HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: St. Maries Creosote Site

Contact Persons:

Integrated Assessment:	Ecology and Environment, Inc.
Documentation Record:	Tara Karamas, Ecology and Environment, Inc., Seattle David Bennett, U.S. Environmental Protection Agency, Seattle

Pathways, Components, or Threats Not Scored

The groundwater migration pathway, groundwater-to-surface water component of the surface water migration pathway, soil exposure pathway, and air pathway were not scored as part of this Hazard Ranking System (HRS) evaluation. These pathways/components were not included because a release to these media does not significantly affect the overall site score and because the threats of the overland/flood component of the surface water migration pathway produces an overall site score well above the minimum required for the site to qualify for inclusion on the National Priorities List. These pathways are of concern to the U.S. Environmental Protection Agency and may be evaluated during future investigations.

HRS DOCUMENTATION RECORD

Name of Site: St. Maries Creosote

EPA Region 10 Date Prepared: November 2, 1999

CERCLIS No.: SFN1002095

Street Address of Site: 1369 Railroad Avenue

County and State: St. Maries, Idaho

General Location in the State: Northwest

Topographic Map: St. Maries Quadrangle 7.5 Minute Series

Latitude: 47° 19' 17" North Longitude: 116° 34' 30" West
(Reference point: Approximate center of contaminated soil)

Scores	
Groundwater Pathway	0.00
Surface Water Pathway	100.00
Soil Exposure Pathway	0.00
Air Pathway	0.00
HRS SITE SCORE	50.00

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENT SCORESHEET

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENT Factor Categories and Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Assigned Value
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5×10^8
16. Hazardous Waste Quantity	*	100
17. Waste Characteristics	1000	320
Targets		
18. Food Chain Individual	50	20
19. Population	**	
19a. Level I Concentrations	**	0
19b. Level II Concentrations	**	0
19c. Potential Contamination	**	0.000003
19d. Population (lines 19a+19b+19c)	**	0.000003
20. Targets (lines 18 + 19d)	**	20.000003
21. HUMAN FOOD CHAIN THREAT SCORE	100	42.67

* Maximum value applies to waste characteristics category

** Maximum value not applicable

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENT SCORESHEET

SURFACE WATER OVERLAND FLOW/FLOOD MIGRATION COMPONENT Factor Categories and Factors ENVIRONMENTAL THREAT	Maximum Value	Assigned Value
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	550
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	*	5×10^8
24. Hazardous Waste Quantity	*	100
25. Waste Characteristics	1000	320
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0
26b. Level II Concentrations	**	125
26c. Potential Contamination	**	0.0525
26d. Sensitive Environments (lines 26a+26b+26c)	**	125.0525
27. Targets	**	125.0525
28. ENVIRONMENTAL THREAT SCORE	60	60
29. WATERSHED SCORE	100	100
30. SURFACE WATER OVERLAND FLOW/FLOOD COMPONENT SCORE	100	100

* Maximum value applies to waste characteristics category

** Maximum value not applicable

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Groundwater Migration Pathway Score (S_{GW})	Not Scored	0
2a.	Surface Water Overland Flow/Flood Component (from HRS Table 4-1, line 30)	100.00	
2b.	Groundwater to Surface Water Migration Component (from HRS Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{SW}) Enter the larger of lines 2a and 2b as the pathway score	100.00	10,000.00
3	Soil Exposure Pathway Score (S_s)	Not Scored	0
4.	Air Migration Pathway Score (S_a) (from HRS Table 6-1, line 12)	Not Scored	0
5.	Total of $S_{GW}^2 + S_{SW}^2 + S_s^2 + S_a^2$		10,000.00
6.	**HRS Site Score.** Divide the value on line 5 by 4 and take the square root.	50.00	

REFERENCES

Reference Number	Description of the Reference
1.	U.S. Environmental Protection Agency, December 14, 1990, Hazard Ranking System, Final Rule, 40 CFR Part 300, Appendix A, 55 FR 51532. (Not included - publically available)
2.	U.S. Environmental Protection Agency, June 1996, Superfund Chemical Data Matrix. (Publically available)
3.	U.S. Geological Survey, 7.5 minute series, Topographic Maps: St. Maries, Idaho Quadrangle 1981; Benewah Lake, Idaho Quadrangle 1981; Black Lake, Idaho Quadrangle 1981; Harrison, Idaho Quadrangle 1981.
4.	Ecology and Environment, Inc., August 1999, St. Maries Creosote Site Integrated Assessment, 750 pages.
5.	EMCON, April 20, 1999, Prepared for Carney Products Company Ltd. and the City of St. Maries, Idaho, Removal Site Assessment and Removal Action Report for the St. Maries Creosote Site, 706 pages.
6.	U.S. Environmental Protection Agency, November 1996, Using Qualified Data to Document an Observed Release and Observed Contamination, OSWER 9285.7-14FS, 18 pages.
7.	U.S. Department of Fish and Wildlife, 7.5 minute series National Wetland Inventory Map, St. Maries, Idaho Quadrangle 1987; Benewah Lake, Idaho Quadrangle 1987; Black Lake, Idaho Quadrangle 1987; Harrison, Idaho Quadrangle 1987.
8.	Idaho Department of Fish and Game, March 23, 1999, Special concern data for the St. Joe River, 4 pages.
9.	United States Geological Survey (USGS), 1980 through 1998, Hydrograph and Station Description for Gaging Station 12414500, 3 pages.
10.	Ecology and Environment, Inc., January 1, 1999 to November 4, 1999, Field Logbooks, 8 logbooks total, St. Maries Creosote Site, St. Maries, Idaho. Logbook 1, 28 pages; Logbook 2, 19 pages; Logbook 3, 20 pages; Logbook 4, 25 pages; Logbook 5, 15 pages; Logbook 6, 48 pages; Logbook 7 (Photolog A), 9 pages; Logbook 8 (Photolog B), 5 pages; Logbook 9, 31 pages; Logbook 10, 25 pages.
11.	Ecology and Environment, Inc., January 7, 1999 to March 11, 1999, Chain of Custody forms and FedEx receipts, 40 pages.
12.	Horner, Ned, Idaho Fish and Game, July 26, 1999, telephone conversation with Lilin Li, Ecology and Environment, Inc., regarding the migratory pathway for the Bull trout *(Salvelinus confluenius*). 2 pages.
13.	Ecology and Environment, Inc., September 9, 1999, Memorandum from Alasdair Turner regarding the calculation of sample quantitation limits (SQLs), 2 pages.

14. Ecology and Environment, Inc., May 21, 1999, Note to file, calculation of volume for hazardous waste quantity, 2 pages.

15. Liter, Mark, Idaho Fish and Game, September 27, 1999, telephone conversation with Tara Karamas, Ecology and Environment, Inc. regarding the presence of a fishery in the St. Joe River, 1 page.

16. Coeur d'Alene Tribe, April 6, 1999, Electrofishing data and Species List from the St. Joe River and Lake Coeur d'Alene, 4 pages.

17. Mitchell, Stephanie, Idaho Conservation Data Center, September 13, 1999 and January 31, 2000, telephone conversation with Tara Karamas, Ecology and Environment, Inc., regarding foraging locations of the bald eagle (*Haliaeetus leucocephalus*), 1 page.

18. Reed, William, Idaho Conservation Data Center, February 1, 2000, telephone conversation with Tara Karamas, Ecology and Environment, Inc., regarding the status of the westslope cutthroat trout (*Oncorhynchus clarki lewisi*), 6 pages.

