ³	30	Year	\$3,500	\$105,000	\$1,448	\$43,432
Analytical	30	Year	\$6,400	\$192,000	\$2,647	\$79,418
Reporting ³	30	Year	\$5,000	\$150,000	\$2,068	\$62,045
Subtotal			\$171,265	\$4,220,100	\$58,186	\$1,745,580
Contingency Allowances (25%) ³			\$42,816	\$1,055,025	\$14,546	\$436,395
Project Management and Support (10%) ³			\$17,127	\$422,010	\$5,819	\$174,558
Total O&M Cost			\$231,208	\$5,697,135	\$78,551	\$2,356,533

Notes

Capital cost estimates are not discounted because the construction work will be performed in the first year.

O&M PV costs are reported as present worth estimates given a 7% discount rate for a 30 year duration.

Total cost represents cost over 30 years without discounting.

Cost estimates are based on soil volume estimates which may be refined when remedy is designed.

Cost estimates are within +50 to -30% accuracy expectation.

¹ Includes mobilization/demobilization costs.

² The cost of asphalt is currently significantly higher than the price shown, which is based on 2004 oil costs.

³ Line item differs from the Feasibility Study. However, cost adjustments are insignificant compared to differences in costs

⁴ Costs were developed in consultation with Pacific Wood Preserving, who bears certain responsibilities for this item per the Prospective Purchase Agreement with EPA. These revised costs reflect groundwater treatment in the current system rather than use of the evaporator.

LS = Lump Sum

SY = Square Yard

CY = Cubic Yard

GW = Groundwater

O&M = Operations and Maintenance

PV = Present value