2.2 SOURCE CHARACTERIZATION

Number of the source: 1

Name and description of the source: Contaminated soil

St. Maries Creosote site is immediately adjacent to, and south of, the St. Joe River in the city of St. Maries, Idaho (Ref. 5, p. 2-1). Currently, the east side of the property contains the log-sorting and -peeling operation and the remainder is used for log storage; however, all processes using creosote ended in 1964 (Ref. 4, pp. 2-1, 2-2). The site is relatively flat and consists of log decks and haul roads between decks (Ref. 5, p. 2-1). The edge of the site that forms the bank of the St. Joe River consists of various fill materials, including concrete, treated poles, scrap metal, and other debris. (Ref. 5, p. 2-1)

From 1939 through 1964, the site was used for peeling and treating logs to be used for poles (Ref. 4, p. 2-2). The bottom portion of the poles were treated by soaking in large butt vats filled with creosote, a wood preservative containing 80% polynuclear aromatic hydrocarbons (PAHs), to prevent the poles from rotting once installed into the ground (Ref. 4, p. 2-2). The butt vats were located approximately 50 to 75 feet from the bank of the St. Joe River (Ref. 5, pp. 2-1 and 2-2).

Two aerial photographs taken in 1951 and 1960 show a log-peeling operation and associated burner on the east end of the site, logs stored throughout the length of the site, and a portion of the west end of the site being used for treating poles (Ref. 4, p. 2-2 and Appendix A). The log-treating operation shown in the photographs consisted of one building with a large smoke stack (the boiler house), an aboveground storage tank (to store creosote), butt vats (to treat poles), two rail spurs (to transport treated poles off-site), a stiff arm (to load treated poles onto rail cars), and a series of wooden piers set next to the river bank and in the channel of the river (to hold logs floated down river prior to being treated) (Ref. 4, pp. 2-2 and 2-3).

Historically, as the treated poles were loaded onto rail cars by the stiff arm, creosote dripped onto the soil around the butt vats and rail cars (Ref. 4, p. 2-3). If several cars were loaded at once, poles would drip creosote onto the soil beneath the rail line (Ref. 4, p. 2-3). It is not known how the butt vats were maintained; a solvent of some type, possibly diesel fuel, probably would have been used to clean caked creosote in the vats, which were then poured/pumped onto the soil in front of the vats (Ref. 4, p. 2-3).

During a site reconnaissance conducted by consultants for the property owners, on November 20, 1998, minor staining on the surface of the site was observed (Ref. 4, p. 2-3; Ref. 5, p. 2-2). Severe soil staining, a noticeable odor (as creosote), and a product sheen were noted along the bank of the river (Ref. 4, p. 2-3; Ref. 5, p. 2-2). The product sheen was observed in the river as well (Ref. 5, p. 2-2; Ref. 4 , p. B-1, B-11).

Another site reconnaissance was conducted by consultants for EPA on January 7, 1999 (Ref. 4, p.2-4; Ref. 5, p. 2-2). Six samples were collected: four samples from the exposed river bank, and two surface water samples along the river in the areas where creosote appeared to be seeping from the river bank into the St. Joe River (Ref. 4, p. 2-4; Ref. 5, p. 2-2). The sample results revealed 18 SVOCs at estimated concentrations ranging from 530 to 24,000,000 mg/kg in the surface soil and 17 SVOCs at estimated concentrations ranging from 2 to 560 mg/L in the surface water (Ref. 4, p. 2-4).

An Integrated Assessment (IA) was conducted during February and March 1999, by consultants for the EPA (Ref. 4, p. 3-1). A total of 30 split surface and subsurface soil samples were collected during the IA (Ref. 4, pp. 3-2, 3-

10). Of the 30 samples, 2 were surface soil samples collected from a depth of 1 to 2 feet below ground surface (bgs), and 28 were subsurface soil samples. Of the subsurface soil samples, 20 were collected from depths ranging from 5 to 27 feet bgs; 8 were collected from 5 to 62.5 feet bgs; the remaining 4 samples were subsurface soil samples collected from the bottom of a 9-foot-deep excavation (Ref. 4, pp. 3-2, Table 3-1). Analytical results indicated significant concentrations of one VOC at 5,600 mg/kg and eighteen SVOCs at concentrations ranging from 3,200 to 590,000 mg/kg (Ref. 4, p. 6-3, Table 6-3).

Location of the source, with reference to the site:

The contaminated soil is located on the northern portion of the site, which is adjacent to the St. Joe River (Ref. 4, Figure 2-3). The contaminated soil encompasses the area of the site that housed the butt vats, aboveground storage tank, boiler house, and railway cars (Ref. 4, p. 2-5, Figures 2-2 and 2-3). More specifically, the lateral extent of soil contamination is bounded by the St. Joe river bank to the north; borings GP-6, GP-15, and GP-18 to the east; borings GP-3, GP-16, and GP-25 to the south; and borings GP-26 and MW-2D to the west (Ref. 4, Figure 3-1, pp. 3-10, 8-1).

Containment

There is no evidence of the presence of a maintained engineered cover, or a functioning and maintained run-on control system and runoff management system (Ref. 4, pp. 2-1 through 2-3, Appendix B, pp. B-16 through B-18; Ref. 5, pp. 2-1, 2-2). In addition, there is evidence of hazardous substance migration as documented in Section 4.1.2.1.1 of this documentation record. Also, as discussed above, in 1998 and 1999, contaminated soil was observed on the site and a sheen was observed on the St. Joe River, indicating that contamination had migrated from the source (see Section 4.1.2.1.1).

Containment Value: 10 (Ref. 1, Table 4-2)

2.2.2 Hazardous Substances

As discussed in Section 2.2 of this HRS documentation record, during the IA, a total of 30 split surface and subsurface soil samples were collected by a consultant for the EPA (Ref. 4, p. 3-2). The following is a list of hazardous substances detected in the soil samples at significantly higher levels than the background soil samples (MW-04D-5 and MW-04D-55) (Ref. 1, Sections 2.2.2 and 2.3).

Substance	Evidence (i.e., sample number)
Phenol	GP-11-15
2-Methylphenol	GP-11-15
4-Methylphenol	GP-11-15
2,4-Dimethylphenol	GP-11-15
Naphthalene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5
2-Methylnaphthalene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5
Acenaphthylene	GP-11-5, GP-11-15, GP-10-5, GP-25-7
Acenaphthene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-16-12, GP-18-5, GP-25-7
Dibenzofuran	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-16-12, GP-18-5 , GP-25-7
Fluorene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-16-12, GP-18-5, GP-25-7
Phenanthrene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-16-12, GP-18-5, GP-25-7
Anthracene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7
Carbazole	GP-11-5, GP-11-15, GP-17-11, GP-3-20, GP-5-4, GP-10-5, GP-16-12, GP-18-5
Fluoranthene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-18-5, GP-25-7
Pyrene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-14-11, GP-18-5, GP-25-7
Benzo(a)anthracene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7

Chrysene	GP-11-5, GP-11-15, GP-17-11, GP-2-25, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7
Bis(ethylhexyl)phthalate	GP-18-5
Benzo(b)fluoranthene	GP-11-5, GP-11-15, GP-17-11, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7
Benzo(k)fluoranthene	GP-11-5, GP-11-15, GP-17-11, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7
Benzo(a)pyrene	GP-11-5, GP-11-15, GP-17-11, GP-3-20, GP-5-4, GP-10-5, GP-18-5, GP-25-7
Indeno(1,2,3-CD)pyrene	GP-11-5, GP-11-15, GP-3-20, GP-5-4, GP-10-5, GP-25-7
Dibenz(a,h)anthracene	GP-11-15, GP-3-20, GP-10-5, GP-25-7
Benzo(g,h,i)perylene	GP-11-5, GP-11-15, GP-3-20, GP-5-4, GP-10-5, GP-25-7

(Ref. 4, pp. 6-5, D157, D158, D161, D162, D178, D179, D182, D183, D196, D197, D200, D201, D203, D204, D207, D208, D210, D211, D214, D215, D217, D218, D230, D231, D233, D234, D237, D238, D240, D241, D244, D245, D247, D248, D251, D252, D593, D594, D597, D598)

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

Available data are insufficient to document a hazardous constituent quantity; therefore a 0 is assigned for this source (Ref. 1, Section 2.4.2.1.1).

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2 Hazardous Wastestream Quantity

Available data are insufficient to document a hazardous wastestream quantity; therefore a 0 is assigned for this source (Ref. 1, Section 2.4.2.1.2).

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3 Volume

Available data are insufficient to document a volume; therefore a 0 is assigned for this source (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: NS

2.4.2.1.4 Area

Based on odors, visual inspection, and analytical results of soil samples collected from March 1 to March 5, 1999, during the IA, the lateral extent of soil contamination was determined to be the area bounded by the St. Joe River bank to the north; borings GP-6, GP-15, and GP-18 to the east; borings GP-3, GP-16, and GP-25 to the south; and borings GP-26 and MW-2D to the west (Ref. 4, p. 8-1, Figure 3-1). In addition to these samples, the area of contamination contains the following contaminated sample locations: MW-1S, MW-1D, GP-5, GP-10, GP-11, and GP-14 (Ref. 4, Figure 3-1).

Although the volume of contaminated soil could not be reasonably determined, the vertical soil contamination at many sample locations has been visually documented to extend from 5 feet below ground surface (bgs) to up to 64.5 feet bgs (Ref. 4, Tables 6-1 and 6-2, pp. D157, D158, D161, D162, D178, D179, D182, D183, D196, D197, D200, D201, D203, D204, D207, D208, D210, D211, D214, D215, D217, D218, D230, D231, D233, D234, D237, D238, D240, D241, D244, D245, D247, D248, D251, D252, D593, D594, D597, D598). Samples GP-5, GP-10, GP-11, GP-18, and GP-25 document soil contamination between 4 feet and 11 feet bgs; and samples GP-14 and GP-16 document soil contamination between 11 feet and 21 feet bgs (Ref. 4, Tables 6-1 and 6-2, pp. D157, D158, D161, D162, D210, D211, D214, D215, D217, D218, D230, D231, D233, D234, D237, D238, D240, D241, D244, D245, D247, D248, D251, D252, D593, D594, D597, D598). Additional samples document soil contamination between 20 and 21 feet bgs, 25 and 27 feet bgs, 32.5 and 35 feet bgs, 50 and 52 feet bgs, and 62.5 and 64.5 feet bgs (Ref. 4, Tables 6-1 and 6-2, pp. D178, D179, D182, D183, D196, D197, D200, D201).

The area of contamination was calculated by drawing a box around the soil sample locations, as depicted on Figure 3 of Reference 4, and measuring the distance between the most northern, southern, eastern, and western sample locations (see Reference 14 for a map depicting the box). The area was calculated as follows: 150 feet x 200 feet = 30,000 square feet.

(30,000/34,000 = 0.88)

Area Assigned Value: 0.88
Ref. 1, Table 2-5

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Source Hazardous Waste Quantity Factor Value: 0.88

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Containment Value for Surface Water
1. Contaminated Soil[a]	0.88	10[b]

a. Ref. 4, p. 6-5 (See Section 2.2.2 of this document)
b. Ref. 1, Table 4-2

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

The St. Maries Creosote site is adjacent to the St. Joe River which is a freshwater river that flows west past the site (Ref. 3; Ref. 4, p. 7-3; Ref. 5, p. 2-1). The river bank is approximately 4 to 8 feet above the water level, depending on river elevation, and slopes steeply towards the water (Ref. 4, p. 7-3; Ref. 5, p. 2-1). The site is relatively flat and stormwater runoff is sheet-like (Ref. 4, p. 7-3). The probable point of entry (PPE) from the contaminated soil source is in front of the former creosote wood-treating facility where overland runoff covers approximately 25 feet of the river bank (Ref. 4, p. 7-3). The land in the butt vat area slopes towards the St. Joe River; therefore, any creosote and cleaning solvents discharged from the butt vats would flow towards and ultimately enter the river (Ref. 4, p. 2-3). The river flow rate recorded at the nearest United States Geologic Survey (USGS) gaging station is 1,885 cubic feet per second (cfs) (Ref. 9, p. 3). The St. Joe River extends 14.7 miles downstream from the PPE where it discharges into Lake Coeur d'Alene (Ref. 4, p. 7-3). The target distance limit (TDL) ends 0.3 miles into Lake Coeur d'Alene.

The St. Joe River is part of the Coeur d'Alene Lake basin, which supports the spawning of the federal-listed threatened bull trout (*Salvenlinus confluentus*) (Ref. 4, p. 7-4). The bull trout and cutthroat trout (*Oncorhynchus clarki clarki*) migrate up the St. Joe River past the St. Maries Creosote site and finally into the St. Maries river (Ref. 4, p. 7-4; Ref. 12). The St. Joe River is also used as a source of drinking water, commercial food crop irrigation, and livestock watering (Ref. 4, p. 7-4).

4.1.2.1 LIKELIHOOD OF RELEASE

4.1.2.1.1 Observed Release

Direct Observation

- Basis for Direct Observation

Observed releases by direct observation were documented to the St. Joe River during several site visits conducted by a consultant for EPA and the consultant for the property owners, EMCON. Specific site reconnaissance/activities are discussed below. During a site reconnaissance conducted by EMCON on November 20, 1998, EMCON personnel observed minor staining on the surface of the site that appeared to be associated with petroleum products (Ref. 5, p. 2-2). Severe soil staining, a noticeable creosote odor, and a product sheen were noted along the bank of the St. Joe River (Ref. 5, p. 2-2). The city of St. Maries was notified by EMCON of the observations noted during the November site visit and the city reported the site to the EPA (Ref. 5, p. 2-2).

During a site visit, consultants for EPA noted soil staining both on site and along the St. Joe River bank adjacent to the site; a sheen on puddling water on site; a sheen on the ice from the river bank seeps; and a sheen on the river (Ref. 4, Appendix B, pp. B-1, B-2, B-6, B-7, B-10; Ref. 10, Logbook 5, p. 3; Photo logbook A, pp. 4-5). The soil staining and sheen were present for approximately 100 feet along the river bank (Ref. 10, Logbook 5, p. 4). A seep was also noticed approximately 1 to 2 feet above river level (Ref. 10, Logbook 5, p. 4). Additionally, a sheen was observed on the river where a log was removed during a removal action conducted by EMCON and EPA in February of 1999 (Ref. 4, pp. B-2, B-27; Ref. 10, Logbook 3, p. 3; Photo Logbook B, p. 2). During a walk-through of the site, on February 11, 1999, consultants for EPA observed a sheen on the river and a noticeable odor coming from the river (Ref. 10, Logbook 4, p.1). EPA personnel had a conversation with one of the residents near the site and the resident informed EPA that in the 1960s, big balls of creosote were frequently observed floating downstream (Ref. 10, Logbook 4, p. 10). A wetland, located 2 miles downstream in the bend of the river, would act as an eddy causing creosote to collect at this location (Ref. 4, p. 7-4; Ref. 10, Logbook 4, p. 10). The resident also mentioned that several gallons of used creosote were poured into the St. Joe River (Ref. 10, Logbook 4, p. 10).

Moreover, a site visit performed by EPA in November 1999 revealed odor, product, and sheen in sediments from the St. Joe River, especially in front of the 25-foot area where seeps were identified in 1999 by EPA, as discussed below (Ref. 10, Logbooks 8, pp. 4, 5, 8, 9, 10, 11, Logbook 9, p. 16).

An EPA contractor collected six samples (four soil and two water samples) on January 7, 1999 from the area where creosote appeared to be seeping from the river bank into the St. Joe River (Ref. 4, p. 2-4; Ref. 5, p. 2-2, Tables 1 and 2). These samples were analyzed using EPA Method 8270C (Ref. 5, p. 2-2). The results are presented in this section to further support the establishment of an observed release by direct observation. Results are provided in Table 1 below (Ref. 4, p. 2-6, 2-7; Ref. 5, Tables 1 and 2, pp. A133 through A145).

Table 1

ANALYTICAL RESULTS OF SEEPS DISCHARGING TO THE ST. JOE RIVER

Hazardous Substance	99010401 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A133-A134, Figure 2; Ref. 13)	99010402 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A135-A137, Figure 2; Ref. 13)	99010403 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A138-A139, Figure 2; Ref. 13)	99010404 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A140-A141, Figure 2; Ref. 13)	99010405 (ug/L) (Ref. 4, p. 3-11; Ref. 5, p. A142-A143, Figure 2; Ref. 13)	99010406 (ug/L) (Ref. 4, p. 3-11; Ref. 5, p. A144-A145, Figure 2; Ref. 13)
	SQL=500	SQL=420	SQL=45,000	SQL=5,800	SQL=1	SQL=1
2,4-Dimethylphenol					23 J (2.3)	14
Naphthalene	150,000 J (15,000)		12,000,000 J (1,200,000)	2,800,000 J (280,000)	560 J (56)	980 J (98)
2-Methylnaphthalene	83,000 J (8,300)		9,300,000 J (930,000)	1,300,000 J (130,000)	120 J (12)	240 J (24)
Acenaphthylene	11,000	530		93,000		13
Acenaphthene	180,000 J (18,000)	600		1,700,000 J (170,000)	120 J (12)	190
Dibenzofuran	100,000 J (10,000)			1,000,000 J (100,000)	54 J (5.4)	83
Fluorene	150,000 J (15,000)	670		1,500,000 J (150,000)	56 J (5.6)	89
Phenanthrene	450,000 J (45,000)	2,300			69 J (6.9)	100
Anthracene	420,000 J (42,000)	3,200	30,000,000 J (3,000,000)	3,700,000 J (370,000)		
Carbazole	46,000		3,300,000	530,000	72 J (7.2)	60
Fluoranthene	420,000 J (42,000)	16,000	18,000,000 J (1,800,000)	2,800,000 J (280,000)	17 J (1.7)	26

Table 1

ANALYTICAL RESULTS OF SEEPS DISCHARGING TO THE ST. JOE RIVER

Hazardous Substance	99010401 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A133-A134, Figure 2; Ref. 13)	99010402 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A135-A137, Figure 2; Ref. 13)	99010403 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A138-A139, Figure 2; Ref. 13)	99010404 (ug/kg) (Ref. 4, p. 3-11; Ref. 5, p. A140-A141, Figure 2; Ref. 13)	99010405 (ug/L) (Ref. 4, p. 3-11; Ref. 5, p. A142-A143, Figure 2; Ref. 13)	99010406 (ug/L) (Ref. 4, p. 3-11; Ref. 5, p. A144-A145, Figure 2; Ref. 13)
	SQL=500	SQL=420	SQL=45,000	SQL=5,800	SQL=1	SQL=1
Pyrene	410,000 J (34,570)	13,000	14,000,000 J (1,180,438)	2,400,000 J (202,361)	14 J (2)	21
Benzo(a)anthracene	190,000 J (19,000)	7,100	5,500,000	960,000 J (96,000)		5
Chrysene	200,000 J (20,000)	13,000	16,000,000 J (1,600,000)	1,200,000 J (120,000)		3
Benzo(b)fluoranthene		14,000	3,400,000	890,000		3
Benzo(k)fluoranthene	230,000 J (23,000)	8,800	3,200,000	430,000		3
Benzo(a)pyrene	120,000 J (12,000)	12,000	3,500,000	760,000		3
Indeno(1,2,3-cd)pyrene	73,000	7,000	1,200,000	300,000		
Dibenzo(a,h)anthracene	16,000		590,000	26,000		
Benzo(g,h,i)perylene	60,000	6,000	890,000	220,000		

Key

J - The analyte was positively identified; the associated numerical result is an estimate.

SQL - Sample quantitation limit (Ref. 13).

ug/kg - Micrograms per kilogram.

ug/L - Micrograms per liter.

Blank cells indicate that the analyte was not detected.

Values in parentheses are the adjusted concentration as per *Using Qualified Data to Establish an Observed Release and Observed Contamination* (Ref. 6). Since the bias for all "J" qualified data was not included on the original Form 1s, all "J" qualified data are assumed to have an unknown bias.

- Hazardous Substances in the Releases

The hazardous substances in the various observed releases by direct observation are: 2,4-Dimethylphenol, Naphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Dibenzofuran, Fluorene, Phenanthrene, Anthracene, Carbazole, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene.

Chemical Analysis

- Basis for Chemical Analysis

Observed releases by chemical analysis are documented in the St. Joe River. The analytical results supporting these releases are presented in the Integrated Assessment (IA) performed for EPA. The supporting laboratory records and quality assurance reports can also be found in the IA and supporting documents (Ref. 4, Appendix D; Ref. 11). The results show repeated examples of HRS observed releases to the St. Joe River.

A 48-inch diameter pipe used as a diversion for Mulch Creek and a 24-inch diameter stave pipe used as a city stormwater drain line transverse the property immediately east of the treating facility and discharge into the St. Joe River (Ref. 4, p. 7-3). Samples were collected at these outfalls on February 13, 1999 (Ref. 4, p. 3-7). All sediment samples used to document an observed release were compared to both the background sample (99MRV10SD) and a sediment sample near the outfall (99MRV09SD). Similarly, all surface water samples used to document an observed release were compared to the background sample (99MRV10SW) and to the outfall sample (99MRV09SW). This strategy was used to account for any contamination that may be released from the outfalls. Contaminants detected at levels above both the background and the outfall samples are attributable to the St. Maries Creosote site.

Table 2 illustrates the sediment samples used to document an observed release by chemical analysis, when compared to the background and outfall sediment samples. Table 3 illustrates the surface water sample used to document an observed release by chemical analysis, when compared to the background surface water sample.

Table 2

SEDIMENT OBSERVED RELEASE SAMPLES
(ug/kg)

Hazardous Substance	99SMRV10SD Background (Ref. 4, pp. D308, D337, D338; Ref. 13)		99SMRV09SD Outfalls (Ref. 4, pp. D308, D329, D330, D335; Ref. 13)		99SMRV05SD (Ref. 4, pp. D546, D547, D550; Ref. 13)		99SMRV06SD (Ref. 4, pp. D569, D570; Ref. 13)		99SMRV07SD (Ref. 4, pp. D577, D578; Ref. 13)		99SMRV08SD (Ref. 4, pp. D580, D581, D584; Ref. 13)	
Approximate Distance from PPE (feet)	**120 upstream (Ref. 4, p. 3-11)**		**25 upstream (Ref. 4, p. 3-11)**		**120 downstream (Ref. 4, p. 3-11)**		**60 downstream (Ref. 4, p. 3-11)**		**0 downstream (Ref. 4, p. 3-11)**		**0 downstream (Ref. 4, p. 3-11)**	
	Conc.	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**
Naphthalene	1,400	500	360 U	360	6,100	2,400	97,000	14,000	21,000	16,000	89,000,000	1,500,000
2-Methylnaphthalene	86 JQ	500	120 JQ	360			28,000	14,000			2,900,000 JL	300,000
Acenaphthene	91 JQ	500	70 JQ	360		590	100,000	14,000			4,300,000 JL	300,000
Dibenzofuran	52 JQ	500	220 JQ	360			48,000	14,000			2,600,000 JL	300,000
Fluorene	86 JQ	500	400	360			74,000	14,000			3,800,000 JL	300,000
Phenanthrene	330 JQ	500	1,600 JH (16,000) [a]	360			210,000 JL	14,000			5,700,000 JL	300,000
Anthracene	360 JQ	500	4,800	360			83,000	14,000			6,400,000 JL	300,000
Carbazole	72 JQ	500	600 JH (6,000) [a]	360							2,700,000 JL	300,000
Fluoranthene	380 JQ	500	7,700	3,600			190,000 JL	14,000	32,000	16,000	3,500,000 JL	300,000
Pyrene	550	500	9,200	3,600			160,000	14,000	42,000	16,000	2,800,000 JL	300,000
Benzo(a)anthracene	270 JQ	500	5,400	3,600			71,000	14,000	23,000	16,000	980,000	300,000
Chrysene	590	500	9,300	3,600			72,000	14,000	42,000	16,000	1,400,000	300,000
Benzo(b)fluoranthene	560	500	6,600	3,600			41,000	14,000	22,000	16,000		

Table 2

SEDIMENT OBSERVED RELEASE SAMPLES
(ug/kg)

Hazardous Substance	99SMRV10SD Background (Ref. 4, pp. D308, D337, D338; Ref. 13)		99SMRV09SD Outfalls (Ref. 4, pp. D308, D329, D330, D335; Ref. 13)		99SMRV05SD (Ref. 4, pp. D546, D547, D550; Ref. 13)		99SMRV06SD (Ref. 4, pp. D569, D570; Ref. 13)		99SMRV07SD (Ref. 4, pp. D577, D578; Ref. 13)		99SMRV08SD (Ref. 4, pp. D580, D581, D584; Ref. 13)	
Approximate Distance from PPE (feet)	**120 upstream (Ref. 4, p. 3-11)**		**25 upstream (Ref. 4, p. 3-11)**		**120 downstream (Ref. 4, p. 3-11)**		**60 downstream (Ref. 4, p. 3-11)**		**0 downstream (Ref. 4, p. 3-11)**		**0 downstream (Ref. 4, p. 3-11)**	
	Conc.	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**
Benzo(k)fluoranthene	540	500	4,700	3,600			33,000	14,000	26,000	16,000		
Benzo(a)pyrene	410 JQ	500	4,800	3,600			42,000	14,000	26,000	16,000	360,000	300,000

Key

Conc. - Concentration.

CRQL - Contract required quantitation limit.

J - The analyte was positively identified; the associated numerical result is an estimate.

H - High bias.

L - Low bias.

PPE - Probable point of entry.

Q - The result is an estimate because the concentration is below the SQL; therefore, these concentrations are considered non-detects.

SQL - Sample quantitation limit (Ref. 13).

U - The material was analyzed for but not detected. The associated numerical value is the SQL.

ug/kg - Microgram per kilogram.

The blank cells indicate hazardous substances that were not detected.

Table 3

SURFACE WATER OBSERVED RELEASE SAMPLES
(ug/L)

Hazardous Substance	99SMRV10SW Background (Ref. 4, p. D357, D358; Ref. 13)		99SMRV09SW Outfalls (Ref. 4, pp. D308, D354, D355; Ref. 13)		99SMRV08SW (Ref. 4, pp. D347, D348, D351, D352; Ref. 13)	
Approximate Distance From PPE (feet)	**120 upstream (Ref. 4, p. 3-11)**		**25 upstream (Ref. 4, p. 3-11)**		**0 downstream (Ref. 4, p. 3-11)**	
	Conc.	**SQL**	**Conc.**	**SQL**	**Conc.**	**SQL**
Naphthalene	10 U	10	2 JQ	10	110	20
2-Methylnaphthalene	10 U	10	0.6 JQ	10	27	10
Acenaphthene	10 U	10	1 JQ	10	34	10
Dibenzofuran	10 U	10	0.6 JQ	10	17	10
Fluorene	10 U	10	0.7 JQ	10	24	20
Phenanthrene	10 U	10	1 JQ	10	56	20
Anthracene	10 U	10	10 U	10	31	20
Carbazole	10 U	10	10 U	10	12	10
Fluoranthene	10 U	10	1 JQ	10	23	10
Pyrene	10 U	10	0.8 JQ	10	20	10

Key

Conc. - Concentration.

CRQL - Contract required quantitation limit.

J - The analyte was positively identified; the associated numerical result is an estimate.

PPE - Probable point of entry.

Q - The result is an estimate because the concentration is below the SQL; therefore, these concentrations are considered non-detects.

SQL - Sample quantitation limit (Ref. 13).

U - The material was analyzed for but not detected. The associated numerical value is the SQL.

ug/L - Microgram per liter.

Blank cells indicate hazardous substances that were not detected.

- Attribution

From 1939 through 1964, the St. Maries Creosote site was used for peeling logs to be used for poles. The bottom portion of the poles were treated by soaking in large butt vats filled with creosote, a wood preservative containing 80% polynuclear aromatic hydrocarbons (PAHs), to prevent the poles from rotting once installed into the ground (Ref. 4, p. 2-2). The butt vats were located approximately 50 to 75 feet from the bank of the St. Joe River (Ref. 5, pp. 2-1 and 2-2).

Historically, as the treated poles were loaded onto rail cars by the stiff arm, creosote dripped onto the soil around the butt vats and rail cars. If several cars were loaded at once, poles would drip creosote onto the soil beneath the rail line. It is not known how the butt vats were maintained; a solvent of some type, possibly diesel fuel, probably would have been used to clean caked creosote in the vats, and then poured/pumped onto the soil in front of the vats (Ref. 4, p. 2-3). Since 1965, the site has been used for storage of untreated poles (Ref. 5, pp. 2-1 and 2-2).

During a site reconnaissance conducted on November 20, 1998, minor staining on the surface of the site was observed. Severe soil staining, a noticeable creosote odor, and a product sheen were noted along the bank of the river (Ref. 5, p. 2-2). The product sheen was obvious in the river as well (Ref. 5, p. 2-2; Ref. 4 , pp. 2-3, B-1 and B-11). Another site reconnaissance was conducted by EPA on January 7, 1999. Four samples of exposed river bank and two surface water samples along the river in the areas where creosote appeared to be seeping from the river bank into the St. Joe River were collected (Ref. 4, p. 2-4; Ref. 5, p. 2-2). The analytical results (see Table 1) illustrate contamination seeping from the site into the St. Joe River.

As discussed in section 4.1.1.1 of this HRS documentation record, both EPA and EMCON documented visual observations of soil staining, sheens on the river and on puddles on site, and the presence of a creosote odor, which were a result of the historical processes performed at the St. Maries Creosote site.

Although the groundwater pathway was not scored as part of this HRS documentation package, there is strong evidence demonstrating that creosote contamination has entered the groundwater underlying the site. Table 4 illustrates analytical results from groundwater samples collected from monitoring wells installed at the St. Maries Creosote site. Each well location consists of a well pair (shallow and deep). The total well depth for background samples MW-04SGW and MW-04DGW is 19.5 feet bgs and 45.22 feet bgs, respectively (Ref. 4, p. 3-9). Similarly, the total well depth for release samples MW-01SGW and MW-01DGW is 21 feet bgs and 55 feet bgs, respectively (Ref. 4, p. 3-9).

Other Potential Sources

Samples GP-1-4 and GP-26-5 were collected from borings near the two railroad tracks at locations east and west of the treating facility respectively, and did not contain significant concentrations of SVOCs (Ref. 4, Figure 3-1, pp. 3-10, 6-5, 6-7, D186, D187). These sample results demonstrate that the railroad tracks are not significantly contributing to the on-site creosote contamination.

A 48-inch diameter pipe used as a diversion for Mulch Creek and a 24-inch diameter stave pipe used as a city stormwater drain line transverse the property immediately east of the treating facility and discharge into the St. Joe River (Ref. 4, p. 7-3). Samples were collected at these outfalls on February 13, 1999 (Ref. 4, p. 3-7). All sediment samples used to document an observed release were compared to both the background sample (99MRV10SD) and a sediment sample near the outfall (99MRV09SD) (see Tables 2 and 3). Similarly, all surface water samples used to document an observed release were compared to the background sample (99MRV10SW) and to the outfall sample (99MRV09SW) (see Tables 2 and 3). This strategy was used to account for any contamination that may be released from the outfalls or upstream of the outfalls. Contaminants detected at levels above both the background and the outfall samples are attributable to the St. Maries Creosote site (see Tables 2 and 3).

Table 4

OBSERVED RELEASE TO GROUNDWATER
(Shallow and Deep groundwater samples)
(ug/L)

Hazardous Substance	MW-04SGW Background (Ref. 4, p. 3-10, D376, D425, D426; Ref. 13)		MW-04DGW Background (Ref. 4, p. 3-10, D376, D428, D429; Ref. 13)		MW-01SGW (Ref. 4, p. 3-10, D376, D401, D402, D404; Ref. 13)		MW-01DGW (Ref. 4, p. 3-10, D376, D407, D408, D410; Ref. 13)	
	Conc.	SQL	Conc.	SQL	Conc.	SQL	Conc.	SQL
Phenol	10 U	10	10 U	10	850	780	560 JL	10
2-Methylphenol	10 U	10	10 U	10	280 JL	10	360 JL	10
4-Methylphenol	10 U	10	10 U	10	1,900	780	1,100 JL	10
2,4-Dimethylphenol	10 U	10	10 U	10	1,300	780	630 JL	10
Naphthalene	2 JQ	10	10 U	10	5,400	780	3,000	1,000
2-Methylnaphthalene	10 U	10	10 U	10	540 JL	10	290 JL	10
Acenaphthene	5 JQ	10	10 U	10	520 JL	10	230 JL	10
Dibenzofuran	3 JQ	10	10 U	10	250 JL	10	110 JL	10
Fluorene	1 JQ	10	10 U	10	240 JL	10	120 JL	10
Phenanthrene	10 U	10	10 U	10	310 JL	10	160 JL	10
Anthracene	10 U	10	10 U	10	30	10	16	10
Carbazole	1 JQ	10	10 U	10	270 JL	10	77	10
Fluoranthene	10 U	10	10 U	10	55	10	22	10
Pyrene	10 U	10	10 U	10	40	10	14	10
Benzo(a)anthracene	10 U	10	10 U	10	10	10		

Key

Conc. - Concentration.

CRQL - Contract required quantitation limit.

J - The analyte was positively identified; the associated numerical result is an estimate.

H - High bias.

L- Low bias.

Q - The result is an estimate because the concentration is below the SQL; therefore, these concentrations are considered non-detects.

SQL - Sample quantitation limit.

U - The material was analyzed for but not detected. The associated numerical value is the SQL.

ug/L - Microgram per liter.

The blank cells indicate hazardous substances that were not detected.

- Hazardous Substances Released

The substances found in the observed releases by chemical analysis to the St. Joe River are 2-Methylnaphthalene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Carbazole, Chrysene, Dibenzofuran, Fluoranthene, Fluorene, Naphthalene, Phenanthrene, and Pyrene.

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Observed Release Factor Value: 550

4.1.3.2 WASTE CHARACTERISTICS

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Table 5 below provides Human Food Chain Threat Contaminant Characteristics Factor Values for those hazardous substances associated with sources and/or attributable to the site.

Table 5

HUMAN FOOD CHAIN THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUE

Hazardous Substance	Source	Toxicity Factor Value	Persistence Factor Value[a]	Human Food Chain Bioaccumulation Factor Value[b]	Toxicity/ Persistence/ Bioaccumulation Factor Value	References
2,4-Dimethylphenol	1	100	0.4	500	2×10^4	Ref. 2, p. B-8; Ref. 5, pp. A142-A145
2-Methylnaphthalene	1	--	0.4	5000	--	Ref. 2, p. B-14; Ref. 4, pp. D569, D580, D580, D584; Ref. 5, pp. A133, A134, A138-A145
Acenaphthylene	1	--	0.4	500	--	Ref. 2, p. B-1; Ref. 5, pp. A133-A136, A145-A145
Acenaphthene	1	10	0.4	500	2×10^3	Ref. 2, p. B-1; Ref. 4, pp. D357, D358, D358, D358; Ref. 5, pp. A133-A137
Anthracene	1	10	1	5000	5×10^4	Ref. 2, p. B-2; Ref. 4, pp. D357, D358, D358, D358, D569, D580, D580, D584; Ref. 5, pp. A133-A145
Benzo(a)anthracene	1	1000	1	50000	5×10^7	Ref. 2, p. B-2; Ref. 4, pp. D569, D580, D577, D578, D580, D584; Ref. 5, pp. A133-A145
Benzo(a)pyrene	1	10000	1	50000	5×10^8	Ref. 2, p. B-2; Ref. 4, pp. D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145

Table 5

HUMAN FOOD CHAIN THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUE

Hazardous Substance	Source	Toxicity Factor Value	Persistence Factor Value[a]	Human Food Chain Bioaccumulation Factor Value[b]	Toxicity/ Persistence/ Bioaccumulation Factor Value	References
Benzo(b)fluoranthene	1	1,000	1	50,000	5×10^7	Ref. 2, p. B-3; Ref. 4, pp. D569, D570, D577, D578; Ref. 5, pp. A133-A145
Benzo(g,h,i)perylene	1	--	1	50,000	--	Ref. 2, p. B-3; Ref. 5, pp. A133-A141
Benzo(k)fluoranthene	1	100	1	50,000	5×10^6	Ref. 2, p. B-3; Ref. 4, pp. D569, D570, D577, D578; Ref. 5, pp. A133-A145
Bis(2-ethylhexyl)phthalate	1	100	1	50,000	5×10^6	Ref. 2, p. B-3; Ref. 4, pp. D247, D248, D251, D252
Carbazole	1	10	0.4	500	2×10^3	Ref. 2, p. B-4; Ref. 4, pp. D347, D348, D351, D352, D580, D584; Ref. 5, pp. A138-A145
Chrysene	1	10	1	500	5×10^3	Ref. 2, p. B-5; Ref. 4, pp. D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145
Dibenz(a,h)anthracene	1	10,000	1	50,000	5×10^8	Ref. 2, p. B-7; Ref. 5, pp. A133, A134, A138-A141
Dibenzofuran	1	--	1	500	--	Ref. 2, p. B-7; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D580, D584
Fluoranthene	1	100	1	5,000	5×10^5	Ref. 2, p. B-10; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D577, D578 D580, D584; Ref. 5, pp. A133-A145
Fluorene	1	100	1	5,000	5×10^5	Ref. 2, p. B-10; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D580, D584; Ref. 5, pp. A133-A137, A140-A145
Indeno(1,2,3-cd)pyrene	1	1,000	1	50,000	5×10^7	Ref. 2, p. B-12; Ref. 5, pp. A133-A141
Naphthalene	1	100	0.4	500	2×10^4	Ref. 2, p. B-14; Ref. 4, pp. D347, D348, D546, D547, D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133, A134, A138-A145

Table 5

HUMAN FOOD CHAIN THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUE

Hazardous Substance	Source	Toxicity Factor Value	Persistence Factor Value[a]	Human Food Chain Bioaccumulation Factor Value[b]	Toxicity/ Persistence/ Bioaccumulation Factor Value	References
Phenanthrene	1	--	1	50	--	Ref. 2, p. B-16; Ref. 4, pp. D347, D348, D351, D352, D569, D570; Ref. 5, pp. A133-137, A142-A145
Phenol	1	1	1	5	5	Ref. 2, p. B-16; Ref. 4, pp. 6-5, D157, D158, D161, D162, D178, D179, D182, D183, D196, D197, D200, D201, D203, D204, D207, D208, D210, D211, D214, D215, D217, D218, D230, D231, D233, D234, D237, D238, D240, D241, D244, D245, D247, D248, D251, D252, D593, D594, D597, D598.
Pyrene	1	100	1	50	5×10^3	Ref. 2, p. B-17; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133--A145

a. River persistence values (Ref. 2)

b. Food Chain bioaccumulation values for fresh water (Ref. 2)

-- Not applicable

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Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.3.2.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (yes/no)
1. Contaminated Soil[a]	0.88	no

a. Ref. 4, p. 6-5 (See Section 2.2.2 of this document)

4.1.3.2.3 Waste Characteristics Factor Category Value

Toxicity/persistence factor value x hazardous waste quantity factor value: 1×10^6

$(10{,}000 \times 100) = 10^6$, capped at 10^8)

(Toxicity/persistence x hazardous waste quantity) x food chain bioaccumulation factor value: 5×10^{10}

$(10^6 \times 5 \times 10^4 = 5 \times 10^{10}$, capped at 1×10^{12})

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Hazardous Waste Quantity Factor Value: 100

Ref. 1, Table 2-6

Waste Characteristics Factor Category Value: 320

Ref. 1, Table 2-7

4.1.3.3 HUMAN FOOD CHAIN TARGETS

Contamination of a watershed which contains a fishery has been established by the presence of bioaccumulative hazardous substances with bioaccumulation factor values of 500 or greater in an observed release by direct observation or chemical analysis (Ref. 1, p. 51620).

Location	Hazardous Substances	Bioaccumulation Potential Factor Value[a]	References
St. Joe River	2-Methylnaphthalene	5,000	Ref. 2; Ref. 3; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145
	Acenaphthene	500	
	Anthracene	5,000	
	Benzo(a)anthracene	50,000	
	Benzo(a)pyrene	50,000	
	Benzo(b)fluoranthene	50,000	
	Benzo(g,h,i)perylene	50,000	
	Benzo(k)fluoranthene	50,000	
	Bis(2-ethylhexyl)phthalate	50,000	
	Carbazole	500	
	Chrysene	500	
	Dibenzofuran	500	
	Dibenz(a,h)anthracene	50,000	
	Indeno(1,2,3-cd)pyrene	50,000	
	Fluoranthene	50	
	Fluorene	5,000	
	Naphthalene	500	

a. Fresh water values (Ref. 2).

4.1.3.3.1 Food Chain Individual

Species of fish present in the St. Joe River may include northern pike (*Esox lucius*), cutthroat trout (*Oncorhynchus clarki lewisi*), chinook salmon (*Oncorhynchus tshawytsha*), and bull trout (*Salvelinus confluenius*) (Ref. 16). Although fish catch data within the target distance limit is not maintained, there is documentation that the area of the St. Joe River between the City of St. Maries and into Lake Coeur d'Alene is fished for consumption (Ref. 15). To be conservative, no fisheries were considered to be exposed to level II concentrations.

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Food Chain Individual Factor Value: 20

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

Not scored.

4.1.3.3.2.2 Level II Concentrations

Not scored.

Level I Concentrations Factor Value: 0
Level II Concentration Factor Value: 0

4.1.3.3.2.3 Potential Human Food Chain Contamination

Although data is not available regarding the amount of fish caught for human consumption from the St. Joe River, people catch fish for consumption from the River within the target distance limit (Ref. 15). Therefore, the amount of fish caught for human consumption is assumed to be greater than zero pounds. The St. Joe River has a flow rate of 1,885 cfs at the nearest gaging station in Caldar (Ref. 9, p. 3).

0.03 x 0.001 = 0.00003 (Ref. 1, Tables 4-13 and 4-18)
0.00003 / 10 = 0.000003

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Potential Human Food Chain Contamination Factor Value: 0.000003
Ref. 1, Section 4.1.3.3.2.3

4.1.4.2 WASTE CHARACTERISTICS

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Table 6 below provides Environmental Threat Contaminant Characteristics Factor Values for a list of those hazardous substances associated with sources and/or attributable to the site.

Table 6
ENVIRONMENTAL THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUES

Hazardous Substance	Source	Ecosystem Toxicity Factor Value[a]	Persistence Factor Value[b]	Environmental Bioaccumulation Factor Value[c]	Ecosystem Toxicity/ Persistence/ Bioaccumulation Value	Reference
2,4-Dimethylphenol	1	100	1	500	2×10^4	Ref. 2, p. B-8; Ref. 5, pp. A142-A145 2, p. B-8
2-Methylnaphthalene	1	1,000	0.4	5,000	2×10^6	Ref. 2, p. B-14; Ref. 4, pp. D569, D570, D580, D584; Ref. 5, pp. A133, A134, A138-A145 p. B-14
Acenaphthylene	1	--	0.4	500	--	Ref. 2, p. B-1; Ref. 5, pp. A133-A136, A140-A145
Acenaphthene	1	10,000	0.4	500	2×10^6	Ref. 2, p. B-1; Ref. 4, pp. D347, D348, D351, D352; Ref. 5, pp. A133-A137 2, p. B-2
Anthracene	1	10,000	1	5,000	5×10^7	Ref. 2, p. B-2; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D580, D584; Ref. 5, pp. A133-A141
Benzo(a)anthracene	1	10,000	1	50,000	5×10^8	Ref. 2, p. B-2; Ref. 4, pp. D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145
Benzo(a)pyrene	1	10,000	1	50,000	5×10^8	Ref. 2, p. B-2; Ref. 4, pp. D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145
Benzo(b)fluoranthene	1	--	1	50,000	--	Ref. 2, p. B-3; Ref. 4, pp. D569, D570, D577, D578; Ref. 5, pp. A133-A145
Benzo(g,h,i)perylene	1	--	1	50,000	--	Ref. 2, p. B-3; Ref. 5, pp. A133-A141
Benzo(k)fluoranthene	1	--	1	50,000	--	Ref. 2, p. B-3; Ref. 4, pp. D569, D570, D577, D578; Ref. 5, pp. A133-A145

Table 6
ENVIRONMENTAL THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUES

Hazardous Substance	Source	Ecosystem Toxicity Factor Value[a]	Persistence Factor Value[b]	Environmental Bioaccumulation Factor Value[c]	Ecosystem Toxicity/ Persistence/ Bioaccumulation Value	Reference
Bis(2-ethylhexyl) phthalate	1	1,000	1	50,000	5×10^7	Ref. 2, p. B-3; Ref. 4, pp. D247, D248, D251, D252
Carbazole	1	--	0.4	500	--	Ref. 2, p. B-4; Ref. 4, pp. D347, D348, D351, D352, D580, D584; Ref. 5, pp. A138-A145
Chrysene	1	1,000	1	5,000	5×10^6	Ref. 2, p. B-5; Ref. 4, pp. D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133-A145 2, p. B-5
Dibenz(a,h)anthracene	1	--	1	50,000	--	Ref. 2, p. B-7; Ref. 5, pp. A133, A134, A138-A141
Dibenzofuran	1	100	1	500	5×10^4	Ref. 2, p. B-7; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D580, D584 2, p. B-7
Fluoranthene	1	10,000	1	500	5×10^6	Ref. 2, p. B-10; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D577, D578 D580, D584; Ref. 5, pp. A133-A145 2, p. B-10
Fluorene	1	1,000	1	5,000	5×10^6	Ref. 2, p. B-10; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D580, D584; Ref. 5, pp. A133-A137, A140-A145
Indeno(1,2,3-cd)pyrene	1	--	1	50,000	--	Ref. 2, p. B-12; Ref. 5, pp. A133-A141
Naphthalene	1	1,000	0.4	500	2×10^5	Ref. 2, p. B-14; Ref. 4, pp. D347, D348, D546, D547, D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133, A134, A138-A145
Phenanthrene	1	1,000	1	5,000	5×10^6	Ref. 2, p. B-16; Ref. 4, pp. D347, D348, D351, D352, D569, D570; Ref. 5, pp. A133-137, A142-A145

Table 6
ENVIRONMENTAL THREAT CONTAMINANT CHARACTERISTICS FACTOR VALUES

Hazardous Substance	Source	Ecosystem Toxicity Factor Value[a]	Persistence Factor Value[b]	Environmental Bioaccumulation Factor Value[c]	Ecosystem Toxicity/ Persistence/ Bioaccumulation Value	Reference
Phenol	1	10,000	1	5	5×10^4	Ref. 2, p. B-16; Ref. 4, pp. 6-5, D157, D158, D161, D162, D178, D179, D182, D183, D196, D197, D200, D201, D203, D204, D207, D208, D210, D211, D214, D215, D217, D218, D230, D231, D233, D234, D237, D238, D240, D241, D244, D245, D247, D248, D251, D252, D593, D594, D597, D598.
Pyrene	1	10,000	1	50	5×10^5	Ref. 2, p. B-17; Ref. 4, pp. D347, D348, D351, D352, D569, D570, D577, D578, D580, D584; Ref. 5, pp. A133--A145

a. Fresh water values (Ref. 2)
b. River persistence values (Ref. 2)
-- Not applicable

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Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.3.2.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (yes/no)
1. Contaminated Soil[a]	0.88	no

a. Ref. 4, p. 6-5 (See Section 2.2.2 of this document)

4.1.3.2.3 Waste Characteristics Factor Category Value

Ecosystem toxicity/persistence factor value x hazardous waste quantity factor value: 1×10^6

$$10{,}000 \times 100 = 1 \times 10^6, \text{ capped at } 1 \times 10^8$$

(Ecosystem toxicity/persistence factor value x hazardous waste quantity factor value) x environmental bioaccumulation factor value: 5×10^{10}

$$(1 \times 10^6 \times 50{,}000 = 5 \times 10^{10}, \text{ capped at } 1 \times 10^{12})$$

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Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 320
Ref. 1, Section 2.4.2.2, Table 2-7

4.1.4.3 ENVIRONMENTAL THREAT - TARGETS

None of the samples contained level I concentrations for the Environmental Threat. The farthest downstream sample containing level II concentrations is sample 99SMRV05SD, which was collected approximately 120 feet from the most upstream portion of the PPE (Ref. 4, pp. 3-11). The St. Joe River is a freshwater river (Ref. 3).

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

- Sensitive Environments

No sensitive environments have been identified in the zone of Level I concentrations in the St. Joe River.

- Wetlands

No wetlands have been identified along the zone of Level I concentrations in the St. Joe River.

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Level I Concentrations Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

- Sensitive Environments

The St. Joe River is part of the Coeur d'Alene Lake basin, which is a critical migratory pathway for the federal-listed threatened bull trout. The bull trout migrates up the St. Joe River past the St. Maries Creosote site and continues on to the St. Maries River (Ref. 4, p. 7-4; Ref. 8; Ref. 12).

Sensitive Environment	Location	Reference	Sensitive Environment Value Ref. 1, Table 4-23
Habitat known to be used by species under review as to its Federal endangered or threatened status: Westslope Cutthroat trout	St. Joe River	Ref. 8; Ref. 18	50
Habitat known to be used by the Federally designated threatened species: Bull trout	St. Joe River	Ref. 4, p. 7-4; Ref. 8; Ref. 12	75

Sum of Sensitive Environment Value: 125

- Wetlands

No wetlands have been identified along the zone of Level II concentrations in the St. Joe River.

Sum of sensitive environment value + wetland value:

$$1 \times (125 + 0) = 125$$

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Level II Concentrations Factor Value: 125

4.1.4.3.1.3 Potential Contamination

- Sensitive Environments

The bald eagle (*Haliaeetus leucocephalus*), a federally designated threatened species has been observed at 2 separate wintering areas about 4 miles northeast of the site (Ref. 8; Ref. 17). A sensitive environments rating value of 75 is assigned for this species (Ref. 1, Table 4-23).

- Wetlands

A seasonally flooded broad-leaved deciduous scrub-shrub palustrine and a semipermanently flooded persistent emergent palustrine wetland with total frontage of 0.4 mile are located at a river bend approximately 2 miles downstream from the PPE (Ref. 4, p. 7-4; Ref. 7). Within the 15 mile target distance limit downstream of the PPE, both sides of the St. Joe River are designated as wetlands (Ref. 4, p. 7-4; Ref. 7). The majority of the wetlands are seasonally flooded broad-leaved deciduous forested palustrine wetlands; however, they are intermixed with the seasonally flooded broad-leaved deciduous scrub-shrub palustrine wetland and semipermanently flooded persistent emergent palustrine wetlands (Ref. 4, p. 7-4; Ref. 7). The total wetland frontage of the St. Joe River is approximately 20 miles (Ref. 4, p. 7-4; Ref. 7).

A wetlands rating value of 450 is assigned (Ref. 1, Table 4-24).

1/10 times the sum of the dilution-weighted values for sensitive environments + wetland value within each dilution category:

$$0.1 \times [0.001 \times (75 + 450)] = 0.0525$$

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Potential Contamination Factor Value: 0.0525